



3rd International Paris Congress on Medical & Health Sciences

1-3 JULY 2024
PARIS, FRANCE

**PROCEEDINGS
BOOK**

EDITORS
David WORTLEY

ISBN: 978-625-367-764-0

3rd INTERNATIONAL
PARIS CONGRESS ON MEDICAL &
HEALTH SCIENCES

July 1-3, 2024 / Paris, FRANCE

EDITOR

David WORTLEY

All rights of this book belong to

IKSAD Publishing House Authors are responsible both ethically and juridically

IKSAD Publications - 2024©

Issued: 17.07.2024

PROCEEDINGS BOOK

ISBN: 978-625-367-764-0

CONGRESS ID

CONGRESS TITLE

3rd INTERNATIONAL PARIS CONGRESS ON MEDICAL & HEALTH
SCIENCES

DATE AND PLACE

July 1-3, 2024 / Paris, FRANCE

ORGANIZATION

IKSAD INSTITUTE

EDITOR

David WORTLEY

PARTICIPANTS COUNTRY (19 countries)

TÜRKİYE, ALBANIA, AZERBAIJAN, BULGARIA, POLAND, MOROCCO, NIGERIA,
ROMANIA, SERBIA, ALGERIA, VIETNAM, INDIA, IRAN, ITALY, PAKISTAN,
ETHIOPIA, THAILAND, UNITED KINGDOM, NORTH MACEDONIA

Total Accepted Article: 119

Total Rejected Papers: 37

Accepted Article (Türkiye): 56

Accepted Article (Other Countries): 63

ISBN: 978-625-367-764-0

3rd INTERNATIONAL PARIS CONGRESS ON MEDICAL AND HEALTH SCIENCES

July 1-3, 2024 / Paris



17.07.2024

REF: Akademik Teşvik

İlgili makama;

3. Uluslararası Paris Tıp Ve Sağlık Bilimleri Kongresi, 1-3 Temmuz 2024 tarihleri arasında Paris Fransa'da 19 farklı ülkenin (Türkiye 57 bildiri- Diğer ülkeler 63 bildiri) akademisyen/araştırmacılarının katılımıyla gerçekleşmiştir

Kongre 16 Ocak 2020 Akademik Teşvik Ödeneği Yönetmeliğine getirilen "Tebliğlerin sunulduğu yurt içinde veya yurt dışındaki etkinliğin uluslararası olarak nitelendirilebilmesi için Türkiye dışında en az beş farklı ülkeden sözlü tebliğ sunan konuşmacının katılım sağlaması ve tebliğlerin yarıdan fazlasının Türkiye dışından katılımcılar tarafından sunulması esastır." değişikliğine uygun düzenlenmiştir.

Bilgilerinize arz edilir,

Saygılarımla

Dr. Mirna Fawaz
Committee Member



T.C.
ATATÜRK ÜNİVERSİTESİ REKTÖRLÜĞÜ
Sağlık Hizmetleri Meslek Yüksekokulu Müdürlüğü



Sayı : E-54826478-000-2400149344
Konu : Akademisyen Temsilcisi

07.05.2024

İLGİLİ MAKAMA

01-03 Temmuz 2024 tarihleri arasında düzenlenecek olan **3.Uluslararası Paris Tıp ve Sağlık Bilimleri Kongresinin** Bilim ve Düzenleme Komitesinde, akademisyen temsilcisi olarak Yüksekokulumuz Eczane Hizmetleri Bölümü öğretim üyesi Doç. Dr. Melvüt ALBAYRAK'ın görev alması Yüksekokul Müdürlüğünce uygun görülmüştür.

Bilgilerinizi arz/rica ederim

Prof.Dr. Necati UTLU
Meslek Yüksekokulu Müdürü

Bu belge, güvenli elektronik imza ile imzalanmıştır.

Doğrulama Kodu: e26cff61-f989-4cc9-8180-6a5e890a842f
Atatürk Üniversitesi Sağlık Hizmetleri Meslek Yüksekokulu
25240 Erzurum
Tel: +90 442 2315857
Elektronik Adres: <http://www.atauni.edu.tr/#!birim=saglik-hizmetleri-meslek-yuksekokulu>
Kep Adresi: atauni@hs01.kep.tr

Doğrulama Adresi: <https://www.turkiye.gov.tr/aturk-universitesi-ebys>

Bilgi: Salih ÇAVU OĞLU
Faks: +90 442 2315891
E-Posta: shmyo@atauni.edu.tr



ORGANIZING COMMITTEE MEMBER

Prof. Dr. Osman EKMEN
Istanbul Arel University, Türkiye

Dr. Hüseyin ERİŞ
Harran University, Türkiye

Dr. Nargiz SULEYMANOVA
Moscow Health Institute, Russia

Dr. Havva MEHTIEVA
Moscow Health Institute, Russia

Dr. Mirna Fawaz
Beirut Arab University, Lebanon

Dr. Mevlut ALBAYRAK
Ataturk University

Dr. Dania ALKHATİB
Al-Quds University, Palestina

Dr. Sümeyye ALTIPARMAK
İnönü University, Türkiye

Dr. Ayşe Nur YILMAZ
Fırat University, Türkiye

Dr. Almaz AHMETOV
Azerbaijan Medical University, Azerbaijan

SCIENTIFIC ADVISORY COMMITTEE

Assoc. Prof. Dr. Fatma Birgili
Mugla Sitki Kocman University

Assoc. Prof. Dr. Tarana Musayeva
Azerbaijan Medical University

Assoc. Prof. Dr. Marian Ambrozy
College of International Business ISM Slovakia

Dr. Alketa Caushi
Sports University of Tirana

Dr. Shahla Ismayilova
Azerbaijan Medical University

Dr. Vibha Kapoor
Banasthali University India

Dr. Valentina Noemi Madia
Sapienza University of Rome

Dr. Doan Tan Sang
Can Tho University

Prof. Dr. Ivan Pavlovic
Belgrade University

Glejdis Hajdini
Aleksander Xhuvani University

Sucheta Nigam
Banasthali University Rajasthan

Md. Ibrahim Khalil
Mahsa University

Prof. Dr. Maka Mantskava
European University, Tbilisi

Dr. Monika Stojanova
University of Ss. Cyril and Methodius

Dr. Rasheedul Haque
Mahsa University

Dr. Twebaze Ronald
King Ceasor University

Dr. Almaz AHMETOV
Azerbaijan Medical University

PHOTO GALLERY

Observer Hall 3

H3- Aleyna KUŞ... H3- Fatma SÖĞ...

H3-Assoc.Prof.... H-3 Fatmanur B...

Участники (9)

- OH Observer ... (Соорганизатор, а)
- HE H3-Gül Eda KILINÇ
- MK MEHMET KILIÇ
- HA H3- Aleyna KUŞKU
- HF H3- Fatma SÖĞÜT
- HG H3- Gamze Kızıhan
- HA H3-Assoc.Prof. Ayşe GÖNEŞ BAYIR
- HALL3-Gökşen Polat
- HF H-3 Fatmanur BALAMUT

Observer Hall 3 H3- Aleyna KUŞ... H3- Fatma SÖĞÜT

ÜNİVERSİTE ÇALIŞANLARINDA GASTROÖZEFAGEAL REFLÜNÜN GECE YEME SENDROMU VE DEPRESYON, AKSİYETE, STRES DÜZEYLERİ İLE İLİŞKİSİ

Участники (9)

- OH Observer ... (Соорганизатор, а)
- HE H3-Gül Eda KILINÇ
- MK MEHMET KILIÇ
- HA H3- Aleyna KUŞKU
- HF H3- Fatma SÖĞÜT
- HG H3- Gamze Kızıhan
- HA H3-Assoc.Prof. Ayşe GÖNEŞ BAYIR
- HALL3-Gökşen Polat
- HF H-3 Fatmanur BALAMUT

Observer Hall 3 H3- Fatma SÖĞÜT H3- Gamze Kızıhan MEHMET KILIÇ H3-Gül Eda KILI...

Material and Methods

- From 20 patients diagnosed with breast cancer, healthy and tumor tissue samples (total 40 samples) were obtained from the same individuals during total or partial mastectomy surgery and immediately stored at -80°C until RNA isolation.
- All participating patients signed consent forms. All medical and experimental procedures were performed in accordance with the approved protocol by Ethic Committee and guideline of World Medical Association Declaration of Helsinki.

Участники (9)

- OH Observer ... (Соорганизатор, а)
- H3-Esra Duman
- Damla Artkaslan
- HA H3- Aleyna KUŞKU
- HF H3- Fatma SÖĞÜT
- HG H3- Gamze Kızıhan
- HE H3-Gül Eda KILINÇ
- HALL3-Gökşen Polat
- MK MEHMET KILIÇ

PHOTO GALLERY

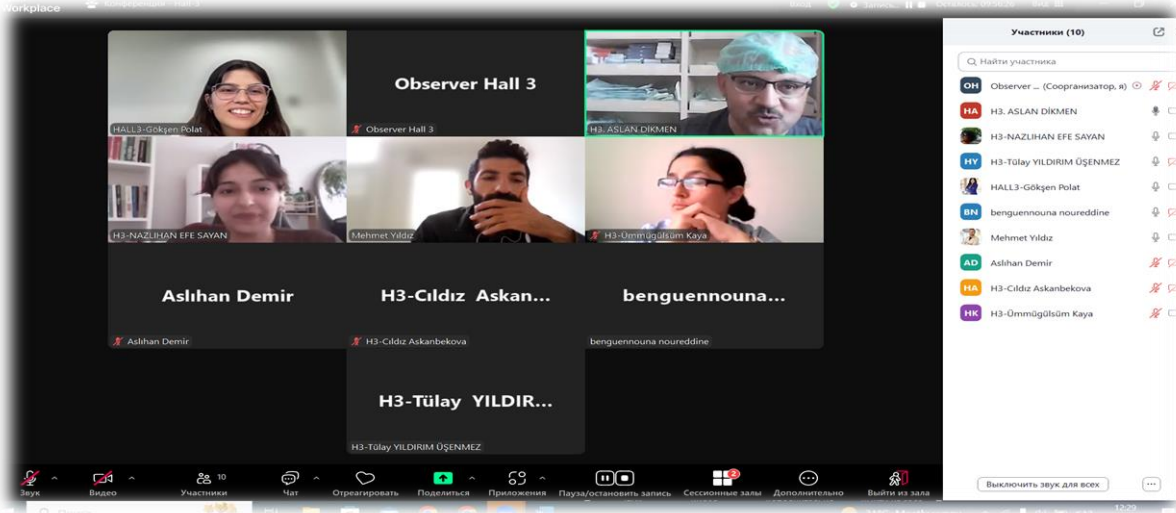


PHOTO GALLERY

Workplace

Observer Hall 3

H3-Fayza KEDD...

Observer Hall 3

H3 - Marieta TODOROVA

Patrycja Widlak

H3-Fayza KEDDAR

AWF JOZEF PHSUDSKI UNIVERSITY OF PHYSICAL EDUCATION IN WARSAW

FMS (Functional Movement Screen)

Part of test	deep squat	hurdle test/hurdle step	in line lunge	shoulder mobility	active straight leg raise	trunk stability push-up	rotational stability
Number of points	1.54	1.38	1.23	1.63	2	2.03	1.63
Sum of points							11.44

The study conducted as part of the University Research Project No. 4 entitled: "Effectiveness of methods and means supporting sports training, post-exercise recovery, and prevention of musculoskeletal injuries in athletes" / Task No. 2 entitled: "Functional assessment of the musculoskeletal system in athletes practicing various disciplines with consideration of risk factors for sports injuries." / Jozef Pihudski University of Physical Education in Warsaw, Poland

Участники (4)

- OH Observer ... (Соорганизатор, я)
- PW Patrycja Widlak
- H3 - Marieta TODOROVA
- HK H3-Fayza KEDDAR

Выключить звук для всех

Workplace

Observer Hall 3

H3-Fayza KEDD...

Observer Hall 3

H3 - Marieta TODOROVA

Patrycja Widlak

H3-Fayza KEDDAR

Concentration minimale inhibitrice CMI

1 неназначенный участник

Участники (4)

- HK H3-Fayza KEDDAR
- H3 - Marieta TODOROVA
- PW Patrycja Widlak

Выключить звук для всех

Workplace

Observer Hall-4

Hall-4 moderator Irina-Ana Drobot

Observer Hall-4

Shuaeeb, A. I. H4-S1

H4-Dorina Minxuri

Arben Prifti

fadoua

1 неназначенный участник

Участники (6)

- OH Observ... (Соорганизатор, я)
- AP Arben Prifti
- Hall-4 moderator Irina-Ana Dro...
- F fadoua
- HM H4-Dorina Minxuri
- SA Shuaeeb, A. I. H4-S1

Выключить звук для всех

PHOTO GALLERY

Workplace

Observer Hall-4

Observer Hall-4

Hall-4 moderator Irina...

fadoua

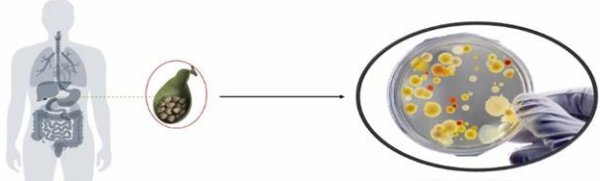
Hall 4 _ADDOUN Ray...

Hall 4 _ADDOUN Ray...

Arben Prifti

3. Results and Discussion

it is unclear how many bacteria can contribute to GBC, but several bacteria have been introduced, such as *Salmonella spp.*, *E. coli*, *Enterobacter spp.*, *Citrobacter freundii*, *K. pneumoniae*, *Bacteroides fragilis*, *Helicobacter spp.*, *Staphylococcus aureus (S. aureus)*, *Enterococcus spp.*, *Pseudomonas aeruginosa*, *Acinetobacter spp.*, and *Proteus spp.*, which are the major isolated microbes by culture methods or identified by PCR (uncultured methods) in gallstones and gallbladder patients [5].



Участники (7)

- OH Observ... (Соорганизатор, я)
- F fadoua
- AP Arben Prifti
- HM H4-Dorina Mixxuri
- H4 Hall 4 _ADDOUN Rayan Ikram
- Hall-4 moderator Irina-Ana Dro...
- SA Shuaeeb, A. I. H4-S1

Выключить звук для всех

Workplace

Observer Hall-4

Observer Hall-4

Hall-4 moderator Irina...


fadoua

Hall 4 _ADDOUN Ray...

Arben Prifti

Influence of nutritional factors in chronic autoimmune Hashimoto's thyroiditis

Dorina Shuraja Mixxuri, MD, PHD
Logos University College, Tirana Albania
minxuridorina@gmail.com



Участники (7)

- OH Observ... (Соорганизатор, я)
- HM H4-Dorina Mixxuri
- F fadoua
- Hall-4 moderator Irina-Ana Dro...
- AP Arben Prifti
- H4 Hall 4 _ADDOUN Rayan Ikram
- SA Shuaeeb, A. I. H4-S1

Выключить звук для всех

Workplace

Observer Hall-5

Observer Hall-5

Beghdadi fedwa

IMANE KHERRAB


H5, d-r Vesna K...

Uthman Abdulg...

PROMISING INTERVENTION: THYME HONEY SUPPLEMENTATION AMELIORATES COGNITIVE FUNCTION IN HIGH FRUCTOSE-TREATED WISTAR RATS

Imane Kherrab, Miloud Chakit, Abdelhalem Mesfioui, Aboubaker Elhessni

Biology and Health Laboratory, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco



Участники (5)

- OH Observ... (Соорганизатор, я)
- IK IMANE KHERRAB
- BF Beghdadi fedwa
- HD H5, d-r Vesna Karapetkovska - H...
- UA Uthman Abdulgafar

Выключить звук для всех

PHOTO GALLERY

Observer Hall-4 SIDDQUI- HALL-6- SE... HALL-4: Ibrahim Kani... Asmae Baghouz- HALL 6... Boutalaka

Use of some botanical powders to protect cowpea seeds against *Callosobruchus maculatus* pest damage

Asmae Baghouz - Rajae El Brahimi - Raja Guemmouh
University of Sidi Mohamed Ben Abdellah, Faculty of Science
Dhar el Mahraz, Department of Biology, Fès, Morocco

Участники (9)

- OH Observ... (Соорганизатор, R)
- AB Asmae Baghouz- HALL 6, SE...
- AP Arben Prifti
- B Boutalaka
- GK Ganesh Kumar H-6 /Session-3
- HM H4- Meryem Boutalaka
- HI HALL-4: Ibrahim Kani Aminu
- SH SIDDQUI- HALL-6- SESSION-3
- VP Vikranti Patel

Включить звук для всех

Observer Hall-5 H5, d-r Vesna K... Harshita Marwaal benguennouna...

3 rd INTERNATIONAL PARIS CONGRESS ON MEDICAL & HEALTH SCIENCES July 1-3, 2024 / Paris, FRANCE

PROFILING PHENOLIC COMPOUNDS IN PROPOLIS: COMPARATIVE ANALYSIS ACROSS VARIOUS APIARIES IN N. MACEDONIA

¹ Ph.D. Bardha Ibishti
¹ MSc. Viktor Kotovski
¹ Prof. d-r Vesna Karapetkovska - Hristova
² Academic prof. dr. Ivan Pavlovic
¹ Faculty of Biotechnical Sciences - Bitola, Macedonia.
² Scientific Institute of Veterinary Medicine of Serbia

Участники (5)

- OH Observ... (Соорганизатор, R)
- HD H5, d-r Vesna Karapetkovsk...
- VP Vikranti Patel
- BN benguennouna noureddine
- HM Harshita Marwaal

Включить звук для всех

Observer Hall-5 H5, d-r Vesna Karape... Vikranti Patel benguennouna... Hall-5, Amin Ma...

Impact des eaux usées traitées sur le profil nutritionnel physico-chimiques et phytochimiques de l'huile d'olive

Présentateur: Benguennouna Noureddine

Участники (5)

- OH Observ... (Соорганизатор, R)
- BN benguennouna noureddine
- HD H5, d-r Vesna Karapetkovska - H...
- HA Hall-5, Amin Marandi
- VP Vikranti Patel

Включить звук для всех

PHOTO GALLERY

Workplace

Observer Hall-4

Akram Hosseinian

Sylvia Stamova

MOHCIN

Участники (4)

OH Observ... (Соорганизатор, я)

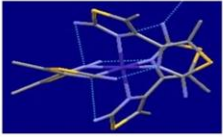
AH Akram Hosseinian

M MOHCIN

SS Sylvia Stamova

File | C:\Users\PC-3\Desktop\Health-presentation%20paper1-Akram%20Hosseinian-.pdf

The crystal packing is mainly stabilized by N-A-H.....N hydrogen bonding interactions. Crystal system of complex and the space group was determined. In compound, to form a tris-chelate complex for coordinating polyhedron, 4,4'-bis(1,3-thiazole) acts as a bidentate ligand, giving a symmetrical octahedral geometry at the metal.



Выключить звук для всех

Workplace

Observer Hall-4

Sylvia Stamova

Akram Hosseinian

4 hall-yeganeh...

Участники (4)

OH Observ... (Соорганизатор, я)

SS Sylvia Stamova

AH 4 hall-yeganeh mazaheri


AH Akram Hosseinian

HOME | INSERT | DESIGN | TRANSITIONS | ANIMATIONS | SLIDE SHOW | REVIEW | VIEW

INTERACTIONS BETWEEN DAIRY PRODUCTS AND DRUGS: A REVIEW

Sylvia Stamova, Neli Ermenlieva, Emiliya Georgieva, Gabriela Tsankova, Petar Stamov

Medical University "Prof. D-r Paraskov Stoyanov" Varna



Звук | Видео | Участники | Чат | Отреagirовать | Поделиться | Приложения | Дополнительно | Выйти из зала

Выключить звук для всех

Workplace

Observer Hall-5

hassane abd-dada

H5-S3- HASSAN...

H5, Salma Elbahi

Участники (6)

OH Observ... (Соорганизатор, я)

HH H5-S3- HASSAN BADAQUI

HA hassane abd-dada

BE Belghalia Etbaria

HS H5, Salma Elbahi

H5-S3-MOHAMED OUBANE

DRALLE MODIFIK - PowerPoint (C:\Chek de l'activation du produit)

International Congress on Health and Medical Sciences

Modeling and 3D-QSAR analysis of selected indoleglyoxamide derivatives as HIV-1 binding inhibitors using molecular docking, molecular dynamics simulations, and ADME

Presented by: Hassan BADAOU¹

Supervised by: Prof. Mohammed BOUACHIRNE²

¹ Molecular Chemistry and Natural Substances Laboratory, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco.

² Chemistry-Biology Applied to the Environment U.R.L. CNRT 13, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco.

Диспетчер 1 de 18 | Alpha | États-Unis

Звук | Видео | Участники | Чат | Отреagirовать | Поделиться | Приложения | Дополнительно | Выйти из зала

Выключить звук для всех

PHOTO GALLERY

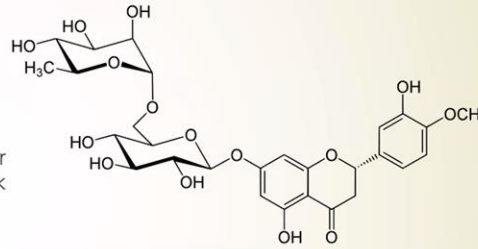
Toplantı H2-TUBA UNVER adlı kişinin ekranı Kaydediliyor... Kalan: 09:21:30

observer 2 H2-gamze demirel H2-TUBA UNVER H2-Betül Danışman H2- Yasin GÖKÇE H2 musaozekinci

GİRİŞ

Hesperidin

- Hesperidin ($C_{28}H_{34}O_{15}$) bir flavanon glikozittir.
- Bu metabolitin antikarsinojenik, antiinflamatuvar ve antimikrobiyal dahil olmak üzere farmakolojik aktiviteleri bulunmuştur.



Lipozomlar, tokozomlar, katı lipid nanopartikülleri (SLN'ler), nanoyapılı lipid taşıyıcıları (NLC'ler), polimerik (proteinler veya polisakaritler) nanopartiküller (NP'ler) aracılığıyla yüklenebilir ve kapsüllenebilir. Bu nanoformülasyonlar hesperidin'in fizyolojik koşullarda biyoyararlanımını artırabilir.

Toplantı H2-Damla Eker adlı kişinin ekranı Kaydediliyor... Kalan: 08:50:50 Görüntüle

observer 2 H2 musaozekinci H2-Damla Eker H2-gamze demirel H2-TUBA UNVER H2- Yasin GÖKÇE

I.KAN-BEYİN BARIYERİ HAKKINDA BİLGİ



Özellik	Açıklama
Seçici Geçirgenlik	Kan-beyin bariyeri yalnızca su, bazı gazlar ve belirli lipofilik moleküllerin geçişine izin verir.
Endotel Hücreleri	Kan-beyin bariyerindeki kapiller damarlar sıkı bağlantılar içeren endotel hücrelerinden oluşur.
Astrosit Ayakçıkları	Astrositlerin uzantıları kapillerlerin dış yüzeyini sararak bariyerin bütünlüğünü destekler.
Taşıyıcı Proteinler	Özel taşıyıcı proteinler, gerekli besin maddeleri ve atık ürünlerin geçişini düzenler.
Enzimatik Bariyer	Endotel hücreleri, zararlı maddeleri parçalayarak etkisiz hale getiren enzimler içerir.
Elektriksel Direnç	Endotel hücreleri arasında yüksek elektriksel direnç bulunur, iyon ve su hareketini sınırlar.
Biyolojik Savunma	Kan-beyin bariyeri merkezi sinir sistemini toksinler ve patojenlere karşı korur.
İlaç Geçisi	Seçici geçirgenlik, ilaçların beyin dokusuna ulaşmasını zorlaştırır.

PHOTO GALLERY

The screenshot shows a Microsoft Teams meeting interface. At the top, there are several participant thumbnails, including 'observer 2', 'H2, Sevinç Çiçek', and 'Hall 2, Sintayeh...'. The main content area displays a presentation slide with the following text:

AN INVESTIGATION OF POSTGRADUATE THESES PREPARED IN TURKEY IN THE CONTEXT OF CHILDREN AT RISK

Esra ERGİN¹
Doç. Dr. Selçuk Üniversitesi, Eğitim Fakültesi, Temel Eğitim Bölümü,
Konya, Türkiye

Esra ERGİN²
Dr. Öğr. Üyesi, Selçuk Üniversitesi, Eğitim Fakültesi, Eğitim Bilimleri
Bölümü, Konya, Türkiye.

The slide also features a decorative graphic on the right side consisting of various geometric shapes and patterns.

The screenshot shows a Microsoft Teams meeting interface. At the top, there are several participant thumbnails, including 'observer 2', 'H2, Sevinç Çiçek', and 'Özlem AKIN'. The main content area displays a presentation slide with the following text:

GİRİŞ

- Batı ülkelerinde, doğum sırasında göbek kordonunun kesilmesi, geleneksel ve bilimsel temellere dayanarak rutin bir uygulama haline gelmiştir.
- Ancak son yıllarda, bu uygulamaya karşı çıkan ve doğumu fetüs perspektifinden ele alan bir düşünce akımı ortaya çıkmıştır.
- Bu görüşe göre ise, kordonun hala atım yaparken kesilmesinin yenidoğana zararlı olabileceği savunulmaktadır.
- Bazı uzmanlar, kordonun damarlarının en az birkaç dakika boyunca kapanmamasını, böylece plasentadan geri akacak kanın yenidoğana maksimum demir ve hemoglobin rezervi sağlanmasını önermektedir.
- Kordonun doğal işlevleri sona erene kadar beklenmesi gerektiği bu yaklaşım, "Lotus Doğum" teorisinin temelini oluşturmuştur (Levy ve Blickstein, 2006).

The photograph shows a newborn baby lying on a woven mat. The baby is positioned next to a small bowl containing a dark liquid, likely blood, and a small container. This illustrates the Lotus Birth practice, where the umbilical cord is not cut immediately after birth.

PHOTO GALLERY

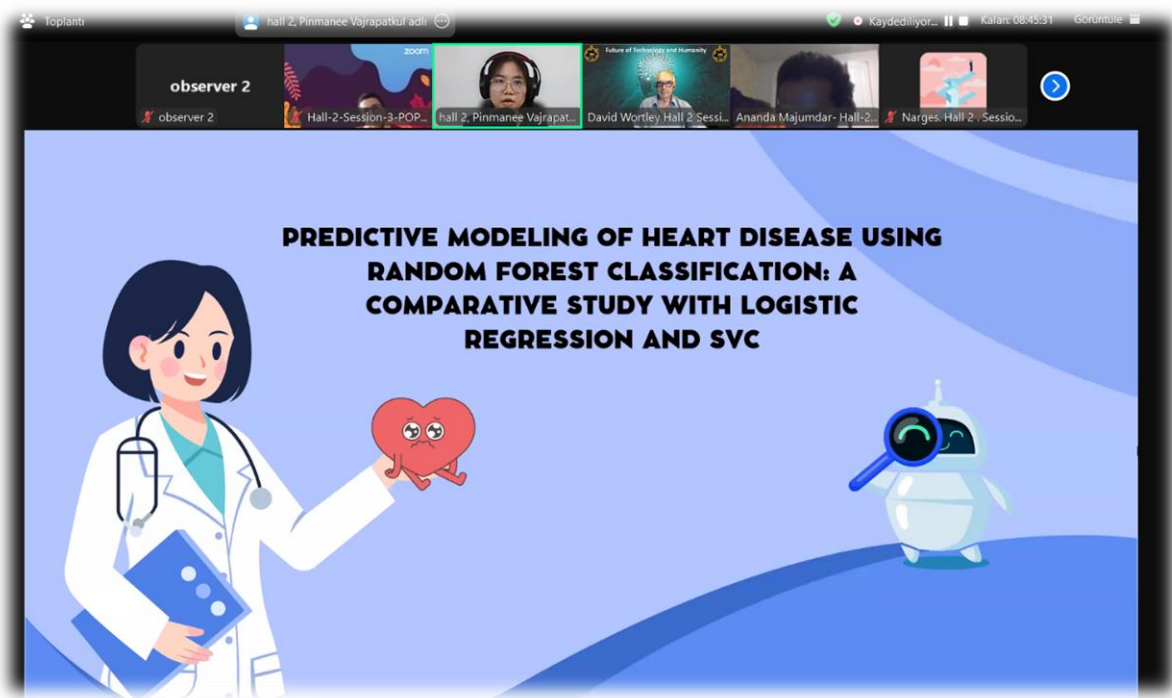
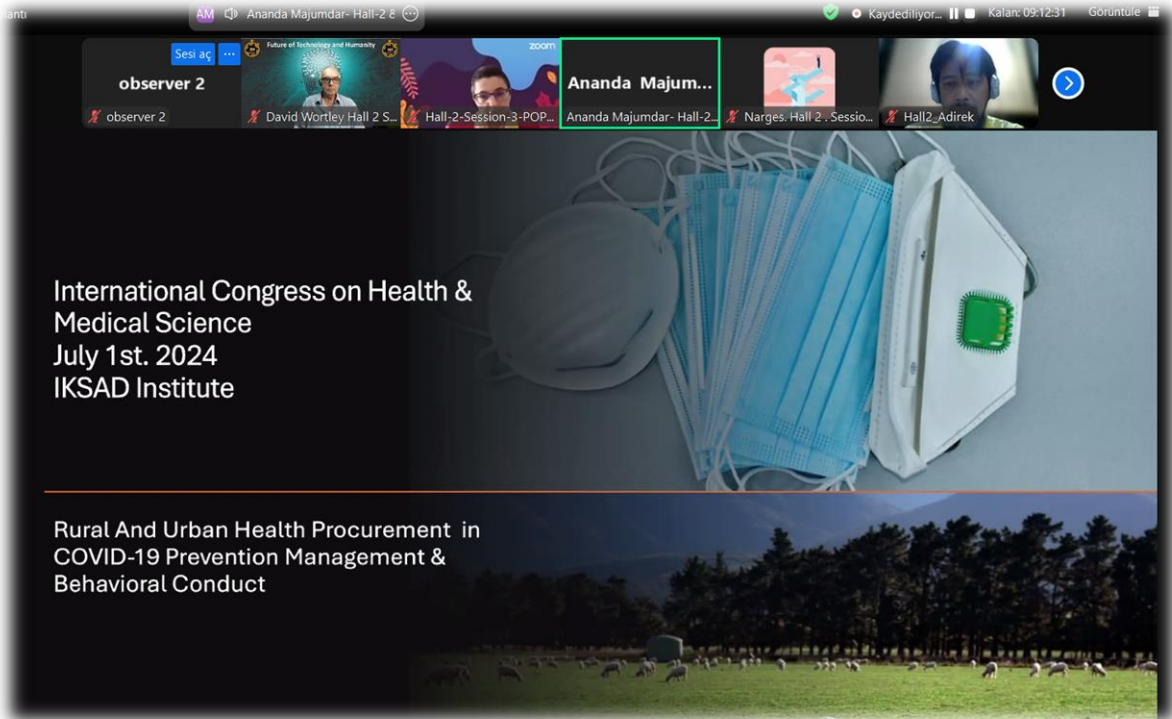


PHOTO GALLERY

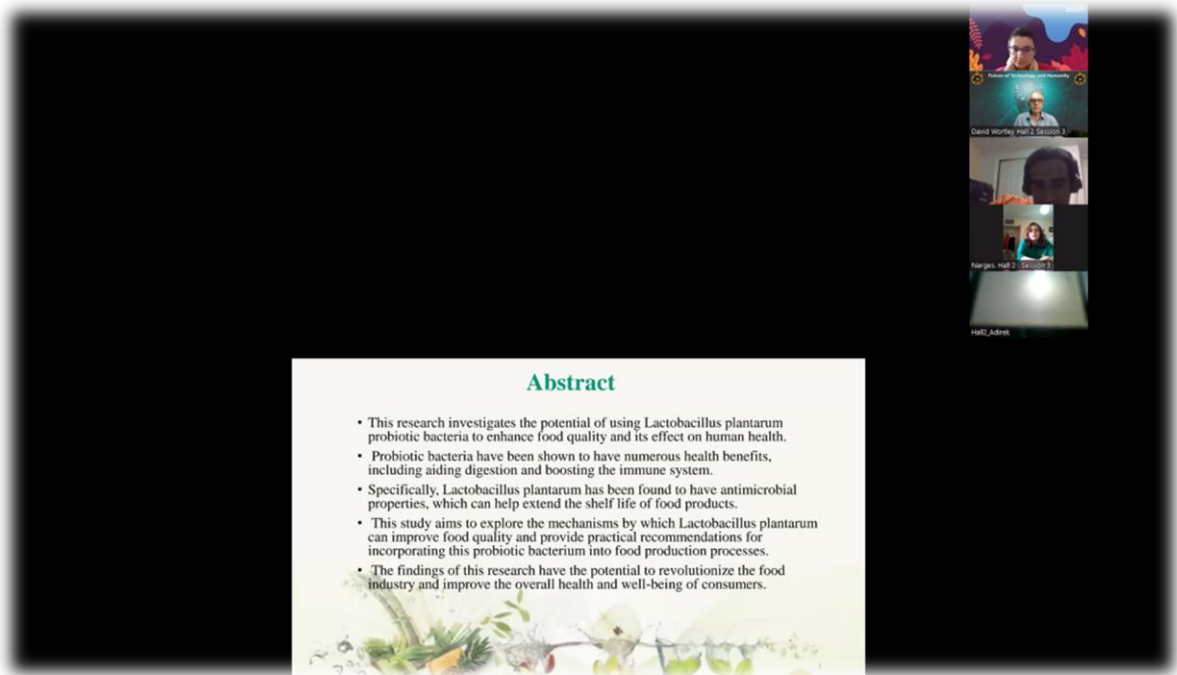
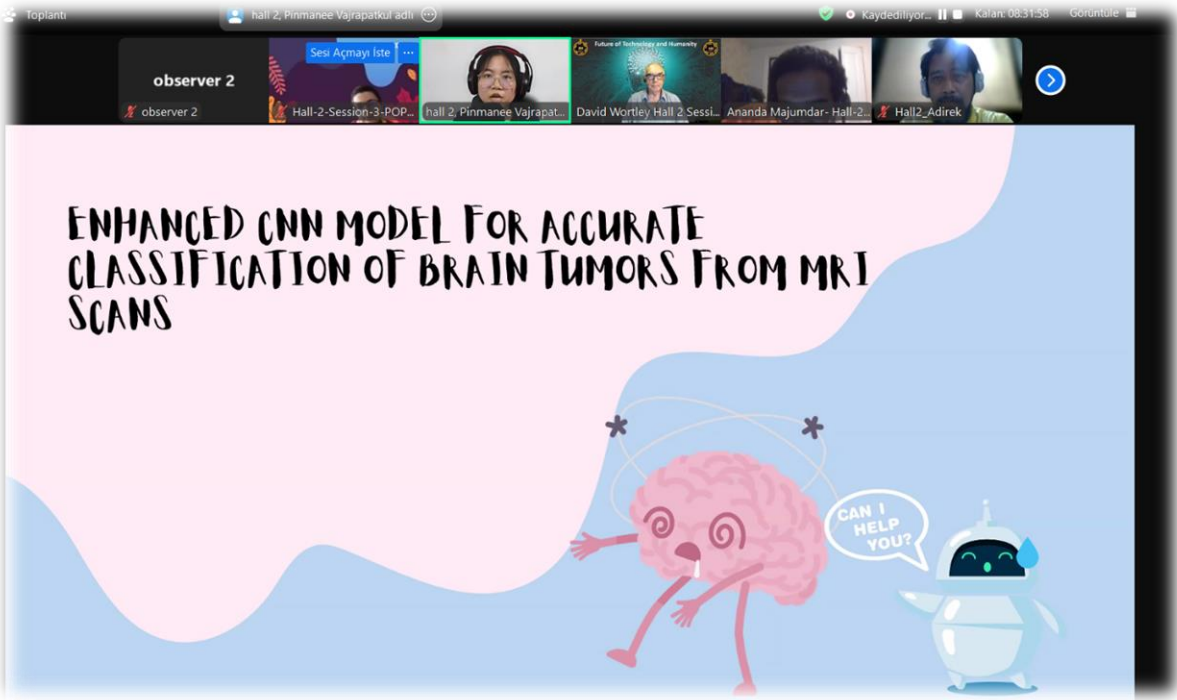


PHOTO GALLERY

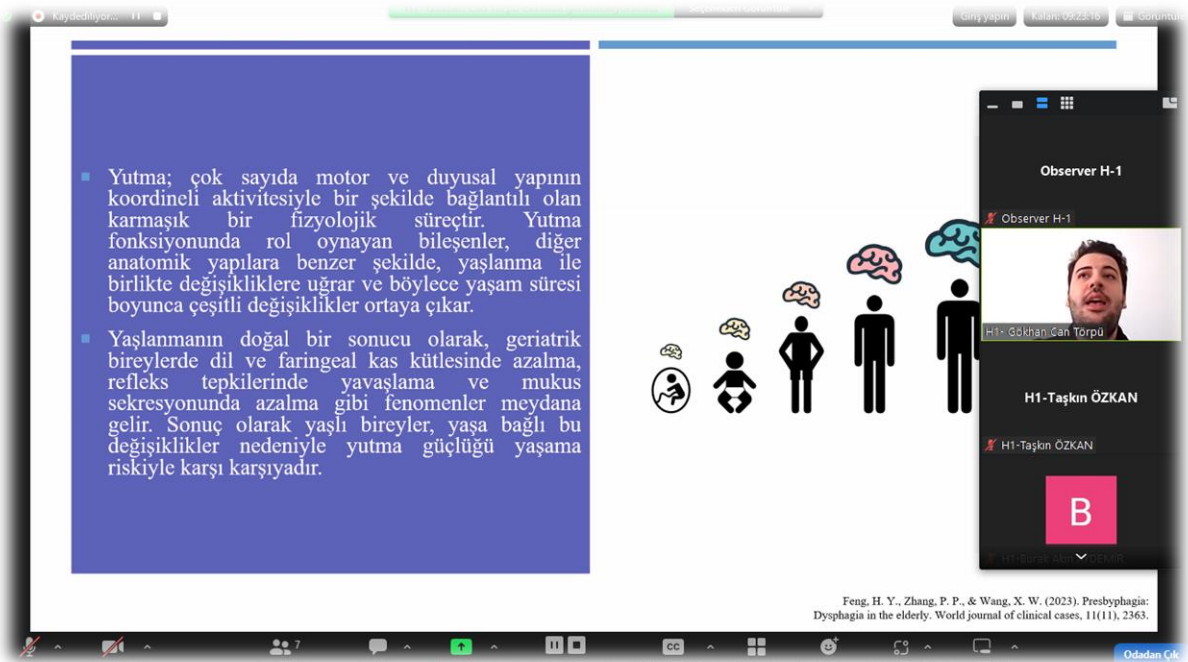
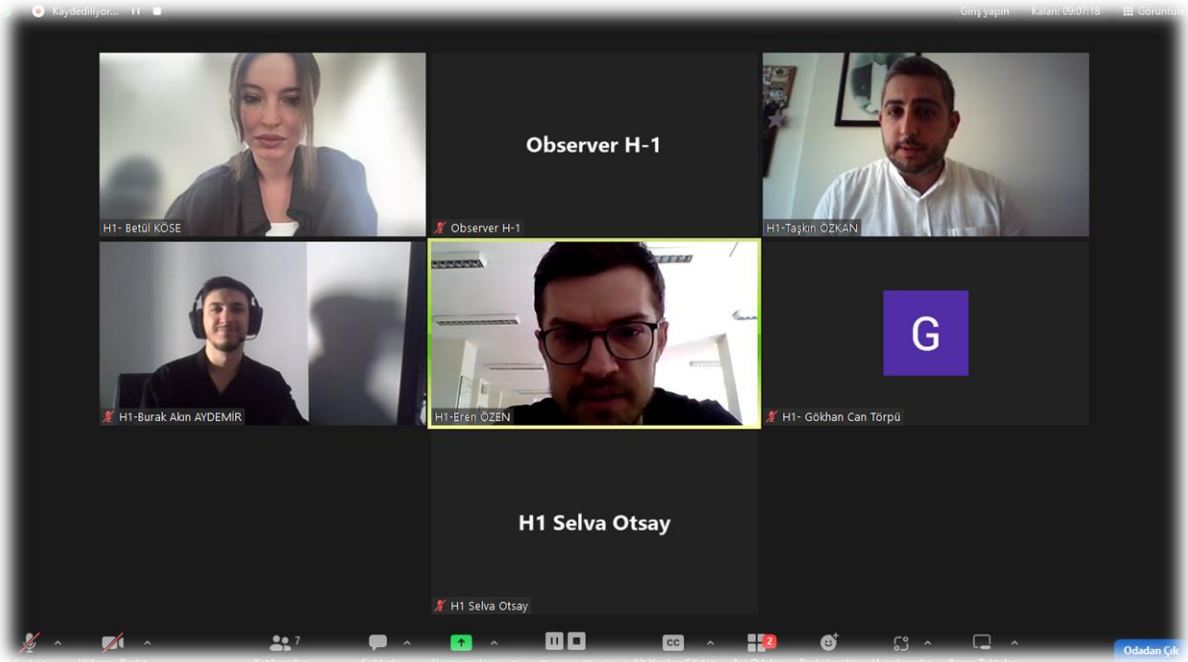


PHOTO GALLERY

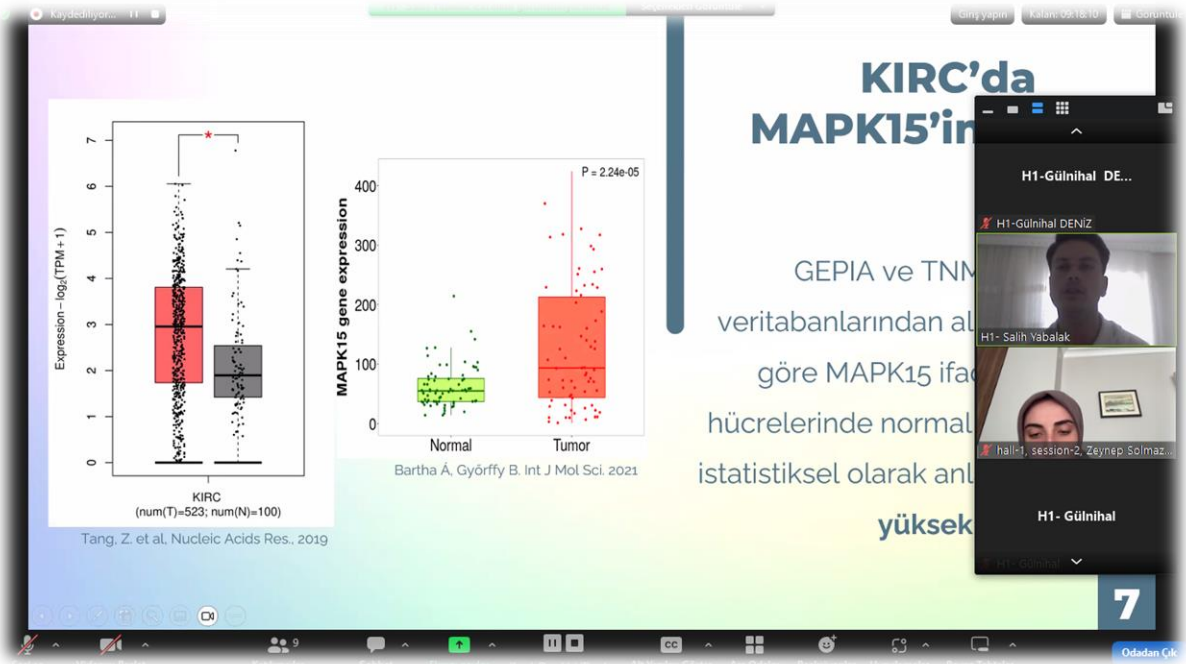
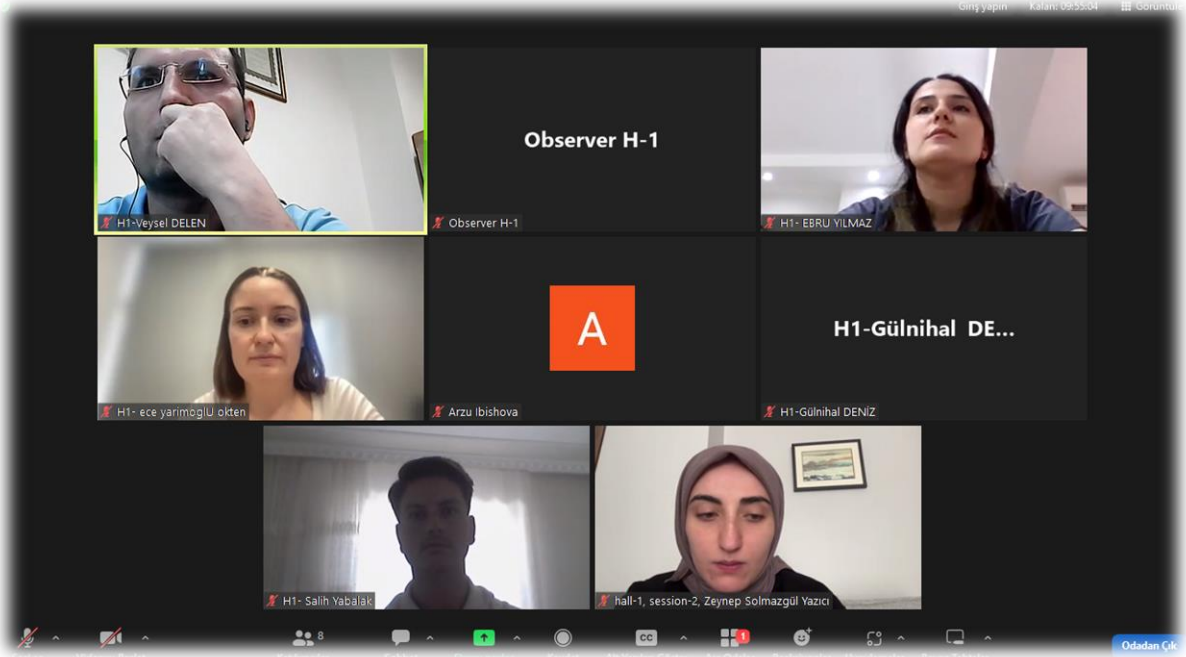



PHOTO GALLERY

Kaydediliyor... | 09:51:05 | Giris yapin | Kalan: 09:51:05 | Gorusu...

Materials and Methods

- The stage of the tumor was determined as pT3 N2 M1b. immunohistochemical evaluation neuroendocrine markers such as synaptophysin and chromogranin were detected as positive. Moreover, KI-67 proliferation index was reported as 80% which was accepted as a high grade nature.



Observer H-1

Observer H-1

H1- Safak MIRIOGLU

H1-ASILHAN SABUNCU

H1 - Burak Cemi...

Odadan Cik

Kaydediliyor... | 05:36:33 | Giris yapin | Kalan: 05:36:33 | Gorusu...

eu.docs.wps.com/...ciFuioIGaOqibQG7sa=S5&st=1&v=v2

Входные - Почт... | Facebook | Sivas Cumhuriyet... | Общероссийская... | Конференция ме... | ПСПБ/М... | Создать PDF - 6... | Visa Miracleti | HAY'HAR ЭЛЕКТ...

İstatistiksel olarak anlamlı değişkenler

Prognostik faktör/Değişken		Veri tipi/ Veri türü	Vaka sayısı
Yaş	< 54	Nitel/Süreli	245
			275
Kaynak yerleştirilmesi	54 Kardiyak departmanı/Kardiyoloji	Nominal/ Kategorik	24
Mide içi kanama/Kanamamanın kaynağının midede lokalizasyonu	Fundus mide Antrum Pilon Küçük egrilik		4
			65
			50
			71
	Daha büyük egrilik		19
Kaynak yerleştirilmesi	Ön duvar	Nominal/ Kategorik	106
Duodenumda kanama/ Kanamamanın kaynağı	Arka duvar/Arka duvar Üst duvar/Üst duvar Alt duvar/Alt duvar Kombinasyon		58
Duodenum içinde lokalizasyon	lokalizasyon		18
			28
			63
Ülser çapı(cm)/Ülser boyutu(cm)	< 2,4	Nitel/Süreli	429
	2,4		97
Kanamamanın şiddeti (Forrest tarafından)	Fla-Ib	Sıralı/	41
	Fla-Ic	sıralı	187
	Fla-II		292
	Fla-III		55
Endoskopik hemostazın gerçekleştirilmesi/Endoskopik hemostazın kullanılması	Düzenlendi/Sunuldu	Nominal/ Kategorik	465
	Mevcut değil		520
Durumun ciddiyeti (Shaposhnikov tarafından değiştirilen APACHE II ölçeğine göre)/ Durumun ciddiyeti (APACHE'ye göre) Shaposhnikov modifikasyonunda II ölçeği	Puan değeri Ordinal/	sıralı	

Observer H-1

Observer H-1

H1-Farah Rahimova

H1-ASILHAN SABUNCU

H1 - Burak Cemi...

Odadan Cik

3rd INTERNATIONAL PARIS CONGRESS ON MEDICAL & HEALTH SCIENCES

July 1-3, 2024 / Paris, FRANCE



CONFERENCE PROGRAM



Meeting ID: 858 1117 0419
Passcode: 010203

Join Zoom Meeting: <https://us02web.zoom.us/j/85811170419?pwd=0wDIAKyXkG01MBSaPd4tVyx4eqM4p1.1>

Participant Countries: (19)

TÜRKİYE, ALBANIA, AZERBAIJAN, BULGARIA, POLAND, MOROCCO, NIGERIA, ROMANIA,
SERBIA, ALGERIA, VIETNAM, INDIA, IRAN, ITALY, PAKISTAN, ETHIOPIA, THAILAND,
UNITED KINGDOM, NORTH MACEDONIA

Önemli, Dikkatle Okuyunuz Lütfen

- Kongremizde Yazım Kurallarına uygun gönderilmiş ve bilim kurulundan geçen bildiriler için online (video konferans sistemi üzerinden) sunum imkanı sağlanmıştır.
- Online sunum yapabilmek için <https://zoom.us/join> sitesi üzerinden giriş yaparak “Meeting ID or Personal Link Name” yerine ID numarasını girerek oturuma katılabilirsiniz.
- Zoom uygulaması ücretsizdir ve hesap oluşturmaya gerek yoktur.
- Zoom uygulaması kaydolmadan kullanılabilir.
- Uygulama tablet, telefon ve PC’lerde çalışıyor.
- Her oturumdaki sunucular, sunum saatinden 5 dk öncesinde oturuma bağlanmış olmaları gerekmektedir.
- Tüm kongre katılımcıları canlı bağlanarak tüm oturumları dinleyebilir.
- Moderatör – oturumdaki sunum ve bilimsel tartışma (soru-cevap) kısmından sorumludur.

Dikkat Edilmesi Gerekenler - TEKNİK BİLGİLER

- Bilgisayarınızda mikrofon olduğuna ve çalıştığına emin olun.
- Zoom'da ekran paylaşma özelliğini kullanabilmelisiniz.
- Kabul edilen bildiri sahiplerinin mail adreslerine Zoom uygulamasında oluşturduğumuz oturuma ait ID numarası gönderilecektir.
- Katılım belgeleri kongre sonunda tarafınıza pdf olarak gönderilecektir.
- Kongre programında yer ve saat değişikliği gibi talepler dikkate alınmayacaktır.

Important, Please Read Carefully

- To be able to attend a meeting online, login via <https://zoom.us/join> site, enter ID “Meeting ID or Personal Link Name” and solidify the session.
- The Zoom application is free and no need to create an account.
- The Zoom application can be used without registration.
- The application works on tablets, phones and PCs.
- The participant must be connected to the session 5 minutes before the presentation time.
- All congress participants can connect live and listen to all sessions.
- Moderator is responsible for the presentation and scientific discussion (question-answer) section of the session.

Points to Take into Consideration - TECHNICAL INFORMATION

- Make sure your computer has a microphone and is working.
- You should be able to use screen sharing feature in Zoom.
- Attendance certificates will be sent to you as pdf at the end of the congress.
- Requests such as change of place and time will not be taken into consideration in the congress program.

Zoom'a giriş yapmadan önce lütfen örnekteki gibi salon numaranızı, adınızı ve soyadınızı belirtiniz

Before you login to Zoom please indicate your hall number, name and surname

exp. H-5, Radmila Janičić



ONLINE PRESENTATIONS

01.07.2024 / HALL-1 / SESSION-1



PARIS LOCAL TIME



09 00 : 11 00



ANKARA LOCAL TIME



10 00 : 12 00

HEAD OF SESSION: Assist. Prof. Dr. Taşkın ÖZKAN

Authors	Affiliation	Presentation title
Assist. Prof. Dr. Taşkın ÖZKAN Yasemin Ateş SARI Nezehat Özgül ÜNLÜER	Giresun University TÜRKİYE Ankara Yıldırım Beyazıt University TÜRKİYE University of Health Sciences TÜRKİYE	INVESTIGATION OF THE RELATIONSHIP BETWEEN FEAR OF FALLING AND TRUNK CONTROL IN PATIENTS WITH MULTIPLE SCLEROSIS
Zeynep YILDIZ KIZKIN Assoc. Prof. Dr. Semra OĞUZ Dr. Semih AK	Artvin Çoruh University TÜRKİYE Marmara University TÜRKİYE	THE EFFECT OF GRADED MOTOR IMAGERY ON PAIN AND FUNCTION IN INDIVIDUALS WITH KNEE OSTEOARTHRITIS
Zeynep YILDIZ KIZKIN Dr. Ridvan YILDIZ Assoc. Prof. Dr. Ali Veysel ÖZDEN	Artvin Çoruh University TÜRKİYE Dicle University TÜRKİYE Bahçeşehir University TÜRKİYE	EFFECTS OF TRANSCUTANEOUS AURICULAR VAGUS NERVE STIMULATION (taVNS) IN INDIVIDUALS WITH PRIMARY DYSMENORRHEA
Burak Akın AYDEMİR Assist. Prof. Dr. Derya AZIM	Bandırma Onyeddi Eylül University TÜRKİYE	THE EFFECT OF PHYSICAL ACTIVITY LEVEL ON SCHOOL ACHIEVEMENT AND SELF-EFFICACY IN YOUNG ADULT
Gökhan Can TÖRPÜ Assoc. Prof. Dr. Müberra TANRIVERDİ Prof. Dr. Remzi DOĞAN Prof. Dr. Pınar SOYSAL Prof. Dr. Orhan ÖZTURAN	Bezmialem Vakıf University TÜRKİYE	COMPARISON OF SWALLOWING DIFFICULTY IN GERIATRIC AND ADULT PATIENTS ACCORDING TO NUTRITIONAL STATUS AND AGE
Gökhan Can TÖRPÜ Selva OTSAY Dr. Deniz TUNCER	Bezmialem Vakıf University TÜRKİYE	HOW HYPERTENSION AFFECTS PHYSICAL ACTIVITY AND LIFE SATISFACTION IN OLDER ADULTS?
Betül KÖSE Assoc. Prof. Dr. Yıldız ERDOĞANOĞLU	Antalya Bilim University TÜRKİYE	EXAMINATION OF CERVICAL AND LUMBAR REGION PAIN SEVERITY, MUSCLE STRENGTH, RANGE OF MOTION AND QUALITY OF LIFE IN INDIVIDUALS WITH COVID-19
Eren ÖZEN Dr. Melike Sümeyye ÖZEN Prof. Dr. Ebru KAYA MUTLU	Bandırma Onyeddi Eylül University TÜRKİYE	RELATIONSHIP BETWEEN THE STRENGTH AND ENDURANCE OF CORE STABILITY MUSCLES WITH PAIN AND FUNCTIONALITY IN PATIENTS WITH SUBACROMIAL IMPINGEMENT SYNDROME
Osman DERE Levent YAZMALAR Veysel DELEN	Başkent University Konya Application and Research Center Konya TÜRKİYE Ozluce Medical Center Bursa TÜRKİYE Harran University TÜRKİYE	EVALUATION OF LUMBAR PARAVERTEBRAL MUSCLE AND SCIATIC NERVE STIFFNESS USING SHEAR WAVE ELASTOGRAPHY IN PATIENTS WITH LOW BACK PAIN AND SCIATALGIA

All participants must join the conference 10 minutes before the session time.

Every presentation should last not longer than 10-12 minutes.

Kindly keep your cameras on till the end of the session.



ONLINE PRESENTATIONS

01.07.2024 / HALL-2 / SESSION-1



PARIS LOCAL TIME



ANKARA LOCAL TIME



09 00 : 11 00



10 00 : 12 00

HEAD OF SESSION: Dr. Tuba UNVER

Authors	Affiliation	Presentation title
Lect. Dr. Gamze DEMİREL Prof. Dr. Mehmet GÜRBİLEK	Selçuk University TÜRKİYE Necmettin Erbakan University TÜRKİYE	CYTOKINE CHANGES RESULTING FROM INFLAMMATION IN HACAT CELLS
Lect. Dr. Gamze DEMİREL Prof. Dr. Mehmet GÜRBİLEK	Selçuk University TÜRKİYE Necmettin Erbakan University TÜRKİYE	NEUROINFLAMMATION-RELATED miR-155 EXPRESSION IN MICROGLIA
Assist. Prof. Dr. Betül DANIŞMAN	Health Sciences University TÜRKİYE	INVESTIGATION OF THE EFFECTS OF SODIUM ARSENATE EXPOSURE ON PERIPHERAL TISSUES
Dr. Yasin GÖKÇE	Harran University TÜRKİYE	INVESTIGATING THE EFFECTS OF ROFLUMILAST ON STORE- OPERATED CA ₂ ⁺ ENTRY IN RAT BASOPHILIC LEUKEMIA CELLS
Dr. Tuba UNVER	İnönü University TÜRKİYE	USABILITY OF HESPERIDIN, FLAVANONE GLYCOSIDE, AS A PHARMACOTHERAPEUTIC ANTIFUNGAL COMPOUND FOR <i>Candida</i> INFECTIONS
Musa ÖZEKİNCİ Lect. Dr. Derya ALTAY Prof. Dr. Murat KOÇ	Ankara Yıldırım Beyazıt University TÜRKİYE	THYMOQUINONE ANALYSIS OF <i>NIGELLA SATIVA</i> L. (BLACK CUMIN) SEED OIL SOLD COMMERCIALY IN TURKEY
Berrin ÖZDİL BAY Damla EKER Prof. Dr. Sinan AKGÖL	Süleyman Demirel University TÜRKİYE Ege University TÜRKİYE	NANOPARTICLE-BASED DRUG DELIVERY SYSTEMS FOR OVERCOMING THE BLOOD-BRAIN BARRIER
Berrin ÖZDİL BAY Yagmur DINDORUK Prof. Dr. Sinan AKGÖL	Süleyman Demirel University TÜRKİYE Ege University TÜRKİYE	TELOMERASE AS A BIOMARKER AND THERAPEUTIC TARGET IN CANCER: RECENT DEVELOPMENTS AND FUTURE PROSPECTS
Assoc. Prof. Dr. Aziz KORKMAZ	Mardin Artuklu University TÜRKİYE	CHANGES IN SOME QUALITY CHARACTERISTICS OF AYVALIK TYPE TABLE OLIVES DURING STORAGE

All participants must join the conference 10 minutes before the session time.

Every presentation should last not longer than 10-12 minutes.

Kindly keep your cameras on till the end of the session.



ONLINE PRESENTATIONS

01.07.2024 / HALL-3 / SESSION-1



PARIS LOCAL TIME



09 00 : 11 00



ANKARA LOCAL TIME



10 00 : 12 00

HEAD OF SESSION: Dr. Gül Eda KILINÇ

Authors	Affiliation	Presentation title
Aleyna KUŞKU Assoc. Prof. Dr. Ayşe GÜNEŞ BAYIR	Bezmialem Foundation University TÜRKİYE	THE RELATIONSHIP BETWEEN CLIMATE CHANGE AND INFECTIOUS DISEASES
Damla ARTIKASLAN	Izmir Katip Celebi University TÜRKİYE	THE RELATIONSHIP BETWEEN GENETICALLY MODIFIED ORGANISM (GMO) PRODUCTS AND CANCER CASES: THE IMPORTANCE OF EDUCATION
Prof. Dr. Aliye ÖZENOĞLU Dr. Gül Eda KILINÇ Yasemin AÇAR	Ondokuz Mayıs University TÜRKİYE	RELATIONSHIP BETWEEN GASTROESOPHAGEAL REFLUX AND NIGHT EATING SYNDROME AND DEPRESSION, ANXIETY AND STRESS LEVELS IN UNIVERSITY EMPLOYEES
Aslıhan DEMİR Assoc. Prof. Dr. Safiye ÖZGÜNÇ	Gaziantep University TÜRKİYE	POST-TRAUMATIC GROWTH AND PSYCHOLOGICAL RESILIENCE IN INDIVIDUALS WHO EXPERIENCED AN EARTHQUAKE
Gamze KIZILHAN Assist. Prof. Dr. Safiye ELİF ÇAĞATAY	İstanbul Arel University TÜRKİYE	THE MEDIATORY ROLE OF EMOTIONAL SCHEMAS AND COGNITIVE DISTORTIONS IN THE RELATIONSHIP BETWEEN ADVERSE CHILDHOOD EXPERIENCES AND BINGE EATING DISORDER IN ADULT INDIVIDUALS
Dr. Mehmet KILIÇ	Konya City Hospital, Konya TÜRKİYE	SHOULD A MEDIAL BUTTRESS PLATE BE USED WITH CANNULATED SCREWS IN NEGLECTED DISPLACED PAUWELS TYPE 3 FEMORAL NECK STRESS FRACTURE?
Dr. Mehmet KILIÇ	Konya City Hospital, Konya TÜRKİYE	THE APPLICATION OF A DISTAL TIBIA ANTEROLATERAL ANATOMICAL PLATE TO THE POSTEROLATERAL SURFACE OF THE DISTAL TIBIA WITH A POSTEROLATERAL APPROACH IN TIBIA PILON FRACTURES ON THE CONTRALATERAL SIDE
Fatma SÖĞÜT Halil ÖZKURT Hakan KAVUR	Mersin University TÜRKİYE Çukurova University TÜRKİYE	EFFECTS OF SOUND WAVES AT DIFFERENT FREQUENCY THRESHOLDS ON HOUSEFLY MORTALITY
Esra DUMAN Mariya MAŞTA Ömer Furkan HALİS Yusufhan YAZIR Nihat Zafer UTKAN	Kocaeli University TÜRKİYE	Hsa-miR-217 EXPRESSION IN BREAST CANCER

All participants must join the conference 10 minutes before the session time.
Every presentation should last not longer than 10-12 minutes.
Kindly keep your cameras on till the end of the session.



ONLINE PRESENTATIONS

01.07.2024 / HALL-4 / SESSION-1



PARIS LOCAL TIME



09 00 : 11 00



ANKARA LOCAL TIME



10 00 : 12 00

HEAD OF SESSION: Lect. PhD Irina-Ana DROBOT

Authors	Affiliation	Presentation title
Dr. Arben Priffi	Mediterranean University ALBANIA	MALA PRAXIS MEDICA AND BIOLAW: A SYNTAGMA APPROACH
Lect. PhD Irina-Ana DROBOT	Technical University of Civil Engineering Bucharest ROMANIA	TRAINING UNIVERSITY LEVEL TEACHERS AND ADMINISTRATION STAFF IN POPULAR PSYCHOLOGY
Dorina (Shuraja) MINXURI	Logos University College ALBANIA	INFLUENCE OF NUTRITIONAL FACTORS IN CHRONIC AUTOIMMUNE HASHIMOTO'S THYROIDITIS
Fadoua LOUGLALI Abdeslam JAAFARI Hafida ZAHIR Mostafa EL LOUALI Hassan LATRACHE	Sultan Moulay Slimane University MOROCCO	GALLSTONES AND BIOFILMS: KEY FACTORS IN THE DEVELOPMENT OF GALLBLADDER CANCER
Amira Cherifa ZERARKA	BATNA 2 University ALGERIA	ACUTE CORONARY SYNDROME: STEMI AND NSTEMI
Younes Fayand Dr. Mohammad Ali Balafar Reza Fayand	Tabriz University IRAN Azad Islami Tabriz University IRAN	AN OVERVIEW OF THE USE OF ARTIFICIAL INTELLIGENCE ALGORITHMS IN THE DIAGNOSIS AND PREDICTION OF DISEASES
SHUAEEB, A. I.	Federal Technology University NIGERIA	EFFECTS OF WATER POLLUTION ON THE HEALTH OF THE PEOPLE: A CASE STUDY OF GENERAL HOSPITAL KONTAGORA AREA OF NIGER STATE, NIGERIA
Rayan Ikram ADDOUN	M'hamed Bougara of Boumerdes University ALGERIA	ON THE FOUNDATIONS OF CANCER MODELLING: SELECTED TOPICS, SPECULATIONS, AND PERSPECTIVES

**All participants must join the conference 10 minutes before the session time.
Every presentation should last not longer than 10-12 minutes.
Kindly keep your cameras on till the end of the session.**



ONLINE PRESENTATIONS

01.07.2024 / HALL-5 / SESSION-1



PARIS LOCAL TIME



ANKARA LOCAL TIME



09 00 : 11 00



10 00 : 12 00

HEAD OF SESSION: Imane Kherrab

Authors	Affiliation	Presentation title
Imane Kherrab Miloud Chakit Abdelhalem Mesfioui Aboubaker Elhessni	Ibn Tofail University MOROCCO	PROMISING INTERVENTION: THYME HONEY SUPPLEMENTATION AMELIORATES COGNITIVE FUNCTION IN HIGH FRUCTOSE-TREATED WISTAR RATS
Imane Kherrab Miloud Chakit Abdelhalim Mesfioui Aboubaker Elhessni	Ibn Tofail University MOROCCO	EXPLORING THE BENEFITS OF PROPOLIS SUPPLEMENTATION ON BRAIN HEALTH: CHRONIC STRESS AND OXIDATIVE STRESS IN THE PREFRONTAL CORTEX AND HIPPOCAMPUS
Emmanuel Oluwatimileyin Matthew Dr. Ibrahim Abdulkarim Ozigi Abdulgafar Ishola Uthman Adeyele Adeyeri David	Kaduna Polytechnic NIGERIA	PHYTOCHEMICAL SCREENING OF COCONUT WATER AND BITTER LEAF EXTRACT AND ANTIBIOGRAM OF THE MIXTURE (COCONUT WATER + BITTER LEAF) ON Salmonella typhi and Streptococcus Spp
Muhammed Rashidat Ocheme Juliana Abdulgafar Ishola Uthman	Kaduna Polytechnic NIGERIA	MYCOLOGICAL ANALYSIS OF SPOILT Colocassia esculenta OBTAINED FROM SELECTED MARKETS (KAWO AND BAKINDOGO) WITHIN KADUNA METROPOLIS
Adebola Aisha Damilola Dr. Ajijolakewu kamoldeen abiodun Nimat Toyosi Ajide-Bamigboye	Ilorin University NIGERIA	COMPARATIVE STUDY OF THE ANTIMICROBIAL EFFICACY OF POLAR AND NON POLAR EXTRACTS OF THE LEAVES OF LEMON GRASS AND MORINGA AGAINST SELECTED CLINICAL ISOLATES
Rafik Abdelkrim Boudia Mehdi Adjdir Abdelkader Ammam	University of Oran 1 - Ahmed Ben Bella ALGERIA University of Saida Dr. Moulay Tahar ALGERIA	CHEMICAL COMPOSITION AND THERAPEUTIC EFFECTS OF AMMODICUS LEUCOTRICUS ESSENTIAL OILS ON NEUROBEHAVIORAL CHANGES IN WISTAR RATS AFTER EXPERIMENTAL SCORPION ENVENOMATION
Fedwa BEGHDADI El-Hadj DRICHE	Hassiba Benbouali University ALGERIA	THE INHIBITION OF SOME PHYTOPATHOGENIC FUNGI BY ACTINOBACTERIA ISOLATED FROM ALGERIAN SAHARAN SOILS
Fedwa BEGHDADI El-Hadj DRICHE	Hassiba Benbouali University ALGERIA	ALTERNARIA IS A DISEASE THAT THREATENS TOMATO CROPS

All participants must join the conference 10 minutes before the session time.

Every presentation should last not longer than 10-12 minutes.

Kindly keep your cameras on till the end of the session.



ONLINE PRESENTATIONS

01.07.2024 / HALL-1 / SESSION-2



PARIS LOCAL TIME



ANKARA LOCAL TIME



11 30 : 13 30



12 30 : 14 30

HEAD OF SESSION: Dr. Ece YARIMOĞLU ÖKTEN

Authors	Affiliation	Presentation title
Dr. Ece YARIMOĞLU ÖKTEN Dr. Tuğçe CEYHANLI	Yeditepe University TÜRKİYE	THE SURFACE ROUGHNESS EVALUATION OF DIFFERENT INSTRUMENTATION METHODS ON IN VITRO STUDY MODELS: A PRELIMINARY PROFILOMETRIC STUDY
Res. Assist. Ebru YILMAZ Assoc. Prof. Dr. Nilgün AKGÜL Res. Assist. Onur AKKURT	Pamukkale University TÜRKİYE	GOLDEN RATIO IN DENTISTRY
Assist. Prof. Şükriye TÜRKOĞLU KAYACI Zeynep SOLMAZGÜL YAZICI	University of Health Sciences TÜRKİYE	OPEN BITE TREATMENT WITH FIXED AND REMOVABLE HABIT-BREAKER APPLIANCES: 2 CASE REPORTS
Assist. Prof. Şükriye TÜRKOĞLU KAYACI Zeynep SOLMAZGÜL YAZICI	University of Health Sciences TÜRKİYE	TREATMENT OF EARLY CHILDHOOD CARIES IN ANTERIOR TEETH WITH PEDIATRIC ZIRCONIA CROWNS: 2 CASE REPORT
Salih YABALAK Assoc. Prof. Dr. Gökhan GÖRGİŞEN	Van Yüzüncü Yıl University TÜRKİYE	BIOINFORMATIC ANALYSIS OF EXPRESSION AND METHYLATION STATUS OF MAPK15 IN KIDNEY RENAL CLEAR CELL CARCINOMA
Assist. Prof. Dr. Arzu Ibishova Chichak Mammadli Aziz Assist. Prof. Dr. Shabnam Ganbaeva	Azerbaijan Medical University AZERBAIJAN	SCLEROSING ANGIOMATOID NODULAR TRANSFORMATION OF THE SPLEEN
Esmâ ÇAĞLAYAN Assist. Prof. Dr. Rafat SASANY	Bafra Oral and Dental Health Hospital, Samsun TÜRKİYE Biruni University TÜRKİYE	THE EMPLOYMENT OF PROBLEM-BASED LEARNING IN COMPLEX DENTAL CASES: A PROPOSAL FOR PROSTHODONTISTS
Assist. Prof. Dr. Gulnihal DENİZ Assoc. Prof. Dr. Rukiye CİFTÇİ	Erzurum Technical University TÜRKİYE Gaziantep Islamic Science and Technology University TÜRKİYE	ATTITUDES OF FIRST- AND SECOND-YEAR MEDICAL STUDENTS TOWARDS CADAVER-BASED AND MODEL-BASED EDUCATION IN ANATOMY

All participants must join the conference 10 minutes before the session time.

Every presentation should last not longer than 10-12 minutes.

Kindly keep your cameras on till the end of the session.



ONLINE PRESENTATIONS

01.07.2024 / HALL-2 / SESSION-2



PARIS LOCAL TIME



11 30 : 13 30



ANKARA LOCAL TIME



12 30 : 14 30

HEAD OF SESSION: Assoc. Prof. Dr. Muammer BUYUKINAN

Authors	Affiliation	Presentation title
Assist. Prof. Dilek GÜLLER	T.C. Demirođlu Science University TÜRKİYE	AUTOIMMUNE SCLEROSING CHOLANGITIS AND CROHN'S DISEASE IN A PEDIATRIC PATIENT WITH AUTISM SPECTRUM DISORDER
Assoc. Prof. Dr. Muammer BUYUKINAN	Selçuk University TÜRKİYE	A RARE CASE OF OSTEOPETORICKETS WITH THE COMBINATION OF INFANTILE MALIGN OSTEOPETROSIS AND RICKETS
Sevinç ÇİÇEK	Istanbul Arel University TÜRKİYE	THE RELATIONSHIP OF PREGNANCY STRESS WITH INFANTY COLIC AND CHILDHOOD EPILEPSY
Assoc. Prof. Dr. Büşra ERGİN Assist. Prof. Dr. Esra ERGİN	Selçuk University TÜRKİYE	AN INVESTIGATION OF POSTGRADUATE THESES PREPARED IN TURKEY IN THE CONTEXT OF CHILDREN AT RISK
Assoc. Prof. Dr. Büşra ERGİN Assist. Prof. Dr. Esra ERGİN	Selçuk University TÜRKİYE	INVESTIGATION OF POSTGRADUATE THESES ON CANCER AND CHILD CONTEXT: THE CASE OF TURKEY
Sintayehu Assefa Yirga	Hawassa University ETHIOPIA	THE EFFECT OF PULL AND PUSH DRIVERS ON BEHAVIORAL DRUG ADDICTION OF STREET CHILDREN: LESSONS FROM HAWASSA CITY
Res. Assist. Hilal Gül BOYRAZ YANIK Assist. Prof. Dr. Özlem AKIN Prof. Dr. Nülüfer ERBİL	Ordu University TÜRKİYE Recep Tayyip Erdoğan University TÜRKİYE Ordu University TÜRKİYE	COMPLEMENTARY ALTERNATIVE MEDICINE PRACTICES IN MENOPAUSE SYMPTOMS: A LITERATURE REVIEW
Assist. Prof. Dr. Özlem AKIN Res. Assist. Hilal Gül BOYRAZ YANIK Prof. Dr. Nülüfer ERBİL	Recep Tayyip Erdoğan University TÜRKİYE Ordu University TÜRKİYE	LITERATURE REVIEW ON LOTUS BIRTH AND HEALTH OUTCOMES

All participants must join the conference 10 minutes before the session time.
Every presentation should last not longer than 10-12 minutes.
Kindly keep your cameras on till the end of the session.



ONLINE PRESENTATIONS

01.07.2024 / HALL-3 / SESSION-2



PARIS LOCAL TIME



ANKARA LOCAL TIME



11 30 : 13 30



12 30 : 14 30

HEAD OF SESSION: Observer

Authors	Affiliation	Presentation title
Assist. Prof. Gökşen POLAT Assoc. Prof. Melike TEKİNDAL Prof. Dr. Elif ÜNSAL AVDAL	Izmir Tınaztepe University TÜRKİYE	THE MEANING OF THE INSULIN PUMP FOR CHILDREN WITH TYPE 1 DIABETES: A PHENOMENOLOGICAL STUDY
Assist. Prof. Gönül DÜZGÜN Kadriye TURAN Assist. Prof. Gökşen POLAT Elif KELEKÇİBAŞI Prof. Dr. Elif ÜNSAL AVDAL Prof. Dr. Fisun ŞENUZUN AYKAR	Izmir Tınaztepe University TÜRKİYE Health Sciences University Tepecik Training and Research Hospital TÜRKİYE Izmir Katip Çelebi University TÜRKİYE	PERCEPTIONS OF PALLIATIVE CARE NURSES ON DEATH WITH DIGNITY: A QUALITATIVE RESEARCH
Assist. Prof. Tülay YILDIRIM ÜŞENMEZ Aslan DİKMEN	Dicle University TÜRKİYE	ARE THE INDIVIDUALS WITH MENTAL ILLNESS HAPPY?
Hande DEMİRTAŞ Nazlıhan EFE SAYAN Prof. Dr. Serap ALTUNTAŞ	Bandırma Onyedi Eylül University TÜRKİYE	EVALUATION OF THE EFFECTIVENESS OF DISASTER TRAINING PROVIDED TO HEALTH WORKERS
Nazlıhan EFE SAYAN Prof. Dr. Serap ALTUNTAŞ	Bandırma Onyedi Eylül University TÜRKİYE	NURSING WORKLOAD AND MISSED NURSING CARE
Ümmügülsüm KAYA Burcu Kübra SÜHA	Sivas Cumhuriyet University TÜRKİYE	AN ETHICAL PERSPECTIVE ON GENETICS IN NURSING CARE
Fatmanur BALAMUT Özge ÖZ YILDIRIM	Ondokuz Mayıs University TÜRKİYE	ADAPTATION TO DISEASE AND NURSING APPROACH IN ELDERLY PEOPLE WITH CHRONIC DISEASES
Necmettin ÇİFTÇİ Meñin YILDIZ Ali KIRKSEKİZ	Muş Alparslan University TÜRKİYE Sakarya University TÜRKİYE	ATTITUDE SCALE TOWARDS ARTIFICIAL INTELLIGENCE IN NURSING EDUCATION: SCALE DEVELOPMENT STUDY
Assoc. Prof. Dr. Fatma KARASU Assoc. Prof. Dr. Filiz POLAT	Kahramanmaraş Sütçü İmam University TÜRKİYE Osmaniye Korkut Ata University TÜRKİYE	VIOLENCE AGAINST MIGRANT WOMEN AND THE ROLE OF THE NURSE
Assoc. Prof. Dr. Filiz POLAT Assoc. Prof. Dr. Fatma KARASU	Osmaniye Korkut Ata University TÜRKİYE Kahramanmaraş Sütçü İmam University TÜRKİYE	INVESTIGATION OF THE RELATIONSHIP BETWEEN IMMIGRANT PERCEPTION AND INTERCULTURAL SENSITIVITY AMONG MIDWIFYING DEPARTMENT STUDENTS

All participants must join the conference 10 minutes before the session time.

Every presentation should last not longer than 10-12 minutes.

Kindly keep your cameras on till the end of the session.



ONLINE PRESENTATIONS

01.07.2024 / HALL-4 / SESSION-2



PARIS LOCAL TIME



ANKARA LOCAL TIME



11³⁰ : 13³⁰



12³⁰ : 14³⁰

HEAD OF SESSION: Meryem Boutalaka

Authors	Affiliation	Presentation title
Meryem Boutalaka Salma Elbahi Hamid Maghat Mohammed Bouachrine	Moulay Ismail University MOROCCO	IN SILICO ANALYSIS OF PHENOLIC COMPOUNDS IN VIRGIN OLIVE OIL: ANTI INFLAMMATORY POTENTIAL
Junaidu Na'aliya Ibrahim Kani Aminu	Bayero University NIGERIA	ANTIMICROBIAL ACTIVITY EVALUATION OF Zn(II) AND Co(II) COMPLEXES WITH NAPHTHALENE DERIVATIVES SCHIFF BASE
Amine El Harfouf Abderrahim Wakif Sanaa Hayani Mounir	Sultan Moulay Slimane University MOROCCO Hassan II University MOROCCO	NUMERICAL INVESTIGATION OF NANOFLUID FLOW WITH GOLD NANOPARTICLES INJECTED INSIDE A STENOTIC ARTERY
Mohcin Elkhafir Miloud Chakit Abdechahid Loukili Youssef Aboussaleh	Ibn Tofail University MOROCCO	ORGANIC FOOD CONSUMPTION AND ATTENTION PERFORMANCE IN 10-13 MOROCCAN PRIMARY STUDENTS FROM KHEMISSSET
Abdelhamid QARA Mohamed OUABANE Chakib SEKKATE Samir CHTITA Tahar LAKHLIFI Mohammed BOUACHRINE	Moulay Ismail University MOROCCO Hassan II University MOROCCO Sultan My Slimane University MOROCCO	DESIGN OF NEW AROMATIC TERTIARY AMINE-BASED AS BUTYRYLCHOLINESTERASE INHIBITORS RELYING ON MOLECULAR DOCKING, ADME-TOX AND MOLECULAR DYNAMICS
Muhammad Mateen Afzal Awan Mehmoona Javed Awan	University of Management and Technology Lahore PAKISTAN	ADVANCED TELEMEDICINE TECHNOLOGIES FOR CHRONIC DISEASE MANAGEMENT: AN ELECTRONICS ENGINEERING PERSPECTIVE
Rima SAAD BOUZID Housna LABED Dounia HELLAL Ines BOUDIAF Hachani KHADRAOUI	BATNA 2 University ALGERIA	EXPLORING THE MOLECULAR AND HISTOLOGICAL LANDSCAPE OF BREAST CANCER: PRELIMINARY FINDINGS IN EASTERN OF ALGERIA

All participants must join the conference 10 minutes before the session time.

Every presentation should last not longer than 10-12 minutes.

Kindly keep your cameras on till the end of the session.



ONLINE PRESENTATIONS

01.07.2024 / HALL-5 / SESSION-2



PARIS LOCAL TIME



ANKARA LOCAL TIME



11 :30 : 13 :30



12 :30 : 14 :30

HEAD OF SESSION: Dang Hoang Xuan Huy

Authors	Affiliation	Presentation title
Prof. Dr. Ivan PAVLOVIC	Scientific Institute of Veterinary Medicine of Serbia, Belgrade SERBIA	PREVALENCE OF TOXASCARIS LEONINA IN PETS DOGS IN BELGRADE AREA
Dang Hoang Xuan Huy	Nha Trang University VIETNAM	EVALUATING THE HEALTH IMPACTS OF MARINE LITTER POLLUTION ON FISHING COMMUNITIES AND THE FISHERIES SECTOR IN VIETNAM: A CASE STUDY OF KHANH HOA, PHU YEN, AND NINH THUAN PROVINCES
Vikranti Patel Kapila Manoj	Veer Narmad South Gujarat University INDIA	EFFECTS OF DIFFERENT FEEDS ON THE PROXIMATE COMPOSITION OF CATLA CATLA
Noureddine Djilali Amine Ghelamallah Soltani Fatiha Fodil Mustafa Kamel Fayza Keddar Said Dahmani	Abedlhamib Ibnbadis University ALGERIA	IMPACT OF TREATED WASTEWATER ON THE PROFILE NUTRITIONAL PHYSICOCHEMICAL AND PHYTOCHEMICAL OLIVE OIL
Amin Marandi Hooman Rahmati-Holasoo Hosseinali Ebrahimzadeh Mousavi Fatemeh Arabkhazaeli Sara Shokrpoor Zahra Ziafati Kafi Alireza Nassiri Soroush Sarmadi	Tehran University IRAN	MORPHOLOGIC STUDY AND MOLECULAR CONFIRMATION OF MYXOBOLUS SP. (MYXOZOA: MYXOBOLIDAE) INFECTING GOLDFISH (CARASSIUS AURATUS)
Bardha IBISHI Viktor KOLOVSKI Vesna KARAPETKOVSKA - HRISTOVA Prof. Dr. Ivan PAVLOVIC	St. Kliment Ohridski University NORTH MACEDONIA Scientific Institute of Veterinary Medicine of Serbia, Belgrade SERBIA	PROFILING PHENOLIC COMPOUNDS IN PROPOLIS: COMPARATIVE ANALYSIS ACROSS VARIOUS APIARIES IN N. MACEDONIA

All participants must join the conference 10 minutes before the session time.

Every presentation should last not longer than 10-12 minutes.

Kindly keep your cameras on till the end of the session.



ONLINE PRESENTATIONS

01.07.2024 / HALL-1 / SESSION-3



PARIS LOCAL TIME



14 00 : 16 00



ANKARA LOCAL TIME



15 00 : 17 00

HEAD OF SESSION: Observer

Authors	Affiliation	Presentation title
Özgür ÇAKICI Gökhan KAYA Serap KARACA	Goztepe Prof. Dr. Süleyman Yalçın City Hospital TÜRKİYE Bağcılar Training and Research Hospital TÜRKİYE	COMPARISON OF LIMBAL- CONJUNCTIVAL AUTOGRAFT AND BARE SCLERA COMBINED WITH MITOMYCIN C TECHNIQUE IN PRIMARY PTERYGIUM SURGERY
Serhat YENTÜR Asilhan SABUNCU	University of Health Sciences TÜRKİYE	HIGH GRADE PRIMARY TESTICULAR CARCINOID TUMOR WITH A MULTIPLE METASTASIS: A CASE REPORT WITH SEVEN YEARS FOLLOW-UP
Dr. Ali KARABULUT Dr. Betül GÜZELYÜZ Dr. Fikri ŞİRİN	Siirt Training and Research Hospital General Surgery Clinic, Siirt TÜRKİYE Afsin State Hospital General Surgery Clinic, Kahramanmaraş TÜRKİYE	LOCAL SUCRALPHATE APPLICATION IN A CASE OF PERSISTENT ANORECTAL ABSCESS FISTULA
Valeh Rahimov Alovsat Aliyev Cümşüd Ramazanov Şabnam Rahimli Farah Rahimova	Azerbaijan Medical University AZERBAIJAN	RISK ASSESSMENT OF ULCERATIVE GASTRODUODENAL BLEEDING RECURRENCE
Dr. Burak Cemil BALIK Assoc. Prof. Dr. Berna KAYA UĞUR Assoc. Prof. Dr. Feyza YILMAZ Prof. Dr. Abidin Murat GEYİK	Gaziantep University TÜRKİYE	COMPARISON OF RADIOLOGICAL MEASUREMENTS MARKERS WITH CONVENTIONAL METHODS FOR PREDICTION OF DIFFICULT INTUBATION: A PROSPECTIVE DOUBLE-BLIND, OBSERVATIONAL STUDY
Dr. Safak MIRIOGLU	Istanbul University TÜRKİYE	COMPARISON OF VARIOUS FEATURES AND OUTCOMES IN ADULTS WITH IMMUNE COMPLEX MEMBRANOPROLIFERATIVE GLOMERULONEPHRITIS AND C3 GLOMERULOPATHY
Deniz ÖZLER KIRAL Gülbin ÖZÇELİKAY	Ankara University TÜRKİYE	REGULATION ON PHARMACISTS AND PHARMACIES IN TURKEY FROM PAST TO PRESENT

All participants must join the conference 10 minutes before the session time.

Every presentation should last not longer than 10-12 minutes.

Kindly keep your cameras on till the end of the session.



ONLINE PRESENTATIONS

01.07.2024 / HALL-2 / SESSION-3



PARIS LOCAL TIME



14 00 : 16 00



ANKARA LOCAL TIME



15 00 : 17 00

HEAD OF SESSION: David WORTLEY

Authors	Affiliation	Presentation title
Full-Professor PhD. Habil. Cristina Raluca Gh. Popescu	Bucharest University ROMANIA	ASSESSING AND MONITORING THE HEALTH-RELATED SUSTAINABLE DEVELOPMENT GOALS (SDGS): IMPERATIVE INDICATORS FOR TRACKING UNIVERSAL HEALTH COVERAGE (UHC) AND SIGNIFICANCE OF MEDICAL AND HEALTH SCIENCES
Full-Professor PhD. Habil. Cristina Raluca Gh. Popescu Emeritus Full-Professor PhD. Gheorghe N. Popescu	Bucharest University ROMANIA	STRENGTHENING THE NEXUS HEALTH SYSTEMS, SUSTAINABLE DEVELOPMENT GOALS (SDGS), AND GLOBAL GROWTH: MEDICAL AND WELLNESS TOURISM MARKET AND THE CASE OF TURKEY AS LEADING DESTINATION FOR MEDICAL TOURISM
David WORTLEY	360in360 Immersive Experiences, Alderton UNITED KINGDOM	GAMIFICATION AND ENABLING TECHNOLOGIES FOR HEALTHY AGEING
Ananda Majumdar	Alberta University CANADA	RURAL AND URBAN HEALTH PROCUREMENT IN COVID-19 PREVENTION MANAGEMENT & BEHAVIORAL CONDUCT
Ibrahim Bala Yahaya Jamilu Lawal Ajiya Abdu Mustapha	Federal University NIGERIA	ASSESSMENT OF PERCEPTION, BEHAVIOUR AND PRACTICE OF PERSONAL HYGIENE AMONG INMATES IN CORRECTIONAL CENTRES OF KANO STATE, NIGERIA
Narges Fathabadibozcheloei	Islamic Azad University IRAN	ENHANCING FOOD QUALITY WITH LACTOBACILLUS PLANTARUM PROBIOTIC BACTERIA AND ITS EFFECT ON HEALTH
Pinmanee Vajrapatkul Adirek Vajrapatkul	Srinakharinwirot University THAILAND Sukhothai Thammathirat Open University THAILAND	PREDICTIVE MODELING OF HEART DISEASE USING RANDOM FOREST CLASSIFICATION: A COMPARATIVE STUDY WITH LOGISTIC REGRESSION AND SVC
Pinmanee Vajrapatkul Boonta Wayupab Adirek Vajrapatkul	Srinakharinwirot University THAILAND Central Food Retail Company Limited, Replenishment and Demand Forecasting Department THAILAND Sukhothai Thammathirat Open University THAILAND	ENHANCED CNN MODEL FOR ACCURATE CLASSIFICATION OF BRAIN TUMORS FROM MRI SCANS

**All participants must join the conference 10 minutes before the session time.
Every presentation should last not longer than 10-12 minutes.
Kindly keep your cameras on till the end of the session.**



ONLINE PRESENTATIONS

01.07.2024 / HALL-3 / SESSION-3



PARIS LOCAL TIME



ANKARA LOCAL TIME



14 00 : 16 00



15 00 : 17 00

HEAD OF SESSION: Patrycja WIDŁAK

Authors	Affiliation	Presentation title
Rajah, A. S. Yunusa, U. Tashi, F. T. Abdullahi, S. O. Tukuntawa, A. S.	Bayero University NIGERIA College of Nursing and Midwifery NIGERIA National Orthopaedic Hospital, Dala-Kano, NIGERIA	NOVEL ECO-FRIENDLY MATERIALS USED FOR REUSABLE MENSTRUAL PADS: A SCOPING REVIEW
Rajah, A. S. Yunusa, U. Tashi, F. T. Abdullahi, S. O. Tukuntawa, A. S.	Bayero University NIGERIA College of Nursing and Midwifery NIGERIA National Orthopaedic Hospital, Dala-Kano, NIGERIA	EVALUATION OF MICROBIAL LOAD OF REUSABLE MENSTRUAL PADS AND THE ASSOCIATED RISKS OF INFECTION
Marieta Todorova Angelina Kirkova-Bogdanova Veselina Bukova Daniela Taneva	Medical University BULGARIA	BONE HEALTH OF WOMEN OF BULGARIAN AND ROMA ORIGIN -RISK FACTORS
Patrycja WIDŁAK Dariusz BOGUSZEWSKI Jakub ADAMCZYK Bartłomiej MICHALAK	Józef Piłsudski University of Physical Education in Warsaw POLAND	FUNCTIONAL ASSESSMENT OF MALE ATHLETES COMPETING IN THE MASTERS CATEGORY
KEDDAR Fayza BOUALEM Malika BRADA Moussa BENGUENOUNA Nouredine	Hassiba Benbouali University ALGERIA Abdelhamid Ibn Badis University ALGERIA Khemis Miliana University ALGERIA	EVALUATION OF THE ANTIBACTERIAL ACTIVITY OF URTICA DIOICA ESSENTIAL OIL ON THREE STRAINS RESPONSIBLE FOR URINARY TRACT INFECTIONS
Doc. Elona Hasalla Phd.cand. Ilda Taka Dr. Brikena Greca Msc. Elda Ruçi Msc. Blerita Hasalla Dr. Sulejman Baha Msc. Brandi Fahriu Msc. Klajdi Tarko Dr. Ana Topuzi Edmonda Ruda	Aleksander Xhuvani University ALBANIA Florence University ITALY	THE ROLE OF SPINAL ANESTHESIA IN ORTHOPEDIC SURGERIES OF THE LOWER EXTREMITIES
Irfan Ullah Nita Susanti Roostita L. Balia Saskia L Nasroen Ani Melani Maskoen Erlil Sarilita	Padjadjaran University INDONESIA Jenderal Achmad Yani University INDONESIA	APPLICATION OF CAISPR-CAS9 TECHNOLOGY IN THE ZOO NOTIC DISEASE LEPTOSPIROSIS AND BIOSECURITY CHALLENGES

All participants must join the conference 10 minutes before the session time.

Every presentation should last not longer than 10-12 minutes.

Kindly keep your cameras on till the end of the session.



ONLINE PRESENTATIONS

01.07.2024 / HALL-4 / SESSION-3



PARIS LOCAL TIME



ANKARA LOCAL TIME



14 00 : 16 00



15 00 : 17 00

HEAD OF SESSION: Akram Hosseinian

Authors	Affiliation	Presentation title
Akram Hosseinian	Tehran University IRAN	NANO CO –MOFS BASED ON BTZ AS ANTIOXIDANT & ANTICANCER AGENT
Akram Hosseinian	Tehran University IRAN	SYNTHESIS, CRYSTAL STRUCTURE AND DNA BINDING STUDIES OF NEW AG(I) COMPLEX WITH BITHIAZOLE
Akram Hosseinian	Tehran University IRAN	EVALUATION OF STEREO ACTIVITY OF LONE PAIR EFFECTS ON REMOVAL OF LEAD TOXICITY IN HUMAN BODY WITH BTZ
Osarumwense Peter Osarodion	Ondo state University of science and Technology NIGERIA	SYNTHESIS, ANALGESIC ACTIVITY OF 3-AMINO 4,5-DIMETHOXYL-2-METHYL QUINAZOLIN-4(3H)-ONE AN AMINO-METHOXYL-2-METHYL OF 4H-BENZO[D] [1,3]-OXAZINE-4-ONE
Yeganeh Mazaheri Parisa Sadighara Ebrahim Molae-aghvae Nabi Shariati Far	Tehran University of Medical Sciences IRAN	THE EFFECT OF ANTIOXIDANT ON POLYCYCLIC AROMATIC HYDROCARBONS (PAHS)
Swetha Suresh Pavithra Rajendran Santhosh Manoharan Karthikeyan Elumalai	Saveetha Institute of Medical and Technical Sciences INDIA	THE EFFECTIVENESS OF SYZYGIUM CUMINI AQUEOUS EXTRACT IN PREVENTING OXYTOCIN-INDUCED PRETERM LABOR IN RATS: A TOCOLYTIC STUDY
Madhumitha S. Yuvaraj M. Muhammad Mujaahid Karthikeyan Elumalai	Saveetha Institute of Medical and Technical Sciences INDIA	PREVALENCE OF ANEMIA IN CHRONIC KIDNEY DISEASE: A CROSS-SECTIONAL STUDY IN A TERTIARY CARE HOSPITAL
Ph.D. Sylvia STAMOVA Assoc. Prof. Dr. Neli ERMENLIEVA Assoc. Prof. Dr. Emiliya GEORGIEVA Assoc. Prof. Dr. Gabriela TSANKOVA Dr. Petar STAMOV	Medical University of Varna BULGARIA	INTERACTIONS BETWEEN DAIRY PRODUCTS AND DRUGS: A REVIEW

All participants must join the conference 10 minutes before the session time.

Every presentation should last not longer than 10-12 minutes.

Kindly keep your cameras on till the end of the session.



ONLINE PRESENTATIONS

01.07.2024 / HALL-5 / SESSION-3



PARIS LOCAL TIME



ANKARA LOCAL TIME



14⁰⁰ : 16⁰⁰



15⁰⁰ : 17⁰⁰

HEAD OF SESSION: Hassane ABD-DADA

Authors	Affiliation	Presentation title
Zakariya Arbaoui Oussama Boutahir Abdelhai Rahmani	Moulay Ismail University MOROCCO	RAMAN SPECTROSCOPY: PHOSPHORENE AND PHOSPHORENE NANORIBBONS
Zakariya Arbaoui Soufiane Elhadfi Mourad Boutahir Brahim Fakrach Abdelhai Rahmani Hassan Chadli Abdelali Rahmani	Moulay Ismail University MOROCCO	ARMCHAIR AND ZIGZAG PHOSPHORENE NANOTUBES: DFT STUDY
Mohamed OUABANE Khadija ZAKI Hassan BADAoui Mohammed BOUACHRINE	Moulay Ismail University MOROCCO	2D-QSPR INVESTIGATION OF THE ODORANT MOLECULES' RELEASED RETENTION INDEX PROPERTIES IN PECTIN GELS AT VARIOUS ODORANT MOLECULE CONCENTRATIONS
Hassane ABD-DADA	Sultan Moulay Slimane University MOROCCO	GENETIC DIVERSITY ANALYSIS OF A MEDICINAL PLANT (EUPHORBIA RESINIFERA) USES IN TRADITIONAL PHOTOTHERAPY, USING MOLECULAR MARKERS
Hassan BADAoui Mohamed OUABANE M'barek CHOUKRAD Mohammed BOUACHRINE	Moulay Ismail University MOROCCO	MODELING AND 3D-QSAR ANALYSIS OF SELECTED INDOLE-GLYOXAMIDE DERIVATIVES AS HIV-1 BINDING INHIBITORS USING MOLECULAR DOCKING, MOLECULAR DYNAMICS SIMULATIONS, AND ADME
Z. El Hamri M. Karaoui I. Maouhoubi M. Alami M. Assouag	Moulay Ismail University MOROCCO Sidi Mohamed Ben Abdellah University MOROCCO	PHYSICO-CHEMICAL CHARACTERIZATION OF SNAIL SHELL POWDER PREPARED VIA MECHANOCHEMICAL PROCESSING AND THERMAL TREATMENT FOR MEDICAL APPLICATIONS
Etibarria Belghalia Abdelouahid Sbai Tahar Lakhlfia Mohammed Bouachrine	Moulay Ismail University MOROCCO	EXPLORING CANDIDATE COMPOUNDS TARGETING EGFR, HER2, AND ERA IN BREAST CANCER: VIRTUAL SCREENING AND DYNAMIC SIMULATION
Salma El Bahi Meryem Boutalaka M'barek Choukrad Abdelouahid Sbai Mohammed Bouachrine	Moulay Ismail University MOROCCO	IN-SILICO INVESTIGATION OF OSIMERTINIB BASED COMPOUNDS AS POTENTIAL DOUBLE MUTANT EGFR KINASE INHIBITORS. INTEGRATING QSAR MODELING, MOLECULAR DOCKING, MD SIMULATIONS, AND ADME/TOX STUDIES

All participants must join the conference 10 minutes before the session time.

Every presentation should last not longer than 10-12 minutes.

Kindly keep your cameras on till the end of the session.

CONTENTS

AUTHOR	TITLE	No
David WORTLEY	GAMIFICATION AND ENABLING TECHNOLOGIES FOR HEALTHY AGEING	1
Muhammad Mateen Afzal Awan Mehmoona Javed Awan	ADVANCED TELEMEDICINE TECHNOLOGIES FOR CHRONIC DISEASE MANAGEMENT: AN ELECTRONICS ENGINEERING PERSPECTIVE	2
Özgür ÇAKICI Gökhan KAYA Serap KARACA	COMPARISON OF LIMBAL- CONJUNCTIVAL AUTOGRAFT AND BARE SCLERA COMBINED WITH MITOMYCIN C TECHNIQUE IN PRIMARY PTERYGIUM SURGERY	3
Muammer BUYUKINAN	A RARE CASE OF OSTEOPETROTRICKETS WITH THE COMBINATION OF INFANTILE MALIGN OSTEOPETROSIS AND RICKETS	4
Imane Kherrab Miloud Chakit Abdelhalem Mesfioui Aboubaker Elhessni	PROMISING INTERVENTION: THYME HONEY SUPPLEMENTATION AMELIORATES COGNITIVE FUNCTION IN HIGH FRUCTOSE-TREATED WISTAR RATS	6
Imane Kherrab Miloud Chakit Abdelhalem Mesfioui Aboubaker Elhessni	EXPLORING THE BENEFITS OF PROPOLIS SUPPLEMENTATION ON BRAIN HEALTH: CHRONIC STRESS AND OXIDATIVE STRESS IN THE PREFRONTAL CORTEX AND HIPPOCAMPUS	7
Hassane ABD-DADA	GENETIC DIVERSITY ANALYSIS OF A MEDICINAL PLANT (<i>EUPHORBIA RESINIFERA</i>) USES IN TRADITIONAL PHOTOTHERAPY, USING MOLECULAR MARKERS	8
Rayan Ikram ADDOUN	ON THE FOUNDATIONS OF CANCER MODELLING: SELECTED TOPICS, SPECULATIONS, AND PERSPECTIVES	9
Tuba UNVER	USABILITY OF HESPERIDIN, FLAVANONE GLYCOSIDE, AS A PHARMACOTHERAPEUTIC ANTIFUNGAL COMPOUND FOR <i>Candida</i> INFECTIONS	10
Etibaria Belghalia Abdelouahid Sbai Tahar Lakhlifia Mohammed Bouachrine	EXPLORING CANDIDATE COMPOUNDS TARGETING EGFR, HER2, AND ERA IN BREAST CANCER: VIRTUAL SCREENING AND DYNAMIC SIMULATION	11
Madhumitha S Yuvaraj M Muhammad Mujaahid Karthikeyan Elumalai	PREVALENCE OF ANEMIA IN CHRONIC KIDNEY DISEASE: A CROSS-SECTIONAL STUDY IN A TERTIARY CARE HOSPITAL	12
Swetha Suresh Pavithra Rajendran Santhosh Manoharan Karthikeyan Elumalai	THE EFFECTIVENESS OF SYZYGIUM CUMINI AQUEOUS EXTRACT IN PREVENTING OXYTOCIN-INDUCED PRETERM LABOR IN RATS: A TOCOLYTIC STUDY	13
Amine El Harfouf Abderrahim Wakif Sanaa Hayani Mounir	NUMERICAL INVESTIGATION OF NANOFLUID FLOW WITH GOLD NANOPARTICLES INJECTED INSIDE A STENOTIC ARTERY	14

Meryem Boutalaka Salma Elbahi Hamid Maghat Mohammed Bouachrine	IN SILICO ANALYSIS OF PHENOLIC COMPOUNDS IN VIRGIN OLIVE OIL: ANTI-INFLAMMATORY POTENTIAL	15
Necmettin ÇİFTÇİ Metin YILDIZ Ali KIRKSEKİZ	ATTITUDE SCALE TOWARDS ARTIFICIAL INTELLIGENCE IN NURSING EDUCATION: SCALE DEVELOPMENT STUDY	16
Sintayehu Assefa Yirga	THE EFFECT OF PULL AND PUSH DRIVERS ON BEHAVIORAL DRUG ADDICTION OF STREET CHILDREN: LESSONS FROM HAWASSA CITY: LESSONS FROM HAWASSA CITY	17
Ece Yarimoglu Okten Tugce Ceyhanli	THE SURFACE ROUGHNESS EVALUATION OF DIFFERENT INSTRUMENTATION METHODS ON IN VITRO STUDY MODELS: A PRELIMINARY PROFILOMETRIC STUDY	18
Rafik Abdelkrim Boudia Mehdi Adjdir Abdelkader Ammam	CHEMICAL COMPOSITION AND THERAPEUTIC EFFECTS OF <i>AMMODICUS LEUCOTRICUS</i> ESSENTIAL OILS ON NEUROBEHAVIORAL CHANGES IN WISTAR RATS AFTER EXPERIMENTAL SCORPION ENVENOMATION	19
Rima SAAD BOUZID Housna LABED Dounia HELLAL Ines BOUDIAF Hachani KHADRAOUI	EXPLORING THE MOLECULAR AND HISTOLOGICAL LANDSCAPE OF BREAST CANCER: PRELIMINARY FINDINGS IN EASTERN OF ALGERIA	22
Z. El Hamri M. Karaoui I. Maouhoubi M. Alami M. Assouag	PHYSICOCHEMICAL CHARACTERIZATION OF SNAIL SHELL POWDER PREPARED VIA MECHANOCHEMICAL PROCESSING AND THERMAL TREATMENT FOR MEDICAL APPLICATIONS	24
Vikranti Patel Kapila Manoj	EFFECTS OF DIFFERENT FEEDS ON THE PROXIMATE COMPOSITION OF <i>CATLA CATLA</i>	26
Gamze DEMİREL Mehmet GÜRBİLEK	NEUROINFLAMMATION-RELATED MiR-155 EXPRESSION IN MICROGLIA	27
Hassan BADAOUİ Mohamed OUABANE M'barek CHOUKRAD Mohammed BOUACHRINE	MODELING AND 3D-QSAR ANALYSIS OF SELECTED INDOLE-GLYOXAMIDE DERIVATIVES AS HIV-1 BINDING INHIBITORS USING MOLECULAR DOCKING, MOLECULAR DYNAMICS SIMULATIONS, AND ADME	34
Mohamed OUABANE Khadija ZAKI Hassan BADAOUİ Mohammed BOUACHRINE	2D-QSPR INVESTIGATION OF THE ODORANT MOLECULES' RELEASED RETENTION INDEX PROPERTIES IN PECTIN GELS AT VARIOUS ODORANT MOLECULE CONCENTRATIONS	36
Bardha IBISHI Viktor KOLOVSKI Vesna KARAPETKOVSKA – HRISTOVA Ivan PAVLOVIC	PROFILING PHENOLIC COMPOUNDS IN PROPOLIS: COMPARATIVE ANALYSIS ACROSS VARIOUS APIARIES IN N. MACEDONIA	38
Sylvia STAMOVA Neli ERMENLIEVA Emiliya GEORGIEVA Gabriela TSANKOVA Petar STAMOV	INTERACTIONS BETWEEN DAIRY PRODUCTS AND DRUGS: A REVIEW	40

Marieta Todorova Angelina Kirkova-Bogdanova Veselina Bukova Daniela Taneva	BONE HEALTH OF WOMEN OF BULGARIAN AND ROMA ORIGIN - RISK FACTORS	42
Amira Cherifa ZERARKA	ACUTE CORONARY SYNDROME: STEMI AND NSTEMI	43
Yasin GÖKÇE	INVESTIGATING THE EFFECTS OF ROFLUMILAST ON STORE-OPERATED CA ²⁺ ENTRY IN RAT BASOPHILIC LEUKEMIA CELLS	44
Zeynep YILDIZ KIZKIN Semra OĞUZ Semih AK	THE EFFECT OF GRADED MOTOR IMAGERY ON PAIN AND FUNCTION IN INDIVIDUALS WITH KNEE OSTEOARTHRITIS	45
Zeynep YILDIZ KIZKIN Rıdvan YILDIZ Ali Veysel ÖZDEN	EFFECTS OF TRANSCUTANEOUS AURICULAR VAGUS NERVE STIMULATION (taVNS) IN INDIVIDUALS WITH PRIMARY DYSMENORRHEA	46
Gamze DEMİREL Mehmet GÜRBİLEK	CYTOKINE CHANGES RESULTING FROM INFLAMMATION IN HaCaT CELLS	47
Esra Duman Mariya MAŞTA Ömer Furkan HALİS Yusufhan YAZIR Nihat Zafer UTKAN	Hsa-miR-217 EXPRESSION IN BREAST CANCER	53
Hande DEMİRTAŞ Nazlıhan EFE SAYAN Serap ALTUNTAŞ	EVALUATION OF THE EFFECTIVENESS OF DISASTER TRAINING PROVIDED TO HEALTH WORKERS	55
Aleyna KUŞKU Ayşe GÜNEŞ BAYIR	THE RELATIONSHIP BETWEEN CLIMATE CHANGE AND INFECTIOUS DISEASES	57
Ebru YILMAZ Nilgün AKGÜL Onur AKKURT	GOLDEN RATIO IN DENTISTRY	59
Ümmügülsüm KAYA Burcu Kübra SÜHA	AN ETHICAL PERSPECTIVE ON GENETICS IN NURSING CARE	66
Younes Fayand Mohammad Ali Balafar Reza Fayand	AN OVERVIEW OF THE USE OF ARTIFICIAL INTELLIGENCE ALGORITHMS IN THE DIAGNOSIS AND PREDICTION OF DISEASES	76
Elona Hasalla Ilda Taka Brikena Greca Elda Ruçi Blerta Hasalla Sulejman Baha Brandi Fahriu Klajdi Tarko Ana Topuzi Edmonda Ruda	THE ROLE OF SPINAL ANESTHESIA IN ORTHOPEDIC SURGERIES OF THE LOWER EXTREMITIES	77
Arzu Ibishova Chichak Mammadli Aziz Shabnam Ganbaeva	SCLEROSING ANGIOMATOID NODULAR TRANSFORMATION OF THE SPLEEN	79
Ibrahim Bala Yahaya Jamilu Lawal Ajjiya Abdu Mustapha	ASSESSMENT OF PERCEPTION, BEHAVIOUR AND PRACTICE OF PERSONAL HYGIENE AMONG INMATES IN CORRECTIONAL CENTRES OF KANO STATE, NIGERIA	80
Fatma Söğüt Halil Özkurt Hakan Kavur	EFFECTS OF SOUND WAVES AT DIFFERENT FREQUENCY THRESHOLDS ON HOUSEFLY MORTALITY	81

Adebola Aisha Damilola Ajjolakewu kamoldeen Abiodun Nimat Toyosi Ajide-Bamigboye	COMPARATIVE STUDY OF THE ANTIMICROBIAL EFFICACY OF POLAR AND NON POLAR EXTRACTS OF THE LEAVES OF LEMON GRASS AND MORINGA AGAINST SELECTED CLINICAL ISOLATES	82
Gökhan Can TÖRPÜ Müberra TANRIVERDİ Remzi DOĞAN Pınar SOYSAL Orhan ÖZTURAN	COMPARISON OF SWALLOWING DIFFICULTY IN GERIATRIC AND ADULT PATIENTS ACCORDING TO NUTRITIONAL STATUS AND AGE	84
Musa ÖZEKİNCİ Derya ALTAY Murat KOÇ	THYMOQUINONE ANALYSIS OF <i>NIGELLA SATIVA</i> L. (BLACK CUMIN) SEED OIL SOLD COMMERCIALY IN TURKEY	86
Damla ARTIKASLAN	THE RELATIONSHIP BETWEEN GENETICALLY MODIFIED ORGANISM (GMO) PRODUCTS AND CANCER CASES: THE IMPORTANCE OF EDUCATION	88
Berrin ÖZDİL BAY Damla EKER Sinan AKGÖL	NANOPARTICLE-BASED DRUG DELIVERY SYSTEMS FOR OVERCOMING THE BLOOD-BRAIN BARRIER	89
Zakariya Arbaoui Soufiane Elhadfi Mourad Boutahir Brahim Fakrach Abdelhai Rahmani Hassan Chadli Abdelali Rahmani	ARMCHAIR AND ZIGZAG PHOSPHORENE NANOTUBES: DFT STUDY	90
Narges Fathabadibozcheloei	ENHANCING FOOD QUALITY WITH <i>LACTOBACILLUS PLANTARUM</i> PROBIOTIC BACTERIA AND ITS EFFECT ON HEALTH	91
Esmâ CAGLAYAN Rafat SASANY	THE EMPLOYMENT OF PROBLEM-BASED LEARNING IN COMPLEX DENTAL CASES: A PROPOSAL FOR PROSTHODONTISTS	92
Dang Hoang Xuan Huy	EVALUATING THE HEALTH IMPACTS OF MARINE LITTER POLLUTION ON FISHING COMMUNITIES AND THE FISHERIES SECTOR IN VIETNAM: A CASE STUDY OF KHANH HOA, PHU YEN, AND NINH THUAN PROVINCES	93
Osman DERE Levent YAZMALAR Veysel DELEN	EVALUATION OF LUMBAR PARAVERTEBRAL MUSCLE AND SCIATIC NERVE STIFFNESS USING SHEAR WAVE ELASTOGRAPHY IN PATIENTS WITH LOW BACK PAIN AND SCIATALGIA	94
Fadoua LOUGLALI Abdeslam JAAFARI Hafida ZAHIR Mostafa EL LOUALI Hassan LATRACHE	GALLSTONES AND BIOFILMS: KEY FACTORS IN THE DEVELOPMENT OF GALLBLADDER CANCER	96
Mehmet KILIÇ	SHOULD A MEDIAL BUTTRESS PLATE BE USED WITH CANNULATED SCREWS IN NEGLECTED DISPLACED PAUWELS TYPE 3 FEMORAL NECK STRESS FRACTURE?	98

Mehmet KILIÇ	THE APPLICATION OF A DISTAL TIBIA ANTEROLATERAL ANATOMICAL PLATE TO THE POSTEROLATERAL SURFACE OF THE DISTAL TIBIA WITH A POSTEROLATERAL APPROACH IN TIBIA PILON FRACTURES ON THE CONTRALATERAL SIDE	99
SHUAEEB, A. I.	EFFECTS OF WATER POLLUTION ON THE HEALTH OF THE PEOPLE: A CASE STUDY OF GENERAL HOSPITAL KONTAGORA AREA OF NIGER STATE, NIGERIA	100
Irina-Ana DROBOT	TRAINING UNIVERSITY LEVEL TEACHERS AND ADMINISTRATION STAFF IN POPULAR PSYCHOLOGY	108
Arben Prifti	MALA PRAXIS MEDICA AND BIOLAW: A SYNTAGMA APPROACH	116
Burak Cemil BALIK Berna KAYA UĞUR Feyza YILMAZ Abidin Murat GEYİK	COMPARISON OF RADIOLOGICAL MEASUREMENTS MARKERS WITH CONVENTIONAL METHODS FOR PREDICTION OF DIFFICULT INTUBATION: A PROSPECTIVE DOUBLE-BLIND, OBSERVATIONAL STUDY	127
Gulnihal DENİZ Rukiye CİFTCI	ATTITUDES OF FIRST- AND SECOND-YEAR MEDICAL STUDENTS TOWARDS CADAVER-BASED AND MODEL-BASED EDUCATION IN ANATOMY	140
Dilek GÜLLER	AUTOIMMUNE SCLEROSING CHOLANGITIS AND CROHN'S DISEASE IN A PEDIATRIC PATIENT WITH AUTISM SPECTRUM DISORDER	148
Habil. Cristina Raluca Gh. POPESCU	ASSESSING AND MONITORING THE HEALTH-RELATED SUSTAINABLE DEVELOPMENT GOALS (SDGS): IMPERATIVE INDICATORS FOR TRACKING UNIVERSAL HEALTH COVERAGE (UHC) AND SIGNIFICANCE OF MEDICAL AND HEALTH SCIENCES	152
Habil. Cristina Raluca Gh. POPESCU Gheorghe N. Popescu	STRENGTHENING THE NEXUS HEALTH SYSTEMS, SUSTAINABLE DEVELOPMENT GOALS (SDGS), AND GLOBAL GROWTH: MEDICAL AND WELLNESS TOURISM MARKET AND THE CASE OF TURKEY AS LEADING DESTINATION FOR MEDICAL TOURISM	170
Burak Akın AYDEMİR Derya AZİM	THE EFFECT OF PHYSICAL ACTIVITY LEVEL ON SCHOOL ACHIEVEMENT AND SELF-EFFICACY IN YOUNG ADULT	190
Akram Hosseinian	NANO Co – MOFs BASED ON BTZ AS ANTIOXIDANT & ANTICANCER AGENT	195
Akram Hosseinian	SYNTHESIS, CRYSTAL STRUCTURE AND DNA BINDING STUDIES OF NEW Ag (I) COMPLEX WITH BITHIAZOLE	201
Akram Hosseinian	EVALUATION OF STEREO ACTIVITY OF LONE PAIR EFFECTS ON REMOVAL OF LEAD TOXICITY IN HUMAN BODY WITH BTZ	207
Sevinç ÇİÇEK	THE RELATIONSHIP OF PREGNANCY STRESS WITH INFANTY COLIC AND CHILDHOOD EPILEPSY	212
Dorina (Shuraja) Minxuri	INFLUENCE OF NUTRITIONAL FACTORS IN CHRONIC AUTOIMMUNE HASHIMOTO'S THYROIDITIS	217

Gamze KIZILHAN Safiye Elif ÇAĞATAY	THE MEDIATORY ROLE OF EMOTIONAL SCHEMAS AND COGNITIVE DISTORTIONS IN THE RELATIONSHIP BETWEEN ADVERSE CHILDHOOD EXPERIENCES IN CHILDHOOD AND BINGE EATING DISORDER IN ADULT INDIVIDUALS	230
Nazlıhan EFE SAYAN Serap ALTUNTAŞ	WORKLOAD IN NURSES AND MISSED NURSING CARE	244
Serhat YENTÜR Asilhan SABUNCU	HIGH GRADE PRIMARY TESTICULAR CARCINOMA TUMOR WITH A MULTIPLE METASTASIS: A CASE REPORT WITH SEVEN YEARS FOLLOW-UP	258
Gökhan Can TÖRPÜ Selva OTSAY Deniz TUNCER	HOW HYPERTENSION AFFECTS PHYSICAL ACTIVITY AND LIFE SATISFACTION IN OLDER ADULTS?	259
Noureddine Djilali Amine Ghelamallah Soltani Fatiha Fodil Mustafa Kamel Fayza Keddar Said Dahmani	IMPACT OF TREATED WASTEWATER ON THE PROFILE NUTRITIONAL PHYSICOCHEMICAL AND PHYTOCHEMICAL OLIVE OIL	260
Gökşen POLAT Melike TEKİNDAL Elif ÜNSAL AVDAL	THE MEANING OF THE INSULIN PUMP FOR CHILDREN WITH TYPE 1 DIABETES: A PHENOMENOLOGICAL STUDY	262
Irfan Ullah Nita Susanti Roostita L. Balia Saskia L Nasroen Ani Melani Maskoen Erli Sarilita	APPLICATION OF CAISPR-CAS9 TECHNOLOGY IN THE ZOONOTIC DISEASE LEPTOSPIROSIS AND BIOSECURITY CHALLENGES	263
Junaidu Na'aliya Ibrahim Kani Aminu	ANTIMICROBIAL ACTIVITY EVALUATION OF Zn(II) AND Co(II) COMPLEXES WITH NAPHTHALENE DERIVATIVES SCHIFF BASE	271
Betül KÖSE Yıldız ERDOĞANOĞLU	EXAMINATION OF CERVICAL AND LUMBAR REGION PAIN SEVERITY, MUSCLE STRENGTH, RANGE OF MOTION AND QUALITY OF LIFE IN INDIVIDUALS WITH COVID-19	281
Ali KARABULUT Betül GÜZELYÜZ Fikri ŞİRİN	LOCAL SUCRALPHATE APPLICATION IN A CASE OF PERSISTENT ANORECTAL ABSCESS FISTULA	290
Özlem AKIN Hilal Gül BOYRAZ YANIK Nülüfer ERBİL	LITERATURE REVIEW ON LOTUS BIRTH AND HEALTH OUTCOMES	292
Salih YABALAK Gökhan GÖRGİŞEN	BIOINFORMATIC ANALYSIS OF EXPRESSION AND METHYLATION STATUS OF MAPK15 IN KIDNEY RENAL CLEAR CELL CARCINOMA	298
Hilal Gül BOYRAZ YANIK Özlem AKIN Nülüfer ERBİL	COMPLEMENTARY ALTERNATIVE MEDICINE PRACTICES IN MENOPAUSE SYMPTOMS: A LITERATURE REVIEW	299
Amin Marandi Hooman Rahmati-Holasoo Hosseinali Ebrahimzadeh Mousavi Fatemeh Arabkhazaeli Sara Shokrpour Zahra Ziafati Kafi Alireza Nassiri Soroush Sarmadi	MORPHOLOGIC STUDY AND MOLECULAR CONFIRMATION OF <i>MYXOBOLUS SP.</i> (MYXOZOA: MYXOBOLIDAE) INFECTING GOLDFISH (<i>CARASSIUS AURATUS</i>)	312

Emmanuel Oluwatimileyin Matthew Ibrahim Abdulkarim Ozigi Abdulgafar Ishola Uthman Adeleye Adeyeri David	PHYTOCHEMICAL SCREENING OF COCONUT WATER AND BITTER LEAF EXTRACT AND ANTIBIOGRAM OF THE MIXTURE (COCONUT WATER + BITTER LEAF) ON <i>Salmonella typhi</i> and <i>Streptococcus Spp</i>	313
Muhammed Rashidat Ocheme Juliana Abdulgafar Ishola Uthman	MYCOLOGICAL ANALYSIS OF SPOILT <i>Colocassia escukenta</i> OBTAINED FROM SELECTED MARKETS (KAWO AND BAKINDOGO) WITHIN KADUNA METROPOLIS	323
Tülay YILDIRIM ÜŞENMEZ Aslan DİKMEN	ARE THE INDIVIDUALS WITH MENTAL ILLNESS HAPPY?	330
Mohcin Elkhatir Miloud Chakit Abdechahid Loukili Youssef Aboussaleh	ORGANIC FOOD CONSUMPTION AND ATTENTION PERFORMANCE IN 10-13 MOROCCAN PRIMARY STUDENTS FROM KHEMISSSET	338
Şükriye TÜRKÖĞLU KAYACI Zeynep SOLMAZGÜL YAZICI	TREATMENT OF EARLY CHILDHOOD CARIES IN ANTERIOR TEETH WITH PEDIATRIC ZIRCONIA CROWNS: 2 CASE REPORT	339
Taşkın Özkan Yasemin Ateş Sarı Nezhat Özgül Ünlüer	INVESTIGATION OF THE RELATIONSHIP BETWEEN FEAR OF FALLING AND TRUNK CONTROL IN PATIENTS WITH MULTIPLE SCLEROSIS	345
Gönül DÜZGÜN Kadriye TURAN Gökşen POLAT Elif KELEKÇİBAŞI Elif ÜNSAL AVDAL	PERCEPTIONS OF PALLIATIVE CARE NURSES ON DEATH WITH DIGNITY: A QUALITATIVE RESEARCH	347
Aslıhan Demir Safiye Özgünç	POST-TRAUMATIC GROWTH AND PSYCHOLOGICAL RESILIENCE IN INDIVIDUALS WHO EXPERIENCED AN EARTHQUAKE	349
Rajah, A. S. Yunusa, U. Tashi, F, T. Abdullahi, S. O. Tukuntawa, A. S.	NOVEL ECO-FRIENDLY MATERIALS USED FOR REUSABLE MENSTRUAL PADS: A SCOPING REVIEW	354
Rajah, A. S. Yunusa, U. Tashi, F, T. Abdullahi, S. O. Tukuntawa, A. S.	EVALUATION OF MICROBIAL LOAD OF REUSABLE MENSTRUAL PADS AND THE ASSOCIATED RISKS OF INFECTION	356
Pinmanee Vajrapatkul Adirek Vajrapatkul	PREDICTIVE MODELING OF HEART DISEASE USING RANDOM FOREST CLASSIFICATION: A COMPARATIVE STUDY WITH LOGISTIC REGRESSION AND SVC	357
Pinmanee Vajrapatkul Boonta Wayupab Adirek Vajrapatkul	ENHANCED CNN MODEL FOR ACCURATE CLASSIFICATION OF BRAIN TUMORS FROM MRI SCANS	368
Ivan PAVLOVIC	PREVALENCE OF TOXASCARIS LEONINA IN PETS DOGS IN BELGRADE AREA	380
Abdelhamid QARA Mohamed OUABANE Chakib SEKKATE Samir CHTITA Tahar LAKHLIFI Mohammed BOUACHRINE	DESIGN OF NEW AROMATIC TERTIARY AMINE- BASED AS BUTYRYLCHOLINESTERASE INHIBITORS RELYING ON MOLECULAR DOCKING, ADME-TOX AND MOLECULAR DYNAMICS	381

Eren ÖZEN Melike Sümeyye ÖZEN Ebru KAYA MUTLU	RELATIONSHIP BETWEEN THE STRENGTH AND ENDURANCE OF CORE STABILITY MUSCLES WITH PAIN AND FUNCTIONALITY IN PATIENTS WITH SUBACROMIAL IMPINGEMENT SYNDROME	383
Ananda Majumdar	RURAL AND URBAN HEALTH PROCUREMENT IN COVID-19 PREVENTION MANAGEMENT AND BEHAVIORAL CONDUCT	390
Betül DANIŞMAN	INVESTIGATION OF THE EFFECTS OF SODIUM ARSENATE EXPOSURE ON PERIPHERAL TISSUES	397
Şükriye TÜRKÖĞLU KAYACI Zeynep SOLMAZGÜL YAZICI	OPEN BITE TREATMENT WITH FIXED AND REMOVABLE HABIT-BREAKER APPLIANCES: 2 CASE REPORTS	398
Safak MIRIOĞLU	COMPARISON OF VARIOUS FEATURES AND OUTCOMES IN ADULTS WITH IMMUNE COMPLEX MEMBRANOPROLIFERATIVE GLOMERULONEPHRITIS AND C3 GLOMERULOPATHY	403
Salma El Bahi Meryem Boutalaka M'barek Choukrad Abdelouahid Sbai Mohammed Bouachrine	IN-SILICO INVESTIGATION OF OSIMERTINIB BASED COMPOUNDS AS POTENTIAL DOUBLE MUTANT EGFR KINASE INHIBITORS. INTEGRATING QSAR MODELING, MOLECULAR DOCKING, MD SIMULATIONS, AND ADME/TOX STUDIES	405
Fedwa BEGHDADI El-Hadj DRICHE	THE INHIBITION OF SOME PHYTOPATHOGENIC FUNGI BY ACTINOBACTERIA ISOLATED FROM ALGERIAN SAHARAN SOILS	407
Fedwa BEGHDADI El-Hadj DRICHE	ALTERNARIA IS A DISEASE THAT THREATENS TOMATO CROPS	408
Yeganeh Mazaheri Parisa Sadighara Ebrahim Molaee-aghaee Nabi Shariati Far	THE EFFECT OF ANTIOXIDANT ON POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)	409
Büşra ERGİN Esra ERGİN	INVESTIGATION OF POSTGRADUATE THESES ON CANCER AND CHILD CONTEXT: THE CASE OF TURKEY	410
Aliye ÖZENOĞLU Gül Eda KILINÇ Yasemin AÇAR	RELATIONSHIP BETWEEN GASTROESOPHAGEAL REFLUX AND NIGHT EATING SYNDROME AND DEPRESSION, ANXIETY AND STRESS LEVELS IN UNIVERSITY EMPLOYEES	416
Fatmanur BALAMUT Özge ÖZ YILDIRIM	ADAPTATION TO DISEASE AND NURSING APPROACH IN ELDERLY PEOPLE WITH CHRONIC DISEASES	426
Büşra ERGİN Esra ERGİN	AN INVESTIGATION OF POSTGRADUATE THESES PREPARED IN TURKEY IN THE CONTEXT OF CHILDREN AT RISK	434
KEDDAR Fayza BOUALEM Malika BRADA Moussa BENGUENNOUNA Nouredine	EVALUATION OF THE ANTIBACTERIAL ACTIVITY OF <i>URTICA DIOICA</i> ESSENTIAL OIL ON THREE STRAINS RESPONSIBLE FOR URINARY TRACT INFECTIONS	440
Zakariya Arbaoui Oussama Boutahir Abdelhai Rahmani	RAMAN SPECTROSCOPY: PHOSPHORENE AND PHOSPHORENE NANORIBBONS	441

Berrin ÖZDİL BAY Yagmur DINDORUK Sinan AKGÖL	TELOMERASE AS A BIOMARKER AND THERAPEUTIC TARGET IN CANCER: RECENT DEVELOPMENTS AND FUTURE PROSPECTS	442
Patrycja WIDŁAK Dariusz BOGUSZEWSKI Jakub ADAMCZYK Bartłomiej MICHALAK	FUNCTIONAL ASSESSMENT OF MALE ATHLETES COMPETING IN THE MASTERS CATEGORY	444
Valeh Rahimov Alovsat Aliyev Cümşüd Ramazanov Şabnam Rahimli Farah Rahimova	RISK ASSESSMENT OF ULCERATIVE GASTRODUODENAL BLEEDING RECURRENCE	446
Fatma KARASU Filiz POLAT	VIOLENCE AGAINST MIGRANT WOMEN AND THE ROLE OF THE NURSE	448
Filiz POLAT Fatma KARASU	INVESTIGATION OF THE RELATIONSHIP BETWEEN IMMIGRANT PERCEPTION AND INTERCULTURAL SENSITIVITY AMONG MIDWIFYING DEPARTMENT STUDENTS	450
Aziz KORKMAZ	CHANGES IN SOME QUALITY CHARACTERISTICS OF AYVALIK TYPE TABLE OLIVES DURING STORAGE	459

GAMIFICATION AND ENABLING TECHNOLOGIES FOR HEALTHY AGEING**David WORTLEY**

ORCID: 0000-0001-5598-6987

Mr David John Wortley FRSA, 360in360 Immersive Experiences, Alderton, United Kingdom,

Abstract

The global demographic shift towards an ageing population presents significant challenges and opportunities for enhancing the quality of life and health of older adults. Gamification, the application of game design elements in non-game contexts, combined with enabling technologies, offers a promising approach to address these challenges. This abstract explores the integration of gamification and enabling technologies to promote healthy ageing, focusing on their potential to improve physical, mental, and social well-being among older adults.

Studies have shown that gamified interventions can lead to increased physical activity, better adherence to medication and therapy regimens, and enhanced cognitive functioning. Additionally, social gamification elements can reduce feelings of loneliness and isolation by fostering community and social connections among older adults. The adaptability of gamification allows for personalized experiences that cater to individual preferences and needs, making it a versatile tool in promoting healthy ageing.

In this presentation, the author will reflect on the impact of technological developments over the last 10 years from early wearable devices and applications such as the Jawbone UP to present day highly sophisticated and personalised gamified diet and exercise applications such as Zoe and Longevity.

In conclusion, the synergy between gamification and enabling technologies holds significant promise for improving the health and well-being of older adults. By fostering engagement, motivation, and social connectivity, these innovative approaches can contribute to a more active, fulfilling, and healthy ageing process.

Keywords: Digital Health, Preventative Healthcare, Gamification, Behaviour Change, Physical Health

**ADVANCED TELEMEDICINE TECHNOLOGIES FOR CHRONIC DISEASE
MANAGEMENT: AN ELECTRONICS ENGINEERING PERSPECTIVE****Muhammad Mateen Afzal Awan**

University of Management and Technology Lahore PAKISTAN

Mehmooona Javed Awan

University of Management and Technology Lahore PAKISTAN

Abstract

Integrating advanced telemedicine technologies is transforming chronic disease management, offering innovative solutions for continuous monitoring and patient care. This paper explores the development and application of cutting-edge electronic systems in telemedicine, focusing on their role in managing chronic conditions such as diabetes, hypertension, and heart disease. We review the design and implementation of wearable devices, remote monitoring systems, and smart healthcare platforms, highlighting their impact on patient outcomes, data accuracy, and system reliability. A comprehensive analysis of recent advancements in sensor technology, wireless communication, and data encryption is provided, emphasizing their contributions to improving the efficacy and security of telemedicine solutions. The study also addresses the challenges in integrating these technologies into existing healthcare infrastructures and presents potential strategies to overcome them. Our findings underscore the critical role of electronics engineering in advancing telemedicine, advocating for continued innovation and collaboration across disciplines to enhance chronic disease management and patient quality of life.

**COMPARISON OF LIMBAL- CONJUNCTIVAL AUTOGRAFT AND BARE SCLERA
COMBINED WITH MITOMYCIN C TECHNIQUE IN PRIMARY PTERYGIUM
SURGERY****Özgür ÇAKICI**

Goztepe Prof. Dr. Süleyman Yalçın City Hospital, Department of Ophthalmology, Istanbul, Turkey

ORCID ID: <https://orcid.org/0000-0003-2839-2301>**Gökhan KAYA**

Bağcılar Training and Research Hospital, Ophthalmology, Istanbul, Turkey

ORCID ID: <https://orcid.org/0000-0001-5924-2096>**Serap KARACA**

Goztepe Prof. Dr. Süleyman Yalçın City Hospital, Department of Ophthalmology, Istanbul, Turkey

ORCID ID: <https://orcid.org/0000-0003-0325-2804>**Abstract****Introduction and Purpose:** To compare the effect of limbal-conjunctival autograft and Bare Sclera Combined with Mitomycin C Technique in the treatment of primary pterygium**Materials and Methods:** A total of 35 eyes of 25 patients with primary pterygium underwent limbal conjunctival autografting excision in group 1; 19 eyes (% 54.2) and Bare Sclera Combined with Mitomycin C Technique surgery group 2; 16 eyes (% 45.8). Surgical time, complications and recurrence rates were recorded of patients.**Results:** The mean follow-up period was 14.52±5.25 (9-18) months and 14.65±5.32 (9-18) months in the group 1 and group 2, respectively (p=0.94). The operation duration was 17.13±2.8 (14-20) minutes in the group 2 and 29.4±6.2 (23-37) minutes in the group 1 (p <0.001). There were no recurrences in the group 1 and one recurrences in the group 2 in 3 months. Postoperative complications was not statistically different between the two groups.**Conclusion:** Both limbal-conjunctival autograft and Bare Sclera Combined with Mitomycin C Technique procedures are safe and effective methods for pterygium surgery. Bare Sclera Combined with Mitomycin C Technique in recurrent surgery reduces operative time and patient symptoms.**Key Words:** Limbal conjunctival autograft, Primary pterygium, Mitomycin C, Sclera

A RARE CASE OF OSTEOPETRORICKETS WITH THE COMBINATION OF INFANTILE MALIGN OSTEOPETROSIS AND RICKETS**Muammer BUYUKINAN**

Selcuk University Medical School, Department of Pediatric Endocrinology, Konya, Turkey

ORCID ID: <https://orcid.org/0000-0002-2937-823X>**Abstract**

Introduction: Osteopetrosis is a very rare and clinically and genetically heterogeneous disease, characterized by increased bone density on radiographs, resulting from disorders in osteoclast differentiation or functions. The balance between bone formation and resorption is disrupted in Osteopetrosis, and excessive mineralization in bone tissue causes bone fragility with a wide range of clinical phenotype variability, from the severe form that results in mortality in the first years of life to the mild form diagnosed in adulthood. As well as skeletal system and dental disorders, disorders in mineral homeostasis, findings of bone marrow failure that occurs because of the expansion of progressive sclerotic bone into the bone marrow cavities, and hepatosplenomegaly because of extramedullary hematopoiesis can lead to neurological dysfunctions such as blindness, deafness, and nerve paralysis after the compression of the cranial nerve foramen by the sclerotic bone. Here, a 2-month-old female patient who presented with hypocalcemia, and hypophosphatemia, and was diagnosed with Osteopetrorickets with nystagmus, organomegaly, and skeletal radiography findings and rickets findings is presented.

Case: A two-month-old female patient was hospitalized to investigate symptomatic hypocalcemia because her Ca level was 5.2 mg/dL because of generalized convulsion. In the anamnesis, she was admitted to the Emergency Department because of a convulsion when she was 7 days old, admitted to the Neonatal Intensive Care Unit after hypocalcemia, hypophosphatemia, low vitamin D, and high PTH were detected. Then, calcium, phosphorus, and vitamin D treatment was started, her hypocalcemia improved immediately with calcium treatment, and when her hypophosphatemia persisted, she was admitted to the Neonatal Intensive Care Unit. It was learned that she was discharged after being called to the clinic for phosphorus and vitamin D treatment.

The patient was born after a normal birth at 39 weeks, weighing 3700 grams, and her prenatal-perinatal history was unremarkable in her medical history. There was a history of consanguineous marriage between the parents in her family history, and there was no history of bone metabolism disease in the family.

In her physical examination, her weight was 6000 g (0.79 SDS), height was 56 cm (-0.96 SDS), head circumference was 41 cm (0.94 SDS), fontanel was normal, object tracking was poor and vertical nystagmus, and hepatosplenomegaly were detected. Other system examinations were normal.

In her laboratory tests, Ca 6.9 mg/dL, P 4.9 mg/dL, Mg 1.98 mg/dL, ALP 881 U/L, PTH 90 pg/ml (15-65), D-vit 10.5 ug/L, spot urine showed Ca <0.8, TPR 98%, hemogram was normal, LDH 992 U/L (120-300), ALT 12U/L, AST 53 U/L, BG 90mg/dL, creatinine 0.15mg/dL, CK 409 (26-192), and CK MB 5.46 ng/ml (0-3.6). Intravenous and oral calcium treatment was initiated for the patient along with oral phosphorus treatment because of hypophosphatemia during follow-up, and calcitriol treatment because of borderline hypocalcemic values that continued despite high doses of calcium. The oral phosphorus dose was constantly increased. ALP value normalized within 1 month. In direct bone radiographs, there was a healed fracture line in the left clavicle, widening and irregularity in

the metaphysis in the long bone structures in the upper and lower extremities. A diffuse increase was detected in direct radiographs in density in the bone structures in the vertebral column, calvarium, both upper and lower extremities, and hip bones. Findings that were consistent with Osteopetrosis were noted in the craniography and vertebral radiographs. Cranial CT-EEG-VEP-BAEP- metabolic scans -ECHO-cardiological evaluation- Cranial MRI results were evaluated as normal. Osteopetrosis was considered in the patient because of the thrombocytopenic values, hepatosplenomegaly, nystagmus, LDH, and CK increase detected during the follow-up along with the direct radiography findings. As well as the clinical and laboratory findings of rickets, a c.1384_1386del homozygous pathogenic variant was detected in the TCIRG1 Gene Analysis, which was specifically requested for the differential diagnosis of Osteopetrorickets because of the association with Osteopetrosis. Calcium lactate, joule solution, and calcitriol treatment of the patient, who was diagnosed with Infantile Malignant Osteopetrosis + Rickets, was continued. During the follow-up, hypocalcemia and hypophosphatemia started to improve after the 2nd month, and an improvement was detected in the radiography findings of Rickets. Genetic counseling was given, the Pediatric Hematology Unit was consulted, and after the necessary preparations, the patient underwent Hematopoietic Stem Cell Transplantation (HSCT) at the age of 7.5 months.

Conclusion: Osteopetrosis is a very heterogeneous and rare disease presenting with clinical findings with typical skeletal radiography findings, vision, hearing, neurological findings, and bone marrow failure. In contrast to the increase in bone density, which is the typical finding in Osteopetrosis, hypocalcemia, hypophosphatemia, as well as rickets symptoms may accompany in patients with TCIR1 gene mutation, causing Osteopetrorickets. Osteopetrosis should be kept in mind in patients with rickets that do not show a typical clinical course. Early diagnosis of Osteopetrosis, whose severe forms can be mortal, and HSCT at an early age are lifesaving.

Keywords: Osteopetrosis, Osteopetrorickets, hypophosphatemia, TCIRG1 gene mutation

**PROMISING INTERVENTION: THYME HONEY SUPPLEMENTATION
AMELIORATES COGNITIVE FUNCTION IN HIGH FRUCTOSE-TREATED WISTAR
RATS**

Imane Kherrab

Biology and Health Laboratory, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco

Miloud Chakit

Biology and Health Laboratory, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco

Abdelhalem Mesfioui

Biology and Health Laboratory, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco

Aboubaker Elhessni

Biology and Health Laboratory, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco

Abstract

Thyme honey is known for its anti-inflammatory, analgesic and antibacterial capacity as well as its ability to promote wound healing. This study aims to evaluate the effect of honey supplementation memory ability in adolescence High Fructose diet (HFD) Wistar rats during prepuberty and adolescence. For this reason, we adopted experimental research carried out on 24 rats divided into 3 groups of 8 rats foreach, control group (C): receiving normal diet, group 2: fructose (F), treated with fructose 23% /day for6 weeks and group 3: Fructose + honey (FH), treating in 6 weeks fructose feeding combined to 2 weeks of thyme honey supplementation (5g/Kg/day). After 8 weeks of experience, working and recognition memory were evaluated using the Object Recognition (OR) Y-maze and Barne maze tests. Honey supplementation significantly increased the recognition index ($p < 0.01$; +67%) as compared with the HFD group and were able to prevent this effect on the memory induced by the HFD ($p < 0.01$). This may be due to a reduction in the production of factors of attacks and/or an increase in the synthesis of protective factors. Fructose diet alters body and organs weight, Honey supplementation decreased body weight. A fructose rich diet improves memory ability in rats. Honey administration could serve as potential therapeutic agents for memory impairment caused by HFD.

Keywords. Honey Supplementation, Memory, High Fructose Diet, Wistar Rats.

EXPLORING THE BENEFITS OF PROPOLIS SUPPLEMENTATION ON BRAIN HEALTH: CHRONIC STRESS AND OXIDATIVE STRESS IN THE PREFRONTAL CORTEX AND HIPPOCAMPUS**Imane Kherrab**

Biology and Health Laboratory, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco

Miloud Chakit

Biology and Health Laboratory, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco

Abdelhalim Mesfioui

Biology and Health Laboratory, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco

Aboubaker Elhessni

Biology and Health Laboratory, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco

Abstract

Collected evidence highlights the strong effect of propolis due to its benefits on neurobiological enhancement. Chronic stress in prepuberty and adolescence periods has critical effect in adult age inducing various diseases, mood disorders and inflammatory pathologies. This study aims to investigate the effect of unpredictable chronic mild stress (UCMS) and methanolic extract of propolis (MEP) supplementation on nitric content as oxidative stress parameter. For this evaluation, rats were randomly divided into three groups including control group. Stressed group was exposed to UCMS for 6 weeks. The treated group received 200 mg/kg/day for 2 weeks. Our data shows that stress in prepuberty and adolescence increased the level of nitrite content in the prefrontal cortex and hippocampus. Thus, the supplementation with propolis effectively reversed these results. These findings suggest that the strong regulation effect of propolis extract is linked to its anti-oxidative properties.

Keywords: propolis, brain, unpredictable chronic mild stress, oxidative stress, antioxidant activity.

GENETIC DIVERSITY ANALYSIS OF A MEDICINAL PLANT (*EUPHORBIA RESINIFERA*) USES IN TRADITIONAL PHOTOTHERAPY, USING MOLECULAR MARKERS

Hassane ABD-DADA

Faculty of Sciences and Techniques, Sultan Moulay Slimane University, Beni Mellal, Morocco

ORCID ID: <https://orcid.org/0009-0004-5214-3043>

Abstract

Euphorbia resinifera is a melliferous, medicinal and endemic plant to Morocco. Its ecological and genetic diversity are not known. The objective of this study is to analyze the diversity and genetic structure of Moroccan wild populations of *E. resinifera* using ISSR markers. 12 natural populations collected from its geographical area in Morocco were analyzed using 14 ISSR markers.

The plant material used in this study included twelve natural populations representing the distribution area of *E. resinifera* in Morocco. A total of 14 ISSR primers previously displayed reliable and polymorphic band profiles were used in this work. A total of 125 bands were generated, with polymorphism of 74.81%. The polymorphic information content (PIC), resolving power (Rp), Shannon's information index (I) and total genetic diversity (Ht) were 0.33, 2.8, 0.35 and 0.21, respectively. The analysis of molecular variance showed that 75.56% of the total variability is present within population and that 24.44% exists among population. Moreover, the geographical distances between populations are correlated with their corresponding genetic distances according to the Mantel test ($r= 0.507$; $P < 0.0001$).

This study underscores the importance of preserving the genetic diversity of *E. resinifera* and the knowledge associated with its use in traditional medicine. The results offer valuable insights for the management and enhancement of this endemic and medicinal species in Morocco, while highlighting the ongoing relevance of traditional phytotherapy.

Keywords *Euphorbia resinifera*, genetic diversity, ISSR, medicinal plant, phytotherapy

**ON THE FOUNDATIONS OF CANCER MODELLING: SELECTED TOPICS,
SPECULATIONS, AND PERSPECTIVES****Rayan Ikram ADDOUN**

University m'hamed Bougara of Boumerdes, Algeria

<https://orcid.org/0009-0005-0467-6950>**Abstract**

Bellomo, Li, and Maini (2008) delve into foundational aspects of cancer modeling using mathematical methods. The article explores how mathematical models are applied to decipher the intricate dynamics of cancer growth and treatment strategies. The authors stress the significance of merging biological insights with mathematical frameworks to construct comprehensive models. Key topics include the application of reaction-diffusion equations, multiscale modeling techniques, and the influence of spatial heterogeneity on tumor development. Moreover, the article speculates on future trends in cancer modeling, advocating for predictive and clinically relevant models. In essence, it offers a thorough overview of mathematical principles and their role in advancing cancer research.

Keywords: Cancer modeling, Mathematical methods, Reaction-diffusion equations, Multiscale modeling.

References

Bellomo, N., Li, N. K., & Maini, P. K. (2008). On the foundations of cancer modelling: Selected topics, speculations, and perspectives. *Mathematical Models and Methods in Applied Sciences*, 18(4), 593-646.

USABILITY OF HESPERIDIN, FLAVANONE GLYCOSIDE, AS A PHARMACOTHERAPEUTIC ANTIFUNGAL COMPOUND FOR *Candida* INFECTIONS**Tuba UNVER**

Inonu University, Faculty of Pharmacy, Department of Pharmaceutical Microbiology, Malatya, Turkiye

ORCID ID: <https://orcid.org/0000-0002-8655-2716>**Abstract**

Introduction and Purpose: Hesperidin, a flavanone glycoside, has shown promise in various pharmacological activities, including anticarcinogenic, anti-inflammatory, and antimicrobial. Although various studies proving the antibacterial properties of hesperidin are found in the literature, its clinical applications are hindered by its water solubility and low bioavailability. By exploring the antifungal activity of hesperidin, this study could contribute to developing novel hesperidin-based pharmaceutical formulations, addressing a current limitation in the field.

Materials and Methods: The antifungal activity of hesperidin (C₂₈H₃₄O₁₅) (BLDpharm, Shanghai, China) was tested on five *Candida* species. The fungal species tested were *Candida tropicalis* (ATCC 13803), *Candida krusei* (ATCC 14243), *Candida glabrata* (ATCC 2001), *Candida parapsilosis* (ATCC 22019) and *Candida albicans* (ATCC 14053). The Minimum Inhibitory Concentration (MIC) of hesperidin was determined individually against the five strains tested using the resazurin-based microdilution method. The experimental protocol was carried out by dissolving hesperidin in dimethylsulfoxide and adjusting its ratio in sabouraud broth to 30 mg/mL in the first wells on the microplate, then diluting two-fold.

Results: As a result of this study, the MIC value of hesperidin against *C. tropicalis*, *C. glabrata*, and *C. parapsilosis* was found to be 7.5 mg/mL. The MIC value of hesperidin against *C. krusei* and *C. albicans* was found to be 15 mg/mL.

Discussion and Conclusion: Although hesperidin has no selective inhibitory effect among *Candida* species, its MIC values are close. The antifungal mechanism of hesperidin is thought to be caused by damaging the microbial cell wall, leading to leakage of microbial macromolecules (biological macromolecules such as proteins and DNA) through the production of reactive oxygen species (ROS). These significant findings highlight the potential of hesperidin as a natural antifungal agent, offering a crucial compound for preventing and treating fungal infections.

Key Words: Hesperidin; Flavanone glycoside; Antifungal activity; *Candida* sp.; non-*albicans Candida*

EXPLORING CANDIDATE COMPOUNDS TARGETING EGFR, HER2, AND ERA IN BREAST CANCER: VIRTUAL SCREENING AND DYNAMIC SIMULATION**Etibaria Belghalia**

Molecular chemistry and Natural Substances Laboratory, Faculty of Science, University Moulay
Ismail, Meknes, Morocco
ORCID ID: <https://orcid.org/0000-0001-6813-3887>

Abdelouahid Sbai

Molecular chemistry and Natural Substances Laboratory, Faculty of Science, University Moulay
Ismail, Meknes, Morocco

Tahar Lakhlfia

Molecular chemistry and Natural Substances Laboratory, Faculty of Science, University Moulay
Ismail, Meknes, Morocco

Mohammed Bouachrine

Molecular chemistry and Natural Substances Laboratory, Faculty of Science, University Moulay
Ismail, Meknes, Morocco

Abstract

Breast cancer is a major global health issue for women. This study seeks innovative, affordable treatments by targeting the Estrogen receptor ER α , EGFR, and HER2 with active compounds. We analyzed 72 Baloxavir derivatives via molecular docking in PyRx software. Of 32 selected compounds, seven had promising ADMET properties. AutoDock 4.2 identified six potential inhibitors for ER α and HER2, and three for EGFR. A 100 ns molecular dynamics simulation confirmed the stability of the top compound, using metrics like RMSD, RMSE, Radius of Gyration, MolSA, SASA, and protein-ligand interactions. This research aims to enhance breast cancer therapy by overcoming current treatment challenges.

PREVALENCE OF ANEMIA IN CHRONIC KIDNEY DISEASE: A CROSS-SECTIONAL STUDY IN A TERTIARY CARE HOSPITAL**Madhumitha S**

Department of Pharmaceutical Chemistry, Saveetha College of Pharmacy, Saveetha Institute of Medical and Technical Sciences, Chennai-602105, Tamilnadu, India

Yuvaraj M

Department of Pharmaceutical Chemistry, Saveetha College of Pharmacy, Saveetha Institute of Medical and Technical Sciences, Chennai-602105, Tamilnadu, India

Muhammad Mujaahid

Department of Pharmaceutical Chemistry, Saveetha College of Pharmacy, Saveetha Institute of Medical and Technical Sciences, Chennai-602105, Tamilnadu, India

Karthikeyan Elumalai

Department of Pharmaceutical Chemistry, Saveetha College of Pharmacy, Saveetha Institute of Medical and Technical Sciences, Chennai-602105, Tamilnadu, India

Abstract

Anemia, a prevalent complication of chronic kidney disease, is associated with negative health outcomes, including an increased risk of mortality and hospitalization. Chronic kidney disease can cause anemia in a number of ways, including inflammation that raises hepcidin levels and lowers the body's own production of erythropoietin. In a cross-sectional and observational study spanning a six-month period at a tertiary care hospital, 132 patients with chronic kidney disease were analyzed for anemia prevalence. The largest age group, constituting 35.6% of participants, consisted of patients aged 40–50. The prevalence of chronic kidney disease was higher in male patients (67.43%) than in female patients (32.57%). The majority of participants had hemoglobin readings between 7 and 9 g/dL. The prevalence of stage 1 chronic kidney disease was notably high, affecting 46.2% of the population. The most prevalent risk factor was hypertension (41.6%), followed by old age (20.2%). The most frequently prescribed medications were those for the digestive system and metabolism (44.86%), then those for the cardiovascular system (21.81%), medications for blood disorders and blood-forming organs (20.12%), and vitamin and mineral supplements (18.42%). In this analysis, a substantial majority of participants with chronic kidney disease were anemic. It is crucial to develop personalized treatment plans for each patient. To address the current situation, periodic screening and intervention programmes for anemia in chronic kidney disease should be implemented. These programmes should include regular monitoring of hemoglobin levels and appropriate adjustments to medication dosages. Additionally, educating patients on the importance of maintaining healthy iron levels through diet and supplementation can help improve outcomes in this population.

Keywords: Anemia, chronic kidney disease, prevalence, tertiary care hospital, hemoglobin, hypertension.

THE EFFECTIVENESS OF SYZYGIIUM CUMINI AQUEOUS EXTRACT IN PREVENTING OXYTOCIN-INDUCED PRETERM LABOR IN RATS: A TOCOLYTIC STUDY

Swetha Suresh

Department of Pharmaceutical Chemistry, Saveetha College of Pharmacy, Saveetha Institute of Medical and Technical Sciences, Chennai-602105, Tamilnadu, India

Pavithra Rajendran

Department of Pharmaceutical Chemistry, Saveetha College of Pharmacy, Saveetha Institute of Medical and Technical Sciences, Chennai-602105, Tamilnadu, India

Santhosh Manoharan

Department of Pharmaceutical Chemistry, Saveetha College of Pharmacy, Saveetha Institute of Medical and Technical Sciences, Chennai-602105, Tamilnadu, India

Karthikeyan Elumalai

Department of Pharmaceutical Chemistry, Saveetha College of Pharmacy, Saveetha Institute of Medical and Technical Sciences, Chennai-602105, Tamilnadu, India

Abstract

The aim of this research was to investigate the effectiveness of the aqueous extract of *Syzygium cumini* (AESC) in preventing oxytocin-induced preterm labor in rats. The study involved administering AESC and Atosiban to pregnant rats from day one until delivery. On day 14 of gestation, the rats were given oxytocin, and the tocolytic effects of AESC were assessed. The antioxidant activity of AESC was also tested in vitro using the DPPH and ABTS radical scavenging assays, which showed that the extract has free radical scavenging activity that can help prevent preterm labor. In addition, in-vitro pharmacological testing was conducted on a portion of the isolated rat uterus, and it was found that the concentrations of 25 mg/mL and 50 mg/mL effectively suppressed uterine contractions by 45.7% and 66.9%, respectively. The results suggest that the aqueous extract of *Syzygium cumini* bark has considerable tocolytic activity, as demonstrated by a decrease in the rate of preterm birth. The researchers also said that more research could be done to find out how the tocolytic activity of *Syzygium cumini* bark works and how it could be used to stop babies from being born before they're due. For example, in the future, scientists could look into the molecular pathways that *Syzygium cumini* bark uses to break down tocolytic cells. They might also think about how to make new drugs that target these pathways to stop babies from being born before they're due.

Keywords: *Syzygium cumini*, aqueous extract, preterm labor, Oxytocin, Tocolytic, Antioxidant, Rat uterus.

NUMERICAL INVESTIGATION OF NANOFLUID FLOW WITH GOLD NANOPARTICLES INJECTED INSIDE A STENOTIC ARTERY**Amine El Harfouf**

Multidisciplinary Laboratory of Research and Innovation (LaMRI), Energy, Materials, Atomic and Information Fusion (EMAFI) Team, Polydisciplinary Faculty of Khouribga, Sultan Moulay Slimane University, Morocco

Abderrahim Wakif

Hassan II University, Faculty of Sciences Ain Chock, Laboratory of Mechanics, Casablanca, Morocco

Sanaa Hayani Mounir

Multidisciplinary Laboratory of Research and Innovation (LaMRI), Energy, Materials, Atomic and Information Fusion (EMAFI) Team, Polydisciplinary Faculty of Khouribga, Sultan Moulay Slimane University, Morocco

Abstract

The primary objective of the existing framework is to examine the significance of gold nanoparticles immersed in human blood when magnetohydrodynamics (MHD) flow occurs within a stenotic artery. Gold nanoparticles are employed as nanomaterials for medication delivery primarily because of their potential for drug transport and imaging. The blood's warmth and velocity gradually decrease as the size of the gold nanoparticles increases. In addition, the effects of thermal radiation and heat source-sink are taken into account. Using a technique of appropriate similarity transformations, the partial differential equations (PDEs) were transformed into dimensionless ordinary differential equations (ODEs). Then, the ODEs were solved numerically and graphically using the `bvp4c` built-in solver in the mathematical program MAPLE. Then, using a shooting technique, higher order ordinary differential equations (ODEs) were solved. Graphs elaborate on the physical regulating parameters' results, such as temperature and velocity profiles. As the Biot number and thermal radiation parameter increase, the Biot number is estimated more highly, and the Nusselt number rises, but when the suction or injection parameter is used, it decreases. For the delivery of drugs, the gold nanoparticles are highly helpful, and the thermal distribution profile exhibits an increasing behavior. The current method has the potential to be very helpful in effective blood medication delivery.

Keywords: Nanofluid; Gold nanoparticles; MHD Thermal radiation; Blood; HPM

IN SILICO ANALYSIS OF PHENOLIC COMPOUNDS IN VIRGIN OLIVE OIL: ANTI-INFLAMMATORY POTENTIAL**Meryem Boutalaka**

Molecular Chemistry and Natural Substances Laboratory, Department of Chemistry, Faculty of Science, University of Moulay Ismail, Meknes, Morocco

Salma Elbahi

Molecular Chemistry and Natural Substances Laboratory, Department of Chemistry, Faculty of Science, University of Moulay Ismail, Meknes, Morocco

Hamid Maghat

Molecular Chemistry and Natural Substances Laboratory, Department of Chemistry, Faculty of Science, University of Moulay Ismail, Meknes, Morocco

Mohammed Bouachrine

Molecular Chemistry and Natural Substances Laboratory, Department of Chemistry, Faculty of Science, University of Moulay Ismail, Meknes, Morocco

Abstract

Virgin olive oil (VOO) is renowned for its significant nutritional and therapeutic benefits, primarily attributed to its high phenolic compound content. This research aimed to investigate the anti-inflammatory potential of the main phenolic compounds found in VOO through in silico studies.

The anti-inflammatory effects were assessed using molecular docking to simulate the interactions of these compounds with COX-1 and COX-2 enzymes, pivotal targets in the inflammatory cascade. Additionally, ADMET (Absorption, Distribution, Metabolism, Excretion, and Toxicity) analysis was employed to predict the pharmacokinetic and toxicological profiles of the phenolic compounds. These computational approaches provide valuable insights into how these compounds may modulate inflammatory pathways at a molecular level and their potential therapeutic applications.

This study contributes to a comprehensive understanding of the health benefits associated with VOO, highlighting its potential as a functional food with anti-inflammatory properties.

Keywords: Virgin Olive Oil, Phenolic Compounds, In Silico Analysis, Molecular Docking, ADMET Analysis, Anti-Inflammatory Potential

**ATTITUDE SCALE TOWARDS ARTIFICIAL INTELLIGENCE IN NURSING
EDUCATION: SCALE DEVELOPMENT STUDY****Necmettin ÇİFTÇİ**

Muş Alparslan University, Faculty of Health Sciences, Department of Nursing, 49100 Muş/Turkey

ORCID ID: <https://orcid.org/0000-0002-4713-4212>**Metin YILDIZ**

Sakarya University, Faculty of Health Sciences, Department of Midwifery, 54100 Sakarya/Turkey

ORCID ID: <https://orcid.org/0000-0003-0122-5677>**Ali KIRKSEKİZ**Sakarya University of Applied Sciences, Distance Education Research and Application Center,
Sakarya/ TurkeyORCID ID: <https://orcid.org/0000-0002-7873-3402>**Abstract**

Aim: Successful integration of Artificial Intelligence (AI) into clinical practice demands a comprehensive understanding of nurses' attitudes towards current and future AI applications. Therefore, there is a need for a measurement tool that evaluates attitudes towards artificial intelligence in nursing education. This study aimed to develop a reliable and valid measurement tool that quantitatively measures the attitude towards artificial intelligence in nursing education.

Method: This methodological study was conducted between May 24 and September 30, 2023 and data were collected from a total of 681 people through a questionnaire. Validity and reliability analyses were conducted.

Results: In the Exploratory Factor Analysis of the developed scale, it was determined that the scale items were collected under 2 factors and the explanatory coefficient was 66.145%. For the measurement of the applicability of the Exploratory Factor Analysis for the scale, the KMO value of the scale was found to be 0.924 and the Bartlett's Test of Sphericity value was $\chi^2=3420.244$, $df=105$, $p<.05$. In the CFA process, it was observed that the chi-square goodness-of-fit indices for this scale were significant ($\chi^2/df = 2.850$). Other fit indices were found as RMSEA=.077, GFI=.908, AGFI=.871, IFI=.954, TLI=.943, CFI=.953. The Cronbach Alpha internal consistency coefficient of the scale was found to be 0.933. All these values show that the scale is reliable.

Conclusion: The Attitude Scale Towards Artificial Intelligence in Nursing Education has been determined to be a valid and reliable measurement tool.

Keywords: Nursing education, Scale development, Artificial intelligence, Attitude

**THE EFFECT OF PULL AND PUSH DRIVERS ON BEHAVIORAL DRUG ADDICTION
OF STREET CHILDREN: LESSONS FROM HAWASSA CITY: LESSONS FROM
HAWASSA CITY**

Sintayehu Assefa Yirga (Ph.D)

College of Business and Economics, Department of Management, Hawassa University, Hawassa,
Ethiopia

Abstract

The objective of this study was to the effect of pull and push drivers on behavioral drug addiction of street children from Hawassa City. The researcher employed a cross-sectional descripto-explanatory research design and also a quantitative research approach was used to collect and analyze primary data. In order to collect primary data a survey instrument was adapted from behavioral drug addiction literatures and by using census sampling 389 questionnaires were distributed to street children in Hawassa City and only 366 questionnaires were fully filled and returned with a 94.1% response rate. The survey data were analyzed through descriptive statistics, correlation and multiple regression analysis to investigate the effect of pull and push drivers (independent variables) and behavioral drug addiction (dependent variable). The findings of multiple regression analysis insured that all of the two drivers (pull and push) have positive and significant effect with behavioral drug addiction at 95% confidence level. From the two drivers, push drivers with beta value of 0.613 was the most influential drivers to have positive and significant effect on behavioral addiction followed by pull with beta value of 0.156. Also, regression result also shows that the fore mentioned two drivers of explained 61.8% of the variations in behavioral drug addiction. Therefore the researcher recommended that the Hawassa City administration should give care on push factors like family conflict, parental separation, and domestic abuse in the home, poverty, physical, emotional or sexual abuse on the street children in order to reduce the drug addiction behavior among the street children in Hawassa City. Additionally, the societies required potential resources to give education, evidence-based prevention, interventions, treatment and rehabilitation because drug abuse affects attention, perception, coordination, neurological functions which affect driving/

Key Words: Pull and Push Drivers, Behavioral Drug Addiction, Street Children, Hawassa City

THE SURFACE ROUGHNESS EVALUATION OF DIFFERENT INSTRUMENTATION METHODS ON IN VITRO STUDY MODELS: A PRELIMINARY PROFILOMETRIC STUDY**Ece Yarimoglu Okten Dds, Phd**

Yeditepe University, Faculty of Dentistry, Department of Periodontology

Tugce Ceyhanli Dds, Phd

Yeditepe University, Faculty of Dentistry, Department of Periodontology

Abstract

Introduction and Purpose: The main aim of initial periodontal therapy is the mechanical removal of microbial biofilm and dental calculus on diseased root surfaces. The instrumentation can be performed by using different instruments such as hand instruments, sonic/ultrasonic devices, etc. The goal of this preliminary study is to evaluate the root surface roughness changes of different instruments used in the root surface debridement profilometrically.

Materials and Methods: In this study 15 root dentin samples obtained from 8 extracted impacted third molars were included. The samples were embedded in acrylic blocks, polished, and divided into 3 groups to apply different instruments for debridement: In group 1 Gracey curettes were applied, in group 2 an ultrasonic device was used, and in group 3 airflow was applied on study models. All root surface debridement procedures performed for 20 seconds at each group by a single calibrated operator. The surface roughness values of the samples were evaluated with a profilometer device before and after the instrumentations.

Results: In terms of initial surface roughness values there were no statistical differences between the groups ($p>0.05$). According to the pairwise comparisons, airflow group showed the highest roughness in comparison with the other root surface instrumentation tools significantly ($p<0.01$).

Discussion and Conclusion: Within the limitations of this preliminary study, airflow creates more surface roughness in the same application duration. It was concluded that the application of the instruments should be followed by polishing to create more smooth surfaces to avoid the bacterial overload.

Keywords: profilometer, root debridement, surface roughness

CHEMICAL COMPOSITION AND THERAPEUTIC EFFECTS OF *AMMODICUS LEUCOTRICUS* ESSENTIAL OILS ON NEUROBEHAVIORAL CHANGES IN WISTAR RATS AFTER EXPERIMENTAL SCORPION ENVENOMATION

Rafik Abdelkrim Boudia

Laboratory of Applied Organic Synthesis, Faculty of Exact and Applied Sciences, University Oran1 Ahmed Ben Bella, BP 1524 El M'Naouer, 31000, Oran, Algeria

Mehdi Adjdir

Laboratory of Applied Organic Synthesis, Faculty of Exact and Applied Sciences, University Oran1 Ahmed Ben Bella, BP 1524 El M'Naouer, 31000, Oran, Algeria

Department of the Engineering process, Faculty of Technology, University of Saïda Dr. Tahar Moulay, 20000, Saida, Algeria.

Abdelkader Ammam

Laboratory of Pharmacognosy, Bio Toxicology and Biological Valorization of Plants, Moulay Tahar University, Saida, ALGERIA.

Abstract

Background: Our study consists of a study of the chemical composition of the essential oil administered to a batch of rats undergoing a scorpion sting. Compared with control batches, the nervous state was evaluated by several neurobehavioral tests, namely open classified, dark and light and forced swimming. **Materials and Methods:** Determination of the composition of the essential oil the plant by GC/MS and its protective effect on the nervous system after exposure of rats to scorpions. **Results:** of GC/MS show that the chemical composition of this plant is characterized by the dominance of the natural monoterpenoid agent Perilla aldehyde, with a percentage of 70.12%, followed by Limonene (10.10%), Methyleugenol (5.69%), and alpha-Pinene (5.04%). Other compounds such as Perilla alcohol (1.90%), Beta-Pinene (0.61%), Delta-3-Carene (0.59%), Carvone (0.44%) and Camphene (0.33%) were identified only in a small proportion. The series of tests allowed us to see the onset of a depressive state, as well as a significant decrease in locomotor activity in the bitten rats compared to the controls and the treated batch. This hypolocomotor effect is accompanied by a decrease in the animal's stereotyped behaviours (curiosity, sniffing, biting, and grooming) and muscular tone, which explains the animal's inability to explore the environment. **Conclusion:** The neuroprotective power study confirmed the powerful properties of the plant to improve the symptoms caused by the scorpion sting, as proven by several neurobehavioral tests.

Keywords: Scorpion, Rat, *Ammodicus leucotricus*, Neurobehavioral test.



References

1. Fet V, Sissom WD, Lowe G, Braunwalder ME. Catalog of the scorpions of the world (1758-1998). New York Entomological Society; 2000.
2. Hammiche V, Maiza K. Traditional medicine in Central Sahara: pharmacopoeia of Tassili n'Ajjer. *J Ethnopharmacol.* 2006;105(3):358-67. doi: 10.1016/j.jep.2005.11.028 , PMID 16414225.
3. Jouad H, Haloui M, Rhiouani H, El Hilaly J, Eddouks M. Ethnobotanical survey of medicinal plants used for the treatment of diabetes, cardiac and renal diseases in the North centre region of Morocco (Fez–Boulemane). *J Ethnopharmacol.* 2001;77(2-3):175-82. doi: 10.1016/s0378-8741(01)00289-6, PMID 11535361.
4. Kabbaj F, Meddah B, Cherrah Y, Faouzi E. Ethnopharmacological profile of traditional plants used in Morocco by cancer patients as herbal therapeutics. *Phytopharmacology.* 2012;2(2):243-56.
5. Beghalia M, Ghalem S, Allali H, Belouatek A, Marouf A. Inhibition of calcium oxalate monohydrate crystal growth using Algerian medicinal plants. *J Med Plants Res.* 2008;2(3):66-70.
6. Ernst WH, Knolle F, Kratz S, Schnug E. Institute of Plant Nutrition and Soil Science; 2004.
7. Moser K, Kriwet K, Naik A, Kalia YN, Guy RH. Passive skin penetration enhancement and its quantification in vitro. *Eur J Pharm Biopharm.* 2001;52(2):103-12. doi: 10.1016 /s0939-6411(01)00166-7, PMID 11522474.
8. Senatore F, Napolitano F, Ozcan M. Composition and antibacterial activity of the essential oil from *Crithmum maritimum* L. (Apiaceae) growing wild in Turkey. *Flavour Fragr J.* 2000;15(3):186-9. doi: 10.1002/1099-1026(200005/06)15:3<186::AID-FFJ889 >3.0.CO;2-I.
9. Ruberto G, Baratta MT. Antioxidant activity of selected essential oil components in two lipid model systems. *Food Chem.* 2000;69(2):167-74. doi: 10.1016/S0308-8146 (99)00247-2.
10. Özcan M, Erkmen O. Antimicrobial activity of the essential oils of Turkish plant spices. *Eur Food Res Technol.* 2001;212(6):658-60. doi: 10.1007/s002170100310.

11. Mekinić IG, Skroza D, Ljubenkov I, Katalinić V. Insight into the presence of stilbenes in medicinal plants traditionally used in Croatian folk medicine. *Nat Prod Commun.* 2016;11(6):833-5. doi: 10.1177/1934578X1601100634, PMID 27534129.
12. Kulisic-Bilusic T, BLAŽEVIĆ I, DEJANOVIĆ B, MILOŠ M, Pifat G. Evaluation of the antioxidant activity of essential oils from caper (*Capparis spinosa*) and sea fennel (*Crithmum maritimum*) by different methods. *J Food Biochem.* 2010;34:286-302. doi: 10.1111/j.1745-4514.2009.00330.x.
13. Marongiu B, Piras A, Porcedda S, Tuveri E, Sanjust E, Meli M, et al. Supercritical CO₂ extract of *Cinnamomum zeylanicum*: chemical characterization and antityrosinase activity. *J Agric Food Chem.* 2007;55(24):10022-7. doi: 10.1021/jf071938f, PMID 17966976.

**EXPLORING THE MOLECULAR AND HISTOLOGICAL LANDSCAPE OF BREAST
CANCER: PRELIMINARY FINDINGS IN EASTERN OF ALGERIA****Rima SAAD BOUZID**

Laboratory of Acquired and Constitutional Genetic Diseases (MAGECA), Department of Medicine,
Faculty of Medicine, Batna 2 University, Ezzouhour, Batna 05000, Algeria
Faculty of Nature and Life Sciences, Batna 2 University, Batna, Algeria

Housna LABED

Laboratory of Acquired and Constitutional Genetic Diseases (MAGECA), Department of Medicine,
Faculty of Medicine, Batna 2 University, Ezzouhour, Batna 05000, Algeria
Faculty of Nature and Life Sciences, Batna 2 University, Batna, Algeria

Dounia HELLAL

Faculty of Medicine, Batna 2 University, Batna, Algeria
Physician, pathology Department CLCC Batna, Algeria

Ines BOUDIAF

Physician, pathology Department CLCC Batna, Algeria

Hachani KHADRAOUI

Laboratory of Acquired and Constitutional Genetic Diseases (MAGECA), Department of Medicine,
Faculty of Medicine, Batna 2 University, Ezzouhour, Batna 05000, Algeria
Faculty of Medicine, Batna 2 University, Batna, Algeria

Abstract

Breast cancer is the most frequently diagnosed cancer and the second cause of death worldwide and in Algeria. We can distinguish different histological and molecular entities in breast cancer. The objective of this work is to report the preliminary results of a molecular and histological characterization of breast cancer in CLCC Batna center during the period from 2018 to 2023.

Clinical and pathological characteristics of 573 breast cancer cases were collected from the archives of the pathology department of CLCC Batna. To analyze their characteristics, age, histological type, SBR grade, hormone receptor status, HER2 status were taken in account, and molecular phenotypes were compared.

The results revealed that the mean age of the selected population is 50 years with a predominance of the age group 50 to 59 years. The proportions of luminal A, luminal B, TNBC and HER2 breast cancer subtypes were 23.4%, 48,9%, 17.3% and 10.5%, respectively. The invasive ductal carcinoma

(IDC) was the most common histological type (85.5%) followed by the invasive lobular carcinoma (9.4%).

The SBR grade II was the most common in the population. We noticed a higher frequency of IDC in the young [40 - 49 y] and middle-aged groups [50 -59 y], while all the IDC were of Luminal B molecular type-

Although our results are preliminary, some of them are concordant with other Algerian studies. A more extended molecular and immunohistological characterization is ongoing.

Keywords: Breast Cancer, Histological type, sub-molecular type, Aures region, immunohistochemistry

**PHYSICOCHEMICAL CHARACTERIZATION OF SNAIL SHELL POWDER
PREPARED VIA MECHANOCHEMICAL PROCESSING AND THERMAL TREATMENT
FOR MEDICAL APPLICATIONS**

Z. El Hamri

Team of Innovative Materials and Mechanical Manufacturing Processes, ENSAM, University
Moulay Ismail, B.P. 15290, Al Mansour, Meknes, Morocco

M. Karaoui

Team of Innovative Materials and Mechanical Manufacturing Processes, ENSAM, University
Moulay Ismail, B.P. 15290, Al Mansour, Meknes, Morocco

I. Maouhoubi

Solid Physics Laboratory, Group of Nanomaterial and Renewable Energies, Department of
Physics, Faculty of Sciences Dhar El Mahraz, Sidi Mohamed Ben Abdellah University, B.P. 1796,
Fez, Morocco

M. Alami

Team of Innovative Materials and Mechanical Manufacturing Processes, ENSAM, University
Moulay Ismail, B.P. 15290, Al Mansour, Meknes, Morocco

M. Assouag

Team of Innovative Materials and Mechanical Manufacturing Processes, ENSAM, University
Moulay Ismail, B.P. 15290, Al Mansour, Meknes, Morocco

Abstract

Natural particles are among the most abundant resources in nature. Bio-derived CaCO_3 particles have garnered significant interest from researchers due to their diverse applications in cosmetics, industry, and medicine. This study explores the structural evolution of CaCO_3 in snail shell particles, which were prepared using a mechanochemical process. Characterization techniques employed include Differential Scanning Calorimetry (DSC), Thermogravimetric Analysis (TGA), X-ray Diffraction (XRD), Fourier Transform Infrared Spectroscopy (FTIR), and Scanning Electron Microscopy with Energy-Dispersive X-Ray Spectroscopy (SEM-EDXS). The results from these analyses reveal that snail shell powder (SSP) calcined between 200°C and 400°C undergoes dehydration, followed by a phase transition from aragonite to calcite CaCO_3 . At 800°C , the SSP decomposes, forming calcium oxide (CaO) crystals and releasing CO_2 molecules. This process results in a mass loss of 47.08% at 800°C . Morphological analysis indicates that SSP calcined at 800°C shows surface formation of CaO/ CaCO_3 crystals. The mechanochemical process yields SSP particles ranging in size from $3.311\ \mu\text{m}$ to $10.140\ \mu\text{m}$. Snail shells are thus demonstrated to be a viable natural source of CaCO_3 and CaO due to their easy extraction and processing.

Keywords: *Composites, Snail shell; Thermal treatment; DSC; XRD; FT-IR.*

References

- [1]: M. Karaoui, R. Hsissou, M. Alami, and M. Assouag, "Thermal, flow, and mechanical properties of composites based on polystyrene (PS) and snail shell powder (SSP) biofiller (PS/SSP)," *Iranian Polymer Journal (English Edition)*, vol. 32, no. 4, pp. 1-11, 2023.
- [2]: A. Shafiu Kamba, M. Ismail, T. A. Tengku Ibrahim, and Z. A. B. Zakaria, "Synthesis and characterisation of calcium carbonate aragonite nanocrystals from cockle shell powder (*Anadara granosa*)," *Journal of Nanomaterials*, vol. 2013, no. 8, p. 5, 2013.
- [3]: S. Parveen, A. Chakraborty, D. K. Chanda, S. Pramanik, A. Barik, and G. Aditya, "Microstructure analysis and chemical and mechanical characterization of the shells of three freshwater snails," *ACS Omega*, vol. 5, no. 40, pp. 25757-25771, 2020.

EFFECTS OF DIFFERENT FEEDS ON THE PROXIMATE COMPOSITION OF *CATLA***Vikranti Patel**

Research scholar, Dept. of Aquatic Biology, Veer Narmad South Gujarat University, Surat 395007, Gujarat, India

Kapila Manoj

Professor and Head, Dept. of Aquatic Biology, Veer Narmad South Gujarat University, Surat 395007, Gujarat, India

Abstract

Catla fish is one of the fish from the Indian Major Carps that belongs to the Cyprinidae family and is a commonly cultured fish in India. Catla, Rohu, and Mrigal are three widely known fishes from IMC cultured together. They are well known for their nutrient values as Catla is rich in protein and vitamins, containing 19 % of protein and other nutrients like lipids, minerals, and vitamins. The proximate composition of catla fishes was analyzed as protein, lipid, sugar, ash, and moisture after being fed on different feeds like traditional feed (F-1), fishmeal-based feed (F-2), vegetable waste feed (F-3) and *Spirulina* incorporated vegetable waste feed (F-4) for 6 months. Sugar level was found 0.00 % in all the fishes. Protein level was found high in fish fed on fishmeal-based feed as it was 16.18 ± 0.006 , Lipid was found high in fish fed on vegetable waste-based feed as it was 16.18 ± 0.006 . Moisture and ash were found high in fish fed on traditional feed which shows that every feed ingredient has its different effects on the proximate growth of fishes.

Keywords: Catla fish, *Spirulina*, Vegetable waste, Traditional feed.

NEUROINFLAMMATION-RELATED MiR-155 EXPRESSION IN MICROGLIA**Lecturer Dr. Gamze DEMİREL**

Selçuk University, Akşehir Kadir Yallagöz School of Health

Prof. Dr. Mehmet GÜRBİLEK

Necmettin Erbakan University, Faculty of Medicine, Medical Biochemistry

Abstract

Chronic inflammation in the brain plays significant role in neurodegenerative diseases. During the inflammatory response, the activation of microglia and the release of pro-inflammatory mediators influence the disease pathology. MicroRNAs (MiRs) are present at varying concentrations in the central nervous system (CNS), and the imbalance in their expressions levels can contribute to the development of neurological disorders. MiR-155, in particular, is known to be involved in processes such as immune response, inflammation, cell differentiation and cancer development. For our study, BV2 microglial cells were treated with Lipopolisaccharide (LPS) concentration of 1 µg/mL for 24 hours, with separate group of cells maintained as a control. Cell viability was assessed using the 3-(4,5,-dimethylthiazol-2-yl)-2,5 diphenyltetrazolium bromide (MTT) assays. The expression level of miR-155 was detected by Real-Time PCR. We used anti-miR-155 (5'-TcAcAATtaGmCAtTA-3'). All qRT-PCRs assays were performed in triplicate and data are presented as mean ± SEM. Data were analyzed using Student's t test for two-group experiments or one-way ANOVA for multiple-group experiments and post-hoc comparison using the Dunnett method. $p < 0.05$ was considered significant. Neuroinflammation was induced by LPS to detect the expression of miR-155 in microglia. The presence of LPS did not alter the viability of BV2 microglial cells. When investigating the expression of miR-155 upon LPS stimulation using a real-time PCR assay, miR-155 was found to be upregulated approximately 4-fold ($n=3$ $P < 0.05$ versus control). MiRs are known to play various roles in biological processes, and in our study we found that MiR-155 was upregulated in a time-dependent manner by LPS stimulation in BV2 microglial cells. Activated microglia secrete various proinflammatory mediators upon stimulation. Controlling their activation may contribute to the recovery of immune-mediated central nervous system disorders, especially neurodegenerative diseases.

Key Words: Neuroinflammation; Neurodegenerative disease; Microglia; Central nervous system; MiR-155

INTRODUCTION

Neuroinflammation; It plays important roles in the development process of many neurodegenerative diseases, including Alzheimer's (AD) and Parkinson's (PD). It has been reported that microglial cells are activated by inflammation. Microglial cells, which make up approximately 15% of brain cells, serve as primary effectors. It plays a role especially in neuronal homeostasis, innate immunity of the Central Nervous System (CNS) and neuroinflammatory conditions (Borst et al., 2021). Microglia are innate immune cells of the CNS that play a role in CNS growth and development, homeostasis establishment, and CNS disorders. It has been observed that microglial cells can be

rapidly activated in response to conditions such as injury, inflammation, infection and brain damage. It leads to alteration of normal levels of various inflammatory mediators, including cytokines (such as IL-1 β , IL-6, TNF- α), nitric oxide, reactive oxygen species (ROS) (Streit et al., 2004).

Resting microglia are often referred to as M0 microglia. Due to various physiological and pathological factors such as neuroinflammation, injury, and degeneration, the resting state is disrupted and microglia undergo an activation process (Antonetti et al., 2021). Microglial activation; It can be classified into two main phenotypes, defined as "classical activation" (also known as the pro-inflammatory state), known as the M1 phenotype, and "alternative activation" (anti-inflammatory state), known as the M2 phenotype (Ryan et al., 2017).

Lipopolysaccharide (LPS) is an endotoxin found in the outer membrane of Gram-negative bacteria. It acts as an activator of the innate immune system and is frequently used to induce neuroinflammation experimentally (Khan et al., 2018).

MicroRNAs (miRNAs) have been associated with pathological conditions in various CNS diseases, including neuroinflammation, neurodegenerative diseases and autoimmune diseases (Su et al., 2016). Small (21-23 nucleotides) non-coding miRNAs are known to play a role as important regulators in many pathophysiological processes, including cancer, autoimmune, and neurodegenerative (Long et al., 2018). miRNAs are known to help regulate gene expression and affect approximately 35% of human genes. It has been shown that miRNAs can regulate multiple different mRNA targets and also that the same mRNA can regulate multiple miRNAs. This enables many miRNAs to be seen as control elements of many pathways involved in the regulation of very important cellular processes such as cell differentiation, cell cycle regulation and apoptosis, and to shed light on the events taking place in these pathways (Freilich et al., 2013; Sayed et al., 2018).

miR-155, known as inflamma-miR, has been found to be a potent activator of inflammation. It is one of the main miRNAs that functions in the pathogenesis of neurodegenerative and autoimmune diseases. This feature functionally affects proinflammatory conditions through the effect of myeloid cell polarization. Irregularities in miR-155 levels have been associated with many conditions such as malignancies, cancer, and inflammation. At the same time, MiR-155 plays a role in the inflammatory mediator reaction between monocytes and macrophages (Faraoni et al., 2009; Leng et al., 2011). LPS administration showed increased miR-155 expression (Faraoni et al., 2009).

It is known that miR-155 down-regulates SOCS-1, which is its target transcript and is involved in the cytokine signaling suppressor pathway, and as a result, various inflammatory pathways are up-regulated. For example, the inflammatory process is changed by inhibiting the JAK/STAT pathway. For this reason, it plays important roles in regulatory pathways (Cardoso et al., 2012). After microglia were exposed to LPS, SOCS-1 level decreased following the increase in miR-155 expression to trigger inflammation (Li et al., 2023a, 2023b). miR-155, nörodejeneratif hastalık patogenezinde önemli bir oyuncu olarak görev yapar. miR-155'in inflamasyon sürecine nasıl katkıda bulunduğunu açıklayıcı bir şekilde araştırmak, hastalıkların teşhisinde kullanım için potansiyele sahiptir ve nörodejenerasyonun belirteci olarak kullanılabilir (Moore et al., 2013).

METHODOLOGY

Cell culture

The BV2 mouse microglial cell line used in the research was received as a gift (Izmir Biomedicine and Genome Center). Cells were grown in Dulbecco's Modified Eagle Medium (5% FBS, supplemented with 100 U/ml penicillin and 100 mg/ml streptomycin) in an incubator at 37°C under 5% CO₂. LPS was used to measure inflammatory mediators in this study. One group of cells was treated with LPS for 24 h and one group was kept as a control group.

Cell Viability Assay

Cell viability in microglia was assessed by MTT (3-[4,5-dimethyl-thiazol-2-yl]-2,5-diphenyltetrazolium bromide) assay. BV2 cells were plated in 96-well plates at 2×10^4 cells/well. After MTT was added to the cells at a concentration of 0.5 mg/ml, they were incubated for 1 hour (at 37°). After DMSO was added to the plates and absorbance was measured at 570 nm via Bio-rad, xMark microplate reader. Cell viability was determined as an average. Cell viability was calculated according to the formula of % Viability = (OD assay/OD control) x 100%. Cell viability result is given in FIGURE 1.

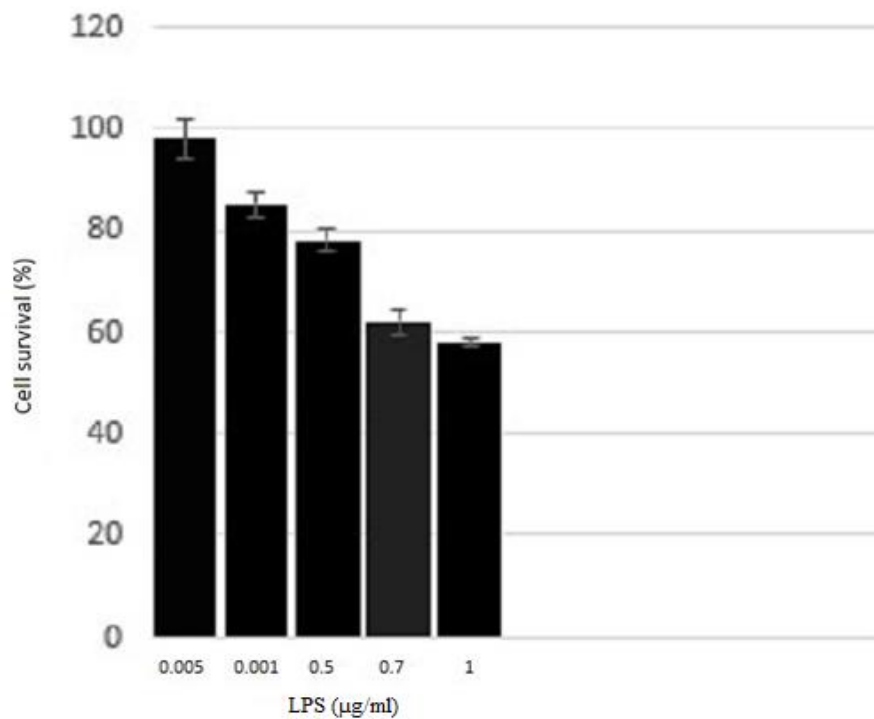


FIGURE 1: MTT cell viability

Total RNA was extracted from cells after LPS application using Trizol reagent (according to Manufacturer's instructions). To test miR-155 expression level in cells, Taqman kit was used for MicroRNA Reverse Transcription and MicroRNA Assay studies.

July 1-3, 2024 -PARIS

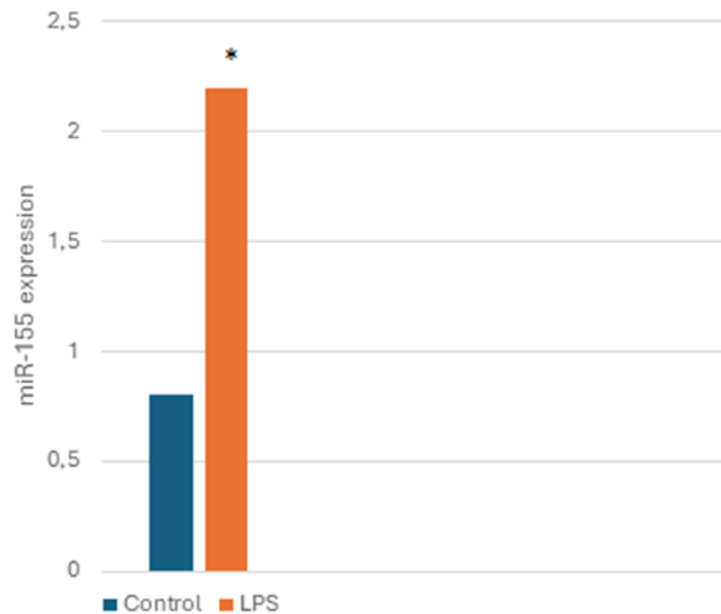


FIGURE 2: miR-155 expression level (n=3, * P < 0.05)

Statistical Analysis

Data were replicated 3 times. And its mean value was calculated (SEM). Student's t test was used for two-group experiments. Data were then analyzed using the Dunnett method for experiments with multiple groups. ($p < 0.05$ was considered significant).

CONCLUSION AND DISCUSSION

In microglial cells, miRNAs are important as post-transcriptional regulators of gene expression. They have been shown to play a role in the pathogenesis of many diseases, including AD, PD, and Multiple Sclerosis (MS) (dos Santos et al., 2024). miR-155 has been shown to be a pro-inflammatory factor in different inflammatory diseases and especially to alter the M1 polarization of macrophages (Pasca et al., 2020).

Studies have shown that miR-155 directs many biological processes, including inflammation. MiR-155 has been identified as a component of macrophages that respond to various inflammatory mediators such as cytokines and so on, and has been characterized based on these properties (Faraoni et al., 2009). In the state of inflammation, miR-155 expression was specifically upregulated in monocytes and macrophages (Leng et al., 2011). It is known that miR-155 protects microglia cells against possible damage by regulating the activation of RACK1, MAPK / NF- κ B and mTOR signaling pathways (Yin et al., 2017).

It was determined that upregulating the expression of miR-155 upon activation in microglia would cause the transformation of these cells into a pro-inflammatory phenotype, and accordingly, blocking the expression of miR-155 in microglia could reduce microglia-mediated neurotoxicity. (Freilich et al., 2013). A study in multiple sclerosis patients found that miR-155 expression was significantly increased at lesion sites; This actually indicates that miR-155 not only participates in the inflammatory response and regulation of the response, but also supports the polarization of microglia to the M1 type. Due to such an active role, the miR-155 pathway is considered a target for the treatment of CNS autoimmune diseases (Zha et al., 2021).

Phenotypic change in microglia from anti-inflammatory phenotype to pro-inflammatory phenotype may benefit in the treatment of CNS and neurodegenerative diseases (Almolda et al., 2015). For example, it has been observed that some active substances (such as Resveratrol) can promote M2 type conversion of microglia by inhibiting miR-155 expression, thus trying to improve neuroinflammation after ischemia (Ghazavi et al., n.d.).

In our study, miR-155 level was upregulated, consistent with others. The effect of BV2 microglial cells in regulating the inflammatory response has been clearly demonstrated (Cardoso et al., 2012).

Studies have shown that miR-155 plays a pro-inflammatory role following microglia activation. It has been determined that SOCS-1, one of the signaling pathways of posttranslational changes, is part of the protein group that inhibits the cytokine signaling pathways. In the study, N9 microglia cells were induced with LPS and evidenced upregulation of miR-155 and reduction in SOCS-1 levels. At the same time, anti-miR-155 oligonucleotides caused a decrease in the expression of the production of IL-6, IFN- β and TNF- α , and a decrease in the production of nitric oxide (Moore et al., 2013). It has been proven that miR-155 has an effect on cognitive impairment and neuroprotection in MS, especially in blood-brain barrier (BBB) damage and demyelination (Leng et al., 2011; Moore et al., 2013).

In conclusion; It has been shown that there is an increase in the expression levels of miR-155 due to neuroinflammation, and miR-155 inhibition may provide neuronal protection, and in addition, miR-155 may be a target in protecting neuron inflammation.

REFERENCES

- Almolda, B., de Labra, C., Barrera, I., Gruart, A., Delgado-Garcia, J. M., Villacampa, N., Vilella, A., Hofer, M. J., Hidalgo, J., Campbell, I. L., Gonzalez, B., & Castellano, B. (2015). Alterations in microglial phenotype and hippocampal neuronal function in transgenic mice with astrocyte-targeted production of interleukin-10. *Brain Behav Immun*, 45, 80–97. <https://doi.org/10.1016/j.bbi.2014.10.015>
- Antonetti, D. A., Silva, P. S., & Stitt, A. W. (2021). Current understanding of the molecular and cellular pathology of diabetic retinopathy. In *Nature Reviews Endocrinology* (Vol. 17, Issue 4, pp. 195–206). Nature Research. <https://doi.org/10.1038/s41574-020-00451-4>
- Borst, K., Dumas, A. A., & Prinz, M. (2021). Microglia: Immune and non-immune functions. In *Immunity* (Vol. 54, Issue 10, pp. 2194–2208). Cell Press. <https://doi.org/10.1016/j.immuni.2021.09.014>
- Cardoso, A. L., Guedes, J. R., Pereira de Almeida, L., & Pedroso de Lima, M. C. (2012). miR-155 modulates microglia-mediated immune response by down-regulating SOCS-1 and promoting cytokine and nitric oxide production. *Immunology*, 135(1), 73–88. <https://doi.org/10.1111/j.1365-2567.2011.03514.x>
- dos Santos, B. L., dos Santos, C. C., da Silva, K. C., Nonaka, C. K. V., Souza, B. S. de F., David, J. M., de Oliveira, J. V. R., Costa, M. de F. D., Butt, A. M., da Silva, V. D. A., & Costa, S. L. (2024). The Phytochemical Agathisflavone Modulates miR146a and miR155 in Activated Microglia Involving STAT3 Signaling. *International Journal of Molecular Sciences*, 25(5). <https://doi.org/10.3390/ijms25052547>
- Faraoni, I., Antonetti, F. R., Cardone, J., & Bonmassar, E. (2009). miR-155 gene: A typical multifunctional microRNA. *Biochimica et Biophysica Acta (BBA) - Molecular Basis of Disease*, 1792(6), 497–505. <https://doi.org/10.1016/J.BBADIS.2009.02.013>

- Freilich, R. W., Woodbury, M. E., & Ikezu, T. (2013). Integrated expression profiles of mRNA and miRNA in polarized primary murine microglia. *PLoS ONE*, 8(11). <https://doi.org/10.1371/journal.pone.0079416>
- Ghazavi, H., Shirzad, S., Forouzanfar, F., Negah, S. S., Rad, M. R., & Vafae, F. (n.d.). The role of resveratrol as a natural modulator in glia activation in experimental models of stroke. In *AJP* (Vol. 10, Issue 6).
- Khan, A., Ali, T., Rehman, S. U., Khan, M. S., Alam, S. I., Ikram, M., Muhammad, T., Saeed, K., Badshah, H., & Kim, M. O. (2018). Neuroprotective effect of quercetin against the detrimental effects of LPS in the adult mouse brain. *Frontiers in Pharmacology*, 9, 1–16. <https://doi.org/10.3389/fphar.2018.01383>
- Leng, R. X., Pan, H. F., Qin, W. Z., Chen, G. M., & Ye, D. Q. (2011). Role of microRNA-155 in autoimmunity. In *Cytokine and Growth Factor Reviews* (Vol. 22, Issue 3, pp. 141–147). <https://doi.org/10.1016/j.cytogfr.2011.05.002>
- Li, X., Zhou, J. X., Qu, Y. D., & Kuang, X. (2023a). Cyclooxygenase-2 Inhibitor Parecoxib Reduces LPS-Induced Activation of BV2 Microglia Cells. *Bulletin of Experimental Biology and Medicine*, 1–6.
- Li, X., Zhou, J. X., Qu, Y. D., & Kuang, X. (2023b). Cyclooxygenase-2 Inhibitor Parecoxib Reduces LPS-Induced Activation of BV2 Microglia Cells. *Bulletin of Experimental Biology and Medicine*, 1–6.
- Long, H., Wang, X., Chen, Y., Wang, L., Zhao, M., & Lu, Q. (2018). Dysregulation of microRNAs in autoimmune diseases: Pathogenesis, biomarkers and potential therapeutic targets. In *Cancer Letters* (Vol. 428, pp. 90–103). Elsevier Ireland Ltd. <https://doi.org/10.1016/j.canlet.2018.04.016>
- Moore, C. S., Rao, V. T. S., Durafourt, B. A., Bedell, B. J., Ludwin, S. K., Bar-Or, A., & Antel, J. P. (2013). MiR-155 as a multiple sclerosis-relevant regulator of myeloid cell polarization. *Annals of Neurology*, 74(5), 709–720. <https://doi.org/10.1002/ana.23967>
- Pasca, S., Jurj, A., Petrushev, B., Tomuleasa, C., & Matei, D. (2020). MicroRNA-155 Implication in M1 Polarization and the Impact in Inflammatory Diseases. In *Frontiers in Immunology* (Vol. 11). Frontiers Media S.A. <https://doi.org/10.3389/fimmu.2020.00625>
- Ryan, K. J., White, C. C., Patel, K., Xu, J., Olah, M., Replogle, J. M., Frangieh, M., Cimpean, M., Winn, P., McHenry, A., Kaskow, B. J., Chan, G., Cuerdon, N., Bennett, D. A., Boyd, J. D., Imitola, J., Elyaman, W., De Jager, P. L., & Bradshaw, E. M. (2017). A human microglia-like cellular model for assessing the effects of neurodegenerative disease gene variants. *Science Translational Medicine*, 9(421). <https://doi.org/10.1126/scitranslmed.aai7635>
- Sayed, A. S., Gomaa, I. E. O., Bader, M., & El Sayed, N. S. E. D. (2018). Role of 3-Acetyl-11-Keto-Beta-Boswellic Acid in Counteracting LPS-Induced Neuroinflammation via Modulation of miRNA-155. *Molecular Neurobiology*, 55(7), 5798–5808. <https://doi.org/10.1007/s12035-017-0801-2>
- Streit, W. J., Mrak, R. E., & Griffin, W. S. T. (2004). Microglia and neuroinflammation: A pathological perspective. *Journal of Neuroinflammation*, 1. <https://doi.org/10.1186/1742-2094-1-14>
- Su, W., Aloï, M. S., & Garden, G. A. (2016). MicroRNAs mediating CNS inflammation: Small regulators with powerful potential. In *Brain, Behavior, and Immunity* (Vol. 52, pp. 1–8). Academic Press Inc. <https://doi.org/10.1016/j.bbi.2015.07.003>

Yin, H., Song, S., & Pan, X. (2017). Knockdown of miR-155 protects microglia against LPS-induced inflammatory injury via targeting RACK1: A novel research for intracranial infection. *Journal of Inflammation (United Kingdom)*, 14(1). <https://doi.org/10.1186/s12950-017-0162-7>

Zha, Z., Gao, Y. F., Ji, J., Sun, Y. Q., Li, J. L., Qi, F., Zhang, N., Jin, L. Y., Xue, B., Yang, T., Fan, Y. P., Zhao, H., & Wang, L. (2021). Bu Shen Yi sui Capsule Alleviates Neuroinflammation and Demyelination by Promoting Microglia toward M2 Polarization, Which Correlates with Changes in miR-124 and miR-155 in Experimental Autoimmune Encephalomyelitis. *Oxidative Medicine and Cellular Longevity*, 2021. <https://doi.org/10.1155/2021/5521503>

MODELING AND 3D-QSAR ANALYSIS OF SELECTED INDOLE-GLYOXAMIDE DERIVATIVES AS HIV-1 BINDING INHIBITORS USING MOLECULAR DOCKING, MOLECULAR DYNAMICS SIMULATIONS, AND ADME

Hassan BADAoui

Molecular Chemistry and Natural Substances Laboratory, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco

Mohamed OUABANE

Molecular Chemistry and Natural Substances Laboratory, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco

Chemistry-Biology Applied to the Environment URL CNRT 13, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco

M'barek CHOUKRAD

Molecular Chemistry and Natural Substances Laboratory, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco

Mohammed BOUACHRINE

Molecular Chemistry and Natural Substances Laboratory, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco

Abstract

The present study aims to investigate the inhibitory activity of indole-glyoxamide-based compounds against HIV using computational 3D-QSAR, molecular docking and molecular dynamics (MD) simulation methods. The CoMFA and CoMSIA approaches were used to create the 3D-QSAR models. Molecular docking and molecular dynamics simulations were carried out to generate the binding mode and stability of the inhibitors studied [1]. The CoMSIA model achieved good predictability with $Q^2 = 0.689$, $R^2 = 0.933$, $SEE = 0.508$, and a significant value for the coefficient of determination $R^2_{test} = 0.932$. Furthermore, based on the information retained by the CoMSIA contour maps, we proposed five new molecules (T2-T6) with significantly higher inhibitory activity. In addition, molecular docking and MD simulation analysis were used to confirm the 3D-QSAR results, supporting the stability of the proposed molecules in the receptor (PDB code: 1SJ0). Finally, the selected molecules showed favorable pharmacokinetic properties and were non-toxic. The results provide significant information on the proposed indole-glyoxamide-based compounds as HIV-1 binding inhibitors, encouraging further innovative experimental and clinical research [2].

Keywords: 3D-QSAR, Molecular Docking, Molecular Dynamics, CoMSIA, ADME/Tox, anti-VIH.

References

- [1] H. Badaoui, Y. Koubi, Y. Moukhliiss, K. El Khatabi, M. Elbouhi, M. Ouabane, M. Choukrad, M.A. Jana, A. Sbai, T. Lakhlifi, M. Bouachrine, Cytotoxic activity of new thioglycosides of the arylamino-1,3,4-thiadiazole and glycosyl-1,3,4-thiadiazole-triazole conjugates against *Escherichia coli*: QSAR study, *Turkish Computational and Theoretical Chemistry* 7 (2023) 51–61. <https://doi.org/10.33435/tcandtc.1093987>.
- [2] M. Ouabane, H. Hajji, A. Belhassan, Y. Koubi, M'hamed El, H. Badaoui, C. Sekkate, T. Lakhlifi, 2D-QSPR of the retention/release property for odorant molecules in pectin gels of different concentration, *RHAZES: Green and Applied Chemistry* 14 (2022) 15–35.

**2D-QSPR INVESTIGATION OF THE ODORANT MOLECULES' RELEASED
RETENTION INDEX PROPERTIES IN PECTIN GELS AT VARIOUS ODORANT
MOLECULE CONCENTRATIONS**

Mohamed OUABANE

Molecular Chemistry and Natural Substances Laboratory, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco

Chemistry-Biology Applied to the Environment URL CNRT 13, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco

Khadija ZAKI

Molecular Chemistry and Natural Substances Laboratory, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco

Hassan BADAoui

Molecular Chemistry and Natural Substances Laboratory, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco

Mohammed BOUACHRINE

Molecular Chemistry and Natural Substances Laboratory, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco

Abstract

2D-QSPR is a physicochemical modelling method studied the quantitative structure-property relationship has been implemented to study the phenomenon of released retention of odorant compounds in pectin gels PG-0.8 and PG-0.4 (two different mass concentrations of pectin 0.8% and 0.5%). It was assumed that any structural change would necessarily lead to a change in the retention property of the odor compounds belonging to a series of molecules with different structures and organic functionalities (9 ketones, 11 aldehydes, 15 alcohols and 16 esters) [1] in the same series, and then in subsets depending on a given structural characteristic, in order to highlight the structural characteristics that influence it; this series contains a total of 51 molecules divided into two sets - 34 learning molecules and 17 test molecules [2]. The best explanatory descriptors were selected by Principal Component Analysis to establish the Quantitative Structure-Property Relation (QSPR)[3] of the odor molecules of different pectin concentrations PG-0.8% and PG-0.4%, using MLR and MNLR to propose a quantitative model based on these analyses, comparing the results we find only two models A11 by MLR with a correlation coefficient of $R=0.97$ and B32 by MNLR with a correlation coefficient of $R=0.98$ that meet all the criteria of internal and external validation.

Keywords: 2D-QSPR, MLR, MNLR, PG-0.8% and PG-0.4%.

References:

- [1] M. Ouabane, H. Hajji, A. Belhassan, Y. Koubi, M'hamed El, H. Badaoui, C. Sekkate, T. Lakhlifi, 2D-QSPR of the retention/release property for odorant molecules in pectin gels of different concentration, *RHAZES: Green and Applied Chemistry* 14 (2022) 15–35.
- [2] M.H. Elbouhi, M. Ouabane, Y. Koubi, T. Lakhlifi, *RHAZES : Green and Applied Chemistry* Anti-Tumor Activity of Novel Benzimidazole-Chalcone Hybrids as non-Intercalative Topoisomerase II Catalytic Inhibitors : 2D- QSAR study, (2022). <https://doi.org/10.48419/IMIST.PRSM/rhazes-v14.31147>.
- [3] H. Badaoui, Y. Koubi, Y. Moukhliiss, K. El Khatabi, M. Elbouhi, M. Ouabane, M. Choukrad, M.A. Jana, A. Sbai, T. Lakhlifi, M. Bouachrine, Cytotoxic activity of new thioglycosides of the arylamino-1,3,4-thiadiazole and glycosyl-1,3,4-thiadiazole-triazole conjugates against *Escherichia coli*: QSAR study, *Turkish Computational and Theoretical Chemistry* 7 (2023) 51–61. <https://doi.org/10.33435/tcandtc.1093987>.

**PROFILING PHENOLIC COMPOUNDS IN PROPOLIS: COMPARATIVE ANALYSIS
ACROSS VARIOUS APIARIES IN N. MACEDONIA****Bardha IBISHI**

Univerity “St. Kliment Ohridski”, Faculty of Biotechnical Sciences - Bitola, North Macedonia,

Viktor KOLOVSKI

Univerity “St. Kliment Ohridski”, Faculty of Biotechnical Sciences - Bitola, North Macedonia,

Vesna KARAPETKOVSKA - HRISTOVAUniverity “St. Kliment Ohridski”, Faculty of Biotechnical Sciences - Bitola, Department of
Biotechnology, North Macedonia

ORCID ID: 0000-0002-5056-8003

Ivan PAVLOVICScientific Institute of Veterinary Medicine of Serbia, Department of Microbiology and
Parasitology, Belgrade, Serbia

ORCID ID: 0000-0003-4751-6760

Abstract

Introduction and Purpose: Propolis, a natural resinous substance collected by honeybees, is recognized for its medicinal properties attributed to diverse bioactive compounds, especially phenolic compounds. This study aimed to characterize and compare the phenolic profiles of propolis samples collected from different apiaries across North Macedonia.

Materials and Methods: Propolis samples were collected from two districts, Dihovo (D) and Rankovce (R), in North Macedonia during 2023-24. Solutions of ethanolic propolis (4%) were prepared. The pH values of the solutions were measured using an ATC pH-meter, resulting in pH 5.20 for PE (D) and pH 5.45 for PE (R). Conductivity measurements were performed using a conductivity meter (Xiaomi TDS & EC), indicating values of 22 ppm for PE (D) and 21 ppm for PE (R). The total phenolic content in propolis extracts was determined using the Folin-Ciocalteu colorimetric method, with results expressed as mg GAE/g. The total flavonoid content was assessed using an aluminum chloride colorimetric method, with results expressed as mg Que/g.

Results: The average total phenolic content was found to be 155 mg GAE/g for PE (D) and 201 mg GAE/g for PE (R). Similarly, the total flavonoid content was measured at 259 mg Que/g for PE (D) and 320.5 mg Que/g for PE (R). pH measurements yielded values of 5.20 for PE (D) and 5.45 for PE (R), while conductivity measurements indicated values of 22 ppm for PE (D) and 21 ppm for PE (R). Significant variability was observed in the phenolic and flavonoid content among the propolis samples from different apiaries in the country.

Discussion and Conclusions: Variations in the bioactive substance content are likely influenced by factors such as the geographical origin of propolis, bee species, botanical sources, and extraction methods. These findings underscore the need for further research to elucidate the specific mechanisms underlying these variations in bioactive components and antioxidant activity of propolis. Understanding these factors is crucial for optimizing propolis harvesting and processing techniques to enhance its medicinal and therapeutic potential.

Key Words: Propolis, phenolic compounds, flavonoids, bioactive substances, apiaries, North Macedonia

INTERACTIONS BETWEEN DAIRY PRODUCTS AND DRUGS: A REVIEW**Sylvia STAMOVA**

Medical University of Varna, Pharmacy Faculty, Department of Pharmaceutical Chemistry, Varna,
Bulgaria

ORCID ID: 0000-0003-2135-066X

Neli ERMENLIEVA

Medical University of Varna, Medicine Faculty, Department of Microbiology and virology, Varna,
Bulgaria

ORCID ID: 0000-0002-4713-5346

Emiliya GEORGIEVA

Medical University of Varna, Medical College, TS" "Medical Laboratory Assistant", Varna,
Bulgaria

ORCID ID: 0000-0003-2732-6839

Gabriela TSANKOVA

Medical University of Varna, Medicine Faculty, Department of Microbiology and virology, Varna,
Bulgaria

ORCID ID: 0000-0001-8146-5050

Petar STAMOV

Medical University of Varna, Medicine Faculty, Department of General and operative surgery,
Varna, Bulgaria

ORCID ID: 0000-0002-9266-9769

Abstract

Introduction and Purpose: Knowledge of possible interactions between foods/nutritional supplements and drugs is important to build a proper approach to avoid toxic reactions. As a result of the interaction, the effects of drugs are affected by other drugs, foods, herbs, or chemical agents. Drug-food interactions can cause changes in the bioavailability and excretion of the drug, which can negatively affect the healing process or, conversely, cause a beneficial effect. The way of eating can affect the healing effect of the medicine taken, since its resorption through the mucous membrane of the gastrointestinal tract depends on the acidity of the environment, the speed of peristalsis, etc. It is the food we eat that determines the level of gastric acidity, the time of gastric emptying, the secretion of digestive juices, the level of blood flow in these organs and the liver, as well as the degree of bile excretion. The aim of the present work is to investigate the interactions of dairy food products with certain drugs.

Materials and Methods: This study covers a systematic review of literature data from electronic databases such as PubMed, Scopus, Web of Science, Research Gate, etc. using computer software. Keywords in the study include "drug interactions", "dairy products and drugs", "drug-milk interactions", cheese and drugs, etc.

Results: Milk interferes with the absorption of various antibiotics such as tetracycline and ciprofloxacin by reducing their absorption. Cow's milk also reduces the bioavailability of mercaptopurine. Patients taking antihypertensive therapy (especially captopril) are at risk of reduced absorption when taking the drug and dairy products at the same time. The simultaneous intake of sodium fluoride salts in the treatment of osteoporosis and milk reduces their absorption. Bisacodyl is a laxative drug and should not be taken with milk. The tablets are enteric coated and their dissolution depends on pH. Milk can cause the drug to dissolve in the stomach rather than the small intestine, leading to severe abdominal cramps and gastrointestinal irritation. On the other hand, non-steroidal anti-inflammatory drugs, as well as corticosteroid preparations, have an irritating effect on the lining of the gastrointestinal tract. It is recommended to be taken with food or milk. **Discussion and Conclusion:** As is well-known, drug-food interactions can affect the safety and effectiveness of drug therapy. Interactions between milk and drugs are mainly pharmacokinetic interactions because milk affects the absorption and excretion of drugs and are classified as moderate in severity because treatment failure and the need for additional treatment may occur. Responsibility for the health of the patient comes first, and it is important that healthcare professionals, doctors, and pharmacists, have a thorough knowledge of these interactions.

Key Words: Drug-milk interactions; Dairy products; Cheese and drugs; Adverse interactions

BONE HEALTH OF WOMEN OF BULGARIAN AND ROMA ORIGIN - RISK FACTORS**Marieta Todorova**

Medical University – Plovdiv, Faculty of Public Health, Department of Nursing Care

Angelina Kirkova-BogdanovaMedical University – Plovdiv, Faculty of Public Health, Department of Medical Informatics,
Biostatistics and E-learning**Veselina Bukova**

Medical University – Plovdiv, Faculty of Public Health, Department of Nursing Care

Daniela Taneva

Medical University – Plovdiv, Faculty of Public Health, Department of Nursing Care

Abstract

Osteoporosis is a metabolic condition that results in a decrease in bone density. Menopausal women are particularly vulnerable to bone loss and developing osteoporosis. As such, a study was conducted to find risk factors associated with osteoporosis development among active-age Bulgarian and Roma women. The study involved 417 working-age women of Bulgarian and Roma origin. The results revealed that early menopause before the age of 45 and having a first child before the age of 18 increased the risk of osteoporosis development significantly ($p < 0.0001$). However, non-modifiable risk factors such as prior fractures, familial history of fractures, height reduction, diseases, or medications that increase the risk of developing osteoporosis did not show significant differences. It is essential to identify common risk factors among women of diverse ethnic backgrounds, considering their differences in culture, education, socio-economic status, and health behaviors. This information is critical in creating effective prevention strategies for specific risk groups.

Keywords: bone health, risk factors, prevention, Bulgarian, Roma

ACUTE CORONARY SYNDROME: STEMI AND NSTEMI**Amira Cherifa ZERARKA**

University of BATNA 2, Faculty of Medicine, Department of Medicine, Batna, Algeria

ORCID ID: <https://orcid.org/0009-0001-8439-8591>**Abstract**

One of the most frequently encountered emergencies in cardiology is acute coronary syndrome (ACS), which includes two types: ST-segment elevation myocardial infarction (STEMI) and non-ST-segment elevation myocardial infarction (NSTEMI). ACS, in general, is characterized by the sudden onset of acute myocardial ischemia that may progress to myocardial necrosis (myocardial infarction) in the absence of timely and adequate management. This ischemic injury is most commonly due to the rupture of an atherosclerotic plaque, leading to a sustained total or incomplete obstruction of a coronary artery supplying a well-defined myocardial territory. Treatment involves medical or interventional revascularization depending on the case, following assessment of bleeding risk of the patient. Both types of ACS also require secondary prevention treatment against atherosclerotic disease, which is the most common etiology of ACS.

Key Words: ACS (Acute Coronary Syndrome), atherosclerosis, ischemia, myocardial infarction, prevention.

INVESTIGATING THE EFFECTS OF ROFLUMILAST ON STORE-OPERATED Ca^{2+} ENTRY IN RAT BASOPHILIC LEUKEMIA CELLS**Yasin GÖKÇE**

Harran University, Faculty of Medicine, Department of Biophysics, Harran, Turkey

ORCID ID: <https://orcid.org/0000-0002-2811-0709>**Abstract**

Introduction and Purpose: Store-Operated Ca^{2+} Entry (SOCE) is a critical cellular mechanism where the depletion of calcium stores in the endoplasmic reticulum (ER) triggers calcium influx through plasma membrane channels, primarily mediated by STIM1 and Orai1 proteins. This process is vital for numerous cellular functions, including gene expression, secretion, and cell proliferation, and plays a significant role in the immune response and inflammation. Roflumilast, a selective phosphodiesterase-4 (PDE4) inhibitor, is known for its anti-inflammatory properties, primarily through increasing intracellular cyclic AMP (cAMP) levels. However, its impact on Ca^{2+} signaling pathways such as SOCE is less understood. Using Rat Basophilic Leukemia (RBL-1) cells, a model known for robust Ca^{2+} signaling responses, this study aims to investigate the effects of roflumilast on SOCE.

Materials and Methods: In this study, Rat Basophilic Leukemia (RBL-1) cells were used to examine the dose-dependent effects of roflumilast on SOCE at concentrations of 3 μ M, 10 μ M, and 30 μ M using the patch-clamp technique. Cells were cultured to approximately 80% confluence, then plated on plastic petri dishes for electrophysiological recordings. RBL-1 cells were chosen for their pronounced SOCE response. Recordings were made at a holding potential of -90 mV, with SOCE induced by thapsigargin (TG), an ER Ca^{2+} ATPase inhibitor. Cells were incubated with roflumilast for 20 minutes at each concentration prior to recordings.

Results: Current-time graphs after breaking in displayed a clear, dose-dependent decrease in Ca^{2+} influx, with higher concentrations of roflumilast resulting in greater inhibition of SOCE. Quantitative analysis revealed that the amplitude of SOCE currents decreased significantly with increasing concentrations of roflumilast. **Discussion and Conclusion:** The inhibition of PDE4 by roflumilast increases intracellular cAMP levels. Elevated cAMP can modulate various signaling pathways, potentially interfering with the activation of STIM1 and Orai1, the primary components of SOCE. Roflumilast may directly or indirectly affect SOCE by altering the phosphorylation states or the interactions between STIM1 and Orai1. Modulating SOCE may be beneficial in conditions where dysregulated Ca^{2+} signaling contributes to disease pathology, such as asthma, COPD, and other inflammatory diseases.

Key Words: Roflumilast; SOCE; Stim1; Orai1; RBL1-cells

THE EFFECT OF GRADED MOTOR IMAGERY ON PAIN AND FUNCTION IN INDIVIDUALS WITH KNEE OSTEOARTHRITIS¹**Zeynep YILDIZ KIZKIN**

Artvin Coruh University, Vocational School of Health Services, Department of Therapy and Rehabilitation, Artvin, Turkey

ORCID ID: <https://orcid.org/0000-0002-2510-5410>**Semra OĞUZ**

Marmara University, Faculty of Health Sciences, Department of Physical Therapy and Rehabilitation, İstanbul, Turkey

ORCID ID: <https://orcid.org/0000-0002-7148-4562>**Semih AK**

Artvin State Hospital, Artvin, Turkey

ORCID ID: <https://orcid.org/0000-0002-0095-6374>**Abstract**

Introduction and Purpose: Transcutaneous Electrical Nerve Stimulation (TENS) is a modality frequently used in the treatment of osteoarthritic pain. The aim of this study was to investigate whether Graded Motor Imagery (GMI), which is inexpensive and device-free, is as effective as TENS in improving pain and function in patients with knee osteoarthritis (KOA).

Materials and Methods: Thirty participants diagnosed with KOA at Artvin State Hospital were randomized into two groups. For 8 weeks (24 sessions), one group received GMI training and the other received TENS. Conventional exercises and home exercises were also given to both groups. Participants were evaluated before and after treatment. Knee pain was assessed by Visual Analog Scale (VAS), pressure pain threshold (PPT) by algometer, knee range of motion (ROM) by digital goniometer, muscle strength by hand-held dynamometer, physical performance by Timed Up and Go Test (TUG), pain, function and stiffness by Western Ontario and McMaster University Osteoarthritis Index (WOMAC).

Results: Significant changes were observed in VAS-rest, VAS-activity, VAS-night, pressure pain threshold, active knee flexion ROM, isometric muscle strength, physical performance and WOMAC levels at the end of treatment in both groups ($p < 0.05$). However, the change in VAS-rest, VAS-night, PPT, active knee flexion ROM, isometric muscle strength and WOMAC-pain and WOMAC-function values was superior in the group receiving GMI training ($p < 0.05$). There was no difference between the two interventions in terms of change in VAS-activity, physical performance and WOMAC-stiffness values ($p > 0.05$).

Discussion and Conclusion: GMI may be a more effective method than TENS in improving pain, ROM, isometric muscle strength and function in the treatment of KOA.

Key Words: Pain; Knee Joint; Exercise; Range of Motion; Muscle Strength.

¹ This study is derived from PhD dissertation of Zeynep Yıldız Kızkın, a student at Marmara University, Institute of Health Sciences, Physiotherapy and Rehabilitation Program, entitled "The Effect of Progressive Motor Imagery on Pain and Function in Individuals with Knee Osteoarthritis". Her thesis advisor was Assoc. Prof. Dr. Semra Oğuz.

EFFECTS OF TRANSCUTANEOUS AURICULAR VAGUS NERVE STIMULATION (taVNS) IN INDIVIDUALS WITH PRIMARY DYSMENORRHEA**Zeynep YILDIZ KIZKIN**

Artvin Coruh University, Vocational School of Health Services, Department of Therapy and Rehabilitation, Artvin, Turkey

ORCID ID: <https://orcid.org/0000-0002-2510-5410>**Rıdvan YILDIZ**

Dicle University, Ataturk Vocational School of Health Sciences, Department of Medical Services and Techniques, Diyarbakır, Turkey

ORCID ID: <https://orcid.org/0000-0001-8160-1470>**Ali Veysel ÖZDEN**

Bahcesehir University, Faculty of Health Sciences, Department of Physical Therapy and Rehabilitation, İstanbul, Turkey

ORCID ID: <https://orcid.org/0000-0003-2349-996X>**Abstract**

Introduction and Purpose: A large proportion of patients with primary dysmenorrhea (pwPD) use anti-inflammatory drugs (NSAIDs) for pain management. However, it is known that NSAIDs are often inadequate in relieving pain and have side effects. Therefore, the aim of this study was to investigate the effects of taVNS, an alternative and non-pharmacological intervention, on pain, functional and emotional symptoms and physical performance in pwPD.

Materials and Methods: In this study, conducted over two menstrual cycles, twenty patients with primary dysmenorrhea were randomly assigned to either the taVNS group or the sham treatment group. The taVNS or sham treatment was administered for five days, starting from the onset of pain during the menstrual cycle. Pain severity was assessed using the Numerical Rating Scale (NRS), and the pressure pain threshold was measured with an algometer. Menstrual symptoms were evaluated using the Functional and Emotional Measure of Dysmenorrhea (FEMD) and the Menstrual Symptom Questionnaire (MSQ). Physical performance was measured with the 6-Minute Walk Test (6MWT), and anxiety severity was assessed using the Hamilton Anxiety Scale (HAM-A) during both the first and subsequent menstrual cycles.

Results: In the taVNS group, significant reductions were observed in pain, menstrual symptoms, and anxiety severity, alongside significant improvements in pain threshold and physical functionality ($p < 0.05$).

Discussion and Conclusion: TaVNS has shown clear benefits for young women with primary dysmenorrhea, effectively reducing pain and menstrual symptoms while improving physical performance.

Key Words: Dysmenorrhea; Menstrual Cycle; Pain; Function.

CYTOKINE CHANGES RESULTING FROM INFLAMMATION IN HaCaT CELLS**Lecturer Dr. Gamze DEMİREL**

Selçuk University, Akşehir Kadir Yallagöz School of Health

Prof. Dr. Mehmet GÜRBİLEK

Necmettin Erbakan University, Faculty of Medicine, Medical Biochemistry

Abstract

Inflammatory damage caused by abnormal proliferation of epidermal cells and infiltration of inflammatory cells as a result of many skin problems such as psoriasis, acne, burn damage, and epidermal inflammation is effective in the inflammatory process in keratinocytes. Inflammation-induced cytokine changes are frequently observed as a result of changes in cellular processes. IL-6 plays various roles in acute and chronic inflammation. Identifying the cytokine change in this case may contribute to the inflammatory process. In this study, inflammatory damage was created by inducing HaCaT cells with LPS (6 µg/mL). Cells were seeded into each well of the 6-well plate at a density of 1×10^6 cells per well. Cell viability was determined with 3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT). The group without LPS was considered as the control group. Each group was performed independently 3 times. Total RNA was extracted from cells and reverse transcribed into complementary DNA (cDNA). The relative expression of mRNA level was calculated using the $\Delta\Delta C_t$ method. β -actin was used as a reference. Results are presented as mean \pm standard deviation. Statistically, comparison between two groups was determined by Student's t-test. $p < 0.05$ was considered statistically significant. When LPS was examined with MTT to HaCaT cells, we detected a cell reduction of approximately 34%. Additionally, for cytokine evaluation, it was observed that the expression of IL-6 increased approximately 3-fold compared to the control group as a result of LPS-induced inflammation. ($n = 3$. $p < 0.05$). IL-6 is known to cause local inflammation. Prolonged upregulation of IL-6 can increase local inflammation and greatly influence disease processes. Additionally, upregulated cytokines may work as activators of inflammatory cells. Inhibition of inflammation occurring in HaCaT cells may play a role in protecting the cells.

Key Words: Inflammation; Cytokines; Skin diseases; Skin inflammation**INTRODUCTION**

The skin is the part that is connected to the living system and environment. It protects the parts close to the external environment, as well as the internal organs, against potentially harmful environmental factors such as chemicals and dryness (Garcia et al., 2018).

It has been observed that the skin basically consists of 3 main layers: epidermis, dermis and the fat layer under the skin. Skin is the structure that covers the most area in the body and protects the body from chemical, disease, radiation and physical damage (K. Wang et al., 2018).

The epidermis is located at the very surface of the skin and has five main layers in its structure: stratum granulosum, stratum corneum, stratum spinosum, stratum lucidum and stratum basale. Keratinocytes, which are part of the innate immune system and are associated with cell types such

as melanocytes and langerhans, are the most dominant type of cell types (constituting approximately 95%). Inflammation of keratinocytes is considered a skin problem (Garcia et al., 2018).

Additionally, keratinocytes called basal keratinocytes can be found in the basal layer of the skin (Yang et al., 2016, 2018).

One of the most important functions of epidermal keratinocytes is to create a barrier against pathogens. Keratinocytes begin to produce cytokines (such as TNF- α , IL-6, IL-8 and monocyte chemoattractant protein-1 (MCP-1)) and chemokines that play a role in various processes against pathogens in the epidermis. These factors also serve to increase skin infiltration into the area of inflammation. Therefore, especially in inflammatory skin diseases, alteration of pro-inflammatory cytokine and chemokine production in keratinocytes may be an effective treatment strategy in the treatment of skin diseases caused by inflammation (Choi et al., 2014; Kong et al., 2015; X. Wang & Zhang, 2018; Zhang et al., 2017).

For example, anti-inflammatory drugs (both steroid and non-steroidal) are used in Psoriasis and atopic dermatitis. These drugs reduce the production of molecules such as cytokines and chemokines by inhibiting the MAPK or NF- κ B pathways. However, excessive exposure to these drugs may trigger drug resistance and allergic reactions (Schooling et al., 2013).

Inflammation; It is an important part of the host's defense mechanism that can be activated by various external factors. Although inflammation plays an important role in the healing process in terms of development, it is also important in the pathogenesis of diseases (such as cardiovascular, diabetes, skin diseases and cancer) (Chen et al., 2018).

The inflammatory response is characterized by the production of various pro-inflammatory cytokines (including IL-1 β , IL-6, TNF- α , etc.).

IL-6 serves as an important moderator in the activation and proliferation of leukocytes, keratinocytes, and fibroblasts in the inflammatory process (Jeong et al., 2014).

Lipopolysaccharide (LPS) is the main component in the membrane of gram-negative bacteria. It is also used quite often to stimulate inflammation.

METHODOLOGY

HaCaT cell line was cultured in DMEM (supplemented with 10% fetal bovine serum (FBS)) and DMEM:F12 (1:1 ratio) in an environment of 37 °C and 5% CO₂. LPS (Escherichia coli O127:B8) was used to trigger inflammation, cells were incubated with LPS for 12 hours. LPS was applied at different concentrations to observe the change depending on the concentration difference. And cell viability was observed depending on the dose. Based on these results, 0,75 μ g/mL LPS was used as the middle concentration in our study.

MTT (expansion) assay was used to measure HaCaT cell viability. Cells were seeded in a 96-well plate, then 10 μ l of MTT solution was added to each well and kept at 37°C for four hours. After the MTT mixture was cleared, DMSO was added to each well. After the plate remained on the shaker for 15 minutes, the absorbance of the groups at 570 nm was tested with a Microplate Reader.

The inflammatory response induced by LPS was assessed by detecting the change in IL-6 mRNA levels. mRNA expression of IL-6 was determined by RT-PCR analysis. To isolate total RNA from HaCaT cells, RNAiso PLUS was used. A total of 1 μ g of RNA was used to generate cDNA by reverse transcription using cDNA Synthesis (SuperMix).

Statistical analysis

Data were replicated 3 times and its mean value was calculated (SEM). It was analyzed using ANOVA for experiments with two groups followed by Dunnett's method for experiments with more than one group ($p < 0.05$ was considered significant).

CONCLUSION AND DISCUSSION

When LPS was examined with MTT to HaCaT cells, we detected a cell reduction of approximately 34%. (Figure 1.) Additionally, for cytokine evaluation, it was observed that the expression of IL-6 increased approximately 3-fold compared to the control group as a result of LPS-induced inflammation. ($n = 3$. $p < 0.05$). (Figure 2.)

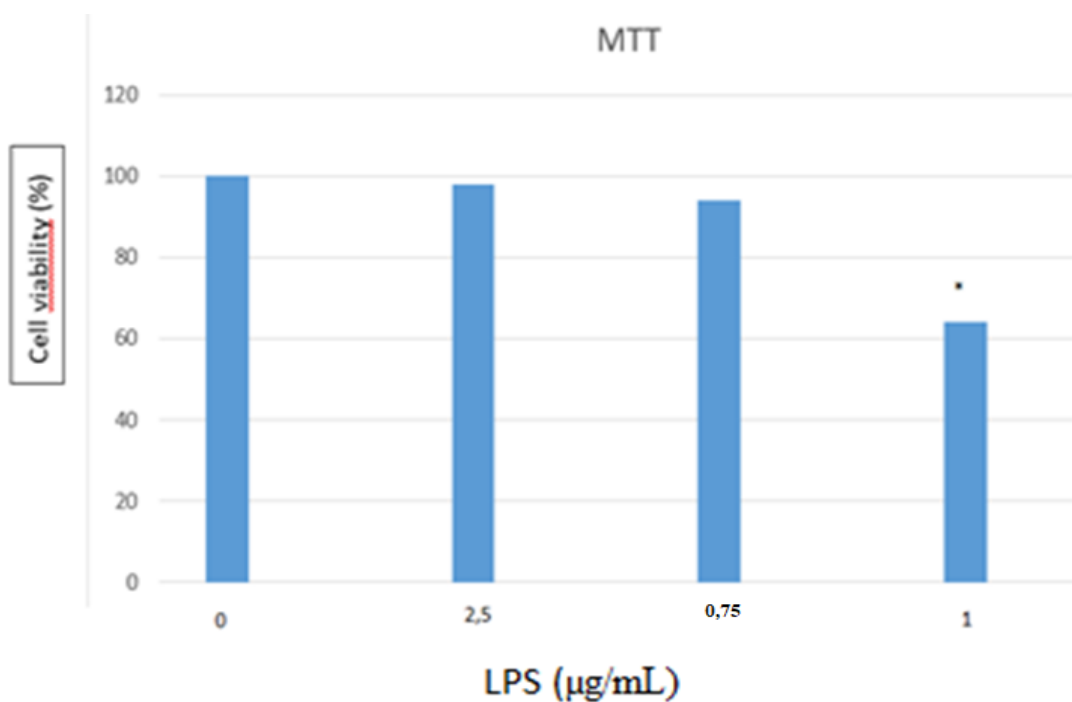


FIGURE 1: (MTT cell viability) (* $p < 0,05$)

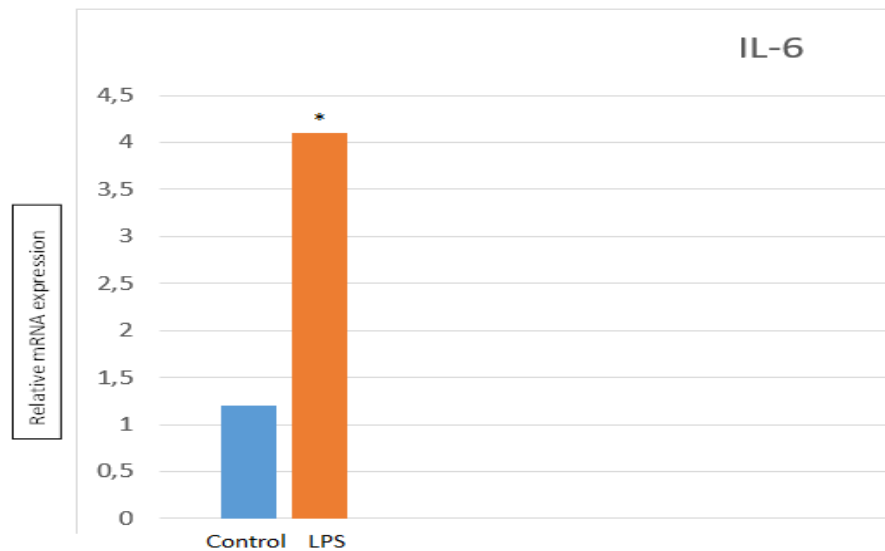


FIGURE 2: IL-6 mRNA expression (* $p < 0,05$)

Traumas that cause damage to the skin, such as burns, result in inflammation in the skin barrier, and this inflammatory response can trigger serious metabolic disorders.

The role of circulating immune cells (such as neutrophils) is important in case of infection, but excessive inflammatory response can have negative consequences such as injury to tissues and organs. Therefore, the production of mediators and cytokines in the inflammatory response needs to be well controlled. LPS has been shown to cause activation of cytokines such as $\text{TNF-}\alpha$, $\text{IL-1}\beta$, and IL-6. Histamine enhances UVB-induced IL-6 production by human keratinocytes (Hoffmann & Baltimore, 2006).

IL-6 has been observed to be upregulated in the pathogenesis of skin inflammatory diseases such as psoriasis and atopic dermatitis, as well as skin squamous cell carcinoma (SCC). For example; It has been observed that lymphocyte infiltration is induced in psoriasis by the effect of IL-6, and in addition, keratinocyte proliferation is stimulated. It has been observed that IL-6 is upregulated in people with atopic dermatitis, aggravating the person's response to these diseases (Lederle et al., 2011).

Another study reported that exposure to UV light significantly increases IL-6 and contributes especially to the cutaneous inflammatory response (Nishimura et al., 1999).

To detect changes in the inflammatory response in the skin, IL-6-deficient mice were exposed to UVB and subsequent deficits in the cutaneous immune response were observed. This shows that IL-6 plays an active role in inflammation. Transcription factors are also important in regulating the inflammatory response and treatment options. For example, $\text{NF-}\kappa\text{B}$ acts as a regulatory transcription factor and plays a role in the cellular response as a result of the expression of $\text{TNF}\alpha$, $\text{IL-1}\beta$, IL-6, iNOS (Gröne, et al.)

$\text{NF-}\kappa\text{B}$ dimers are released due to inflammation stimulation by LPS. After phosphorylation, they enter the nucleus and bind to DNA sequences to express target genes (Gröne, n.d.).

Keratinocytes are most prominent in allergic skin diseases and allergic dermatitis processes. After exposure to the allergen, keratinocytes are activated, causing the formation of inflammatory mediators such as chemokines and cytokines. It has been observed that keratinocytes self-activate

with TNF- α stimulation and therefore the release of various cytokines (including IL-8, IL-6) is stimulated (Kong et al., 2015).

Different studies have shown that pro-inflammatory cytokines cause iNOS expression, IL-6 secretion changes with the increase in TNF- α , and there is an increase in nitric oxide (NO) production (Marcus et al., 2003). Important representatives of the inflammatory response, such as cytokines, mediate the development of many inflammatory diseases. And they are also used in terms of treatment options (Marcus et al., 2003).

REFERENCES

- Chen, L., Deng, H., Cui, H., Fang, J., Zuo, Z., Deng, J., Li, Y., Wang, X., & Zhao, L. (2018). Oncotarget 7204 www.impactjournals.com/oncotarget Inflammatory responses and inflammation-associated diseases in organs. In *Oncotarget* (Vol. 9, Issue 6). www.impactjournals.com/oncotarget/
- Choi, H. J., Lee, J. H., & Jung, Y. S. (2014). (+)-Nootkatone inhibits tumor necrosis factor α /interferon γ -induced production of chemokines in HaCaT cells. *Biochemical and Biophysical Research Communications*, 447(2), 278–284. <https://doi.org/10.1016/j.bbrc.2014.03.121>
- Garcia, M., Morello, E., Garnier, J., Barrault, C., Garnier, M., Burucoa, C., Lecron, J. C., Si-Tahar, M., Bernard, F. X., & Bodet, C. (2018). Pseudomonas aeruginosa flagellum is critical for invasion, cutaneous persistence and induction of inflammatory response of skin epidermis. *Virulence*, 9(1), 1163–1175. <https://doi.org/10.1080/21505594.2018.1480830>
- Gröne A. (2002). Keratinocytes and cytokines. *Vet Immunol Immunopathol*. Sep 6;88(1-2):1-12. doi: 10.1016/s0165-2427(02)00136-8. PMID: 12088639.
- Hoffmann, A., & Baltimore, D. (2006). Circuitry of nuclear factor κ B signaling. In *Immunological Reviews* (Vol. 210, pp. 171–186). <https://doi.org/10.1111/j.0105-2896.2006.00375.x>
- Jeong, J.-W., Lee, H. H., Han, M. H., Kim, G.-Y., Hong, S. H., Park, C., & Choi, Y. H. (2014). *Ethanol extract of Poria cocos reduces the production of inflammatory mediators by suppressing the NF-kappaB signaling pathway in lipopolysaccharide-stimulated RAW 264.7 macrophages*. <http://www.biomedcentral.com/1472-6882/14/101>
- Kong, L., Liu, J., Wang, J., Luo, Q., Zhang, H., Liu, B., Xu, F., Pang, Q., Liu, Y., & Dong, J. (2015). Icaritin inhibits TNF- α /IFN- γ induced inflammatory response via inhibition of the substance P and p38-MAPK signaling pathway in human keratinocytes. *International Immunopharmacology*, 29(2), 401–407. <https://doi.org/10.1016/j.intimp.2015.10.023>
- Lederle, W., Depner, S., Schnur, S., Obermueller, E., Catone, N., Just, A., Fusenig, N. E., & Mueller, M. M. (2011). IL-6 promotes malignant growth of skin SCCs by regulating a network of autocrine and paracrine cytokines. *International Journal of Cancer*, 128(12), 2803–2814. <https://doi.org/10.1002/ijc.25621>
- Marcus, J. S., Karackattu, S. L., Fleegal, M. A., & Summers, C. (2003). Cytokine-stimulated inducible nitric oxide synthase expression in astroglia: Role of Erk mitogen-activated protein kinase and NF- κ B. *GLIA*, 41(2), 152–160. <https://doi.org/10.1002/glia.10168>
- Nishimura, N., Tohyama, C., Satoh, M., Nishimura, H., & Reeve, V. E. (1999). Defective immune response and severe skin damage following UVB irradiation in interleukin-6-deficient mice. *Immunology*, 97(1), 77–83. <https://doi.org/10.1046/j.1365-2567.1999.00733.x>
- Schooling, C. M., Au Yeung, S. L., Freeman, G., & Cowling, B. J. (2013). The effect of statins on testosterone in men and women, a systematic review and meta-analysis of randomized controlled trials. *BMC Medicine*, 11(1). <https://doi.org/10.1186/1741-7015-11-57>

Wang, K., Jiang, H., Li, W., Qiang, M., Dong, T., & Li, H. (2018). Role of vitamin C in skin diseases. In *Frontiers in Physiology* (Vol. 9, Issue JUL). Frontiers Media S.A. <https://doi.org/10.3389/fphys.2018.00819>

Wang, X., & Zhang, Y. (2018). Resveratrol alleviates LPS-induced injury in human keratinocyte cell line HaCaT by up-regulation of miR-17. *Biochemical and Biophysical Research Communications*, 501(1), 106–112. <https://doi.org/10.1016/j.bbrc.2018.04.184>

Yang, J. H., Yoo, J. M., Cho, W. K., & Ma, J. Y. (2016). Anti-inflammatory effects of Sanguisorbae Radix water extract on the suppression of mast cell degranulation and STAT-1/Jak-2 activation in BMDCs and HaCaT keratinocytes. *BMC Complementary and Alternative Medicine*, 16(1). <https://doi.org/10.1186/s12906-016-1317-4>

Yang, J. H., Yoo, J. M., Lee, E., Lee, B. H., Cho, W. K., Park, K. Il, & Yeul Ma, J. (2018). Anti-inflammatory effects of Perillae Herba ethanolic extract against TNF- α /IFN- γ -stimulated human keratinocyte HaCaT cells. *Journal of Ethnopharmacology*, 211, 217–223. <https://doi.org/10.1016/j.jep.2017.09.041>

Zhang, J., Yang, X., Wang, H., Zhao, B., Wu, X., Su, L., Xie, S., Wang, Y., Li, J., Liu, J., Liu, M., Han, F., He, T., Zhang, W., Tao, K., & Hu, D. (2017). PKC η as a promising therapeutic target for TNF α -induced inflammatory disorders in chronic cutaneous wounds. *International Journal of Molecular Medicine*, 40(5), 1335–1346. <https://doi.org/10.3892/ijmm.2017.3144>

Hsa-miR-217 EXPRESSION IN BREAST CANCER**Esra Duman**

Kocaeli University, Faculty of Medicine, Department of Medical Genetics, Kocaeli, Turkiye

ORCID ID: 0000-0003-4209-3009

Mariya MAŞTA

Kocaeli University, Faculty of Medicine, Department of General Surgery, Kocaeli, Turkiye

ORCID ID: 0009-0009-7462-7029

Ömer Furkan HALİS

Kocaeli University, Faculty of Medicine, Department of Pharmacology

ORCID ID: 0009-0006-0993-7256

Yusufhan YAZIR

Kocaeli University, Faculty of Medicine, Department of Stem Cell and Gene Therapy Research and Application Center

ORCID ID: 0000-0002-8472-0261

Nihat Zafer UTKAN

Kocaeli University, Faculty of Medicine, Department of General Surgery, Kocaeli, Turkiye

ORCID ID: 0000-0002-2133-3336

Abstract

Introduction and Purpose: According to world cancer research statistics, breast cancer is second most common type of cancer regardless of gender, ranks first among newly diagnosed cancers among women with a rate of 25% and one in eight women in the world develops breast cancer. Many environmental and genetic factors play a role in the etiology of cancer. The circadian clock is responsible for the coordination of the 24-hour oscillation of the environmental time cycle in almost all tissues in the body. MicroRNAs (miRNAs) are 18-21 nucleotide long, single-stranded, non-coding RNA molecules that alter gene expression at the post-transcriptional stage. Based on this information, we hypothesized that, the expression of the *CLOCK* gene conserved miRNA hsa-miR-217 in healthy and tumor tissue samples from 20 patients diagnosed with breast cancer was compared by real time PCR.

Materials and Methods: From 20 patients diagnosed with breast cancer, healthy and tumor tissue samples were obtained from the same individuals during total or partial mastectomy surgery and stored at -80°C until RNA isolation. Total RNA isolation, cDNA synthesis revealed and gene

expression were compared by RT-PCR. For gene expression estimation, $2^{-\Delta\Delta C_t}$ values were used and the differences between the tissues were compared with T-test using SPSS package program.

Results: hsa-miR-217 expression between healthy and tumor tissues was significantly different ($p < 0.05$).

Discussion and Conclusion: The present study demonstrated that hsa-miR-217 expression is significantly different in tumor and healthy breast tissue. There are studies showing the association of circadian rhythm dysregulation and hsa-miR-217 with cancer in different cancer types separately, but this is the first study to identify the *CLOCK* gene and miR-217 in breast cancer. Further analysis and further studies are needed to determine the potential of the gene and miR-217 as breast cancer markers, and this study is a preliminary investigation.

Key Words: Breast cancer, miRNA, Circadian rhythm, Clock gene, Real Time PCR

EVALUATION OF THE EFFECTIVENESS OF DISASTER TRAINING PROVIDED TO HEALTH WORKERS**SAĞLIK ÇALIŞANLARINA VERİLEN AFET EĞİTİMİNİN ETKİNLİĞİNİN DEĞERLENDİRİLMESİ****Hande DEMİRTAŞ**

Bandırma Onyedi Eylül University Institute of Health Sciences Department of Nursing
Management, Balıkesir, Turkey

ORCID ID:<https://orcid.org/0000-0002-2870-8890>

Nazlıhan EFE SAYAN

Bandırma Onyedi Eylül University Institute of Health Sciences Department of Nursing
Management, Balıkesir, Turkey

ORCID ID:<https://orcid.org/0000-0002-9231-6998>

Serap ALTUNTAŞ

Bandırma Onyedi Eylül University Faculty of Health Sciences, Department of Nursing
Management, Balıkesir, Turkey

ORCID ID:<https://orcid.org/0000-0002-7695-7736>

Abstract

Introduction and purpose: Disasters are important events that affect the lives of many people in the world. It is stated that 7348 disasters occurred in twenty years in the world and 1.2 million people were affected by disasters. Disaster trainings play an important role in reducing the damage that may occur in disasters and preventing disasters. Effective trainings have critical importance for achieving the intended results in disasters. This study was conducted to evaluate the effectiveness of disaster training received by healthcare workers.

Materials and Method: The study was descriptive and cross-sectional. Simple random sampling method was used in the study and data were collected from 501 healthcare professionals who could be reached online and who voluntarily agreed to participate in the study. An "online questionnaire form" consisting of 23 questions was used to collect the data. The data were collected between 22 January and 01 May 2024 and analysed using statistical package software.

Results: Of the health personnel participating in the study, 32.5% did not receive disaster training. 91.3% of those working in family health centres and 71% of those working in private practices did not receive training. It was found that 57.3% of the employees who received training received training compulsorily, 52.9% received training for 1-3 hours, 48.3% received face-to-face training and 58.3% received in-service training. 58.6% of the employees who received disaster training stated that disaster training helped them to recognise the risks in the environment. The employees

who participated in the training stated that the trainings should be face-to-face (59.8%), specific to the region (55.3%) and specific to occupational groups (54.4%).

Discussion and conclusion: It was determined that the disaster training received by healthcare workers helped them to recognise the risks in their environment. Since Turkey is a country located in a disaster zone and healthcare workers play a vital role in disaster management, it is important to develop trainings by planning activities to encourage employees to voluntarily participate in trainings in terms of public health and sustainability. In addition, strategies should be developed for systematic training in family health centres and private practices.

Keywords: Disaster, Disaster Training, Health Workers

Özet

Giriş ve amaç: Afetler dünyada birçok insanın yaşamını etkileyen önemli olaylardır. Dünya’da yirmi yılda 7348 afet olayının gerçekleştiği ve 1,2 milyon insanın afetlerden etkilendiği belirtilmektedir. Afet eğitimleri afetlerde meydana gelebilecek zararın azaltılması ve afetlerin önlenmesinde önemli rol oynamaktadır. Yapılacak eğitimlerin etkin olması afetlerde amaçlanan sonuçlara ulaşmak için kritik öneme sahiptir. Bu çalışma sağlık çalışanlarının aldıkları afet eğitiminin etkinliğinin değerlendirilmesi amacıyla yapılmıştır.

Gereç ve Yöntem: Çalışma tanımlayıcı ve kesitsel olarak yapılmıştır. Araştırmada basit tesadüfi örnekleme yöntemi kullanılmış olup, veriler çevrimiçi olarak ulaşılabilen ve gönüllü olarak çalışmaya katılmayı kabul eden 501 sağlık personelinin toplanmıştır. Verilerin toplanmasında 23 sorudan oluşan “çevrimiçi anket formu” kullanılmıştır. Veriler 22 Ocak- 01 Mayıs 2024 tarihleri arasında toplanmış ve istatistik paket programı kullanılarak analiz edilmiştir.

Bulgular: Çalışmaya katılan sağlık personellerinin %32,5’i afet eğitimi almamıştır. Aile sağlığı merkezlerinde çalışanların %91,3’ü, özel muayenehanelerde çalışanların ise %71’i eğitim almamıştır. Eğitim alan çalışanların %57,3’ü zorunlu olarak, %52,9’u 1-3 saat süresince, %48,3’ü yüz yüze ve %58,3’ü hizmet içi eğitim kapsamında eğitim aldıkları saptanmıştır. Afet eğitimi alan çalışanların %58,6’sı afet eğitimlerinin çevredeki riskleri tanımalarına yardımcı olduğunu belirtmiştir. Eğitime katılan çalışanlar eğitimlerin yüz yüze (%59,8), yaşanan bölgeye (%55,3) ve meslek gruplarına özgü (%54,4) verilmesi gerektiğini ifade etmiştir.

Tartışma ve sonuç: Sağlık çalışanlarının aldıkları afet eğitiminin yaşadıkları çevredeki riskleri tanımalarına yardımcı olduğu belirlenmiştir. Türkiye afet bölgesinde bulunan bir ülke olması ve sağlık çalışanlarının afet yönetiminde hayati bir rol üstlenmeleri sebebi ile çalışanların eğitimlere gönüllü olarak katılmasını özendirilecek faaliyetler planlanarak eğitimlerin geliştirilmesi toplumun sağlığı ve sürdürülmesi açısından önemlidir. Bununla birlikte aile sağlığı merkezleri ve özel muayenehanelerde eğitimlerin sistematik biçimde alınmasına yönelik stratejiler geliştirilmelidir.

Anahtar Kelimeler: Afet, Afet Eğitimi, Sağlık Çalışanları

THE RELATIONSHIP BETWEEN CLIMATE CHANGE AND INFECTIOUS DISEASES**İKLİM DEĞİŞİKLİKLERİ İLE BULAŞICI HASTALIKLAR İLİŞKİSİ****Aleyna KUŞKU**

Bezmialem Vakıf Üniversitesi, Sağlık Bilimleri Enstitüsü, Afet Yönetimi Anabilim Dalı
Bezmialem Vakıf University, Institute of Health Sciences, Department of Disaster Management
ORCID ID: 0009-0006-3969-3272

Doç. Dr. Ayşe GÜNEŞ BAYIR

Bezmialem Vakıf Üniversitesi, Sağlık Bilimleri Fakültesi, Beslenme ve Diyetetik Bölümü
Bezmialem Vakıf University, Faculty of Health Sciences, Department of Nutrition and Dietetics
ORCID ID: 0000-0002-9993-7850

Abstract

Apart from increasing air temperature, climate change disrupts natural balances, causing glaciers to melt, sea level to rise, sudden weather events and their effects to increase, deforestation and drought. These effects therefore threaten agriculture, ecosystem, biodiversity and human health in direct and indirect ways. One of the physical and strongest effects of climate change is on human health. Heat waves can be fatal to humans. With the increase in flood cases, there is a risk of many infectious diseases, danger of injury and even death. The problem of access to clean water and sanitation is also among the effects of climate change. With the water crisis that is expected to affect the whole world, environmental conditions and dirty, accumulated water that are predicted to deteriorate will create a habitat for mosquitoes and cause an increase in vector-borne diseases. Due to increasing temperature, agents of vector-borne diseases such as Plasmodium malaria and Zika virus are expected to become more widespread day by day. The cycle of vector reproduction and parasite development increases with temperature, increasing the vector load in a particular region. Climate change threatens human health with the food crisis and food safety problems it may cause. A low immune system caused by malnutrition can exacerbate deaths caused by infectious diseases. Climate-related population movements can carry diseases and infectious agents that were not previously observed in a region to the new region. In this context, it is aimed to compile research on the relationship between climate changes and infectious diseases.

Keywords: Climate Change, Infectious Diseases, Human Health, Vector-Borne Diseases

Özet

İklim değişikliği hava sıcaklığının artması dışında, doğal dengeleri bozarak buzulların erimesine, deniz seviyesinin yükselmesine, ani gelişen hava olaylarının ve etkilerinin artmasına, ormansızlaşma ve kuraklığa sebep olmaktadır. Bu etkiler dolayısıyla tarımı, ekosistemi,

biyoçeşitliliği ve insan sağlığını doğrudan ve dolaylı yollarla tehdit etmektedir. İklim değişikliğinin fiziksel ve en kuvvetli etkilerinden biri insan sağlığı üzerinedir. Sıcak hava dalgaları insanlar için ölümcül olabilmektedir. Sel vakalarının artması ile birçok bulaşıcı hastalık tehlikesi, yaralanma tehlikesi hatta ölüm vakaları yaşanmaktadır. Temiz suya ve sanitasyona erişim sorunu da iklim değişikliğinin etkileri arasındadır. Tüm dünyayı etkisi altına alması beklenen su kriziyle beraber bozulması öngörülen çevre koşulları ve kirliliği, birikmiş sular sivrisinekler için yaşam alanı oluşturur ve vektör kaynaklı hastalıkların artmasına neden olur. Artan sıcaklığa bağlı olarak; *Plasmodium malariae* ve Zika virüsü gibi vektör kaynaklı hastalıkların ajanlarının günden güne daha da yaygınlaşması beklenmektedir. Vektör üreme ve parazit gelişme döngüsü sıcaklık ile artmakta, belirli bir bölgedeki vektör yükünü arttırmaktadır. İklim değişikliği yol açabileceği gıda krizi ve gıda güvenliği sorunları ile insan sağlığını tehdit etmektedir. Yetersiz beslenmenin neden olduğu düşük bağışıklık sistemi bulaşıcı hastalıkların sebep olabileceği ölümleri şiddetlendirebilir. İklimle ilgili nüfus hareketleri, bir bölgede daha önceden gözlenmeyen hastalığı ve enfeksiyon etkenlerini gelinen bölgeye taşıyabilir. Bu bağlamda iklim değişiklikleri ile bulaşıcı hastalıklar ilişkisi konusunda yapılan araştırmaların derlenmesi amaçlanmıştır.

Anahtar Kelimeler: İklim Değişikliği, Bulaşıcı Hastalıklar, İnsan Sağlığı, Vektör Kaynaklı Hastalıklar

GOLDEN RATIO IN DENTISTRY**DIŞ HEKİMLİĞİNDE ALTIN ORAN****Arş. Gör. Ebru YILMAZ**

Pamukkale Üniversitesi, Diş Hekimliği Fakültesi, Restoratif Diş Tedavisi, Denizli, Türkiye

ORCID ID: <https://orcid.org/0000-0001-8793-3273>**Doç. Dr. Nilgün AKGÜL**

Pamukkale Üniversitesi, Diş Hekimliği Fakültesi, Restoratif Diş Tedavisi, Denizli, Türkiye

ORCID ID: <https://orcid.org/0000-0002-6732-0485>**Arş. Gör. Onur AKKURT**

Pamukkale Üniversitesi, Diş Hekimliği Fakültesi, Restoratif Diş Tedavisi, Denizli, Türkiye

ORCID ID: <https://orcid.org/0009-0000-2010-1632>**Abstract**

The golden ratio, discovered by the ancient Egyptians and Greeks, is a special ratio that many beings in nature have, and then tried to be adapted to many fields from art to architecture, aesthetics to science. When we consider it mathematically, when a line is divided into two segments in the golden ratio, the ratio of the long segment of the line to the short segment is equal to the ratio of the entire line to the long segment. In recent years, aesthetic dentistry with a focus on smile aesthetics has become one of the most sought-after disciplines. It has become a necessity for physicians to evaluate the factors that lead to increased aesthetic anxiety and dissatisfaction in patients based on objective and standardised rules. In many studies, clinicians have used the golden ratio, which they consider as the mathematics of aesthetics, in research on these issues. In studies related to the dental golden ratio, the compatibility of the widths of the maxillary anterior teeth with this ratio has been the most discussed subject. Frontally, it was stated that the width of each anterior tooth should be 60% of the width of the neighbouring tooth. As a result, many studies suggest that strictly following this ratio may limit creativity and may lead to unsuccessful results in cosmetic interventions. Therefore, in addition to the golden ratio, personal preferences, individual anatomical differences and individual aesthetic understanding should always be taken into consideration. In aesthetic applications, it is very important to emphasise the natural beauty of the patient and to preserve the integrity of the face.

Keywords: Golden Ratio; Dental Ratio; Dental Golden Ratio; Facial Golden Ratio

Özet

Eski Mısırlılar ve Yunanlılar tarafından keşfedilen altın oran; doğadaki birçok varlığın sahip olduğu, sonrasında ise sanattan mimariye, estetikten bilime kadar pek çok alana uyarlanmaya çalışılan özel bir orandır. Matematiksel olarak ele aldığımızda bir çizgi altın oranda iki segmente bölündüğünde çizginin uzun segmentinin kısa segmentine oranı, tüm çizginin uzun segmente oranına eşittir. Son yıllarda gülüş estetiği odaklı estetik diş hekimliği, en çok aranan disiplinlerden biri olmuştur. Hastalardaki artan estetik kaygının ve memnuniyetsizliğe yol açan etkenlerin objektif ve standart kurallara dayalı olarak hekimler tarafından değerlendirilmesi bir zorunluluk haline gelmiştir. Birçok çalışmada klinisyenler, estetiğin matematiği olarak düşündükleri altın oranı bu konularla ilgili araştırmalarda kullanmışlardır. Dental altın oranla ilgili çalışmalarda maksiller ön dişlerin genişliklerinin bu orana uygunlukları en çok tartışılan konu olmuştur. Frontal olarak bakıldığında her bir ön diş genişliğinin komşu diş genişliğinin %60'ı olması gerektiği ifade edilmiştir. Sonuç olarak yapılan pek çok çalışmada ise bu oranın sıkı sıkıya takip edilmesinin, yaratıcılığı sınırlayabileceği ve kozmetik müdahalelerde başarısız sonuçlara yol açabileceğini düşündürebileceği ifade edilmektedir. Bu nedenle, altın oranın yanısıra kişisel tercihler, bireysel anatomik farklılıklar ve bireysel estetik anlayış her zaman göz önünde bulundurulmalıdır. Estetik uygulamalarda, hastanın doğal güzelliğini vurgulamak ve yüzün bütünlüğünü korumak oldukça önemlidir.

Anahtar Kelimeler: Altın Oran; Dental Oran; Dental Altın Oran; Fasiyal Altın Oran

GİRİŞ

Güzellik, bireysel sezgi ve kişisel deneyimlerle şekillenen, içgüdüsel olarak algılanan hoş bir duygudur. Güzellik algısı, varoluşun ilk anlarından itibaren insanların ilgisini çeken bir durumdur. Bireylerin yüz görünümü kişisel imajın vazgeçilmez bir unsuru olarak, her zaman önemli hale gelmiştir (Sandeep et al., 2015). Bu güzellik algısı estetik diş hekimliği alanında da, dişlerin restorasyonu sırasında önemli bir rol oynamaktadır (Mahshid, Khoshvaghti, Varshosaz, & Vallaei, 2004). Diş hekimleri, hastaların diş tedavileri sırasında, optimal sonuçlar elde etmek için dişlerin formlarını ve boyutlarını dikkate almalıdır (Rosenstiel, Ward, & Rashid, 2000). Kozmetik diş hekimliğindeki estetik kalite; diş eti seviyesi, orta hat pozisyonu, diş etinin yapısı, klinik kron boyu ve dişin pozisyonu ile değerlendirilir. Özellikle maksiller ön dişler, gülümseme esnasında en çok dikkat çeken dişler oldukları için, estetik diş hekimliğinde kritik öneme sahiptirler (Sulaiman, Yaakub, Zulkifli, Abdullah, & Gonzalez, 2010).

Kişinin gülümsemesi, onun dış görünüşünü ve dolayısıyla özgüvenini de belirleyen ve aynı zamanda iyileştiren önemli bir unsurdur (Moskowitz & Nayyar, 1995). Her toplumun güzellik anlayışı farklı olmakla birlikte, çekici gülümsemeler üzerine yapılan çalışmalar, diş estetiği konusunda da uygulanabilir, ölçülebilir ve tutarlı ilkelerin etkili bir şekilde kullanılabileceğini ortaya koymuştur (Snow, 1999). Estetik algısı kişiden kişiye değişkenlik gösterse de, gülümsemenin estetik değerlendirmesi büyük ölçüde uygulayıcının estetik anlayışına bağlıdır. Bu sebeple, restoratif tedavi uygulamaları sırasında bazı estetik rehberlerin kullanılması yanlıgıları azaltabilir ve tedavi sonuçlarını olumlu yönde iyileştirebilir (Londono, Ghasemi, Lawand, & Dashti, 2023).

Gülümseme, sadece yüz güzelliğinin bir göstergesi olmakla kalmaz, aynı zamanda bireyin psikolojik niteliklerinin algılanmasında da önemli bir rol oynar (Van der Geld, Oosterveld, Van Heck, & Kuijpers-Jagtman, 2007). Çalışmalar göstermiştir ki; estetik diş tedavileri sonrasında, bireylerin özsaygısı ve yaşam kalitesinde iyileşmeler gözlemlenebilir. Ayrıca gülümsemede estetik değişimler bireyi daha çekici hale getirebilir (Machado, 2014).

Diş hekimliğinde, estetik bir gülümsemenin temel ilkeleri, gülüş tasarımı kavramı altında incelenir (Morley & Eubank, 2001). Hasta ve hekim arasındaki etkili iletişim, klinik beklentiler ve ihtiyaçlar

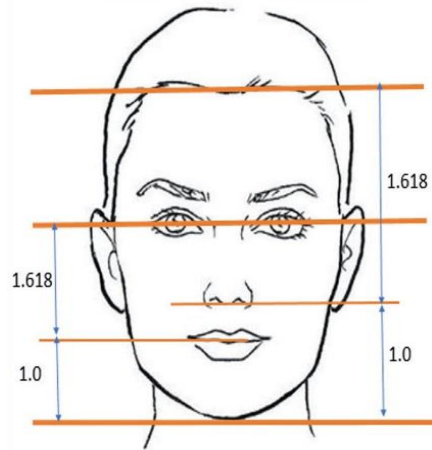
kritik bir öneme sahiptir. Fotoğrafik ve radyografik kayıtların alınması da gülüş estetiğinde kişisel verilerin oluşturulmasına katkı sağlar (Machado, 2014). Bu kayıtlar doğal gülüş ve konuşma esnasındaki gülümsemelerin dudaklar ve yumuşak dokularla nasıl bütünleştiğini analiz etmede kullanılır (Morley & Eubank, 2001).

İdeal bir gülümseme, bireylerin hislerini ifade etmede en etkili yöntemlerden biridir (Hulsey, 1970). Sağlık ve başarı algısıyla ilişkilendirilen ideal gülümseme; diş eti büyümelerinin ve plakların olmaması, renklenmiş dişlerin beyazlatılması ve kırık dişlerin restorasyonları ile birlikte bireyin kendini daha iyi hissetmesini sağlar (Correa, Bittencourt, & Machado, 2014).

Gülümseme estetiğinde, özellikle üst ön diş restorasyonlarında, dişler arasındaki genişliklerin boyutlarına ve uyumuna büyük özen gösterilmelidir. Gülüş tasarımı sürecinde "Altın oran", estetik bir uyum yakalamak için kritik bir ölçüttür (Mahshid et al., 2004). En sade ifadeyle altın oran; bütünü meydana getiren parçalardan büyük parçanın bütüne, küçük parçanın da büyük parçaya oranını izah eder, bu oranlar birbirlerine eşit ve 1,618'dir (Livio, 2002). Lombardi, estetik diş hekimliği uygulamalarında altın oranın kullanılmasını öneren ve bu oranın diş boyutlarının belirlenmesinde etkili olduğunu savunan ilk kişidir (Lombardi, 1973). Levin ise, maksiller anterior dişlerin frontal görünümdeki ardışık genişliklerinin altın oran teorisi ile ilişkilendirilmesini önermiştir. Levin'e göre, maksiller lateral dişlerin genişliği santral dişlerin %62'si kadar, kanin dişlerin genişliği ise lateral dişlerin %62'si kadar olmalıdır (Mahshid et al., 2004). Dişlerin estetik oranları, hem dişlerin kendi boyutları hem de birbirleriyle olan ilişkileri açısından değerlendirilmelidir. Estetik bir görünüm için, bu oranların harmonik bir şekilde bir araya gelmesi önemlidir (Lombardi, 1973).

Fasiyal Altın Oran

Yüz bölgesinde, alın bölgesinden başlayarak burun ve çene uçlarına kadar uzanan bir çizgi çizildiğinde, bu çizginin göz, dudak ve çene hizasında yer alan yatay çizgilerle kesilmesi sonucu oluşan mesafelerin, altın oranı temsil ettiği söylenir. Bu "yüz altın oranı" olarak adlandırılır ve genellikle 1.618/1 oranında ifade edilir. Bu oran, estetik ve simetri açısından insan yüzünün yapısında doğal bir uyum ve denge sağlar (Resim 1)(Çelik, Bala, & Akgül, 2024; Guan, 2009).



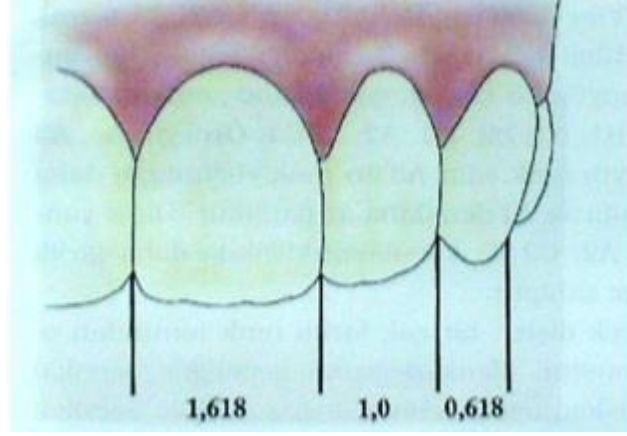
Resim 1. Fasiyal altın oran

Doğu Asyalı bireylerde, yüzün merkezi bölümü sıklıkla en üstteki bölümden daha geniş olup, en alttaki bölümlerle aynı genişlikte ve en üst bölüm, en alt bölümden daha dar görünmektedir (Teck Sim, Smith, & Chan, 2000). Kafkas kökenlilerde ise, yüzün orta bölümü genellikle en üst bölümden daha dar olup, hem orta hem de üst bölümler, en alt bölümden daha küçüktür (Farkas, Katic, &

Forrest, 2005). Yüze önden bakıldığında, üst dudak ile alt dudağın ideal oranı, altın oranı yansıtmalı, yani 1:1.618 değerine sahip olmalıdır. Bu temel estetik prensipler, yüzyıllar öncesinden günümüze kadar bazı uzmanlar tarafından hala önemli kabul edilmektedir. Fasiyal altın oran, yüzün daha simetrik ve dolayısıyla toplumun genel estetik anlayışına daha uygun görünmesini sağlamak için bir rehber olarak kullanılır. Ayrıca, insanlar arası ilk izlenimlerde ve sosyal etkileşimlerde yüz oranlarının ve genel görünümünün önemli bir rol oynadığı düşünülmektedir. Bu nedenle, bu oran hem tarihsel hem de güncel bir öneme sahiptir (Dağlı, 2022).

Dental Altın Oran

Estetik diş hekimliğinde, ön dişlerin tasarımında altın oran, estetik bir görünüm sağlamak için kritik bir faktördür. Dental altın orana göre, üst santral kesicilerin genişliği, yan kesicilere göre 1.618 kat daha fazladır. Bu prensibe göre, üst santral kesici dişler, yan kesicilere kıyasla %60 oranında daha geniş olarak algılanır. Benzer şekilde, yan kesici dişler de, kanin dişlerine göre %60 daha geniş görünme eğilimindedir (Resim 2) (Özdemir & Bayındır, 2016)



Resim 2. Dental altın oran

Çeşitli araştırmalar, popülasyonlardaki dental altın oranın varlığını incelemiştir. 1993 yılında Preston, çalışmalarında %17 oranında maksiller orta keser ve yan kesiciler arasında bir altın oran olduğunu bulmuştur (Preston, 1993). Öte yandan üst çene ön dişlerinin genişlikleri arasında altın oranın bulunmadığını belirten çalışmalar da mevcuttur (Gillen, Schwartz, Hilton, & Evans, 1994; Rosenstiel et al., 2000; Ward, 2001).

George ve Bhat'ın 2010 yılında Hindistan'da gerçekleştirdiği çalışmada, dişlerin genişliği açısından altın oranın bazı tutarsızlıklar gösterdiği belirtilmiştir.(Al-Marzok, Majeed, & Ibrahim, 2013; Aldegheishem et al., 2019; George & Bhat, 2010).

Forster ve arkadaşları tarafından yapılan bir araştırmada, Macar popülasyonundaki maksiller santral kesici, lateral kesici ve kanin dişlerinin mesiodistal genişlik oranlarının altın oranı yansıtmadığını göstermiştir. Ek olarak, Koreli yetişkinlerde maksiller ön dişlerin mesiodistal genişlik oranları hakkında istatistiksel olarak bir anlamlılık bulunmamaktadır (Forster, Velez, Antal, & Nagy, 2013; Jin, Hong, Lee, & Lee, 2016).

Nikgoo gerçekleştirdiği araştırmada, 903 bireyin fotoğraflarını incelemiş, gülümsemenin estetik algısı ile altın oran ilişkisini analiz etmiştir. Altın oranın, maksiller santral ve maksiller lateral dişler arasında önemli bir etken olduğu tespit edilmiş, ancak lateral ve köpek dişi genişlikleri arasındaki altın oranın, estetik açıdan ideal bir gülümseme yaratmada kesin bir ölçüt oluşturmadığı sonucuna varılmıştır (Nikgoo, Alavi, Alavi, & Mirfazaelian, 2009). Yapılan bir başka çalışmada araştırmacılar

60 İngiliz bireyin fotoğraflarını incelemişler ve estetik olarak kabul edilen gülümsemelerde altın oranı tespit edememişlerdir (Ong, Brown, & Richmond, 2006). Bu bulgu, diğer birçok çalışma tarafından da desteklenmektedir (Ali Fayyad, Jamani, & Agrabawi, 2006; Dağlı, 2022; Hasanreisoglu, Berksun, Aras, & Arslan, 2005).

Kuzey Amerika'daki bireyler üzerinde gerçekleştirilen bir araştırmada, gülüş tasarımının altın oranı takip etmesi durumunda, bu durumun hem hastalar hem de doktorlar tarafından en az tercih edilen tedavi seçeneği olduğu gözlemlenmiştir (Ward, 2007). Ward'ın yaptığı bir çalışmada, altın oranın uygulanmasıyla maksiller lateral dişlerin daha ince görüldüğü ve kanin dişlerinin yeterince belirgin olmadığı sonucuna ulaşılmıştır (Ward, 2015). Ürdün'de 376 kişinin üst ön dişlerini kapsayan bir çalışmada ise, dişlerin genişliği ile altın oran arasında herhangi bir ilişki saptanmamıştır (Ali Fayyad et al., 2006). Türkler üzerinde gerçekleştirilen bir çalışmada da altın oranın izlerine rastlanmamıştır (Hasanreisoglu et al., 2005). Üst ön dişlerin estetik algısında önemli bir faktör olan ve doğal diş düzeninde aranan altın oranın varlığı konusunda şüpheler bulunmaktadır (Mahshid et al., 2004). Klinik uygulamalarda altın oranın etkin bir şekilde kullanılabilmesi için, çeşitli etnik kökenlere sahip bireyler üzerinde daha fazla araştırma yapılması gerektiği vurgulanmaktadır (Hasanreisoglu et al., 2005).

SONUÇ

Altın oran, diş hekimlerine estetik tasarımlarında matematiksel bir temel sağlayarak ölçülebilir standartları belirgin hale getirmiştir. Bununla birlikte, son dönemde gerçekleştirilen araştırmalar, altın oranın maksiller anterior dişlerin genişliğini belirlemede tek başına yeterli olmadığını ve toplumdaki bireylerin dişlerinin çoğunun altın orana sahip olmadığını da ortaya koymuştur (Ali Fayyad et al., 2006; Murthy & Ramani, 2008).

REFERANSLAR

- Al-Marzok, M. I., Majeed, K. R. A., & Ibrahim, I. K. (2013). Evaluation of maxillary anterior teeth and their relation to the golden proportion in Malaysian population. *BMC oral health*, 13, 1-5.
- Aldegheishem, A., Azam, A., Al-Madi, E., Abu-Khalaf, L., Ali, B. B., & Anweigi, L. (2019). Golden proportion evaluation in maxillary anterior teeth amongst Saudi population in Riyadh. *The Saudi Dental Journal*, 31(3), 322-329.
- Ali Fayyad, M., Jamani, K., & Agrabawi, J. (2006). Geometric and mathematical proportions and their relations to maxillary anterior teeth. *J Contemp Dent Pract*, 7(5), 62-70.
- Correa, B. D., Bittencourt, M. A. V., & Machado, A. W. (2014). Influence of maxillary canine gingival margin asymmetries on the perception of smile esthetics among orthodontists and laypersons. *American Journal of Orthodontics and Dentofacial Orthopedics*, 145(1), 55-63.
- Çelik, A., Bala, O., & Akgül, S. (2024). Dijital Gülüş Tasarımı. *ADO Klinik Bilimler Dergisi*, 13(1), 167-176.
- Dağlı, I. (2022). Dijital gülüş tasarımı kullanılarak planlanan protetik diş tedavilerinin estetik algı üzerindeki etkisinin değerlendirilmesi.
- Farkas, L. G., Katic, M. J., & Forrest, C. R. (2005). International anthropometric study of facial morphology in various ethnic groups/races. *Journal of Craniofacial Surgery*, 16(4), 615-646.
- Forster, A., Velez, R., Antal, M., & Nagy, K. (2013). Width ratios in the anterior maxillary region in a Hungarian population: addition to the golden proportion debate. *The Journal of prosthetic dentistry*, 110(3), 211-215.

- George, S., & Bhat, V. (2010). Inner canthal distance and golden proportion as predictors of maxillary central incisor width in south Indian population. *Indian Journal of Dental Research*, 21(4), 491-495.
- Gillen, R. J., Schwartz, R. S., Hilton, T. J., & Evans, D. B. (1994). An analysis of selected normative tooth proportions. *International journal of prosthodontics*, 7(5).
- Guan, Y.-P. (2009). Unsupervised human height estimation from a single image. *Journal of Biomedical Science and Engineering*, 2(06), 425.
- Hasanreisoglu, U., Berksun, S., Aras, K., & Arslan, I. (2005). An analysis of maxillary anterior teeth: facial and dental proportions. *The Journal of prosthetic dentistry*, 94(6), 530-538.
- Hulsey, C. M. (1970). An esthetic evaluation of lip-teeth relationships present in the smile. *American journal of orthodontics*, 57(2), 132-144.
- Jin, M.-X., Hong, M.-H., Lee, K.-J., & Lee, K.-B. (2016). Does the maxillary anterior ratio in Korean adults follow the Golden Proportion? *The journal of advanced prosthodontics*, 8(2), 125.
- Livio, M. (2002). The golden ratio and aesthetics. *Plus Magazine*, 22.
- Lombardi, R. E. (1973). The principles of visual perception and their clinical application to denture esthetics. *The Journal of prosthetic dentistry*, 29(4), 358-382.
- Londono, J., Ghasemi, S., Lawand, G., & Dashti, M. (2023). Evaluation of the golden proportion in the natural dentition: A systematic review and meta-analysis. *The Journal of prosthetic dentistry*, 129(5), 696-702.
- Machado, A. W. (2014). 10 commandments of smile esthetics. *Dental Press Journal of Orthodontics*, 19, 136-157.
- Mahshid, M., Khoshvaghti, A., Varshosaz, M., & Vallaei, N. (2004). Evaluation of “golden proportion” in individuals with an esthetic smile. *Journal of esthetic and restorative dentistry*, 16(3), 185-192.
- Morley, J., & Eubank, J. (2001). Macroesthetic elements of smile design. *The Journal of the American Dental Association*, 132(1), 39-45.
- Moskowitz, M., & Nayyar, A. (1995). Determinants of dental esthetics: a rational for smile analysis and treatment. *Compendium of continuing education in dentistry (Jamesburg, NJ: 1995)*, 16(12), 1164, 1166, passim; quiz 1186-1164, 1166, passim; quiz 1186.
- Murthy, B. S., & Ramani, N. (2008). Evaluation of natural smile: Golden proportion, RED or Golden percentage. *Journal of conservative Dentistry*, 11(1), 16-21.
- Nikgoo, A., Alavi, K., Alavi, K., & Mirfazaelian, A. (2009). Assessment of the golden ratio in pleasing smiles. *World journal of orthodontics*, 10(3).
- Ong, E., Brown, R. A., & Richmond, S. (2006). Peer assessment of dental attractiveness. *American Journal of Orthodontics and Dentofacial Orthopedics*, 130(2), 163-169.
- Özdemir, H., Bayındır, F. (2016). Doğal Dişli Bireylerde Altın Oranın Değerlendirilmesi. *Atatürk Üniversitesi Diş Hekimliği Fakültesi Dergisi*, 26(2).
- Preston, J. D. (1993). The golden proportion revisited. *Journal of esthetic and restorative dentistry*, 5(6), 247-251.
- Rosenstiel, S. F., Ward, D. H., & Rashid, R. G. (2000). Dentists' preferences of anterior tooth proportion—a web-based study. *Journal of Prosthodontics*, 9(3), 123-136.

Sandeep, N., Satwalekar, P., Srinivas, S., Reddy, C. S., Reddy, G. R., & Reddy, B. A. (2015). An analysis of maxillary anterior teeth dimensions for the existence of golden proportion: clinical study. *Journal of international oral health: JIOH*, 7(9), 18.

Snow, S. R. (1999). Esthetic smile analysis of maxillary anterior tooth width: the golden percentage. *Journal of esthetic and restorative dentistry*, 11(4), 177-184.

Sulaiman, E., Yaakub, M., Zulkifli, N., Abdullah, M., & Gonzalez, M. A. G. (2010). Existence of golden proportion in maxillary anterior teeth of University of Malaya dental students. *Annals of Dentistry University of Malaya*, 17(1), 9-14.

Teck Sim, R. S., Smith, J. D., & Chan, A. S. (2000). Comparison of the aesthetic facial proportions of southern Chinese and white women. *Archives of facial plastic surgery*, 2(2), 113-120.

Van der Geld, P., Oosterveld, P., Van Heck, G., & Kuijpers-Jagtman, A. M. (2007). Smile attractiveness: self-perception and influence on personality. *The Angle Orthodontist*, 77(5), 759-765.

Ward, D. H. (2001). Proportional smile design using the recurring esthetic dental (red) proportion. *Dental Clinics of North America*, 45(1), 143-154.

Ward, D. H. (2007). A study of dentists' preferred maxillary anterior tooth width proportions: comparing the recurring esthetic dental proportion to other mathematical and naturally occurring proportions. *Journal of esthetic and restorative dentistry*, 19(6), 324-339.

Ward, D. H. (2015). Proportional smile design: using the recurring esthetic dental proportion to correlate the widths and lengths of the maxillary anterior teeth with the size of the face. *Dental Clinics*, 59(3), 623-638.

AN ETHICAL PERSPECTIVE ON GENETICS IN NURSING CARE**Ümmügülsüm KAYA**

Sivas Cumhuriyet University, Institute of Health Sciences, Department of Fundamentals of Nursing, Sivas, Türkiye

ORCID ID: <https://orcid.org/0009-0005-5753-9087>

Burcu Kübra SÜHA

Sivas Cumhuriyet University, Faculty of Health Sciences, Department of Fundamentals of Nursing, Sivas, Türkiye

ORCID ID: <https://orcid.org/0000-0001-6748-372X>

Abstract

Introduction and Purpose: Genetic counseling is a communication process that empowers patients and families to make autonomous decisions and use new genetic information more effectively. Nurses are increasingly approaching genetic developments that affect nursing care in clinics, and therefore their ethical responsibilities and genetic counseling roles are increasing. The aim of this review is to critically analyze ethical issues in genetic testing, genetic counseling and genetic therapies in nursing care according to ethical principles.

Materials and Methods: An extensive, multiprocessed search of ScienceDirect (2) and Google Academic (15) databases was conducted to identify primary research articles published between 2018 and May 2024 that evaluated ethical issues related to genetic testing, genetic counseling, and genetic therapies in nursing care. There were 17 primary research articles that matched the inclusion criteria. Main findings from the studies are discussed according to ethical principles of autonomy, confidentiality, beneficence, nonmaleficence and justice.

Results: The principle of autonomy was the most discussed in the studies analyzed. The principle of autonomy is likely to be violated in individuals who are young, who have less knowledge and understanding of genetic testing, treatments and counseling, who are under pressure due to high risks and time constraints, who are not given the right to choose and informed consent, who encounter health professionals who do not provide adequate transparency and lack knowledge about genetics, who do not receive genetic counseling, and who have religious beliefs that oppose medical information. The principle of autonomy versus nonmaleficence and privacy was the most common ethical dilemma.

Discussion and Conclusion: This study showed that nurses may face many ethical problems in genetic diagnosis, treatment and counseling, especially problems related to the principle of autonomy. Nurses should follow genetic developments in terms of both diagnosis and treatment in order to provide the best nursing care. Nurses should develop their genetic counseling skills with an ethical understanding that informs the patient correctly, offers appropriate options to the patient and respects the patient's autonomy by using their roles as educators and counselors.

Keywords: Genetic Techniques, Genetic Testing, Genetic Therapies, Genetic Counseling, Principle Based Ethics, Nursing Ethics, Nursing Care.

INTRODUCTION

The human genome project has opened new doors to understanding the relationship between human genes and disease by mapping the entire human genome. With advancing genetic technologies, the medical health system has begun to transform in terms of diagnosis, treatment and counseling based on genetics (Camak, 2016). The concept of genomic health care has emerged, defined as care developed on the basis of genomic information and technologies to provide earlier diagnosis, risk assessment and treatment options for genetic diseases. In these ways, genomic healthcare promotes quality and patient safety, reduces costs and improves health outcomes (Calzone et al., 2018b).

Genetic technologies enable the direct diagnosis of diseases, the planning of treatments specific to the defect in the gene where the disease is located, and the provision of genetic counseling to patients to reduce the spread of disease (Patch and Middleton, 2018). Genetic testing detects DNA anomalies that are potentially leading to pathological outcomes by predicting the risk of developing disease and transmitting the disease to offspring (Zhong et al., 2021). Genetic therapies are radical change therapy that addresses the underlying cause of diseases by altering the expression of a patient's genes or repairing abnormal genes (Dwivedi et al., 2022). Genetic counseling is a communication process that empowers patients and families to make autonomous decisions and use new genetic information more effectively. (Patch and Middleton, 2018). Genetic counseling is also a process of helping patients understand and adapt to the biopsychosocial consequences of the disease. This process includes interpretation of the family's medical history to assess the onset or occurrence of disease, education about heredity, testing, prevention, and counseling for informed choices (Resta, 2020).

With the integration of genetic testing, treatment and genetic counseling into health care, nurses, as well as all health professionals, have been affected by this situation. Nurses are increasingly approaching genetic developments that affect nursing care in clinics, and therefore their ethical responsibilities and genetic counseling roles are increasing (Aykan and Fidancı, 2021). The aim of this review is to critically analyze ethical issues in genetic testing, genetic counseling, and genetic therapies in nursing care according to ethical principles.

MATERIALS AND METHODS

Sciencedirect and Google Scholar databases are used for articles published between 2018 and May 2024, to be able to identify original research studies that evaluated ethical issues related to genetic testing, genetic therapies and genetic counseling in nursing care. The keywords "genetic techniques AND genetic testing AND genetic therapies AND genetic counseling AND principle based ethics AND nursing ethics AND nursing care" were used during the research. According to the inclusion criteria 17 primary research articles are found from Sciencedirect (2) and Google Scholar (15) databases. Inclusion and exclusion criteria are showned at Table 1.

Table 1. Inclusion and Exclusion Criteria

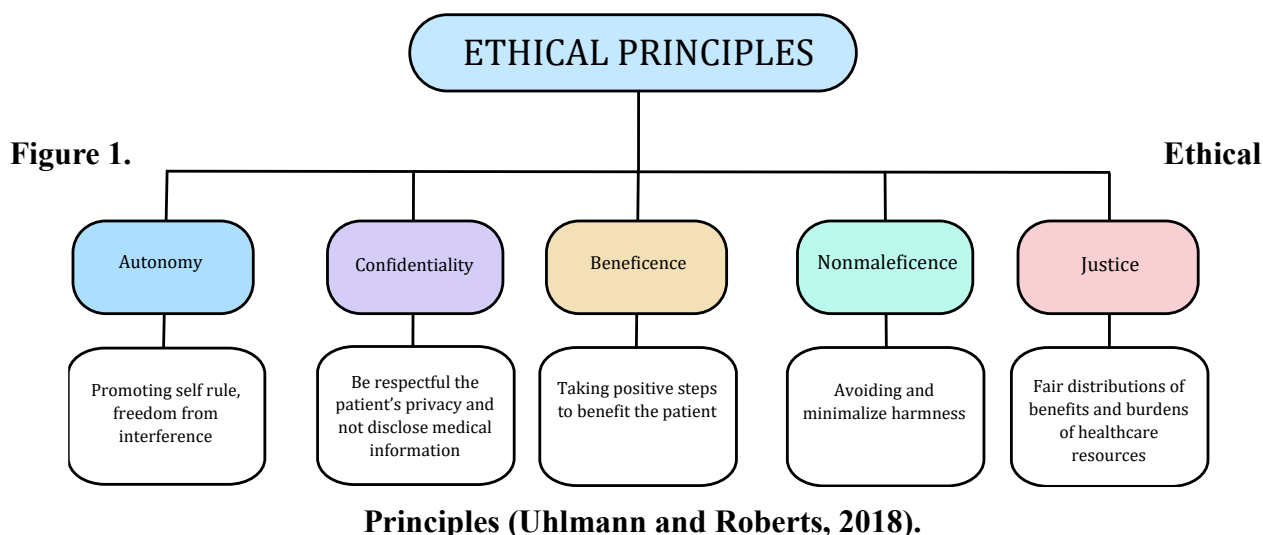
INCLUSION CRITERIA	EXCLUSION CRITERIA
Original research articles	Reviews, commentary, book chapters, position statements, original manuscript
Including genetic testing, genetic therapies, genetic counseling in healthcare	Excluding genetic testing, genetic therapies, genetic counseling in healthcare
Including ethical principles	Excluding ethical principles
Articles in English	Articles non written in English

According to Table 1, reviews, commentaries, book chapters, position papers, original manuscripts; articles that did not include genetic tests, genetic therapies, genetic counseling in health care; articles that did not include ethical principles and were not written in English were excluded. While evaluating the articles, attention was paid to reviewing original research articles, including genetic

tests, genetic therapies, genetic counseling in health services, ethical principles and articles in English.

RESULTS

This section presents the review of articles that met the inclusion criteria according to the ethical principles of autonomy, confidentiality, beneficence, non-maleficence and justice. Ethical principles and definitions are shown at Figure 1.



Autonomy

The principle of ethical autonomy focuses on individual freedom and the capacity to act consciously. The concept of autonomy consists of four dimensions: self-determination, freedom, independence and fulfillment of one's desires (Hedman et al., 2019). According to a study, appropriate professional training of genetic counselors, providing emotional support to patients, paying attention to the patient's understanding of the information, obtaining informed consent, family influences and genetic discrimination were found to be effective in patients' autonomy (Ormond et al., 2024). Two studies emphasized that non-directive genetic counseling is necessary to ensure patient autonomy and avoid medical paternalism (Vears et al., 2021; Schupmann et al., 2020). A study focusing on soft paternalism mentions that patients' choices can be moderately constrained when acceptability and utility are high (Saelaert et al., 2020). In a research article, it was concluded that genetic counseling affects the decision-making processes of patients who are accompanied by relatives who have undergone similar treatment processes. While this situation is sometimes beneficial in decision-making, sometimes it makes individual decision-making difficult (Gilbar and Barnoy, 2018).

Informed consent in clinical care respects patients' rights to autonomous participation in medical care decisions after careful consideration of possible risks and benefits and aims to empower individuals to receive appropriate care tailored to their health-related goals (Axson et al., 2019). In a research article on amniocentesis, patients do not have a valid consent due to the lack of decision-making time, lack of knowledge about genetic testing, lack of information from health professionals, being in a stressful situation against the risk of fetal anomaly, and the risk of losing the fetus. In the same study, an example of this is when a patient tells the genetic consultant to do whatever he or she wants (Horn and Parker, 2018).

In a research article on whole genome sequencing in pediatric patients, a health worker emphasizes that patient benefit is important for long-term health, but more important is the patient's ability to make their own decision. From this perspective, an ethical dilemma arises between autonomy and nonmaleficence. In the same article, children who are unable to make the decision to accept or refuse treatment may have a violation of autonomy when their parents make this decision instead. Here, parents and health professionals who want the child's well-being may disregard the child's autonomy (Szego et al., 2019). In another research paper on Shared Decision Making (SDM), SDM promoted patients' autonomy, improved understanding of medical options, increased benefit and minimized harm by enabling assessment of risks and benefits. (Birch et al., 2019).

According to a research article, while autonomy and confidentiality are promoted in pharmacogenetic testing, this can lead to the disclosure of genetic information. To avoid this ethical dilemma, strict confidentiality is required to prevent any information being shared without the patient's consent. Healthcare professionals should therefore adhere to the principle of confidentiality and not share any information except as specified in informed consent and with the patient's permission (Muflih et al., 2020). Another point emphasized in the two articles is that healthcare professionals are inadequate about genetic tests and do not provide sufficient information to patients. Therefore, patients do not know the beneficial and harmful aspects of the tests, it becomes difficult to obtain informed consent from patients and the principle of autonomy may be violated. Genetic counseling plays an important role in preventing ethical problems. At the same time, people may experience decision-making problems due to religious beliefs that oppose medical knowledge (Haidar et al., 2020; Ochieng et al., 2021).

Confidentiality

Nurses are obliged not to disclose confidential information provided by the patient to any other third party without the patient's consent (Varkey, 2021). Patients' medical information is not only their clinical examinations and test results, but also their perceptions about their family life, lifestyle and habits. Inappropriate disclosure of this information can threaten a patient's reputation, opportunities and human dignity (Noroozi et al., 2018).

In a research article on amniocentesis scientists and health professionals shared worries about disclosure of genetic information and data protection (Horn and Parker, 2018). Genetic information may be accessed by others without authorization, genetic information may be disclosed and used for purposes other than healthcare (Clayton et al., 2019). Another research paper suggests that genes cause stigmatization and discrimination. While avoiding genetic diseases is seen as a positive thing, what if a mother is a carrier and then commits suicide? Another study emphasized that genetic testing can open a can of worms, meaning that everyone can be stigmatized, starting with one family member, but on the other hand, sharing this information prevents harm (Dearing and Taverner, 2018). These examples raise the ethical dilemma of the usefulness of genetic testing versus the principles of privacy and non-harm (Szego et al., 2019).

Beneficence and nonmaleficence

The principle of beneficence focuses on the benefit of the patient via moral rules. Patient's benefit outweigh other factors. For this reason this ethical principle defend patient rights, prevent patient from harm, remove harmness in clinical practice, help disadvantaged groups and save people in danger. Unlike nonmaleficence in beneficence requires positiveness. The principle urges not only avoiding harm, but also benefiting patients and promoting their well-being (Varkey, 2021).

The principle of nonmaleficence focuses on not harming the patient. This principle requires moral rules such as not harming, neutralizing, offending, causing pain, suffering, death and depriving patients of the joy of life. According to this principle, nurses should ensure that the benefits outweigh the risks and harms in nursing care (Varkey, 2021). With genetic counseling nurses should decrease prejudice against genetic testings which enable early detection of diseases (Kawasaki et al., 2021).

In a research article on amniocentesis, is it right or wrong to abort a fetus with Down syndrome? Doesn't abortion for the sake of the family actually cost a human life? (Horn and Parker, 2018). Similarly, a study conducted in Lebanon and Quebec emphasizes that noninvasive prenatal testing segregates people with genetic differences, the number of people with disabilities is reduced by testing and they will face more discrimination and stigmatization. In addition, the same study stated that male favoritism is common in these countries, so this test could be used in gender discrimination and many baby girls could end their lives (Haidar et al., 2020). In these examples, it is seen that the ethical principles of beneficence, nonmaleficence and justice are violated.

In a research article on whole genome sequencing in pediatric patients, the impossibility for health professionals to explain all the details of genetic testing was mentioned, so parents made decisions without fully understanding the harms and benefits of genetic testing. As a result, this violated the principles of beneficence and nonmaleficence. In the same research paper, it is noted that genetic testing can have a negative impact on a person's life as it can predict future diseases in individuals who do not currently have any disease (Szego et al., 2019).

Justice

The principle of justice focuses on the equal, fair and impartial distribution of health services to all people and on treating patients equally without discrimination in the provision of care. In the provision of nursing services, nurses are responsible for ensuring fair distribution of labor, time, and all other resources (Evrenol Öçal et al., 2020).

Parents whose children were diagnosed with cystic fibrosis faced inequalities in access to genetic counseling (Langfelder-Schwind et al., 2019). In a similar way parents who have autistic children cannot access genetic testings due to the high costs which leads to late diagnosis of disease and harden circumstances (Hanish et al., 2018). Moreover, noninvasive prenatal testing in Lebanon is not covered by healthcare system and people face disparities and economic barriers (Haidar et al., 2020).

Accessing genetic diagnosis, genetic treatment and counseling is hard for many vulnerable people. This inequality can be minimized by maximising existing resources to promote nursing literacy in genomics that includes associated ethical, legal, and societal challenges (Calzone et al., 2018a). For this reason, nurses should lead the integration of genetic diagnosis, treatment, and counseling into the health system to ensure the fair use of genetic diagnosis, treatment, and counseling by all segments of the society, encouraging patients to access and use the resources they need and managing resources with their roles as managers and consultants.

DISCUSSION

This review study was conducted to critically examine genetic testing, counseling and treatments in nursing care according to ethical principles. According to the current review result, the principle of autonomy was the most discussed in the studies analyzed. The principle of autonomy is likely to be violated in individuals who are young, who have less knowledge and understanding of genetic testing, treatments and counseling, who are under pressure due to high risks and time constraints, who are not given the right to choose and informed consent, who encounter health professionals who do not provide adequate transparency and lack knowledge about genetics, who do not receive

genetic counseling, and who have religious beliefs that oppose medical information. The principle of autonomy versus nonmaleficence and privacy was the most common ethical dilemma. When the review studies in the literature were examined, results consistent with the results of the current review were found. A review examining genetic testing and genetic counseling from an ethical perspective in relation to autonomy concluded that being a guide in genetic counseling, lack of education in medical genetics, and having social, religious, and cultural beliefs that influence decision-making have an impact on access to genetic health services (Zhong et al., 2021).

Studies emphasize that nurses and doctors have limited knowledge and skills about genetic in medical care (White et al., 2020; Charron et al., 2022). In addition, according to the results of a review, nurses do not adequately demonstrate their competencies when providing holistic care to people with genetic disorders (Skirton et al., 2012). According to a review result, nurses are failing to meet main competencies like determining three-generation of family history, constructing a pedigree and understanding relationships between genetics and genomics. (Wright et al., 2018). This current review study showed that when nurses and other health professionals are inadequate in providing genetic testing and counseling, they inadequately educate, failing to provide sufficient transparency, restrict the patient and consequently prevent the patient from making decisions autonomously.

In the current review, young and parent-dependent children fail to demonstrate autonomy in genetic testing. Similarly, in the literature, patients with neurodegenerative diseases share the same autonomy issues (Manrique de Lara et al., 2019). Under these circumstances, genetic testing should be carried out where there are significant health concerns and in the best interest of patients (UNESCO, 2003; Ginoza and Isasi, 2020). In addition, violations of the principle of autonomy can be prevented by educating children and their parents with videos and forms on genetic tests appropriate to their level and increasing the child's share in decision-making so that parents can make decisions without violating the child's autonomy (Haga, 2019).

Religion and culture can be preventive factors to make autonomous decisions. In the current review women gave birth to disabled children but they had an abortion if the sex is female. Religion and culture can be inhibiting factors for making autonomous decisions. In the present study, women gave birth to children with disabilities to avoid religious objection, but had abortions if the gender was female because of cultural male favoritism. In the literature religious beliefs opposed termination of pregnancy and genetic services (Zhong et al., 2021). Carriers are ostracized and culturally blamed. Not only by society but also health professionals used accusatory expressions to carrier individuals (Clarke and Wallgren-Pettersson, 2019; Zhong et al., 2021).

The current study shows that when patients have less knowledge and understanding about genetic testing and do not have enough time, their decision-making is affected. According to one review, patients find information about genetics difficult and unhelpful. To protect the patient's autonomy and enable them to make the right decision, the language of the consent document should be consistent with the patient's health literacy (Williams & Anderson, 2018). The patient cannot understand something that is not explained to them. Therefore, the informed consent process should provide good, clear and transparent information (Woollard et al., 2021).

In the process of getting informed consent for a genetic test, nurses should be able to describe the purpose of the test, its results, limitations, side effects, possible treatment options and provide patients with access to additional resources (Tluczek et al., 2019). For a successful informed consent, patients should be given enough time, given the opportunity to read the form completely, understand the procedures to be performed in genetic diagnosis and treatment, and be allowed to ask questions and have their questions answered (Riva and Petrini, 2019; Delhove et al., 2020; Desine et al., 2020).

CONCLUSION

This study showed that nurses may encounter many ethical problems in genetic diagnosis, treatment and counseling, especially problems related to the principle of autonomy. Since genetic technology takes place in health services and develops day by day, nurses should follow genetic developments in terms of both diagnosis and treatment in order to provide the best nursing care. Nurses should develop their genetic counseling skills with an ethical understanding that informs the patient correctly, offers appropriate options to the patient and respects the patient's autonomy by using their roles as educators and counselors. The genetic competencies of nurses should be increased by adding genetics courses to nursing education and by including genetic diseases, tests, treatments and counseling in in-service training of nurses. Genomic nursing studies could also focus on developing genetic competence among nurses.

REFERENCES

- Axson, S. A., Giordano, N. A., Hermann, R. M., & Ulrich, C. M. (2019). Evaluating nurse understanding and participation in the informed consent process. *Nursing Ethics*, 26(4), 1050-1061. <https://doi.org/10.1177/0969733017740175>.
- Aykan, E. B., & Fidancı, B. E. (2021). Pediatri Hemşireliğinde Genetik/Genomik. *Turkish Journal of Family Medicine and Primary Care*, 15(4), 895-905. <https://doi.org/10.21763/tjfm.c.900034>.
- Birch, P. H., Adam, S., Coe, R. R., Port, A. V., Vortel, M., Friedman, J. M., & Légaré, F. (2019). Assessing shared decision-making clinical behaviors among genetic counsellors. *Journal of genetic counseling*, 28(1), 40-49. <https://doi.org/10.1007/s10897-018-0285-x>.
- Calzone, K. A., Kirk, M., Tonkin, E., Badzek, L., Benjamin, C., & Middleton, A. (2018a). The global landscape of nursing and genomics. *Journal of nursing scholarship*, 50(3), 249-256. <https://doi.org/10.1111/jnu.12380>.
- Calzone, K. A., Kirk, M., Tonkin, E., Badzek, L., Benjamin, C., & Middleton, A. (2018b). Increasing nursing capacity in genomics: Overview of existing global genomics resources. *Nurse education today*, 69, 53-59. <https://doi.org/10.1016/j.nedt.2018.06.032>.
- Camak, D. J. (2016). Increasing importance of genetics in nursing. *Nurse Education Today*, 44, 86-91. <https://doi.org/10.1016/j.nedt.2016.05.018>.
- Charron, M., Kaiser, B., Dauge, A., Gallois, H., Lapointe, J., Dorval, M., ... & Joly, Y. (2022). Integrating hereditary breast and ovarian cancer genetic counselling and testing into mainstream clinical practice: Legal and ethical challenges. *Critical Reviews in Oncology/Hematology*, 178, 1-10. <https://doi.org/10.1016/j.critrevonc.2022.103797>.
- Clarke, A. J., & Wallgren-Pettersson, C. (2019). Ethics in genetic counselling. *Journal of Community Genetics*, 10(1), 3-33. <https://doi.org/10.1007/s12687-018-0371-7>.
- Clayton, E. W., Evans, B. J., Hazel, J. W., & Rothstein, M. A. (2019). The law of genetic privacy: applications, implications, and limitations. *Journal of Law and the Biosciences*, 6(1), 1-36. <https://doi.org/10.1093/jlb/lz007>.
- Dearing, A., & Taverner, N. (2018). Mainstreaming genetics in palliative care: barriers and suggestions for clinical genetic services. *Journal of community genetics*, 9(3), 243-256. <https://doi.org/10.1007/s12687-017-0345-1>.
- Delhove, J., Osenk, I., Prichard, I., & Donnelley, M. (2020). Public acceptability of gene therapy and gene editing for human use: a systematic review. *Human gene therapy*, 31(1-2), 20-46. <https://doi.org/10.1089/hum.2019.197>.

- Desine, S., Hollister, B. M., Abdallah, K. E., Persaud, A., Hull, S. C., & Bonham, V. L. (2020). The meaning of informed consent: genome editing clinical trials for sickle cell disease. *AJOB empirical bioethics*, 11(4), 195-207. <https://doi.org/10.1080/23294515.2020.1818876>.
- Dwivedi, S., Purohit, P., Vasudeva, A., Kumar, M., Agrawal, R., Sheikh, N. A., ... & Misra, S. (2022). Gene therapy and gene editing in healthcare. In *Biotechnology in Healthcare*, 147-175. Academic Press. <https://doi.org/10.1016/B978-0-323-89837-9.00006-1>.
- Evrenol Öçal S, Şimşek Çetinkaya Ş, Yücel Ç, Koç G. (2020). Gene Replacement in the Prevention of Hereditary Mitochondrial Diseases: Three Parent Babies and Ethics. *Arc Health Sci Res*, 7(2): 201-206. <https://doi.org/10.5152/ArcHealthSciRes.2020.589394>.
- Gilbar, R., & Barnoy, S. (2018). Companions or patients? The impact of family presence in genetic consultations for inherited breast cancer: relational autonomy in practice. *Bioethics*, 32(6), 378-387. <https://doi.org/10.1111/bioe.12448>.
- Ginoza, M. E., & Isasi, R. (2020). Regulating preimplantation genetic testing across the world: a comparison of international policy and ethical perspectives. *Cold Spring Harbor perspectives in medicine*, 10(5), <https://doi.org/10.1101/cshperspect.a036681>.
- Haga, S. B. (2019). Pharmacogenomic testing in pediatrics: navigating the ethical, social, and legal challenges. *Pharmacogenomics and Personalized Medicine*, 273-285. <https://doi.org/10.2147/PGPM.S179172>.
- Haidar, H., Vanstone, M., Laberge, A. M., Bibeau, G., Ghulmiyyah, L., & Ravitsky, V. (2020). Implementation challenges for an ethical introduction of noninvasive prenatal testing: a qualitative study of healthcare professionals' views from Lebanon and Quebec. *BMC medical ethics*, 21, 1-11 <https://doi.org/10.1186/s12910-020-0455-x>.
- Hanish, A. E., Cohen, M. Z., & Starr, L. J. (2018). Autism spectrum disorder and genetic testing: Parental perceptions and decision-making. *Journal for Specialists in Pediatric Nursing*, 23(2), 1-8. <https://doi.org/10.1111/jspn.12211>.
- Hedman, M., Häggström, E., Mamhidir, A. G., & Pöder, U. (2019). Caring in nursing homes to promote autonomy and participation. *Nursing ethics*, 26(1), 280-292. <https://doi.org/10.1177/0969733017703698>
- Horn, R., & Parker, M. (2018). Health professionals' and researchers' perspectives on prenatal whole genome and exome sequencing: 'We can't shut the door now, the genie's out, we need to refine it'. *PLoS One*, 13(9), 1-15. <https://doi.org/10.1371/journal.pone.0204158>.
- Kawasaki, H., Kawasaki, M., Iki, T., & Matsuyama, R. (2021). Genetics education program to help public health nurses improve their knowledge and enhance communities' genetic literacy: A pilot study. *BMC nursing*, 20, 1-13. <https://doi.org/10.1186/s12912-021-00549-8>.
- Langfelder-Schwind, E., Raraigh, K. S., & Parad, R. B. (2019). Practice variation of genetic counselor engagement in the cystic fibrosis newborn screen-positive diagnostic resolution process. *Journal of Genetic Counseling*, 28(6), 1178-1188. <https://doi.org/10.1002/jgc4.1170>.
- Manrique de Lara, A., Soto-Gómez, L., Núñez-Acosta, E., Saruwatari-Zavala, G., & Rentería, M. E. (2019). Ethical issues in susceptibility genetic testing for late-onset neurodegenerative diseases. *American Journal of Medical Genetics Part B: Neuropsychiatric Genetics*, 180(8), 609-621. <https://doi.org/10.1002/ajmg.b.32699>.
- Muflih, S., Al-Husein, B. A., Karasneh, R., & Alzoubi, K. H. (2020). Physicians' attitudes and ethical obligations to pharmacogenetic testing. *Journal of multidisciplinary healthcare*, 249-258. <https://doi.org/10.2147/JMDH.S245369>.

- Noroozi, M., Zahedi, L., Bathaei, F. S., & Salari, P. (2018). Challenges of confidentiality in clinical settings: compilation of an ethical guideline. *Iranian journal of public health*, 47(6), 875.
- Ochieng, J., Kwagala, B., Barugahare, J., Mwaka, E., Ekusai-Sebatta, D., Ali, J., & Sewankambo, N. K. (2021). Perspectives and ethical considerations for return of genetics and genomics research results: a qualitative study of genomics researchers in Uganda. *BMC medical ethics*, 22, 1-9. <https://doi.org/10.1186/s12910-021-00724-1>.
- Ormond, K. E., Hayward, L., Wessels, T. M., Patch, C., & Weil, J. (2024). International genetic counseling: What do genetic counselors actually do?. *Journal of genetic counseling*, 33(2), 382-391. <https://doi.org/10.1002/jgc4.1735>.
- Patch, C., & Middleton, A. (2018). Genetic counselling in the era of genomic medicine. *British Medical Bulletin*, 126(1), 27-36. <https://doi.org/10.1093/bmb/ldy008>.
- Resta, R. (2020). Birds of a Feather? Genetic Counseling, Genetic Testing, and Humanism. *Cold Spring Harbor Perspectives in Medicine*, 10(11), 1-12. <https://doi.org/10.1101/cshperspect.a036673>.
- Riva, L., & Petrini, C. (2019). A few ethical issues in translational research for gene and cell therapy. *Journal of Translational Medicine*, 17, 1-6. <https://doi.org/10.1186/s12967-019-02154-5>.
- Saelaert, M., Mertes, H., Moerenhout, T., De Baere, E., & Devisch, I. (2020). Ethical values supporting the disclosure of incidental and secondary findings in clinical genomic testing: a qualitative study. *BMC Medical Ethics*, 21, 1-12. <https://doi.org/10.1186/s12910-020-0452-0>.
- Schupmann, W., Jamal, L., & Berkman, B. E. (2020). Re-examining the ethics of genetic counselling in the genomic era. *Journal of Bioethical Inquiry*, 17(3), 325-335. <https://doi.org/10.1007/s11673-020-09983-w>.
- Skirton, H., O'Connor, A., & Humphreys, A. (2012). Nurses' competence in genetics: A mixed method systematic review. *Journal of Advanced Nursing*, 68, 2387-2398. <https://doi.org/10.1111/nhs.12401>.
- Szego, M. J., Meyn, M. S., Shuman, C., Shaul, R. Z., Anderson, J. A., Bowdin, S., ... & Hayeems, R. Z. (2019). Views from the clinic: healthcare provider perspectives on whole genome sequencing in paediatrics. *European Journal of Medical Genetics*, 62(5), 350-356. <https://doi.org/10.1016/j.ejmg.2018.11.029>
- Tluczek, A., Twal, M. E., Beamer, L. C., Burton, C. W., Darmofal, L., Kracun, M., ... & Turner, M. (2019). How American nurses association code of ethics informs genetic/genomic nursing. *Nursing ethics*, 26(5), 1505-1517. <https://doi.org/10.1177/0969733018767248>.
- Uhlmann, W. R., & Roberts, J. S. (2018). Ethical issues in neurogenetics. *Handbook of clinical neurology*, 147, 23-36. <https://doi.org/10.1016/B978-0-444-63233-3.00003-8>.
- United Nations Educational, Scientific and Cultural Organisation. (2003). International Declaration on Human Genetic Data. Paris. Retrieved from http://portal.unesco.org/en/ev.php-URL_ID=17720&URL_DO=DO_TOPIC&URL_SECTION=201.html.
- Varkey, B. (2021). Principles of clinical ethics and their application to practice. *Medical Principles and Practice*, 30(1), 17-28. <https://doi.org/10.1159/000509119>.
- Vears, D. F., Borry, P., Savulescu, J., & Koplin, J. J. (2021). Old challenges or new issues? Genetic health professionals' experiences obtaining informed consent in diagnostic genomic sequencing. *AJOB Empirical Bioethics*, 12(1), 12-23. <https://doi.org/10.1080/23294515.2020.1823906>.

White, S., Jacobs, C., & Phillips, J. (2020). Mainstreaming genetics and genomics: a systematic review of the barriers and facilitators for nurses and physicians in secondary and tertiary care. *Genetics in Medicine*, 22(7), 1149-1155. <https://doi.org/10.1038/s41436-020-0785-6>.

Williams, J. K., & Anderson, C. M. (2018). Omics research ethics considerations. *Nursing outlook*, 66(4), 386-393. <https://doi.org/10.1016/j.outlook.2018.05.003>.

Woollard, L., Gorman, R., & Rosenfelt, D. J. (2021). Improving patient informed consent for haemophilia gene therapy: the case for change. *Therapeutic Advances in Rare Disease*, 2, <https://doi.org/10.1177/26330040211047244>.

Wright, H., Zhao, L., Birks, M., & Mills, J. (2018). Nurses' competence in genetics: An integrative review. *Nursing & Health Sciences*, 20(2), 142-153. <https://doi.org/10.1111/n.hs.12401>.

Zhong, A., Darren, B., Loiseau, B., He, L. Q. B., Chang, T., Hill, J., & Dimaras, H. (2021). Ethical, social, and cultural issues related to clinical genetic testing and counseling in low-and middle-income countries: a systematic review. *Genetics in Medicine*, 23(12), 2270-2280. <https://doi.org/10.1038/s41436-018-0090-9>.

AN OVERVIEW OF THE USE OF ARTIFICIAL INTELLIGENCE ALGORITHMS IN THE DIAGNOSIS AND PREDICTION OF DISEASES**Younes Fayand**

PhD student in Artificial Intelligence, Department of Computer Science, Faculty of Electrical
Computer Science, University of Tabriz, Tabriz, Iran

Dr. Mohammad Ali Balafar

Professor of in Artificial Intelligence, Department of Computer Science, Faculty of Electrical
Computer Science, University of Tabriz, Tabriz, Iran

Reza Fayand

Master student in Computer, Department of Computer Science, Faculty of Electrical and
Computer Science, University of Azad Islami Tabriz, Tabriz, Iran

Abstract

As the world's population increases and diseases become more complex, it is necessary to use new methods to diagnose diseases. The number of elderly people is increasing every day and their need for diagnostic specialists is increasing day by day. The number of specialist doctors in the world is also limited and in some countries it costs a lot to see a specialist. Computer science, especially the branch of artificial intelligence, tries to fill this gap. The use of artificial intelligence in most personal and social affairs is growing. One of these branches, which is developing very quickly, is the use of artificial intelligence in medical sciences and disease diagnosis. Today, the use of artificial intelligence has made it possible to diagnose diseases with a high accuracy compared to humans. The use of artificial intelligence makes it possible to guarantee 100% accuracy in disease diagnosis by concentrating and integrating the expertise and science of thousands of specialist doctors. With the introduction of deep learning into artificial intelligence, it has also created the ability to learn by machine and has provided the possibility of automatic training of the system without the need for humans. In this review, we try to express the new methods of diagnosing diseases by artificial intelligence algorithms, especially deep learning, and present the challenges and benefits of using artificial intelligence in medical sciences and disease diagnosis.

Keywords: Artificial intelligence, deep learning, machine learning algorithms, diagnosis and prediction

THE ROLE OF SPINAL ANESTHESIA IN ORTHOPEDIC SURGERIES OF THE LOWER EXTREMITIES**Doc. Elona Hasalla****Phd.cand. Ilda Taka****Dr. Brikena Greca****Msc. Elda Ruçi****Msc. Blerta Hasalla****Dr. Sulejman Baha****Msc. Brandi Fahriu****Msc. Klajdi Tarko****Dr. Ana Topuzi****Edmonda Ruda**

University of Elbasan "Aleksander Xhuvani"; Faculty of Technical Medical Sciences; Department of Preclinical Studies; Department of Technical Medical Specialties; University of Florence Italy; Dental clinic "Greca Dent" Elbasan

Introduction

Spinal anesthesia involves the use and application of local anesthetic agents in the subarachnoid space to benefit from a reversible loss of sensory and motor function. It is applied to the Vertebral L2 level in adult patients with the aim of preventing the possibility of spinal cord trauma. Spinal anesthesia creates ideal working conditions for the surgeon, since the muscles are relaxed and has less blood loss. It presents better results for the elderly, those with lung diseases and the patients sensitive to spinal anesthesia.

Scope of the study

The purpose of our study is to underline the value and guarantee of spinal anesthesia in creating optimal, painless and no side effects in patients who need interventions below Th.5. and to present our modest experience and encourage its use in orthopedic operations in the cases of traumas of lower extremities.

Material and Methods of Study

800 patients, 720 males (90%) and 80 females (10%) were taken into study, with lower extremity lesions in the time-period from November 2021 to August 2023. The patients were all above 18 of age.

40% of patients (320) were presented in emergency conditions, with eating and other associated complications, while 60% of patients (480) were scheduled operations.

The maximum age was 87 years, the average age 42 years and the youngest age 14 years.

The medicines used were Lidocaine (2% -3ml), 760 patients (95%), 1.5-2h action time and marcaine (2% -2ml), 40 patients (5%), 2.5h action time.

Conclusions

1. There has not been any major complications such as lethal excitus or paralyzing consequences.
2. Other complications are presented in small percentages such as: headache 43 patients (5.3%), hypotension 18 patients (2.25%), respiratory disorders, 1 patient (0.125%), nausea and vomiting, 6 patients (0.75%)
3. Finally, we recommend the use of spinal anesthesia in orthopedic surgery in the case of inferior traumas, as the complications are minimal and the patient's benefits are considerable.

Key words: spinal anesthesia, trauma of lower extremities, lidocaine, marcaine

SCLEROSING ANGIOMATOID NODULAR TRANSFORMATION OF THE SPLEEN**Assist. Prof. Dr. Arzu Ibishova**

Azerbaijan Medical University AZERBAIJAN, Department of Pathological Anatomy

Chichak Mammadli Aziz

Azerbaijan Medical University AZERBAIJAN, Department of Pathological Anatomy

Assist. Prof. Dr. Shabnam Ganbaeva

Azerbaijan Medical University AZERBAIJAN, Department of Pathological Anatomy

Abstract

Introduction: Sclerosing Angiomatoid Nodular Transformation of the Spleen (SANT) is a rare, non-neoplastic vascular splenic lesion that arises from the pulp of the spleen. It is often incidentally discovered during routine clinical examinations due to splenomegaly. The gender distribution is approximately equal, with a 1:1 ratio between females and males. SANT can occur across various age groups.

Materials and Methods: A 45-year-old female presented to the clinic with a diagnosis of splenomegaly. She underwent surgical splenectomy, and the excised spleen was sent to the pathological laboratory. The splenectomy specimen measured 12x7x5 cm, and upon examination, a well-defined, firm pathological area measuring 2.2x2 cm was identified. Tissue samples were obtained from the pathological area and surgical margins, fixed in 10% formaldehyde, and then rinsed in running water for 2 hours. Subsequently, the samples were prepared for sectioning into 4-micron-thick slices using a microtome. Hematoxylin and eosin staining was performed, followed by dehydration in 96% ethanol and xylene, and with dripped Entellan. The prepared slides were ready for examination under a light microscope. Additionally, immunohistochemical staining using CD34, CD31, SMA, and S100 markers was performed on the pathological area.

Discussion: Microscopic examination revealed encapsulated, well-demarcated nodules of varying sizes, both hypercellular and hypocellular areas, and increased vascularity. Immunohistochemically, CD34, CD31, and SMA were positive, while S100 staining was negative. These findings supported the diagnosis of SANT, a vascular benign lesion with distinctive features.

Conclusion: Although benign, SANT can cause splenic enlargement and necessitate surgical removal. Since it cannot be reliably diagnosed radiologically alongside other spleen pathologies, splenectomy yields similar outcomes as for other complications. Therefore, obtaining a biopsy from spleen tissue remains valuable despite its challenges.

Key words: SANT, spleen, vessel, tumor, immunohistochemistry

ASSESSMENT OF PERCEPTION, BEHAVIOUR AND PRACTICE OF PERSONAL HYGIENE AMONG INMATES IN CORRECTIONAL CENTRES OF KANO STATE, NIGERIA

Ibrahim Bala Yahaya

Department of Human Kinetics and Health Education, Federal University, Dutsin-Ma, Katsina State, Nigeria,

Jamilu Lawal Ajiya

Department of Human Kinetics and Health Education, Federal University, Dutsin-Ma, Katsina State, Nigeria,

ORCID: <https://orcid.org/0000-0001-6838-298X>

Abdu Mustapha

Department of Human Kinetics and Health Education, Federal University, Dutsin-Ma, Katsina State, Nigeria,

Abstract

This is a descriptive survey study aimed at assessing the perception, behavior and practice of personal hygiene among inmates in correctional centers of Kano state, Nigeria. Simple random sampling technique was used to select 357 respondents out of 5725 in 10 correctional centers. A self-developed questionnaire titled: Perception, Behavior and Practice of Personal Hygiene Questionnaire (PBPPHQ) was used to collect data for this study. Descriptive statistics of frequency and percentages were used to analyze the research questions. The findings revealed that perception of inmates towards personal hygiene is low with a total mean of 19.94 (average of 1.99) out of the total mean score of 40.0 (average of 4.0). The findings also revealed that the total mean of the responses on behavior of inmate towards personal hygiene was 16.37 (average of 1.64) out of the total mean score of 20.0 (average of 2.0) which implies that the level of positive behavior of inmate towards personal hygiene is high. The findings further revealed that the mean of the responses on practice of personal hygiene was 17.80 (average of 1.78) out of the total mean score of 30.0 (average of 3.0) which implies that there is low practice of personal hygiene among the inmates. In this research, no differences were found on the basis of age and gender; however, scores on positive behavior towards personal hygiene indicate a significant difference between urban and rural, with urban scoring higher. It was recommended that stakeholders, including Government and non-governmental organizations should collaborate to improve the living condition of inmates and provide proper education on personal hygiene to inmates.

Key words: Personal hygiene, inmates, correctional centers, Kano state

EFFECTS OF SOUND WAVES AT DIFFERENT FREQUENCY THRESHOLDS ON HOUSEFLY MORTALITY**Fatma Söğüt**

Vocational School of Health Services, Mersin University, Mersin, Turkey

ORCID ID: <https://orcid.org/0000-0002-1108-8947>**Halil Özkurt**

Karaisali Vocational School, Cukurova University, Adana, Turkey

ORCID ID: <https://orcid.org/0000-0002-9828-3250>**Hakan Kavur**

Karaisali Vocational School, Cukurova University, Adana, Turkey

ORCID ID: <https://orcid.org/0000-0002-4188-440X>**Abstract**

Introduction and Purpose: Vector arthropods (mosquito, sand fly, housefly, tick, etc.) can transmit a pathogen from one vertebrate to another in various ways. Apart from the inconvenience these creatures cause to vertebrates and some of the diseases they transmit, they can also damage plants and food. The fight against this type of arthropod is extremely important. This fight is being waged using chemical, biological and physical methods. These methods have recently been joined by sound waves, especially in some frequency ranges. Many studies have shown that sound waves (even above and below the ultrasonic limit) can be an effective control method. In this study, the lethal effect of sound waves with different frequency values (10-27 kHz) on the housefly, one of the vector arthropods, was investigated.

Materials and Methods: The experimental set-up created for the study consisted of various devices. These included a frequency oscillator, which generates oscillations in different frequency ranges, a piezo transducer, which converts the generated oscillation energy into mechanical energy and transmits it to the housefly, a 25 W amplifier (signal amplifier), a frequency meter, a db meter and a closed container with the houseflies. For the experiments, there are containers with 20 adult houseflies each. One of these containers served as a control group, which was not exposed to sound waves, and the other containers were exposed to sound waves at different time intervals (1h, 2h, 4h, etc.).

Results: In general, sound waves emitted above 20 kHz (ultrasonic waves are above 20 kHz) are more effective and have a serious lethal effect on houseflies, over 70%. It was therefore hypothesised that ultrasonic frequencies could be an alternative method to control vector arthropods.

Key Words: Vector, arthropod, sound wave, frequency, ultrasound, transducer.

COMPARATIVE STUDY OF THE ANTIMICROBIAL EFFICACY OF POLAR AND NON POLAR EXTRACTS OF THE LEAVES OF LEMON GRASS AND MORINGA AGAINST SELECTED CLINICAL ISOLATES

Adebola Aisha Damilola

Department of Microbiology, University of Ilorin, Ilorin Kwara State, Nigeria.

Dr. Ajjolakewu kamoldeen Abiodun

Department of Microbiology, University of Ilorin, Ilorin Kwara State, Nigeria.

Nimat Toyosi Ajide-Bamigboye

Department of Microbiology, University of Ilorin, Ilorin Kwara State, Nigeria.

Abstract

Background: Due to the emergence of microbial resistance to antibiotics and the rise of new infectious diseases, the discovery of new, safe, and effective antimicrobial compounds is urgently needed. This study aims to compare the antimicrobial activity of the polar and non-polar extracts of *Cymbopogon citratus* (lemon-grass) and *Moringa oleifera* (moringa) against selected clinical isolates.

Method: The antimicrobial activity of the extracts was assessed using the Agar Well Diffusion method. Polar and non-polar extracts of *C. citratus* and *M. oleifera* were prepared, and their phytochemical constituents were determined through quantitative and qualitative analyses. Clinical isolates tested included *Escherichia coli*, *Acinetobacter baumannii*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, and *Enterococcus faecalis*. Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) were determined for extracts showing antimicrobial activity. Gas Chromatography-Mass Spectrometry (GC-MS) was performed on raw plant materials to identify bioactive compounds.

Results: The polar extracts of *C. citratus* exhibited antimicrobial properties against *E. coli*, *A. baumannii*, *S. aureus*, and *K. pneumoniae* but showed no activity against *P. aeruginosa* and *E. faecalis*. Non-polar extracts of *C. citratus* were effective against *E. coli*, *A. baumannii*, and *S. aureus*, with no activity against *P. aeruginosa*. Polar extracts of *M. oleifera* exhibited broad-spectrum antimicrobial activity against *A. baumannii*, *K. pneumoniae*, *P. aeruginosa*, and *E. faecalis*, but were ineffective against *E. coli* and *S. aureus*. Non-polar extracts of *M. oleifera* showed activity against *E. coli* and *E. faecalis*. MIC results indicated *A. baumannii* had the highest inhibitory concentration at 7.5 mg/ml against the dichloromethane (DCM) extract of *C. citratus*, while *K. pneumoniae* had the highest concentration at 62.5 mg/ml against the methanol extract of *M. oleifera*. *A. baumannii*, *S. aureus*, and *E. faecalis* had low MIC values of 1.5 mg/ml against the n-hexane extract of *M. oleifera*. MBC results showed *K. pneumoniae* had the highest bactericidal concentration at 3 mg/ml against the methanol extract of *C. citratus*, while *E. faecalis*, *S. aureus*, and *A. baumannii* had bactericidal effects at 1.5 mg/ml against the n-hexane extract. GC-MS analysis identified 22 phytochemicals in raw *C. citratus* and 21 peaks corresponding to bioactive metabolites in *M. oleifera*.

Conclusion: This study demonstrates that *Cymbopogon citratus* and *Moringa oleifera* possess significant antimicrobial properties against clinical isolates such as *A. baumannii*, *S. aureus*, *K. pneumoniae*, and *E. faecalis*. These findings suggest the therapeutic potential of these plants for treating infections caused by susceptible organisms. Further research and development could lead to new antimicrobial agents from these plant extracts.

Keywords: *Cymbopogon citratus*, *Moringa oleifera*, Agar Well Diffusion, phytochemical analysis, Minimum Inhibitory Concentration (MIC), Minimum Bactericidal Concentration (MBC), Gas Chromatography-Mass Spectrometry (GC-MS), clinical isolates

COMPARISON OF SWALLOWING DIFFICULTY IN GERIATRIC AND ADULT PATIENTS ACCORDING TO NUTRITIONAL STATUS AND AGE**Gökhan Can TÖRPÜ**

Bezmialem Vakıf University, Institute of Health Sciences, Department of Cardiopulmonary
Physiotherapy and Rehabilitation, Istanbul, Turkey

ORCID ID: <https://orcid.org/0009-0004-5400-272X>

Müberra TANRIVERDİ

Bezmialem Vakıf University, Faculty of Health Sciences, Department of Physiotherapy and
Rehabilitation, Istanbul, Turkey

ORCID ID: <https://orcid.org/0000-0002-7770-9718>

Remzi DOĞAN

Bezmialem Vakıf University, Faculty of Medicine, Department of Otorhinolaryngology, Istanbul,
Turkey

ORCID ID: <https://orcid.org/0000-0001-5627-1342>

Pınar SOYSAL

Bezmialem Vakıf University, Faculty of Medicine, Department of Geriatric Medicine, Istanbul,
Turkey

ORCID ID: <https://orcid.org/0000-0002-6042-1718>

Orhan ÖZTURAN

Bezmialem Vakıf University, Faculty of Medicine, Department of Otorhinolaryngology, Istanbul,
Turkey

ORCID ID: <https://orcid.org/0000-0002-6129-8627>

Abstract

Introduction and Purpose: Swallowing disorders emerge as a problem that increase with the aging process, and this negatively affects the health of geriatric individuals. In cases where difficulty in swallowing may cause concern for the patient's health, non-oral feeding should be provided. This study aims to compare the effects of nutritional status and age on dysphagia in geriatric and adult patients.

Materials and Methods: A total of 446 patients (165 geriatrics, 281 adults; 246 female, 200 male) who applied to the outpatient clinic due to difficulty in swallowing were included in the study. The patients' nutritional status was categorized as oral and non-oral feeding according to the Functional Oral Intake Scale (FOIS). Dysphagia was diagnosed by fiberoptic endoscopic evaluation of

swallowing (FEES). During FEES, the severity of dysphagia was scored with the Penetration-Aspiration Scale (PAS) and the hypopharyngeal secretion status was scored with the Murray Secretion Scale (MSS). Quality of life associated with dysphagia was assessed with the Eating Assessment Tool-10 (EAT-10).

Results: In the study 358 patients (122 geriatrics, 236 adults) were fed orally and 88 patients (43 geriatrics, 45 adults) were fed non-orally. Adult patients were found to have significantly better FOIS ($p<0.001$), PAS ($p<0.001$), and MSS ($p<0.001$) values than geriatric patients. At the same time, orally fed patients had better PAS ($p<0.001$), MSS ($p<0.001$) and EAT-10 ($p<0.001$) scores compared to non-orally fed patients.

Discussion and Conclusion: Non-oral feeding causes more negative effects on the severity of dysphagia, hypopharyngeal secretion status and quality of life than oral feeding. In addition, geriatric patients experience more severe dysphagia symptoms compared to adult patients. Therefore, identifying symptoms of dysphagia in geriatric and non-orally fed patients is critical to improve swallowing safety, quality of life and health outcomes.

Key Words: Dysphagia; Geriatrics; Nutritional Status; Enteral Feeding

THYMOQUINONE ANALYSIS OF *NIGELLA SATIVA* L. (BLACK CUMIN) SEED OIL SOLD COMMERCIALY IN TURKEY**M.D. Musa ÖZEKİNCİ**

Ankara Yıldırım Beyazıt University, Public Health Institute, Department of Traditional, Complementary and Integrative Medicine, Ankara, Turkey

ORCID ID: <https://orcid.org/0009-0008-0734-4777>

Öğr. Gör. Dr. Derya ALTAY

Ankara Yıldırım Beyazıt University, Vocational School of Health Services, Department of Medical Services and Techniques, Ankara, Turkey

ORCID ID: <https://orcid.org/0009-0003-1630-7162>

Prof. Dr. Murat KOÇ

Ankara Yıldırım Beyazıt University, Public Health Institute, Department of Traditional, Complementary and Integrative Medicine, Ankara, Turkey

ORCID ID: <https://orcid.org/0000-0002-0829-4571>

Abstract

Introduction and Purpose: Medicinal plants have been a comprehensive source of therapeutic agents for treating human diseases since ancient times. Belonging to the Ranunculaceae family, *Nigella sativa* L., has been used for more than 2000 years as a natural remedy for many diseases and conditions such as asthma, dizziness, hypertension, diabetes, cough, bronchitis, headaches, inflammation, eczema, fever, and flu. *N. sativa*, which is of considerable medical and economic importance, is grown in various parts of Turkey. Pharmacologically, the active components of seed oils are thymoquinone, ditimokinone, timohydroquinone and timol. In this study, the level of thymoquinone in *N. sativa* oil obtained from local markets in Turkey was studied with high-performance liquid chromatography (HPLC).

Materials and Methods: Take 200.0 ± 1.0 microlitres of the oily product and mix 10 ml. In HPLC, standard thymoquinone solutions were prepared at concentrations of 5-10-20--50-100 $\mu\text{g/ml}$, using areas of these concentrations for calibration. HPLC Conditions: Agilent Technologies 1260 series was analyzed with high-pressure liquid chromatography (HPLC). The analytical column used for separation is Thermo ODS Hypersil C18 (4.6 mm x 150 mm x 5 μm). Mobile phase A: acetonitril and mobile phase B: %0.1 Gradient flow using formic acid water. The flow rate was 0.75 mL/min, the analysis time was 14 minutes, the injection volume was 2 μL and the column temperature was 35°C. The gradient began with %70B, was held for 0.5 minutes; in 8 minutes it was raised to %10B and then in 8.1 minutes to 70%B and was held there for 6 minutes. Optimisation studies have been conducted for the standard reference substance and sample of thymoquinone, and chromatographic separation has been achieved for the other components in the sample from the chosen gradient method. The calibration curve was formed in the range of 5-10-20--50-100 $\mu\text{g/ml}$, with the r^2 correlation value (0.99838) and the calibrating equation ($y=11.4xC + 33.90$). Determination on

thymoquinone was done by comparing the retention times of pics of pure standards and the UV spectrum.

Result: According to the results obtained, the level of thymoquinone in the fat sample was 11.94 ± 0.57 mg/ml and the retention time was 6.60 min.

Discussion and Conclusion: In this study, the quantitative level of thymoquinone was determined by HPLC in *N.Sativa* oil. It can be concluded that commercial products sold in Turkey contain sufficient thymoquinone.

Key Words: Black cumin; HPLC, *Nigella sativa*; thymoquinone

THE RELATIONSHIP BETWEEN GENETICALLY MODIFIED ORGANISM (GMO) PRODUCTS AND CANCER CASES: THE IMPORTANCE OF EDUCATION

Damla ARTIKASLAN

Izmir Katip Celebi University, Social Sciences Institute, Department of Agricultural Economics and Health Economics; Izmir, Turkey

ORCID ID: <https://orcid.org/0009-0005-5710-1093>

Abstract

Introduction and Purpose: The world's population is increasing day by day, increasing the demand for food, and therefore the role of the agricultural sector worldwide is an undeniable fact. For this reason, GMO crops have emerged since the 1950s in order to feed the world's growing population and increase the yield per unit area. Although GMO crops are classified as a solution to hunger, the increasing number of cancer cases and the consequent increase in health expenditures reminded us that this issue should be addressed. Therefore, the aim of this study is to determine the effects of Genetically Modified Organisms (GMO) on cancer cases and the role of education in this field.

Materials and Methods: The findings of the Random Effects Panel Model estimated for 12 countries with available GMO data for the period 2003-2019 show that the most important positive determinant of total cancer incidence is GMO products per capita. On the other hand, it can be observed that public health expenditures per capita have a near-neutral effect on cancer cases, while income per capita has a negative distorting effect on cancer cases. On the other hand, as a result of the analysis of agricultural output, increase in GMOs, country population and countries' investments in education within the scope of the 2003-2019 periods, it is possible to observe that there is an opposite diversion effect between the cultivation of GMO crops and expenditures on education for certain countries (such as America, Spain).

Results: Based on both the Hausman Test statistic and the characteristics of the sample, it was deemed appropriate to interpret the findings of the Random Effects Panel Model. According to the findings, a 10% increase in GMO products per capita increases the total number of cancer cases in the country by 38%. However, a 10% increase in public health expenditures per capita (as a result of the state's inability to meet the expenditures on medicine and private care) increases the total cancer rates by 0.00%, albeit negligibly. A 10% increase in per capita income is projected to reduce total cancer incidence by $-3.40E-05\%$. According to the findings of another annual increase-decrease graph; especially in Spain, which is among the 12 countries, there is an increase in the expenditures on education in relation to the population as a result of the availability of GMO products; in the USA, there is a decrease in the expenditures on education in recent years as a result of the increase in GMO products, especially in recent years, and accordingly, the expenditures on education have decreased in recent years compared to the population.

Discussion and Conclusion: As a result of the statistical analysis, GMO products have a negative impact on human health, and accordingly, educating and raising awareness of people in countries will contribute to raising healthier and more conscious individuals due to the return of future generations to natural seed cultivation. Moreover, it is predicted that instead of the public health expenditures in countries putting serious pressure on the country's budget, investing more in the education sector and raising people's awareness about agriculture and nutrition will pave the way and may help to reduce cancer cases in humans along with the balance of nature.

Key Words: Cancer Cases, GMO, Health Expenditure, Education, Panel Data Analysis

NANOPARTICLE-BASED DRUG DELIVERY SYSTEMS FOR OVERCOMING THE BLOOD-BRAIN BARRIER**Berrin ÖZDİL BAY**

Izmir Institute of Technology, Faculty of Science, Department Of Physics, TÜRKİYE
Süleyman Demirel University, Faculty of Medicine, Department of Histology and Embryology,
TÜRKİYE

ORCID ID: <https://orcid.org/0009-0005-4243-3271>**Damla EKER**

Ege University, Faculty of Science, Department of Biochemistry, Izmir, Turkiye

ORCID ID: <https://orcid.org/0000-0001-6081-2308>**Sinan AKGÖL**

Ege University, Faculty of Science, Department of Biochemistry, Izmir, Turkiye

ORCID ID: <https://orcid.org/0000-0002-8528-1854>**Abstract**

Introduction and Purpose: Nanoparticle (NP)-mediated drug delivery is of great importance as an effective and non-invasive method for treating brain diseases. In central nervous system diseases, the disruption of the blood-brain barrier (BBB) prevents many therapeutic drugs from reaching brain tissue. The BBB is highly selective due to endothelial cells connected by tight junctions (TJs) and adherens junctions (AJs). Only small molecules such as water, some gases, and some lipid-soluble compounds can easily pass through the BBB via passive transcellular diffusion. On the other hand, the transport of large molecules with high electric charge, polarity, and hydrophilicity must rely on specific proteins through active transport pathways. Because it has similar properties to the cell membrane, the barrier allows the transport of lipid-soluble molecules across the membrane while minimizing the passage of hydrophilic substances.

Materials and Methods: Nanoparticles possess the ability to cross the BBB due to their size (1-1000 nm), high targeting efficiency, versatility in shape and charge, ease of synthesis, and capacity to carry both hydrophobic and hydrophilic drugs. Nanoparticles can cross the BBB either due to the presence of surfactants that disrupt TJs or under pathological conditions. NPs cross endothelial cells via transcytosis.

Results: NPs have been developed and applied to cross the BBB in neurodegenerative diseases such as stroke, Alzheimer's, and Parkinson's disease. Common polymers used for this purpose include poly(lactic-co-glycolic acid) (PLGA), polyethylenimine (PEI), and poly(lactic acid) (PLA), as well as inorganic materials such as gold.

Key Words: Blood-Brain Barrier (BBB), Nanoparticles, Drug Delivery

ARMCHAIR AND ZIGZAG PHOSPHORENE NANOTUBES: DFT STUDY**Zakariya Arbaoui**

Advanced Material and Applications Laboratory (LEM2A), Moulay Ismail University FSM-ESTM-ENS, BP 11201, Zitoune, Meknes, 50000, Morocco

Soufiane Elhadfi

Advanced Material and Applications Laboratory (LEM2A), Moulay Ismail University FSM-ESTM-ENS, BP 11201, Zitoune, Meknes, 50000, Morocco

Mourad Boutahir

Advanced Material and Applications Laboratory (LEM2A), Moulay Ismail University FSM-ESTM-ENS, BP 11201, Zitoune, Meknes, 50000, Morocco

Brahim Fakrach

Advanced Material and Applications Laboratory (LEM2A), Moulay Ismail University FSM-ESTM-ENS, BP 11201, Zitoune, Meknes, 50000, Morocco

Abdelhai Rahmani

Advanced Material and Applications Laboratory (LEM2A), Moulay Ismail University FSM-ESTM-ENS, BP 11201, Zitoune, Meknes, 50000, Morocco

Hassan Chadli

Advanced Material and Applications Laboratory (LEM2A), Moulay Ismail University FSM-ESTM-ENS, BP 11201, Zitoune, Meknes, 50000, Morocco

Abdelali Rahmani

Advanced Material and Applications Laboratory (LEM2A), Moulay Ismail University FSM-ESTM-ENS, BP 11201, Zitoune, Meknes, 50000, Morocco

Abstract

In this study, we delve into the electronic characteristics of phosphorene nanotubes, examining both armchair and zigzag configurations—specifically, the (7,0) and (0,10) variants, respectively. Employing density functional theory (DFT) calculations, our findings reveal that the armchair configuration exhibits a semiconducting nature with a narrow indirect band gap ($E_g = 0.3$ eV), whereas the zigzag tube (0,10) displays metallic behavior. This dichotomy underscores the diverse potential applications of phosphorene nanotubes across various domains.

Keywords: Phosphorene nanotube, Electronic properties, Density functional theory.

ENHANCING FOOD QUALITY WITH *LACTOBACILLUS PLANTARUM* PROBIOTIC BACTERIA AND ITS EFFECT ON HEALTH

Narges Fathabadibozcheloei

Department of Food Safety and Hygiene, Science and Research Branch, Islamic Azad University, Tehran, Iran. Department of Food Safety and Hygiene, Science and Research Branch, Islamic Azad University, Tehran, Iran.

Abstract

The genus *Lactobacillus* includes more than 200 species and subspecies of Gram-positive bacteria, including *L. plantarum*. This bacterium has been isolated from a range of habitats, such as the human gut, dairy products, fruits and vegetables, fish, meat, poultry and insects. *L. plantarum* has multiple roles in the daily lives of humans and other organisms. This strain has the potential to be a probiotic supplement for humans.

This research investigates the potential of using *Lactobacillus plantarum* probiotic bacteria to enhance food quality and its effect on human health. Probiotic bacteria have been shown to have numerous health benefits, including aiding digestion and boosting the immune system.

Specifically, *Lactobacillus plantarum* has been found to have antimicrobial properties, which can help extend the shelf life of food products. This study aims to explore the mechanisms by which *Lactobacillus plantarum* can improve food quality and provide practical recommendations for incorporating this probiotic bacterium into food production processes. The findings of this research have the potential to revolutionize the food industry and improve the overall health and well-being of consumers.

Keywords: Bacteria, *Lactobacillus plantarum*, Immune system, Food Quality, Health, Antimicrobial properties

THE EMPLOYMENT OF PROBLEM-BASED LEARNING IN COMPLEX DENTAL CASES: A PROPOSAL FOR PROSTHODONTISTS**Esmâ CAGLAYAN**

Prosthodontist, Bafra Oral and Dental Health Hospital, Samsun, Turkey,

ORCID ID: <https://orcid.org/0000-0003-2010-6729>**Rafat SASANY**

Asst. Prof. Dr., Biruni University Dental School, Istanbul, Turkey,

<https://orcid.org/0000-0001-9321-1031>**Abstract**

Introduction and Purpose: The majority of dental scholarship substantively focuses on improving the functional and aesthetic status of teeth. Few of them, however, care about the training of those of prospective dentists, that is, dental students. Problem-based Learning (PBL), which is notably employed by medical instructors, is one of the methods that help those interested in dental pedagogy. The dental literature, including the Turkish one, is very limited in this vein and focuses on the training of undergraduate students through PBL in particular subjects, such as digital implantology, dental trauma education, and lifelong learning for dentists. The purpose of this paper is to address how PBL can be effective in complex dental cases.

Materials and Methods: The method adopted in this paper is two-fold: First, teaching methodologies in the curricula of top dentistry 50 faculties in Turkey and the world, retrieved from THE Ranking, were examined. Second, publications on teaching methodologies in dentistry faculties were examined through well-known academic databases, that is, WoS and PubMed.

Results: While PBL was not found in the course syllabuses of dental faculties in Turkey, it was observed that PBL is inserted in the syllabuses of prosthetics courses in foreign schools. Also, it is accepted in dental literature that PBL provides more effective results in the education of senior students as well as in complex dental cases.

Discussion and Conclusion: It can be argued that adopting PBL in PhD level specialisation, especially in the field of prosthetics as a complex field, would be more appropriate. Training on TME disorders, safety of increasing vertical dimension of occlusal, and digital implant workflow can be counted among the subjects in that context.

Key Words: Dental education, dental scholarship, problem-based learning, prosthodontics, prosthodontist

EVALUATING THE HEALTH IMPACTS OF MARINE LITTER POLLUTION ON FISHING COMMUNITIES AND THE FISHERIES SECTOR IN VIETNAM: A CASE STUDY OF KHANH HOA, PHU YEN, AND NINH THUAN PROVINCES

Dang Hoang Xuan Huy

Faculty of Economics, Nha Trang University

Abstract

The objective of this study is to evaluate the health impacts of marine litter pollution on fishing communities and the fisheries sector in Khánh Hòa, Phú Yên, and Ninh Thuận provinces. The research methods include a comprehensive literature review, surveys and interviews with fishermen, health experts, and stakeholders, along with the analysis of marine litter samples to identify harmful substances and microplastics. The research results indicate that marine litter pollution causes several serious health issues, including skin, respiratory, and digestive diseases due to exposure to toxic substances in marine litter. Some current management and control measures for marine litter are not sufficiently effective, leading to ongoing pollution. Policy implications from this study suggest enhancing international and regional cooperation, raising community awareness about the health impacts of marine litter pollution, and implementing more flexible and effective management measures to protect community health and ensure the sustainability of the fisheries sector.

Keywords: Marine litter, health impacts, fishing communities, toxic substances, microplastics, Vietnam, Khánh Hòa, Phú Yên, Ninh Thuận.

EVALUATION OF LUMBAR PARAVERTEBRAL MUSCLE AND SCIATIC NERVE STIFFNESS USING SHEAR WAVE ELASTOGRAPHY IN PATIENTS WITH LOW BACK PAIN AND SCIATALGIA

BEL AĞRISI VE SİYATALJİSİ OLAN HASTALARDA LOMBER PARAVERTEBRAL KAS VE SİYATİK SİNİR GERİLİMİNİN SHEAR WAVE ELASTOGRAFİSİ KULLANILARAK DEĞERLENDİRİLMESİ

Osman DERE

Başkent University Konya Application and Research Center, Department of Radiology, Konya, Turkey

ORCID ID: <https://orcid.org/0000-0001-8346-9477>

Levent YAZMALAR

Ozluce Medical Center, Department of Physical Medicine and Rehabilitation, Bursa, Turkey

ORCID ID: <https://orcid.org/0000-0002-2486-2305>

Veysel DELEN

Harran University Faculty of Medicine, Department of Physical Medicine and Rehabilitation, Sanliurfa, Turkey

ORCID ID: <https://orcid.org/0000-0002-8152-4628>

Abstract

Introduction and Purpose: To evaluate lumbar paravertebral muscle and sciatic nerve stiffness using shear wave elastography (SWE) in patients with low back pain and sciatalgia.

Material and Methods: This study included 30 volunteer participants with mechanical low back pain and sciatalgia. The SWE values of the complaining side of patients with low back pain and sciatalgia were evaluated as group 1. SWE values of the side without complaints of the same patients with low back pain and sciatalgia were evaluated as group 2. Pain was evaluated using a visual analogue scale. Disability was evaluated using the Oswestry Disability Index.

Results: Although all SWE values in group 1 were greater than those in group 2, these differences were not significant ($p>0.05$). According to Pearson's analysis, SWE values in the erector spinae muscle were significantly negatively correlated with Body Mass Index (BMI) in group 1 and SWE values in the multifidius muscle were significantly positively correlated with disease duration in group 2 ($P<0.05$). The SWE vaules of the sciatic nerve were significantly positively correlated with the SWE vaules of the erector spinae muscle and multifidius muscle in group 1 ($P<0.05$). Moreover SWE vaules in the sciatic nerve significantly were not correlated with SWE vaules in the erector spinae muscle or multifidius muscle in group 2.

Conclusion: We found greater SWE values in the affected limb of patients with chronic low back-related leg pain than in the unaffected limb. Although these findings were not significantly between the two groups, the positive correlation in the affected group provides ideas for future studies.

Key Words: shear wave elastography, low back pain, sciatalgia, stiffness, muscle, sciatic nerve

Özet

Giriş ve Amaç: Bel ağrısı ve siyataljisi olan hastalarda shear wave elastografisini (SWE) kullanarak lomber paravertebral kasları ve siyatik sinir sertliğini değerlendirmeyi amaçladık.

Gereç ve Yöntemler: Bu çalışmaya mekanik bel ağrısı ve siyatalji şikayeti olan 30 gönüllü katılımcı dahil edildi. Bel ağrısı ve siyataljisi olan hastaların şikayeti olan tarafının SWE değerleri grup 1 olarak değerlendirildi. Aynı hastaların bel ağrısı ve siyataljisi şikayeti olmayan tarafın SWE değerleri grup 2 olarak değerlendirildi. Ağrı görsel analog ölçek kullanılarak değerlendirildi. Engellilik, Oswestry Engellilik İndeksi kullanılarak değerlendirildi.

Bulgular: Grup 1'deki tüm SWE değerleri grup 2'den yüksek olmasına rağmen bu farklar anlamlı değildi ($p>0.05$). Pearson analizine göre grup 1'de erektör spina kasındaki SWE değerleri Vücut Kitle İndeksi (VKİ) ile anlamlı negatif korelasyon gösterirken, grup 2'de multifidius kasındaki SWE değerleri hastalık süresi ile anlamlı pozitif korelasyon gösterdi ($P<0.05$). Grup 1'de siyatik sinirin SWE değerleri, erektör spina kası ve multifidius kasının SWE değerleri ile anlamlı pozitif korelasyon gösterdi ($P<0.05$). Ayrıca siyatik sinirdeki SWE değerleri, grup 2'deki erector spina kası veya multifidius kasındaki SWE değerleri ile anlamlı düzeyde korele değildi.

Sonuç: Kronik bel ağrısına bağlı bacak ağrısı olan hastaların etkilenen ekstremitesi, etkilenmeyen ekstremiteden daha yüksek SWE değerleri bulduk. Her ne kadar bu bulgular iki grup arasında anlamlı olmasa da etkilenen gruptaki pozitif korelasyon gelecekteki çalışmalar için fikir sunmaktadır.

Anahtar Kelimeler: kayma dalgası elastografisi, bel ağrısı, siyatalji, sertlik, kas, siyatik sinir

GALLSTONES AND BIOFILMS: KEY FACTORS IN THE DEVELOPMENT OF GALLBLADDER CANCER**Fadoua LOUGLALI**

Laboratory of Industrial and Surface Engineering, Bioprocess and Bio-Interfaces Team. Faculty of Sciences and Techniques, Sultan Moulay Slimane University, BP 523, 23000 Beni Mellal, Morocco

Abdeslam JAAFARI

Laboratory of Industrial and Surface Engineering, Bioprocess and Bio-Interfaces Team. Faculty of Sciences and Techniques, Sultan Moulay Slimane University, BP 523, 23000 Beni Mellal, Morocco

Hafida ZAHIR

Laboratory of Industrial and Surface Engineering, Bioprocess and Bio-Interfaces Team. Faculty of Sciences and Techniques, Sultan Moulay Slimane University, BP 523, 23000 Beni Mellal, Morocco

Mostafa EL LOUALI

Laboratory of Industrial and Surface Engineering, Bioprocess and Bio-Interfaces Team. Faculty of Sciences and Techniques, Sultan Moulay Slimane University, BP 523, 23000 Beni Mellal, Morocco

Hassan LATRACHE

Laboratory of Industrial and Surface Engineering, Bioprocess and Bio-Interfaces Team. Faculty of Sciences and Techniques, Sultan Moulay Slimane University, BP 523, 23000 Beni Mellal, Morocco

Abstract

Background and purpose: Gallbladder cancer (GBC) is the most common malignant tumor of the biliary system and has the poorest prognosis. The pathogenesis of GBC is multifactorial, involving genetic, environmental, and microbial factors. Recent studies suggest that gallstones and bacterial biofilms play a critical role in the development of GBC. Therefore, this review aims to elucidate the relationship between gallstones, bacterial biofilm formation, and the development of gallbladder cancer, by synthesizing current epidemiological, mechanistic, and clinical knowledge.

Methods: A systematic literature review was conducted in databases including PubMed, Scopus, and Web of Science. Relevant studies published in the last two decades were analyzed, focusing on the interaction between gallstones, bacterial biofilms, and gallbladder carcinogenesis.

Results: Evidence indicates a significant association between gallstones and an increased risk of GBC. Gallstones provide a surface for bacterial colonization, leading to the formation of biofilms.

These biofilms, typically composed of bacteria such as *E. coli*, *Helicobacter* species, and *Salmonella spp*, promote chronic inflammation and biliary stasis, key factors in carcinogenesis. Persistent inflammation and biliary stasis induced by biofilm bacteria lead to epithelial damage, cell proliferation, and genetic alterations, facilitating malignant transformation.

Conclusion: The interaction between gallstones and bacterial biofilms plays a crucial role in the pathogenesis of gallbladder cancer. Understanding this relationship highlights potential targets for early detection, prevention, and treatment of GBC. Further research is needed to explore the molecular mechanisms underlying this relationship and to develop strategies to mitigate the impact of gallstones and biofilms on gallbladder carcinogenesis.

Keywords: Gallbladder cancer, Gallstones, Bacterial biofilm, Carcinogenesis, Chronic inflammation.

SHOULD A MEDIAL BUTTRESS PLATE BE USED WITH CANNULATED SCREWS IN NEGLECTED DISPLACED PAUWELS TYPE 3 FEMORAL NECK STRESS FRACTURE?

Mehmet KILIÇ

Konya City Hospital, Department of Orthopaedic and Traumatology, Konya, Turkey

ORCID ID: <https://orcid.org/0000-0001-7013 7879>

Abstract

Introduction and Purpose: Reporting the results of using a combination of medial semi-tubular plate and cannulated screws in a 17-year-old patient with bilateral displaced Pauwels type 3 stress fractures of the femoral neck.

Materials and Methods: An MRI taken in a 17-year-old patient unable to walk for 17 months revealed a non-displaced stress fracture of the right femoral neck and a displaced stress fracture of the left femoral neck. There was no history of trauma. Severe pain complaints were present in both hips before surgery. Range of motion (ROM) of both hip joints was limited. Growth retardation was detected after an endocrine examination of the patient. The right side was stabilized with three percutaneous cannulated screws. Following open reduction using the Smith Peterson approach on the left side and application of three cannulated screws, a medial semi-tubular medial buttress plate was applied to the femoral neck.

Results: The patient started walking with support after 6 weeks postoperatively. Active walking began at 3 months postoperatively. There were no complaints of pain while walking in both hips at 3 months postoperatively. Avascular necrosis was not detected on follow-up radiographs at 3 months postoperatively. There was no loss of reduction on radiographs at 3 months postoperatively. There was no limitation in the range of motion (ROM) of the left and right hip joints.

Discussion and Conclusion: In the treatment of displaced femoral neck stress fractures in young patients, the application of a medial semi-tubular buttress plate in addition to cannulated screws can be considered as a treatment option. Additional medial plate application provides more stable fixation by supporting vertical forces. Larger case series and long-term results are needed for more successful outcomes.

Keywords: Stress fracture; Femoral neck fracture; Medial plate; Pauwels type 3; Young adult

THE APPLICATION OF A DISTAL TIBIA ANTEROLATERAL ANATOMICAL PLATE TO THE POSTEROLATERAL SURFACE OF THE DISTAL TIBIA WITH A POSTEROLATERAL APPROACH IN TIBIA PILON FRACTURES ON THE CONTRALATERAL SIDE

Mehmet KILIÇ

Konya City Hospital, Department of Orthopaedic and Traumatology, Konya, Turkey

ORCID ID: <https://orcid.org/0000-0001-7013-7879>

Abstract

Introduction and Purpose: Infections and soft tissue necrosis in tibia pilon fractures are challenging complications for orthopedic surgeons to manage. Our aim is to present that the distal tibia anterolateral anatomical plate can be safely applied to the ankle from the posterolateral approach.

Material and Methods: A 52-year-old patient diagnosed with a right tibia pilon fracture after a high fall initially received external fixation due to extensive swelling. After a positive crepitus test and soft tissue healing problems anteriorly at the ankle, a distal tibia anterolateral anatomical plate was applied to the anterior aspect of the right ankle and a posterolateral approach was used to apply a plate to the posterolateral surface of the distal tibia.

Results: On the 90th postoperative day, evidence of union was observed on ankle AP and lateral X-rays. No implant failure was detected, and the patient did not report any pain in the right ankle. There was no restriction in ankle joint range of motion (ROM). No signs of infection or soft tissue necrosis were observed.

Discussion and Conclusion: In cases of anterior soft tissue disruption and the need for posterior tibial fixation in tibia pilon fractures, contralateral distal tibia anterolateral anatomical plating can be chosen as a treatment option. Posterolateral plating with a posterolateral approach may be preferred to minimize soft tissue complications and reduce the risk of infection in pilon fractures. More successful outcomes can be achieved with larger case series and biomechanical studies.

Keywords: Pilon fracture; Distal tibia anatomical plate; Posterolateral approach; Tissue necrosis

EFFECTS OF WATER POLLUTION ON THE HEALTH OF THE PEOPLE: A CASE STUDY OF GENERAL HOSPITAL KONTAGORA AREA OF NIGER STATE, NIGERIA

SHUAEEB, A. I.

Department of Science Education, Federal University of Technology, Minna, Niger State Nigeria.

Abstract

Water pollution in Nigeria has become a major public concern in recent times because it breeds poor environmental conditions which threatens the health of the people. To determine the effects of water pollution on the people in Kontagora Town, research was conducted in Community Health Department, General Hospital Kontagora. Nine hundred and fourteen (914) patients who were victims of water-borne diseases were selected and studied from January 2021 to December 2022. Official records in the hospital were used for data collection. Descriptive methods including frequencies and percentages were used to analyze the data collected. Data analysis revealed that the 914 patients were examined by competent and professional medical personnel. The diseases of the patients were diagnosed and several laboratory tests conducted. The study revealed that the patients were infected with water-borne diseases which include cholera, diarrhea, typhoid and hepatitis that were caused by water pollution. The patients received professional medical treatment from the medical personnel including medical consultants, doctors and nurses. They were effectively cured from the waterborne diseases and discharged. Concrete suggestions were proffered about how to reduce the water-borne infection diseases and improve the health of the people like ensuring active participation of Sanitary Inspectors by visitation of industrial and commercial premises, homes and compounds regularly to ensure healthy sanitation and also effective maintenance culture of drainage systems, roads, streets, alleyways and pathways are very crucial in order to sustain adequate sanitation, reduce water pollution and promote the quality health of the people particularly in Kontagora Town, Niger State and Nigeria in general.

Keywords: Water pollution, health, sanitation, hospital & water-borne diseases.

INTRODUCTION

Water is one of the most precious liquids that exists on the earth; however, the introduction of pollutants into the aqua system has set off a complicated series of biological and chemical reactions. In Nigeria, the freshwater is used for the disposal of refuse, human sewage, irrigation, abattoir waste water, etc. This has caused tremendous threat to the living organisms (Arimoro, 2017). Water is important to humanity, animals, and plants for survival. The quality and quantity of available water supply intake have positive and negative implications on health status of communities and societies. Over 500,000 people die daily worldwide to water-borne diseases (Adama, 2019). It is also estimated that about 4 million children under five years old die annually in developing countries (USAID, 2020). Worst still 2.3 billion people world-wide have mortality and morbidity associated with water-related ailments (WHO, 2018). Increased population, geological factors, rapid urbanization, agricultural development, global markets, industrial developments, and poor waste regulation had affected the quality and quantity of life. Those developments represented multi-layered complex processes which place the environment, human activities, food production, and human health at great risk. Water is about 75% in the composition of human body. Water aids in the digestion of food in the body, and acts as solvent to soluble substance. It is used for different purposes such as domestic and industrial purposes. Domestic uses of water include drinking, bathing, laundry, cooking, scrubbing and washing utensils. Industrial uses of water include

processing; water disposal; economic production; washing and clearing of plants, equipment, and machineries.

There are two types of water bodies, namely: surface and underground. Surface water includes oceans, seas, rivers, streams, brooks, lakes and flood. Whereas underground water comprises boreholes and wells. Surface water picks up solid, liquid and gas as rainwater or as percolates through the soil layers. Those substances are classified as biological, physical and radiological impurities. Boreholes and wells are main sources of water supply in cities and urban areas, and even in rural communities in Nigeria today. Compounds and houses have pipe-borne water supply system with taps that never run or bring out water. This is because of the inefficiency, ineffectiveness, and deficiency in the services of Public Water Works Departments. In the rural areas streams are narrowing down and drying up. People prefer to sink boreholes and wells, and construct tanks to store rain water during the rainy season. Auta, *et al.*, 2022; Azodo, 2021, among others discovered that uncontrolled discharge of toxic effluents into the soil, streams, and rivers by industries, factories, and indiscriminate dumping of garbage and faeces heavily contaminate ground waters in Nigeria. Extensive contamination of residential wells and boreholes is also caused by sewage from numerous septic tanks, latrines, and soak-away pits most often sited near them. Majority of residents' drink underground water without any form of treatment mainly because of ignorance, and perhaps, lack of access to basic methods of water treatment before usage. Such people can easily contact water-borne diseases such as cholera, and in extreme cases if care is not taken, cancerous diseases.

Research Problem

Water pollution exists in Nigerian environment inside and outside the homes, compounds, alley ways, pathways, streets, and high roads. Most of the roads are bad; pot-holes in places, and everywhere is flooded especially in rainy season, i.e., March to October yearly. Vehicles, motorists and pedestrians are usually trapped in high level floods, cars sink deep-down into the high-level floods as heavy torrential rain falls, and thereafter. In the circumstances, it is not unusual to see motorists, passengers, and pedestrians who are trapped in flood waters and trying to push out their vehicles to safer grounds. Sometimes, disastrous floods flush away human beings, properties and affluent straight away, down into the river and get them deposited and possibly drowned. Nigerians drink much water, use much water for domestic and industrial purposes. Going by my own personal observation and documented literature, it is obvious that the underground and surface waters which we drink and use for domestic, industrial and commercial purposes are not completely safe and thus, could be contaminated. People are after sick with all sorts of protracted symptoms and nuclear diagnoses. What are the causal factors? Are the symptoms related to water pollution and water-borne diseases? Which water-borne diseases are the people infected with? Which treatment(s) do they receive? And where? These are the questions this research tries to answer.

Research Objectives

General Objective:

The major objective of this research was to discover the effects of water pollution on the health of the people in Kontagora Area of Niger State, Nigeria.

Specific Objectives:

The research had three specific objectives to achieve:

- (i) To determine the water-borne diseases which the patients who were treated in General Hospital Kontagora contacted, during the period of study i.e. January 2021 to December 2022;
- (ii) To determine the treatment which they received from the medical team/personnel to cure the diseases; and
- (iii) To recommend safety measures in order to avoid contacting the water-borne diseases in the future.

Scope of the Study

The study covered patients, males and females from less than 5 years up to 15 years old and above who were infected with water-borne diseases, and were treated at the Community Health Department, General Hospital Kontagora Area, from January 2021 to December 2022. Water-borne diseases are caused by water pollution.

Definition of Terms/Concepts

Pollution: Is the direct and indirect introduction of substances, vibration, health or noise as a result of human activities into the air, water or land which may be harmful to human health or the quality of the environment.

Water Pollution: This is the introduction by man into the environment of substances or energy liable to cause hazards to human health, harm to living organisms and ecological system, damage to structures, or amenity, or interference with legitimate use of environment. It is also any chemical, biological or physical change in water quality that has a harmful effect on living organism or makes water unsuitable for use.

Population: It refers to the specific number of people or sub-category of people, living within a particular area, or a stratum at a given moment as determined by a census count or registration.

Sanitation: Protection of public health by removing and treating contaminated waste.

Waste: This is anything which is no longer useful to the disposer.

Effluent: Waste water from industries.

Garbage: It is unwanted materials or substances that are left discarded after use.

LITERATURE REVIEW

Akaninwor *et al.*, (2017) carried out a study on the Effect of Indomie industrial effluent discharge on microbial properties of new Calabar River. Water quality assessment of certain microbial pollution indicators arising from the industrial effluent of Indo-Food Company (Indomie) on water samples collected at five different sampling points of new Calabar Rivers was carried out. The sampling points were upstream, effluent fall out points, 200, 400 and 600m distances from the fallout point. Using the control (upstream) as an index of comparison to determine extent of pollution caused by the industrial effluent discharge, the results of the analysis indicated a significant difference in the microbial parameters assessed between the control and fallout points, indicating that this sampling point was polluted as a result of the direct effluent discharge at the sampling at this sampling point. The microbial analysis indicated that the viable bacterial counts of the samples ranged from 5.4×10^3 to 26×10^3 cfu (Table 1) suggesting that the water samples contain heavy microbial load. The biochemical identification of the isolate in the water samples showed that *Staphylococcus aureus*, *Shigella* sp., *Proteus vulgaris*, *Escherichia coli* and *Citrobacter* sp. Pre

dominated the water samples while the fungal microscopy identified *Candida* species, *Fusarium*, *Circinotrichum* and *Cephalophora* in the water samples. The elevated levels of microbial pollution indicators would invariably affect the taste, smell, appearance and aesthetic properties of the river water and thus pose a potential health hazard of varying degrees to various life forms that depend on the water for survival and recreational purposes. A routine treatment of the effluent before discharge is therefore highly recommended to maintain safe levels of the microbial pollutants in the immediate and extended environment.

Kinta *et al.*, (2021) conducted research on the Physico-Chemical and some Heavy Metals Concentration Analyses on Three Common Species of Fish in Tungan Kawo Reservoir Kontagora, Niger State, Nigeria. Developing countries like Nigeria are faced with increased in generation of domestic, industrial and agricultural wastes, with a large percentage moving. This study evaluates the physico-chemical and some heavy metals concentration in three common species of fish from Tungan Kawo reservoir Kontagora, Nigeria; using standard methods between (July 2018 – February 2019); at four different sampling stations of human activities on the water. Five heavy metals were evaluated (Lead, Copper, Manganese, Iron and Chromium) in the fish samples. Phosphate (0.4 – 2.5) mg/L, Nitrate (3.2 – 7.5) mg/L, Temperature (27 – 32.4) °C, Dissolved Oxygen (2.4 – 5.2 mg/L), Conductivity (81 – 125 µS/cm), Biochemical Oxygen Demand (1.9 – 4.4 mg/L), Alkalinity (mg/L) and Total Dissolved Solids (117 – 198) ppm were within the standard for drinking water and survival of fish. However, the pH (6.3 – 9.8) was above the standard for NIS and WHO drinking water but can support aquatic life. Iron (0.64 ± 0.072 mg/kg) was the most highly concentrated in *Synodontis clarias* while lead (0.01 ± 0.013 mg/kg) was the lowest in *Oreochromis niloticus* and *Coptidon zillii* (formerly *Tilapia zillii*). This current finding indicates that the water is safe for both aquatic life and domestic purpose but not suitable for direct human consumption without being properly treated. However, there is the need for regular monitoring of the heavy metals load in this water body and the aquatic organisms because of the long-term effects.

Jibrin *et al.*, (2018), conducted research on the Causes and Health Effects of Water Pollution in Domestic Water Sources in Hadeija Metropolis, Nigeria, using Statistical Modeling. In developing countries, water for domestic purposes is initially contaminated or polluted at source and it is a way of transferring waterborne diseases among the local community. The research objectives are to evaluate the causes of water pollution in domestic water sources at Hadeija metropolis, Nigeria, and the impact of use of polluted water for domestic purposes on the health and safety of the immediate community. Secondary information and primary data were used for this study, while simple statistical method (percentages and charts) were used for the analysis of the data. The results showed that about 48% of the community obtained their domestic water from the tap and that 80% of the respondents were aware that the water they use was likely contaminated from the sources. The impact of domestic water pollution on public health of the community indicated that typhoid and cholera are the dominant diseases caused by the use of contaminated water in the study area. There is dire need to formulate a new strategy to reduce contamination of domestic water at source and also to create awareness for boiling domestic water before use.

Jerome *et al.*, (2016) carried out a study on the Health Risks Associated with Oil Pollution in the Niger Delta, Nigeria. Although there is considerable public concern about the environmental impacts of oil pollution in the Niger Delta of Nigeria, actual evidence on the pathological and psychological effects in the health of local communities is minimally known. We sought to associate the perspective measures of exposure to oil pollution with health outcomes (inventory of health symptoms and functional capacity limitations) and determine how emotional reactions to environmental risks moderate these health outcomes. The study was conducted with 600 participants selected from five local government areas in Akwa Ibom State where oil pollution is rampant.

A structured questionnaire was used to collect the data on the respondents' exposure to oil pollution, self-rated health and disease symptoms, perception of risk of exposure and emotional reactions to local oil pollution. Most of the participants lived in areas with visible oil pollution and/or near gas flaring facilities and regularly suffered direct exposure to oil in their environment. High level of emotional distress was a part of everyone's life for the study population. Risk perception in the study area was mediated, to a large extent, by dreaded hazards (catastrophic fears of pipeline explosions and oil spill fire), visual cues (gas flares and smoke stacks) and chemosensory cues (off-flavor in drinking water). The exposure metrics were found to be significant predictors of the health effects and influencing factors (emotional reactions). Multi-levels models suggest that at the individual level, the demographic variables and direct contact with oil pollution were important mediators of functional capacity limitation. At the community level, emotional distress from fear of the sources of exposure was an important mediator of the health symptoms. Conclusions: This study documents high levels of disease symptoms and environmental distress (worry, annoyance and intolerance) associated with oil pollution in the Niger Delta areas of Nigeria. It highlights the need for some intervention to ameliorate the psychological distress associated with living under such environmental adversity.

Uchenna *et al.*, (2021), conducted a study on the health implications of stream water contamination by industrial effluents in the Onitsha urban area of Southeastern Nigeria. Nigeria has abundant surface and ground water resources many of which are polluted and can be detrimental to human health when consumed. This study investigated the effects of effluents discharged by industries into streams on the health of people who depend on stream water for domestic purposes in the Onitsha urban area of eastern Nigeria. Water samples collected from eleven discharge locations underwent physico-chemical and microbiological analyses. Data on the effects of industrial effluents on health were obtained from records in the public hospitals located in Onitsha as well as through questionnaire surveys and field observations. The results of the analyses revealed that the effluents grossly degrade surface water bodies; several parameters (temperature, iron, dissolved oxygen, turbidity, biological oxygen demand, chemical oxygen demand, lead, magnesium, total heterotrophic counts, total coliform group, pH) had values which were higher than the WHO (2011) safety limits for drinking water. The contamination of investigated streams by effluents had negative impact on the health of stream users. The discussion included health effects of polluted water and the prevalence of water borne or related diseases in the area. Implications of these findings were also discussed. Management measures capable of minimizing contamination of surface water in the study area were suggested.

RESEARCH METHODOLOGY

Research Population

During the period of the study, January 2021 to December 2022, 914 patients infected with water-borne diseases formed the research population.

Research Sample Size

The entire research population of 914 were chosen and studied. The sample of 914 patients was drawn from the target population, the patients who were infected with water-borne diseases namely: cholera, diarrhea (water with blood, and water without blood); hepatitis, and typhoid from January 2021 to December 2022, a period of one year as follows: Cholera (number of patients = 4), Diarrhea: watery without blood (number of patients = 615), watery with blood (number of patients = 29), Hepatitis (number of patients = 5), Typhoid (number of patients = 261). All these added together give a total sample size of 914 patients.

Method of Data Collection

Official documents and records were used to collect data of patients who were infected with water-borne diseases according to medical doctor's diagnoses, results of laboratory tests, and treatments received at Community Health Department, General Hospital Kontagora, from January 2021 to December 2022.

Method of Data Analysis

Descriptive method and simple statistics, frequencies and percentages were used to analyze the data collected.

Results and Discussion

Water-borne Diseases, Causes and Treatment

(i) Cholera:

Out of the 914 patients studied, only four (0.4%) were infected with cholera, 3 patients were less than 5 years old, whereas one (1) patient was 15 years old and above. This shows that babies were more prone to infection of cholera than older ones.

Causes: The disease was caused by a bacterium known as vibrio cholerae. The patients contacted the disease from food and drinking water which were contaminated.

Treatment: For the treatment of cholera, Oral Rehydration Therapy (ORT) was used to replace the lost fluid in the patients. Tetracycline was used to eradicate the bacteria which slowed recovery. In severe cases, intravenous administration was used to save lives; the fluid contained sugar and salt mixed with water.

(ii) Diarrhea:

There were two types of diarrheas, watery without blood, and watery with blood.

Watery without blood: Out of the 914 patients studied, 615 (67.3%) patients were infected with diarrhea (watery without blood). Three hundred and fifty-one (351) patients were less than 5 years old; 123 patients were 5-14 years old; and 141 patients were 15 years old and above. Statistical analysis showed that majority of the patients, babies less than 5 years old were the victims of diarrhea, watery without blood. These were followed by patients 15 years old and above.

Watery with blood: There were 29 (3.2%) patients out of 914 who were infected with diarrhea (watery with blood). Twenty-five patients were less than 5 years old; 3 patients were 5-14 years old, and only one (1) patient was 15 years old and above. Statistical analysis revealed that majority of the patients for diarrhea (watery with blood) were babies less than 5 years old.

Causes: Diarrhea was caused by some form of pathogenic known as *Escherichia coli*. Those patients contacted it through contaminated water and also eating food that was contaminated by flies.

Treatment: Codeine phosphate was used to slow down peristalsis and passage of materials down the bowel which gave time for reabsorption. Antibiotics and administration of fluid, Oral Rehydration Therapy (ORT) was also used.

(iii) Hepatitis:

Only 5 patients out of 914 (0.5%) were infected with the hepatitis disease, and they were patients aged 15 years old and above. None of the patients less than 5 years old, and up to – 14 years old had hepatitis disease.

Causes: Hepatitis was caused by *entero-virus*. The patients contacted the disease through contaminated food and water.

Treatment: The 5 patients were given gamma globulin, and they were immunized with vaccines, havrix and VAQTA. The vaccines were given in a series of two shots. The second vaccine was given within 6-8 minutes after the first vaccine. The second vaccine was necessary for long protection against the disease.

(iv) Typhoid:

Out of 914 patients, there were 261 (28.6%) patients who were infected with typhoid. Thirteen (13) patients were less than 5 years old; 8 patients were 5-15 years old, whereas, 240 patients aged 15 years and above. Statistical analysis revealed that majority of the patients who were infected with typhoid disease were grown-ups and few babies were victim of the disease during the period of the study.

Causes: Typhoid disease was caused by a bacterium known as *Salmonella typhi*. The patients contacted the disease by a bacterium known as *Salmonella typhi*. The patients contacted it by ingestion of materials contaminated by human faeces and urine, and also drinking contaminated water and eating contaminated food, for example, taking milk and canned meat that were not properly processed.

Treatment: The 261 patients who contacted typhoid were treated with antibiotics such as iprofloxacin, chloramphenicol. They were also given vaccines for immunity.

Summary and Conclusion

The research was an attempt to explore the implications of water pollution on the health of the people in Kontagora Area of Niger State using 914 patients in Community Health Department, General Hospital Kontagora as a case study, from January 2021 to December 2022. Documentary evidence and records of the patients were used for data collection. Descriptive methods including frequencies and percentages were used to analyze the data collected. Data analysis revealed that the 914 patients were examined by competent, professional medical personnel. The diseases of the patients were diagnosed and several laboratory tests conducted. It became very clear that the patients contacted four (4) water-borne diseases, namely: cholera, diarrhea, hepatitis and typhoid. The diseases were caused by water pollution. The patients received professional medical treatment from the medical personnel including medical consultants, doctors, and nurses. They were effectively cured from the waterborne diseases and discharged.

Recommendations

In view of the above research findings, the following recommendations were made to control water pollution and water-borne diseases:

(i) Town planners should monitor the mapped-out environmental plans in Kontagora Town to ensure that property developers do not encroach on certain sites to purchase undeveloped land, and construct houses on gutters and waterways. This would help to reduce blockages on the drainage systems, water pollution and health hazards on the people;

- (ii) There must be functional and effective drainage system to channel flood waters into the river. This would help to reduce storage of flood waters in places, and keep the environment clean, and hygienic;
- (iii) Manufacturing industries and factories should treat their effluents properly before disposal in order to avoid contamination of water;
- (iv) Landlords, landladies, house-holders, and tenants should keep their compounds clean, dispose wastes and garbage properly and lay sewage pipes away from bore-holes. This would help to control water pollution and promote the health of the residents.
- (v) Sanitary inspectors should be actively involved and mobilized to visit industrial and commercial premises, homes and compounds regularly to ensure healthy sanitation; and
- (vi) Effective maintenance culture of drainage systems, roads, streets, alleyways, and pathways are very crucial in order to sustain adequate sanitation, reduce water pollution, and promote the health of the people particularly in Kontagora Town, Niger State and Nigeria in general.

REFERENCES

- Adama, S. B. (2019). Effect of Climate Change on Clariid Fisheries Resources of Kainji Lake, Nigeria. A Ph.D Thesis submitted to the Post Graduate School, University of Nigeria, NSUKKA.
- Akaninwor, J. O., Anosike, E. O. & Egwim, O. (2017). Effect of Indomie industrial effluent discharge on microbial properties of new Calabar River. *Scientific Research and Essay Vol. 2* (1), pp.001-005.
- Arimoro, F. O., (2017). The impact of sawmill wood wastes on the water quality and fish communities of Benin River. *International Journal of Science and Technology*, **2** (1): 1-12.
- Auta Y. I., Bashiru E. J., Mohammed A. Z., Chukwuemeka V.I. and Moses S. S. (2016). Evaluation of Water Variables and Heavy Metals Concentration in Fish species collected from river gurara at Izom, Niger State. *International Journal of Applied Biological Research*, **7** (2): 133 – 144.
- Azodo, A.Y. (2021). Effects of water pollution on the environment: A case study of Benin City. Unpublished M.Sc. Project, Sociology and Anthropology, University of Benin, Benin City.
- World Health Organization (2018). *Guidelines for drinking water: Health criteria and other supporting information*. Geneva, Switzerland: WHO Publishers and Press.
- Jerome, N., Emilia, A. U., Ibang, E. & Godwin, E. (2016). Health Risks Associated with Oil Pollution in the Niger Delta, Nigeria. *International Journal of Environmental Research and Public Health*, **13**, 346.
- Jibrin, G., Yusuf, A. Y., Garba, A., Suleiman A. G., Ahmad, M. I. & Kamaluddin A. (2018). Causes and Health Effects of Water Pollution in Domestic Water Sources in Hadeija Metropolis, Nigeria, using Statistical Modeling. *Nigerian Research Journal of Chemical Sciences*, Vol. 4, 101-112.
- Kinta, M. Jr., Ayanwale, A. V., Keke, U. N., Auta, Y. I., Adama, B. S. & Usman, H. (2021). Physico-Chemical and some Heavy Metals Concentration Analyses on Three Common Species of Fish in Tungan Kawo Reservoir Kontagora, Niger State, Nigeria. *FUDMA Journal of Sciences (FJS) Vol. 5 No. 1, March, 2021, pp 223 – 232*.
- Uchenna, P. O., Michael, C. O., Romanus, U. A., Anthony, C. O., Godson, C. A., Eberechukwu, J. E., Chetachi, E. O. & Emeka, E. I. (2021). Health implications of stream water contamination by industrial effluents in the Onitsha urban area of Southeastern Nigeria. *Journal of Water and Land Development*, **48** (I–III): 105–114; <https://doi.org/10.24425/jwld.2021.136153>

**TRAINING UNIVERSITY LEVEL TEACHERS AND ADMINISTRATION STAFF IN
POPULAR PSYCHOLOGY****Irina-Ana DROBOT**

Technical University of Civil Engineering Bucharest, Faculty of Engineering in Foreign Languages, Department of Foreign Languages and Communication, Bucharest, Romania

ORCID ID: <https://orcid.org/0000-0002-2556-6233>

Abstract

Introduction and Purpose: The present paper starts from the phenomenon of popularization of notions and theories belonging to the domain of psychology. We can identify a tendency to educate the people for their own good, as well as for the good of the entire society, since they will be more productive once they know how to deal with stress and, especially, with other people.

Materials and Methods: The author of the present paper has participated in workshops organized by the university where she teaches on the topic of mindfulness (Glomb et al, 2011; Siegel et al, 2009) and overcoming imposter syndrome. Therefore, the participant observation within the ethnographic approach can be used, as well as netnographic approach, since some workshops were held online, while others were held face to face. As teaching and administrative staff, we have been taught, first of all, various techniques to work with ourselves, before we can work with other people, students, in both cases, as well as other colleagues and researchers. We were told to wonder what keeps us from making progress, what are our saboteurs, e.g. we can be too perfectionist, struggling to be high achievers as a means to compensate for something we feel we lack in our personality and makes us uneasy about ourselves and not confident enough, as well as to think what we would like to change to improve our lives. We were prompted to reflect on our profession as teachers and researchers, as well as administrative staff, and, eventually, to consider if we like our profession and what we like about them. Imposter syndrome means that we do not feel confident enough among peers in our profession, and we were taught through various interactive techniques how we could overcome it.

Results: Working with ourselves can require permanent effort. It can help us improve our self-image, clarity of personal and professional objectives, as well as relationships with peers and communication with students.

Discussion and Conclusion: The present paper shows the constant presence of popular psychology notions such as mindfulness, communication, saboteurs, self-image, and imposter syndrome. A clear trajectory in professional and personal life can be beneficial for both ourselves and the others around us, peers, students, university administrative staff.

Keywords: Communication; Self-Development; Mindfulness; Self Sabotage; Imposter Syndrome

INTRODUCTION

Nowadays, notions related to psychology are no longer restricted to the domain of professionals. In fact, psychoanalysis had been popularized through a series of Sigmund Freud's own writings, which were addressed to laymen, or to the general public, to those segments of readers who were not preparing for the job of analyst, and who were also not specialists in the field, scientists, or researchers. He wished to popularise working with the unconscious through encouraging the general

public to work with their dreams, by using free associations, with their various issues found in the unconscious, such as those related to various blockages and which were visible through self-analysis using free associations, which could be written down related to a subject, image, word, phrase, person, or situation and starting from these the person could write freely, without worrying about not being coherent and logical in bringing arguments and telling a story. Another method to have access to someone's own unconscious would be through slips of the tongue. The *Psychopathology of Everyday Life* (1938) and *The Interpretation of Dreams* (1983) were addressed to specialists, as well as to the general audience. Sailors were using these books to analyse their dreams and their slips of the tongue. Both dreams and slips of the tongue could be analysed starting from the dreamer's saying anything that came to his or her mind based on the elements in the dream or based on the word that was mispronounced.

Since we are speaking of the domain of psychology, here we have, currently, in popular science articles and books, various methods which combine psychology with psychoanalysis, as well as with meditation, in the case of mindfulness. Self-help books (Schueller & Parks, 2014) are also popular.

Mindfulness has become increasingly popular in all domains of professional activity, as well as in the domain of personal development and personal life improvement of relationships with the others and with one's self. The fields of education, at both university and school levels, corporations, various businesses, all benefit from various mindfulness workshops that are being organized for their teaching and administrative staff, students, employers and employees. In this way, it is hoped to make work in these institutions more efficient, to the benefit of both employers and employees, as well as the beneficiaries: clients, students, and students' parents.

CONCEPTUAL FRAMEWORK

Popular Psychology, Psychoanalysis, Mindfulness, Self-Development

Psychoanalysis is currently continuously popularised through writings about the writings of Freud and through courses for beginners in psychoanalysis, of which we can mention the ones held through email by AROPA (2024), or the Romanian Association for the Promotion of Psychoanalysis. They started working after 1989, from the 1990s, after the event of the Fall of Communism, when psychology and psychoanalysis were banned, as they were considered to be too subversive of the regime. AROPA created, in fact, popularisation courses, willing to make psychoanalysis known and used, especially, for its practical purposes, namely those of letting the ones taking them get the courage to work with themselves after acquiring the basic notions and techniques. These were courses which could be considered as trainings, based on work similar with that done by coaches, through workshops meant to teach mindfulness techniques, which are about working with oneself as well, based on helpful questions and notions, as well as discussions. AROPA has drawn our attention to the fact that, in American culture, psychoanalysis has since long before us become part of popular culture, which makes various elementary notions available to the general public. In Romania, in the 1990s, psychoanalysis was still in its beginnings and AROPA began popularizing various notions through a magazine called OMEN and through their web site, in addition to the email courses, where they published articles to explain elementary notions and to make available techniques for working with dream interpretation, free associations, and also slips of the tongue.

Psychoanalysis is made even more simple through mindfulness. Mindfulness speaks about self-sabotage, a term found in psychoanalysis and dealt with by going back to the childhood of the person and by using dreams' technique and various slips of the tongue, as well as free associations. Nowadays, some psychoanalysts have dealt away with dream analysis, and simplified the process, while other forms of therapy have simplified everything even more. Self-sabotage is a concept

available to anyone now, as we understand through it what inhibits us to act for our success, and what factors contribute to us not reaching our full potential at work and in business, as well as personal, relationships. Something may hold us back, e.g. if our parents were overcritical, we may lack confidence, if they were always asking us for good grades, then we could become perfectionists and feel the need to be high achievers, yet this would make us focus too much on work and neglect spending time with family and friends, and maybe not even getting all the work done, as we can start too many projects and find lack of time and resources to bring everything to a good end.

Mindfulness means awareness of the here and now, and can help us focus to what we are doing at the moment, either teaching a lesson, working on a project, or to focus on the persons we are talking to, e.g. to a student's parents, with whom we need to be sympathetic, or to students trying our best to gain their interest, involve them in the activities, and explaining everything to them clearly enough. Current teacher training workshops and courses at pre-university level include meditation exercises based on breathing techniques to help relax students and concentrate better before starting certain activities in class.

Self-development (Kim Koch & Wang, 2012) is now the equivalent of working with oneself through self-analysis. It involves considering our needs based on certain guiding questions, such as what our aims are, how we feel when we work, what we wish to achieve, how we relate to the others, how we can be more efficient at what we do, how we can be happier, more productive, more creative, more understanding with the others, and so on.

The Concepts of Community, Ethnography, Netnography, and Subcultures

In the specific case of the present paper, the author has in view the academic community (Jewkes & Murcott, 1996) from the Technical University of Civil Engineering Bucharest, as well as administrative staff, who participated in a series of workshops held by coach Frank Basinski from Blue Horizons Training (2024), based in Bucharest, Romania. The workshops were all held in the English language and, with a few exceptions now and then, the participants were about the same group, such as the organizers and teachers within the Doctoral School of the Technical University of Civil Engineering Bucharest, some administrative staff members, present occasionally, which included secretaries from various departments, and teaching staff from various engineering faculties, as well as from the Department of Foreign Languages and Communication, among which the author of the present paper and a few of her colleagues. Since all participants were fluent in English, this shows how English is an international language, used in this academic institution. Additionally, we can see how mindfulness and coaching techniques for professional and self-development can be understood by anyone, regardless of their professional background, showing thus all the more how these are all notions of popular psychology (Cordon, 2005; Nehring et al, 2016) which can be practically applied by anyone who is not a psychological professional.

Since we formed during these series of workshops a group and met with colleagues from other departments and administrative staff, we can say we have formed a group, and that we were always part of the academic community, or even subculture. As members of professional groups, we can form subcultures (Trice, 1993), since we have, based on the grid of culture identity manifestations devised by Baciu (2012), which includes symbols, values, rituals, traditions, practices, and personalities, all these elements included in our activities. The organization of workshops, conferences, lectures, teaching activities, graduation ceremonies, can be included under the category of practices and rituals, as well as even traditions, while among the values we can include democratic values and the connection with the values of the society we live in, such as equality and non-discrimination, and among the symbols the specific academic dress for events such as the awarding of the doctor honoris causa title, or graduation ceremonies.

Ethnography (Dutta, 2016; Flynn, 2010; Schensul et al, 2013) refers to the study of a community and a specific culture, in our case the practice of organization and participation in the workshops held by coach Frank Basinski about mindfulness, popular psychology, and professional development, as well as self-development in general. Netnography (Bowler, 2010; Kozinets, 2012), which refers to the study of online communities, can also be applied, since, during the pandemic and even later on, occasionally, some workshops by Frank Basinski were held on the Microsoft Teams platform. This community of participants has, thus considered the learning and teaching process in both media, which is by now the usual practice for members of the academic community, since they can participate now, after the pandemic, in both online and face-to-face academic events. The method of participant observation (Atkinson & Hammersley, 1998) can be applied, as the author of the present paper has been a participant in such workshops through the course of time, both in online and in face-to-face format. The face-to-face format can ensure establishing more friendly relations, yet even in the online format, once we already knew one another, could help establish a relaxed and friendly atmosphere. The topics and the accessible way in which they were presented, as well as participant engagement in discussions, and the use of menti.com tests where the participants could fill in anonymously the answer they believed was write or to insert short phrases and keywords to make graphs and data collection keywords, arranged like a keyword maps, when all participated finished answering. This provided grounds for discussion.

METHODOLOGY

Data collection and examination

The present paper relies on the topics that were discussed during the series of workshops held by Frank Basinski, from Blue Horizons, a coach for leadership in corporations and institutions, who has adapted his workshops for the institution of education at university level in the case of the Technical University of Civil Engineering Bucharest. The data collected relies on the experience of the author of the present paper, who has participated in some of the workshops both online, in a Microsoft Teams group, and face-to-face, in lecture halls at university.

Among the topics discussed were the following: the art of giving and receiving feedback, imposter syndrome, habits for efficacy in our work, considering our psychological blockages, which included the self-saboteurs (Zampelli, 2002) (e.g. judge, considered the main saboteur, as this judge can hinder our progress and make for us a very poor self-image, to the point where we can lack all self-confidence, avoider, controller, hyper-achiever, pleaser, stickler, victim, etc.) and which hindered us in becoming productive and achieving our full potential at work, efficient communication with our colleagues, and not allowing them to take credit for our work, in case we worked as a team, and mindfulness techniques, which included question regarding how we felt about our work, our relationships at work, and in personal life, about the way we can organize our time to enjoy what we are doing and to be pleased about ourselves, our self-image, and how we could improve our habits to achieve what we want. We need to become, at some point, aware if we are happy about our lives and how we could improve something. Feeling not stressed and satisfied with our work, and communicating efficiently with the other colleagues can help increase our sense of well-being at work, to the benefit of everyone involved. Once we feel we have the imposter syndrome, this can be a negative point about our self-image as well, and we can feel not up to the job compared with the others, and completely an inadequate person, not having the knowledge and skills of the others. This can hinder us in our work and productivity, and produce additional stress, and as a result the quality of our work will be affected.

The limitations include the fact that the author of the present paper has not managed to participate in all of the workshops, since some of them were overlapping with certain seminars and lectures she

was holding, and the same happened to other members of the teaching staff. Additionally, the graduation paper examination and registration for the exam of the students at some point in 2024 also prevented to the administrative staff members, such as secretaries, to participate, as these activities overlapped.

Analysis of the research problem

The role of the coach in this specific series of seminars was a combination with that of a psychologist, therapist, trainer, teacher, friend to whom we confessed about some aspect we were not satisfied with in our professional and personal lives, and for which he gave us some efficient tips. Such workshops can be a very good occasion for introspection and for reconsideration of our professional objectives. We take a pause from what we are doing and we realize we could do so much more, if we just reorganized a bit our thoughts and made an efficient action plan. Questions regarding what we like to do, what we like and what we do not like about our work, about our own personality, what are our hobbies and whether or not we take enough time to dedicate to them, if we like where we are now, where we would like to be and what steps we could take to reach what we want to achieve, whether or not we feel confident enough in our professional skills, how we feel about the way we relate to our colleagues and what solutions we could find to discuss with them politely and efficiently to improve the way we collaborate with them, can all be considered as extremely helpful. We can think that such an approach present in these workshops can remind us of professional and vocational counselling, which can be found available for students in certain universities and schools. Finding one's vocation and realizing what one likes and also what one is skilful and good at can help the person find their way in life. Choosing our profession is a significant moment in the life of anyone, from the point of view of vocation, personal satisfaction, knowledge, educational background, as well as possibilities of finding employment. Some of us, at some point in their lives, even go as far as reconsidering their professional choice, and decide to turn to a completely different professional domain, following the studies of another university and getting the necessary background and skills. The professional reconsideration may be done based on personal vocation and attraction for the domain, as well as based on the combination of factors regarding personal passion for the profession and employment possibilities, as well as financial advantages.

This series of workshops considers the passion for what we do as a profession to a large extent and the way we can improve our professional activity and also our personal lives, which would allow us to achieve a sense of well-being and fulfillment.

It is the interest of employers to have employees who are not experiencing stress-related issues and to maintain an atmosphere of harmony at work, since such an atmosphere can significantly improve the psychological health of the employees. Otherwise, the employees will need to take breaks for recovering from the periods of stress. Nowadays, as our society is valuing equality and low power distance relationships both in society, in politics, and at the level of working institutions, the educational field included, we can believe that this is the norm and wish to have such an atmosphere at work. The current trends in the teaching activity are related to both creative teaching and learning, participatory techniques, and friendly relationships among teachers and students. As in individualist societies, students are encouraged to be creative and to express their personal opinions, and the workshop series held by Frank Basinski included the very same classroom atmosphere, where the teaching and administrative staff could speak to Frank on friendly terms and address him by his first name, as we are used to imagine in Romania that schools and universities in the USA do.

The teaching during these series of workshops was done based on visual methods, as Frank Basinski always used a Powerpoint presentation, and also based on discussions between him and the

participants, or between various groups of participants who were given to consider a certain issue. For example, during the discussions about the self-saboteurs, the participants took a test on menti.com and noticed what their predominant self-saboteur or self-saboteurs were, and were divided based on their main one to discuss about what may have caused us to get this self-saboteur, what our behaviour includes as high achievers in the academic research and teaching activity, how it may hinder our activity and free time, and what we could do to deal with this self-saboteur.

The imposter syndrome workshop included an adaptation of Frank Basinski's leadership coaching to the academic teaching staff by explaining to them that it was a specific syndrome to highly qualified persons like us. He gave us an example from his own life, when he started work at a firm, he was a new colleague, and had no idea what the colleagues were talking about. Eventually, he realized it was normal not to know and that he could simply ask for more information. This was a friendly discussion and showed how rapport could be established between Frank Basinski and the participants.

The issue is that, in all areas of professional activity, we need efficient communication, a harmonious working environment, not allowing colleagues to take credit for our work, we need to ask and give feedback as a means of improving our activity and our communication, and we also need to communicate in order to ask for more information when we feel we lack it. We also need to be well psychologically with ourselves and feel that we are at the workplace we want and doing what we want and like, in order to be efficient in helping others, in our case, students, with their activity.

Psychological well-being and mental health are at the basis of productive work. Stress is a constant in our lives, and supranational organizations such as the European Union constantly draw attention to psychological issues related to the citizens' health through policies and workshops organized to raise awareness about such aspects. At the same time, educational European Union policies include teaching and acquiring communication and collaboration skills, as project work is part of the European Union funded activities in various professional fields and institutions. Students and teachers can cooperated through Erasmus projects and research projects funded by the European Union and they need to have good communication skills, which include getting and receiving feedback.

Model of the Research

We can include the technique used by Frank Basinski in the series of workshops analysed in this paper under the modern teaching techniques, using students' engagement, active participation, group and pair work, as well as teaching with technology and gamification techniques, which are visible through the use of the exercises on menti.com. His teaching in this series of workshops can be used as a teaching model for the academic teaching staff participating in his workshops. We can, thus, become aware of the way the modern and creative teaching techniques are adapted to the world today and to the way we interact with gadgets and technology on an everyday basis in schools, universities, as well as in various training and informational workshops. All of them are structured in the same way. The teacher can be regarded as a guide towards the students' acquiring not only knowledge, but also skills, related to their profession but also to their communicative techniques, which are, after all, the basis of establishing all professional and personal relationships. We can see how small talk during the breaks of various scientific and academic events can be introductions and starting points to establishing further professional connections.

In this series of workshops we notice how communication is a key element, together with personal and professional well-being, which include the element of personal passion and engagement in the professional activities. What we know needs to be transmitted to the others, and for transmitting them our knowledge in an efficient way we need to connect to them emotionally and

sympathetically, to the point where we transmit to them as teachers passion about the domain. We have seen how Frank Basinski is very passionate about all his topics, and how he is convinced that all these notions and techniques can be very helpful. What is even more convincing is that he has used them himself and he tells us about how they have improved his professional and personal life and how they have helped him clarify his objectives.

Popular psychology can, thus, be considered an applicative and practical counterpart of the professional scientific theories and help us consider the practical notions which we can use in our lives. We can include Frank Basinski's workshops under the larger category of popular psychology, which we may consult in order to have it in view for specifically improving our professional and personal lives. First of all, we need to be aware of what we are considering is going on in our lives, at various levels, identify the problems, and then work out solutions towards them.

Personal passion and our professional activity are seen as inseparable through this series of workshops. Definitely, doing what we like contributes to our psychological well-being.

CONCLUSION AND DISCUSSION

The series of workshops by Frank Basinski helps improve the psychological well-being of the academic teaching and administrative staff in the Technical University of Civil Engineering Bucharest. They are activities which bring together colleagues from various departments and, on this occasion, we may feel that we can connect with them and see them as friendly faces when we have various professional activities together on various occasions. This can offer the grounds necessary for a harmonious working environment, which is clearly more beneficial than a tense one, generating stress. Stress has been popularized as a negative factor not only on our psychological and emotional well-being, but also on our physical health, including high blood pressure, weakened immunity system, hair loss, all of which are by now part of popular science articles and campaigns of raising awareness.

Nowadays, we do not need to see a psychologist, psychoanalyst or other psychotherapist to help improve our sense of well-being. We can even have access to such workshops as those in the series held by Frank Basinski, which can improve our sense of well-being, and help us realize what we like about our jobs and what we could do more to enjoy what we are doing. We can realize that we are, in fact, in control of most aspects in our lives and that we need not feel blocked in a certain personal and professional point. We can always find ways to improve what we are not satisfied about and that we can change certain aspects in the relationships of collaboration with our colleagues, in a polite and assertive manner, at the same time.

The way we feel about our self-image can influence our professional productivity and performance. A new workplace can mean adaptation issues to the point where we find ourselves in an unfamiliar environment. Since all working environments are related to a subculture (Trice, 1993), or community, or the respective working profession, we can speak of culture shock, related to the culture of the working environment, to the persons we interact and with their values. Such workshops as those held by Frank Basinski can help improve relationships with colleagues through discussing issues we are all concerned with and through finding solutions together.

REFERENCES

Atkinson, P., & Hammersley, M. (1998). Ethnography and participant observation. *Strategies of Qualitative Inquiry*. Thousand Oaks: Sage, 248-261.

AROPA. (2024). Freud and psychoanalysis. <https://www.psihanaliza.org/>

- Baciu, S. (2012). *Culture: an Awareness-Raising Approach*. Cavallioti Publishing House, Bucharest, Romania.
- Basinski, F. (2024). Frank Basinski. <https://bluehorizontraining.ro/pages/frank-basinski>
- Bowler Jr, G. M. (2010). Netnography: A method specifically designed to study cultures and communities online. *The qualitative report*, 15(5), 1270.
- Cordón, L. A. (2005). *Popular psychology: An encyclopedia*. Greenwood Press/Greenwood Publishing Group.
- Dutta, U. (2016). Ethnographic approaches. *Handbook of methodological approaches to community-based research*, 69-79.
- Flynn, P. (2010). Ethnographic approaches. *Handbook of translation studies*, 1, 116-119.
- Freud, S. (1938). *Psychopathology of everyday life* (Vol. 24). Penguin Group.
- Freud, S. (1983). The interpretation of dreams. In *Literature and Psychoanalysis* (pp. 29-33). Columbia University Press.
- Freud, S. (1983). The interpretation of dreams. In *Literature and Psychoanalysis* (pp. 29-33). Columbia University Press.
- Glomb, T. M., Duffy, M. K., Bono, J. E., & Yang, T. (2011). Mindfulness at work. In *Research in personnel and human resources management* (pp. 115-157). Emerald Group Publishing Limited.
- Jewkes, R., & Murcott, A. (1996). Meanings of community. *Social science & medicine*, 43(4), 555-563.
- Kim Koh, J. B., & Wang, Q. (2012). Self-development. *Wiley Interdisciplinary Reviews: Cognitive Science*, 3(5), 513-524.
- Kozinets, R. (2012). The method of netnography. *SAGE internet research methods*, 3, 101-119.
- Nehring, D., Alvarado, E., Hendriks, E. C., & Kerrigan, D. (2016). *Transnational popular psychology and the global self-help industry: The Politics of Contemporary Social Change*. Basingstoke: Palgrave Macmillan.
- Schensul, S. L., Schensul, J. J., & LeCompte, M. D. (2013). *Initiating ethnographic research: A mixed methods approach* (Vol. 2). Rowman & Littlefield.
- Schueller, S. M., & Parks, A. C. (2014). The science of self-help. *European psychologist*.
- Siegel, R. D., Germer, C. K., & Olendzki, A. (2009). Mindfulness: What is it? Where did it come from?. In *Clinical handbook of mindfulness* (pp. 17-35). New York, NY: Springer New York.
- Trice, H. M. (1993). *Occupational subcultures in the workplace* (No. 26). Cornell University Press.
- Zampelli, S. (2002). *From Sabotage to Success: How to Overcome Self-Defeating Behavior and Reach Your True Potential*. iUniverse.

MALA PRAXIS MEDICA AND BIOLAW: A SYNTAGMA APPROACH**Dr. Arben Prifti**

Lecturer, Faculty of Law, and Humanities “The Mediterranean University of Albania “, Albania

Abstract

The medical field and law interchangeably interact with each other when public or social accountability influences medical decision-making. The intricate nature and significance of contemporary medical malpractice proceedings necessitate serious research endeavors aimed at providing well-informed solutions to the myriad issues encountered within criminal justice. In pursuit of this objective, this paper systematizes the factors that influence this professional and legal obligation. Various scenarios that could lead to criminal medical malpractice are delineated, along with the diverse manifestations of medical negligence stemming from professional impropriety. Lastly, a contemplation is made on the indispensable theoretical resources tailored for legal practitioners, healthcare professionals, students, and individuals with an interest in medical malpractice to protect themselves in such legal situations.

Keywords: mala praxis medica, biolaw criminal justice, medical criminal responsibility, healthcare

Introduction

Medical legislation is a recent development necessitated by advancements in technology in recent years (Mandilara et al.,2023). Essentially, the issues surrounding medical treatments have remained consistent over the decades, but the contexts in which these issues manifest have evolved significantly. The challenge stems from the disparity between the rapid progress in technology and science, and the relatively slower pace at which laws have adapted, leading to a sense of uncertainty. Many issues within medical legislation are rooted in legal and ethical considerations (Solomon,2006; Farber & White, 1991). These ethical discussions impact the most personal concerns of individuals, such as matters related to sexuality or mortality (Sawicki,2021). Increasingly, the judiciary is confronted with novel, previously unexplored dilemmas. As Parliaments, both in general and not exclusively in Albania, have limited involvement in this lawmaking, the responsibility falls upon the courts to render decisions and identify the most suitable solutions for these issues. Consequently, it is imperative to analyze how the courts address cases within this domain and the mechanisms through which these mala praxis medica cases are presented before the judiciary (Sibarani,2020). Frequently, debates concerning medical legislation are underpinned by strong ethical beliefs held by the parties engaged in these discussions, beliefs that have undergone significant transformations in the contexts where these arguments are raised (Sawicki,2021). The challenge lies in the disparity between the rapid advancements in technology and science and the comparatively slower progress in legal frameworks within this field, leading to an unwelcome sense of ambiguity. Most of the challenges emerging in medical legislation stem from moral considerations. These ethical debates impact the most personal concerns of individuals, such as matters related to life, health, sexuality, or mortality. The legal system, particularly the judiciary, is confronted with the intricate task of addressing these inquiries and establishing the fundamental principles that need to be upheld in a world marked by increasing moral ambiguity (Liang et al.,2023). Judicial rulings must be grounded in legal statutes. Even when grappling with moral dilemmas, they must be considered in conjunction with the application of laws and legal doctrines.

It is the lawsuit that will dictate the permissibility of medical interventions, while the ultimate decision will rest with the patient, guided by their moral convictions (Liang et al.,2023). The present paper will explore in a hermeneutical approach and legal examination the ethical discourse and the definition of the concept of "Buona praxis and mala praxis medica", the sanctity of human life, and the role of laws in understanding bioethics and biolaw in defensive care both in the European level and Albania as a country in the process of integration.

Human rights and constitutional rights as the background of patients' rights

The evaluation of civilization lies in its liberty. It is universally acknowledged that the notion of rights is crucial to both the concept of freedom and the function of governance within a society. These rights serve as a shield for individuals against violations of their dignity and welfare. Essentially, they constitute political standards dictating the appropriate treatment of individuals by governmental bodies and establishments. Human rights are an intrinsic aspect of every individual. The term "*human rights*" denotes the entitlements acknowledged by the global community in the Universal Declaration of Human Rights (UDHR), which was endorsed by United Nations (UN) member states in 1948, as well as in other international legal frameworks binding on participating nations (Zandy,2019; Donnelly,2013). Every person holds the entitlement to a satisfactory standard of living for themselves and their family, encompassing provisions like nourishment, attire, shelter, healthcare, essential social amenities, and assurance during periods of joblessness, illness, incapacity, widowhood, advanced age, or other situations beyond their influence. (Universal Declaration of Human Rights, Article 25.1). "*Human rights*" encapsulates not only a generic term symbolizing contemporary society but also mirrors a shared understanding of human principles (Donnelly,2013; Cook et al.,2003). The "*innate dignity*" and "*equal and inalienable rights of all members of the human family*" are acknowledged by the Universal Declaration of Human Rights. In this context, the development of the notion of "*patients' rights*" is rooted in the concept of the person, dignity, and equality of all individuals (Cohen & Ezer,2013; Rider & Makela,2003). Recognition and respect for the rights of patients as human beings were facilitated by the comprehension of the fundamental rights of everyone, embraced by both the state and medical practitioners. The focus of the UDHR is on the universal rights applicable to all individuals. The UN reiterated the universal aspect of this document in 2005 through a resolution adopted by the United Nations General Assembly (see the Resolution of General Assembly,2005). The European Convention for the Protection of Human Rights (ECHR) stands as the initial European treaty designed to safeguard human rights, signed in Rome on November 4, 1950, and enforced on September 3, 1953(see the ECHR,1953). The establishment of the European Court of Human Rights (ECHR) (1959) was crucial to ensure adherence to this Convention, with the Court playing a pivotal role in the enforcement of human rights safeguards. The endorsement and defense of human rights at the European level were influenced by this proclamation. The establishment of the Council of Europe in 1949 and the placement of a Commissioner for Human Rights in 2018, aimed to advance the supremacy of legal principles, human rights, and democratic practices. The International Covenant on Civil and Political Rights (1966) and the International Convention on Economic, Social, and Cultural Rights (1966) were established to safeguard fundamental human rights. In the Albanian context, concerning the safeguarding and assurance of patients' rights, notable references include the Constitution of Albania(2016), the European Convention on Human Rights (1950), the Criminal Code as amended (2021), Law no. 10107 of 30.3.2009 "*On health care in the Republic of Albania*", Law no. 10138 of 11.5.2009 "*On public health*", Law no. 10171 of 22.10.2009 "*On regulated professions in the Republic of Albania*" (specifically outlining responsibilities for professionals in this sector), and more. The Constitution of the Republic of Albania articulates in Article 21 that: "*The life of an individual is safeguarded by legal statutes.*" This stipulation explicitly signifies the protection of human life, establishing it as a constitutional principle. The notion of life

and human dignity are highlighted in the clauses of the Constitution as pivotal principles, serving as the foundation from which all other rights emanate as inherent core rights. The utmost paramount value for the nation is the individual and their life. This entitlement forms the basis of all liberties, and any infringement upon it results in the erosion of other human entitlements. Human life, acknowledged as such from its inception, emerges as a preeminent value above all others, under the shield of constitutional protection (Gostin,2001). The Convention, while fully upholding fundamental human rights and freedoms and recognizing the sanctity and absolute nature of the right to life and human dignity, underscores that this right serves as the foundation of all other human rights. By established principles of international law, states, as the primary actors within this legal framework, are compelled to honor all obligations they have assumed. Failure to fulfill these duties and international commitments will result in the respective states being held accountable, leading to diverse consequences primarily in the realms of politics, law, economy, and society (Adorno,2009). Regarding the Albanian context, the Constitution of the country was developed based on the principles enshrined in the Statute of the Council of Europe, wherein Article 3 emphasizes: "*Every member of the Council of Europe acknowledges the primacy of law and the principle that every individual within its jurisdiction is entitled to human rights and fundamental freedoms.*" Consequently, the legal framework concerning the safeguarding of human life as mandated by Article 21 of the Constitution necessitates careful interpretation. Legislation permits, under specific circumstances related to death, by Article 2, paragraph 2 of the Convention, the lawful termination of an individual's life. Article 17 of the Albanian Constitution stipulates: "*Restrictions on the rights and freedoms outlined in this Constitution may only be enacted through legislation for public interest or to safeguard the rights of others. These limitations must not encroach upon the essence of freedoms and rights and may not surpass the constraints outlined in the European Convention on Human Rights.*" The scope of this provision is extensive.

The rights of the patients

The term "*Medical service*" refers to the health services rendered by healthcare professionals to patients, encompassing discussions on various illnesses, as well as the maintenance and enhancement of health conditions. Upon the establishment of a genuine relationship, the physician is bound by the duty of upholding medical confidentiality. In several jurisdictions, doctors may assert claims for legal privilege when requested to disclose patient-related information they possess or are aware of (O'Sullivan,2020). While laws in many states recognize the doctor-patient privilege, instances of its violations have been reported. Recent judicial decisions have emphasized that physicians are obligated to safeguard not only the patient but also individuals who are not patients and may be at risk due to the patient's actions. In her paper "*The Patient's Rights and the Lawyer's Role in Defending Them*" Agalliu (2019) posits that the establishment of the Charter of Patients' Rights as a health guide and political guidance at the European level, in alignment with Albanian legislation regarding Patients' Rights, is universally applicable, embodying essential rights that must be acknowledged and upheld regardless of financial, economic, or political constraints (p. 25). The author contends that while the European Charter of Patients' Rights pertains to "*every individual*", the Albanian version specifically focuses on "*every patient*" making the Chart more focused on medical care than the individual one. Within the Charter of Patients' Rights, there are fourteen categories of rights, encompassing aspects *such as the right to preventative measures and advancements* (points 1 and 10), *the right to receive treatment and care freely* (point 2), *the right to be informed* (point 3), *the right to provide consent for treatment continuation or cessation, the right to choose freely regarding consent and selection of diagnostic and therapeutic approaches, the right to privacy and confidentiality, the right to timely treatment, the right to lodge complaints, and the right to security and compensation* (point 9). The provision of information, as outlined in the Albanian context, does not extend to patients through either conventional or digital communication

channels (Agalliu, pg. 29) and it constitutes a real gap in the right to treatment and care of the patient in Albania.

a. the right to privacy

In Europe, the right to privacy is safeguarded by Article 8 of the European Convention on Human Rights. In Albania, Article 36 of the Albanian Constitution ensures that "*Freedom and confidentiality of correspondence or any other means of communication are protected*". The doctor-patient relationship is shielded by the constitutional right to privacy (Digglemann & Cleis,2014). Nonetheless, this protection is not absolute and must be considered considering the state's interests that may be impacted. For example, in the classical Whalen v. Roe, 429 US 589 (1977) case in the United States, a coalition of doctors and patients contested a New York law mandating doctors to disclose to state authorities the identities of patients using Schedule II drugs for controlled substances. The physicians argued that such information was covered by doctor-patient confidentiality, while the patients contended that divulging this data infringed upon their right to privacy. The Supreme Court upheld the lower court's ruling that "*the personal nature of the patient's concerns regarding his illnesses and prescribed medications... are safeguarded by the constitutional right to privacy.*" However, after weighing this right against the state's interests, the Supreme Court determined that "*Disclosing this information to state authorities, responsible for the community's health, does not automatically violate the right to privacy*" (see the Whalen vs Roe case,1977).

b. Duty to warn.

In nearly all nations across the globe, it is mandatory for physicians and healthcare professionals to officially report specific sexually transmitted infections, instances of child maltreatment, infectious ailments, HIV/AIDS, or other illnesses perceived as detrimental to the overall public health (Shah et al.,2013). Certain states have also even formulated methodologies to monitor disease categories (such as specific forms of cancer), which could subsequently facilitate researchers in unveiling the etiology of said diseases. The individual's private information is exclusively disclosed to local or state authorities, with these details typically devoid of any identifying patient-specific data (Shah et al.,2013).

c. The patients' right to access their medical data.

Confidentiality in the medical field is a crucial aspect that revolves around the ownership of patient information (Agyapong et al., 2009). While the patient is considered the owner of the information contained in their medical records, it is important to note that the actual ownership of the record lies with the physician, who acts as a representative of the hospital. The legal rights of the patient about their medical records grant them the privilege to access and even obtain copies of these records. However, these rights are not absolute and are subject to reasonable restrictions, such as supervision by the doctor, access within hospital premises, and during official working hours. Patients also have the right to restrict the release or publication of information contained in their records, with certain limitations and exceptions. Patient rights concerning their medical data extend to those individuals who input or create the data, as well as those who access and utilize it (D'Costa et al.,2020). Medical record-keeping requirements may vary from state to state, but the essential content remains consistent across all EU states. Therefore, patient records must include details about the patient and the doctor's identity, important legal documents, relevant patient information, as well as details about therapy, discharge, and post-discharge follow-up. Patients may have various reasons for wanting to view their medical records. Typically, medical data are considered confidential documents with

restricted access. Healthcare professionals are ethically and legally obligated to maintain records of patient treatment. These records should encompass details of services, medications, current and past medical information, as well as other relevant information for the patient's safety and proper care. While the primary goal of keeping medical records is to ensure patient welfare, they also serve as legal documents to safeguard the interests of all involved in healthcare provision. Despite being confidential, many countries now acknowledge patients' rights to access their medical records, based on the principles of information and privacy rights (D'Costa et al.,2020). In the past, there were restrictions on patient access to medical records due to concerns about potential harm to the doctor-patient relationship, the patient, or data integrity. However, recent trends have shifted towards greater individual participation and liberalization in society. The European Court of Human Rights has frequently underscored that the gathering, retention, and disclosure of information concerning an individual's personal life are encompassed by Article 8 of the European Convention on Human Rights (see Article 8 of ECHR). The mere act of retaining such information constitutes an encroachment on the right to privacy, irrespective of its utilization. In the instance of *I. v Finland*, a nurse faced a situation where her contract was not renewed due to rumors about her health status circulating in the hospital where she was employed. Her plea for compensation was dismissed by the Finnish judiciary, asserting her failure to substantiate unauthorized tampering with her medical records, which purportedly happened within her workplace. The European Court deemed it unreasonable to require her to establish a direct link between lax data security measures and the leakage of her health information. It was emphasized by the ECtHR that the hospital could have significantly improved data protection by tightly controlling access to medical records, limiting disclosure to relevant medical staff, or maintaining a log of individuals who accessed the nurse's records. The Court highlighted the inadequacy of the hospital's patient record-keeping system in complying with national legislation, a matter overlooked by the Finnish courts (see *I v Finland case,2008*). This case underscores the insufficiency of merely seeking compensation for unauthorized personal data breaches in safeguarding privacy rights. Effective and practical measures are necessary to prevent unauthorized access. Moreover, the handling of doctor-patient confidentiality varies among different nations, with some permitting patient access during hospitalization and others post-discharge. Other nations require healthcare professionals to publicly disclose an individual's medical records at a designated time and location, often for a fee. Some jurisdictions impose time constraints on the examination and replication of medical documents, while others acknowledge the right of physicians to withhold medical records from patients if it is believed that such information could impact their physical or mental well-being (D'Costa et al.,2020). The core of the patient-doctor relationship lies in confidentiality, fostering trust between the two parties.

d. The right to medical treatment

Various nations assert that healthcare professionals are required to disclose an individual's medical record data publicly at a designated time and place and for a specified fee. Some regions impose time constraints on the examination and duplication of medical records, while certain jurisdictions acknowledge doctors' privilege to withhold medical records from patients if it is believed that such information could impact their physical well-being or mental health. Some areas reserve for physicians the right to reveal solely mental health data, with the provision that healthcare organizations must furnish this information to the patient's representatives or legal counsel. The foundation of the relationship between patient and physician is confidentiality. Undoubtedly, the entitlement to healthcare is universally recognized as an inherent right of individuals, safeguarded by domestic laws of each state and numerous international agreements. The fundamental right to healthcare, viewed as essential as the right to life, encompasses the right to complete health, raising questions about the boundaries of this entitlement (. Healthcare and its enhancement have

consistently been pivotal topics in legislative deliberations within democratic nations, encompassing initiatives such as healthcare personnel education, workforce expansion based on requirements, healthcare service provision, and insurance coverage. The doctor-patient relationship is predicated on an explicit or implicit agreement, with every interaction, examination, or treatment signifying a contractual relationship (Ram-Titkim,2013). This agreement extends beyond doctors to encompass all healthcare personnel, including nurses, lab technicians, ambulance drivers, paramedics, and even individuals in other professions like morticians (Hill,2007). Nevertheless, this contract does not ensure future care provision. Even if a healthcare provider has treated a patient previously and is considered their primary care physician, there is no obligation to provide treatment for a specific ailment. A physician may explicitly or in writing restrict their services to a patient and decline treatment for certain conditions, such as AIDS (Al-Wathinani et al.,2023). By establishing the bond of trust, patients instill greater confidence in their physicians, sharing intricate details about their condition to facilitate comprehensive comprehension and effective treatment, ultimately benefiting the patient. In situations where a patient cannot consent to the release of their data, and it is deemed necessary for such information to be disclosed in the patient's best interest or for public benefit, a careful evaluation must weigh the patient's welfare against the interests of the broader community, determining the most appropriate course of action (Kaba et al.,2007). Physicians in such instances, who lack a close medical relationship with the patient, may stress their prerogative to decline treating individuals with such conditions. The question of whether they have a "*duty to care*" remains subject to interpretation by the judiciary. Common law jurisdictions base the duty to act on legal precedents, yet several states have enacted specific statutes, commonly referred to as "good Samaritan laws"(Thomas,2017). These regulations limit the liability of individuals offering initial medical assistance and do not mandate medical personnel to attend to all life-threatening cases. Their objective is to promote prompt aid by trained medical professionals while shielding them from legal repercussions. When a doctor agrees to treat a patient for a particular ailment, both parties are bound by this consensual agreement until the treatment concludes. Nevertheless, there are constraints on the physician's ability to terminate this relationship. It is impermissible for the doctor to leave a patient in critical condition without providing necessary assistance, as such an act would constitute abandonment and could lead to criminal liability (Ferrara et al.,2013). Abandonment can be shown in various forms, including outright refusal to continue treatment, premature discharge, or neglecting to attend to the patient at designated times (Sibarani,2020). Even if a patient cannot afford healthcare, the doctor is still obligated to provide necessary treatment, and financial constraints do not justify abandonment. However, the scenario differs when considering hospital personnel. The legal framework typically distinguishes between individual doctors and hospital staff. Physicians employed by hospitals are required to attend to all patients admitted to the facility, relinquishing their autonomy to select patients. Consequently, healthcare workers in hospital settings must cater to the needs of all inpatients. In cases involving contagious diseases like AIDS, some hospitals only assign staff members who willingly consent to care for such patients. The rationale behind this approach is that healthcare professionals who voluntarily undertake this responsibility are more likely to deliver compassionate and effective medical care. By relying on volunteers, hospitals can avoid the challenge of dismissing employees who refuse to care for individuals with specific conditions (D'Costa et al.,2020). The issue of whether they have a "*duty to care*" is open to interpretation by the legal system.

Duty to care

The state's positive obligations primarily involve safeguarding the lives of individuals (Lavrysen,2016). In the context of healthcare, these responsibilities are delegated to healthcare professionals such as doctors and nurses. It is incumbent upon them to ensure the well-being and survival of their patients. This duty of care entails the physician's responsibility to diagnose, treat,

and provide guidance to the patient. These obligations carry both moral and legal weight. Treatment is typically focused on preserving the patient's life, alleviating pain and suffering, preventing disabilities, and restoring the patient's normal functionality whenever feasible. However, in situations where there is a prognosis of a permanent condition resulting in the patient being unable to comprehend their surroundings or communicate, continuing treatment may not yield benefits (Arbour,2008). In such cases, the patient experiences neither pain nor pleasure, and their disability is severe, with no prospect of even minimal human or social functioning. In both civil and common law, doctors are obligated to act in the best interest of their patients. According to common law, this duty entails taking reasonable actions, like those of other medical professionals, to either preserve or prolong the patient's life or to act in a manner that serves the patient's welfare. This duty of care poses challenges in end-of-life care scenarios, particularly when the patient's capacity to communicate or consent to treatment is compromised (Arbour,2008). In such instances, doctors must carefully consider whether further treatment aligns with the patient's best interests. During their professional duties, physicians are obligated to uphold the autonomy of their patients by acknowledging the rights of mentally capable adults to make decisions regarding their bodies and exercise control over their lives, including the choice of when and how their lives should come to an end (He et al.,2016). Additionally, doctors must adhere to the principle of beneficence, which entails acting in the best interest of the patient. In the context of end-of-life care, the ethical dilemma arises when determining what course of action would truly serve the patient's best interests. While it may be challenging to perceive how death could be considered advantageous for the patient, there are certain circumstances where the poor quality of life or futile treatments may lead to the conclusion that prolonging treatment would not be in the patient's best interest. Respecting the desires of patients who decline life-saving medical interventions aligns with the core principles of medical ethics (Teno et al.,2013). Physicians are primarily dedicated to the well-being of their patients, and it is essential to recognize that prolonging life may not always be in the patient's best interest. In contemporary medical practice, the alleviation of suffering often takes precedence over the imperative to extend life, particularly when it is the explicit wish of the patient. It is not only the responsibility of healthcare providers to grant patients autonomy in selecting their treatment course but also to offer informed guidance regarding the potential risks associated with different options under consideration. Nevertheless, physicians are obligated to honor the decisions made by patients, even in situations where these decisions diverge from medical advice or professional norms (Schmidt,2006). By upholding the patient's autonomy, a physician can avoid compromising ethical standards and simply refrain from impeding the patient's choices. In instances where a healthcare facility is unwilling to respect a patient's decision to forego treatment, the patient should have the option to seek care at another institution.

Negligence in healthcare

Healthcare providers are mandated to utilize all their expertise to provide the best possible care and treatment to patients. Two primary models are prevalent in the doctor-patient relationship: the first model is centered around the duty of care, while the second model focuses on the duty to obtain the patient's consent (Shutzeberg,2021). The duty of care entails interfering with an individual's freedom to act with the sole purpose of promoting the well-being, happiness, needs, interests, or values of the person receiving care. On the other hand, the duty to obtain the patient's consent is crucial in all cases. In situations where a physician lacks the necessary professional skills to treat common illnesses, they can be held accountable for negligence in fulfilling their duties (Bryden & Storey,2011). Varying opinions among medical professionals regarding the most appropriate course of action for patient treatment are acknowledged by the courts, allowing for the exercise of clinical judgment, and recognizing the diversity of perspectives within the medical community. It is the responsibility of healthcare professionals to attend to and treat patients, with failure to exercise due

diligence resulting in liability for negligence (Wright,2011). Despite efforts to prevent errors and harm, mistakes can still occur during medical practice, such as incorrect diagnoses or treatments that are deemed harmful. Unfortunately, such errors have, at times, led to patient fatalities. The legal responsibility for errors made by healthcare professionals is directly attributed to the individuals involved, with significant and potentially dangerous consequences in the medical field. Medical practitioners must not only possess technical knowledge but also be prepared to face the repercussions of errors in their practice. Patients should be informed of any errors in diagnosis or treatment, as healthcare providers are obligated to be truthful in all circumstances (Wright,2011). Concealing mistakes from patients or their families is a breach of this obligation. Patients must be provided with comprehensive information regarding the treatment, associated risks, possible alternatives, and more, to enable them to make an informed decision about continuing with medical procedures (Rider et al.,2003). The issue of negligence in healthcare has gained significant importance, particularly in cases involving wrongful actions by healthcare professionals, leading to numerous legal cases worldwide. Negligence is often defined as the "*failure to exercise due care and skill.*" A person cannot be deemed negligent for not taking preventive actions unless the risk is foreseeable and significant, and a reasonable person in similar circumstances would have taken steps to mitigate the risk (Pandit et al.,2009). Courts often consider several factors when determining whether a reasonable person or medical staff would have acted against a risk of harm or injury. These factors include the likelihood of harm or injury even with preventive measures, the severity of the damage or injury, who is responsible for eliminating the risk, and the societal benefits of the activity that poses the risk. Proving that a defendant owed a duty of care to the plaintiff is the initial challenge in any negligence case (Gutorova et al.,2019). In the Albanian Criminal Code, negligence is defined as careless treatment according to Article 97 of Law 10 107(see Article 97 of the Albanian Criminal Code). The concept of negligence originated from common law principles and is now part of civil legislation known as obligations or civil wrongs. Liability in negligence was established to address the legal gap that prevented injured individuals from suing the person who caused their injuries in the absence of a contractual agreement. The laws on negligence impose a legal duty to exercise care, regardless of the presence of a contract. Health workers have a duty of care towards the individuals they serve, requiring them to take all necessary precautions to prevent any harm or injury, whether through their actions or omissions (Sullivan,2020; He et al.,2016; Gostin,2001). Negligence law serves as a mechanism to pursue civil lawsuits and provide compensation to patients who have suffered injuries due to the actions or inactions of healthcare professionals.

Conclusive remarks

Patient rights are an integral part of fundamental human rights, and their significance cannot be overstated. While all rights hold importance, the rights of patients are particularly crucial as they directly impact the overall well-being of society. The ability to fully enjoy mental and physical health is closely tied to these rights. Without good health, one's capacity for joy and fulfillment in life becomes severely limited. The European Union has broadly foreseen the Patients' Rights Chart duties and roles in its jurisdiction. In Albania, there remains much work to be done in aligning legislation with the Acquis and internationally accepted principles in this domain, as well as ensuring the practical implementation of these rights, especially in terms of prevention and promotion of the right of protection. Life, health, and medical confidentiality are personal and inherent rights that should be upheld for every individual seeking healthcare. The patient-physician relationship holds exceptional significance, not only in safeguarding patients' rights but also in the state's vested interest in protecting the lives and health of its citizens.

References

1. Agalliu, P. (2019). Të drejtat e pacientëve dhe roli i avokatit për mbrojtjen e tyre [The patient's rights and the lawyer's role in defending them]. *Avokatia [Albanian Chamber of Advocacy Publication]*, 30(2), 21–47. <https://dhka.org.al/en/nr-30/>
2. Al-Wathinani, A. M., Barten, D. G., Alsahli, H., Alhamid, A., Alghamdi, W., Alqahtani, W., Alghamdi, R., Aljuaid, M., Albaqami, N. A., & Goniewicz, K. (2023). The Right to refuse: Understanding healthcare providers' perspectives on patient autonomy in emergency care. *Healthcare*, 11(12), 1756. <https://doi.org/10.3390/healthcare11121756>
3. Agyapong, V., Kirrane, R., & Bangaru, R. (2009). Medical confidentiality versus disclosure: Ethical and legal dilemmas. *Journal of Forensic and Legal Medicine*, 16(2), 93–96. <https://doi.org/10.1016/j.jflm.2008.08.007>
4. Andorno, R. (2009). Human dignity and human rights as a common ground for global bioethics. *the Journal of Medicine and Philosophy/Journal of Medicine and Philosophy*, 34(3), 223–240. <https://doi.org/10.1093/jmp/jhp023>
5. Arbour, L. (2008). The responsibility to protect as a duty of care in international law and practice. *Review of International Studies*, 34(3), 445–458. <https://doi.org/10.1017/s0260210508008115>
6. Bryden, D., & Storey, I. (2011). Duty of care and medical negligence. *Continuing Education in Anaesthesia, Critical Care & Pain*, 11(4), 124–127. <https://doi.org/10.1093/bjaceaccp/mkr016>
7. Cohen, J., & Ezer, T. (2013). Human rights in patient care: a theoretical and practical framework. *PubMed*, 15(2), 7–19. <https://pubmed.ncbi.nlm.nih.gov/24421170>
8. Cook, R. J., Dickens, B. M., & Fathalla, M. F. (2003). Human rights principles. In *Oxford University Press eBooks* (pp. 148–215). <https://doi.org/10.1093/acprof:oso/9780199241323.003.0006>
9. Diggelmann, O., & Cleis, M. N. (2014). How the Right to Privacy Became a Human Right. *Human Rights Law Review*, 14(3), 441–458. <https://doi.org/10.1093/hrlr/ngu014>
10. Donnelly, J. (2013). *Universal human rights in theory and practice*. <https://doi.org/10.7591/9780801467493>
11. Farber, H. S., & White, M. J. (1991). Medical Malpractice: An Empirical examination of the litigation process. *the RAND Journal of Economics*, 22(2), 199. <https://doi.org/10.2307/2601017>
12. Ferrara, S. D., Baccino, E., Bajanowski, T., Boscolo-Berto, R., Castellano, M., De Angel, R., Pauliukevičius, A., Ricci, P., Vanezis, P., Vieira, D. N., Viel, G., & Villanueva, E. (2013). Malpractice and medical liability. European Guidelines on Methods of Ascertainment and Criteria of Evaluation. *International Journal of Legal Medicine*, 127(3), 545–557. <https://doi.org/10.1007/s00414-013-0836-5>
13. Gostin, L. O. (2001). The human right to health: a right to the “highest attainable standard of health”. *PubMed*, 31(2), 29–30. <https://pubmed.ncbi.nlm.nih.gov/11478106>
14. Gutorova, N., Zhytnyi, O., & Kahanovska, T. (2019). MEDICAL NEGLIGENCE SUBJECT TO CRIMINAL LAW. *Wiadomości Lekarskie*, 72(11). <https://doi.org/10.36740/wlek201911118>
15. He, Q., Feng, J., & Huang, W. (2016). Law of negligence: duty of care, standard of care, and the notion of personal responsibility. *Management Science and Management Innovation*. <https://doi.org/10.2991/msmi-16.2016.1>

16. Hill, B. J. (2007). The constitutional right to make medical treatment decisions: a tale of two doctrines. *Social Science Research Network*. https://papers.ssrn.com/sol3/Delivery.cfm/SSRN_ID1076462_code691672.pdf?abstractid=1016203&mirid=1
17. Kaba, R., & Sooriakumaran, P. (2007). The evolution of the doctor-patient relationship. *International Journal of Surgery*, 5(1), 57–65. <https://doi.org/10.1016/j.ijssu.2006.01.005>
18. Lavrysen, L. (2016). *Human Rights in a Positive State: Rethinking the Relationship between Positive and Negative Obligations under the European Convention on Human Rights*. <https://biblio.ugent.be/publication/7195356>
19. Liang, B. A., Maroulis, J., & Mackey, T. K. (2023). Understanding medical malpractice lawsuits. *Stroke*, 54(3). <https://doi.org/10.1161/strokeaha.122.038559>
20. Mandilara, P., Galanakos, S. P., & Bablekos, G. (2023). A history of medical Liability: from ancient times to today. *Curēus*. <https://doi.org/10.7759/cureus.41593>
21. N. D’Costa, S., L.Kuhn, I., & Fritz, Z. (2020). A Systematic review of patient access to medical records in the acute setting: practicalities, perspectives and ethical consequences. *BMC Med Ethics*, 21(18). <https://doi.org/10.1186/s12910-020-0459-6>
22. O’Sullivan, J. (2020). A DUTY OF CARE TO BREACH MEDICAL CONFIDENTIALITY? *Cambridge Law Journal*, 79(2), 214–217. <https://doi.org/10.1017/s0008197320000434>
23. Pandit, M. S., & Pandit, S. (2009). Medical negligence: Coverage of the profession, duties, ethics, case law, and enlightened defense - A legal perspective. *Indian Journal of Urology/Indian Journal of Urology*, 25(3), 372. <https://doi.org/10.4103/0970-1591.56206>
24. Ram-Tiktin, E. (2011). The right to health care as a right to basic human functional capabilities. *Ethical Theory and Moral Practice*, 15(3), 337–351. <https://doi.org/10.1007/s10677-011-9322-7>
25. Rider, M. E., & Makela, C. J. (2003). A comparative analysis of patients’ rights: an international perspective. *International Journal of Consumer Studies*, 27(4), 302–315. <https://doi.org/10.1046/j.1470-6431.2003.00319.x>
26. Sawicki, N. N. (2021). Ethical malpractice. *Social Science Research Network*. <https://doi.org/10.2139/ssrn.3868348>
27. Schmidt, V. (2006). Patient autonomy and the ethics of responsibility. *Asian Journal of Social Science*, 44(02), 44–0961. <https://doi.org/10.5860/choice.44-0961>
28. Sibarani, S. (2020). Medical malpractice in the legal view. *Proceedings of the Tarumanagara International Conference on the Applications of Social Sciences and Humanities (TICASH 2019)*. <https://doi.org/10.2991/assehr.k.200515.006>
29. Shah, S. K., Hull, S. C., Spinner, M. A., Berkman, B. E., Sanchez, L. A., Abdul-Karim, R., Hsu, A. P., Claypool, R., & Holland, S. M. (2013). What does the duty to warn require? *American Journal of Bioethics*, 13(10), 62–63. <https://doi.org/10.1080/15265161.2013.828528>
30. Shutzberg, M. (2021). The doctor as parent, partner, provider. . . or comrade? Distribution of power in past and present models of the Doctor–Patient relationship. *Health Care Analysis*, 29(3), 231–248. <https://doi.org/10.1007/s10728-021-00432-2>
31. Solomon, R. C. (2006). Ethical issues in medical malpractice. *Emergency Medicine Clinics of North America*, 24(3), 733–747. <https://doi.org/10.1016/j.emc.2006.05.017>

32. Teno, J. M., Gozalo, P. L., Bynum, J. P. W., Leland, N. E., Miller, S. C., Morden, N. E., Scupp, T., Goodman, D. C., & Mor, V. (2013). Change in End-of-Life care for Medicare beneficiaries. *JAMA*, 309(5), 470. <https://doi.org/10.1001/jama.2012.207624>
33. Thomas, V. C. (2017). Good Samaritan Law: Impact on physician rescuers. *Wyoming Law Review*, 17(1), 149–168. <https://doi.org/10.59643/1942-9916.1373>
34. Wright, D. J. (2011). Medical malpractice and physician liability under a negligence rule. *International Review of Law and Economics*, 31(3), 205–211. <https://doi.org/10.1016/j.irle.2011.06.001>
35. Zandy, J. (2019). Universal declaration of human rights. *Radical Teacher*, 113, 56–57. <https://doi.org/10.5195/rt.2019.591>

Legal Resources

- Assembly of Albania. (2021). *Criminal Code of Albania [Kodi Penal i Republikes se Shqiperise] as amended*. Official Journal. <https://qbz.gov.al/preview/a2b117e6-69b2-4355-aa49-78967c31bf4d>
- Commissioner for Human Rights - www.coe.int. (2024). Commissioner for Human Rights. <https://www.coe.int/en/web/commissioner>
- ECHR - Homepage of the European Court of Human Rights - ECHR - ECHR / CEDH. (1959). ECHR. <https://www.echr.coe.int/>
- ECHR. (2008). HUDOC - European Court of Human Rights. Case of I v Finland <https://hudoc.echr.coe.int/eng#%7B%22itemid%22:%5B%22001-87510%22%5D%7D>
- European Convention on Human Rights - The European Convention on Human Rights - www.coe.int. (1953). The European Convention on Human Rights. <https://www.coe.int/en/web/human-rights-convention>
- EUROPEAN COMMISSION FOR DEMOCRACY THROUGH LAW. (2016). *Albania Constitution* (CDL-REF (2016)064). Venice Commission. [https://www.venice.coe.int/webforms/documents/default.aspx?pdffile=CDL-REF\(2016\)064-e](https://www.venice.coe.int/webforms/documents/default.aspx?pdffile=CDL-REF(2016)064-e)
- Whalen v. Roe, 429 U.S. 589 (1977). Justia Law. <https://supreme.justia.com/cases/federal/us/429/589/>
- United Nations. (2005). *Resolution adopted by the General Assembly on 16 September 2005: 60/1. 2005 World Summit Outcome* (A/RES/60/1). General Assembly. https://www.un.org/en/development/desa/population/migration/generalassembly/docs/globalcomp/act/A_RES_60_1.pdf
- United Nations. (1996). *International Covenant on Civil and Political Rights* (No. 2200A). General Assembly. <https://www.ohchr.org/en/instruments-mechanisms/instruments/international-covenant-civil-and-political-rights>
- United Nations. (1966). *International Covenant on Economic, Social and Cultural Rights* (2200A (XXI)). General Assembly. <https://www.ohchr.org/en/instruments-mechanisms/instruments/international-covenant-economic-social-and-cultural-rights>
- United Nations. (1948). *Universal Declaration of Human Rights* | United Nations. <https://www.un.org/en/about-us/universal-declaration-of-human-rights>

**COMPARISON OF RADIOLOGICAL MEASUREMENTS MARKERS WITH
CONVENTIONAL METHODS FOR PREDICTION OF DIFFICULT INTUBATION: A
PROSPECTIVE DOUBLE-BLIND, OBSERVATIONAL STUDY**

Burak Cemil BALIK

Gaziantep University, Faculty of Medicine, Department of Anesthesiology and Reanimation,
Gaziantep, Turkey

ORCID ID: <https://orcid.org/0009-0007-0027-350X>

Berna KAYA UĞUR

Gaziantep University, Faculty of Medicine, Department of Anesthesiology and Reanimation,
Gaziantep, Turkey

ORCID ID: <https://orcid.org/0000-0003-0044-363X>

Feyza YILMAZ

Gaziantep University, Faculty of Medicine, Department of Radiology, Gaziantep, Turkey

Abidin Murat GEYİK

Gaziantep University, Faculty of Medicine, Department Of Neurosurgery, Gaziantep, Turkey

Abstract

Difficult airway and difficult intubation are one of the most important challenges faced by anesthesiologists. Predicting difficult intubation preoperatively and making preparations accordingly are indispensable for prevention of complications and therefore patient health. In some cases, traditional subjective measurements, such as Mallampati and Cormack-Lehane which may vary according to the practitioner, cannot be sufficiently predictive and reliable due to their low sensitivity and specificity. Therefore, the search for new objective parameters and methods in predicting intubation difficulty continues. In this study, we planned to investigate the predictive values of radiological markers of difficult intubation that have just started to make their place in the literature, as well as traditional tests such as modified Mallampati, Cormack-Lehane scores, thyromental distance, sternomental distance. 70 patients who were prepared for elective surgery under general anesthesia by the Gaziantep University Faculty of Medicine, Şahinbey Research and Practice Hospital Department of Neurosurgery and Department of Anesthesiology and Reanimation, and who would routinely undergo computerized tomography and plain radiography imaging. Anthropometric measurements, thyromental distance, sternomental distance, Cormack-Lehane and Mallampati scores of the patients included in the study were recorded. Skin-vallecular distance, skin-epiglottic distance, skin-glottic distance, tongue length and height, epiglottis length and angle were also measured from preoperative imaging. As a result, while thyromental and sternomental distance and Mallampati and Cormack-Lehane scores significantly different in the difficult intubation group from easy intubation group, no significant difference was observed between the measurements of radiological indices in the difficult intubation and easy intubation groups.

Keywords: Difficult airway, Difficult intubation, Mallampati, Cormack-Lehane

INTRODUCTION

According to the American Society of Anesthesiologists (ASA) closed case database, respiratory events account for 17% of anesthesia-related complications, which include death or permanent brain damage. (1) Difficult intubation accounts for 23% of respiratory events. (2)

Intubation has an essential place in airway management. Successful endotracheal intubation ensures ventilation while preventing aspiration of gastric contents and other solids/liquids. Being able to predict difficult intubation preoperatively and preparing accordingly in advance is indispensable to avoid complications. Many tests, assessments, and parameters, such as the upper lip biting test, Mallampati, and thyromental distance, have been developed over time. For this reason, these traditional subjective measurements, which may vary depending on the practitioner, cannot be sufficiently predictive and reliable due to low sensitivity and specificity. With the rapid advancement of technology and medicine in the 21st century, the search for new objective and reliable parameters and methods to predict intubation difficulty continues. It may be rational to focus on objective radiological parameters. However, routine use of these methods (such as computed tomography [CT], Magnetic resonance imaging [MRI], and plain radiography) is costly and unethical due to redundant exposure to radiation; studies on this subject are limited in number and scope.

MATERIALS AND METHODS

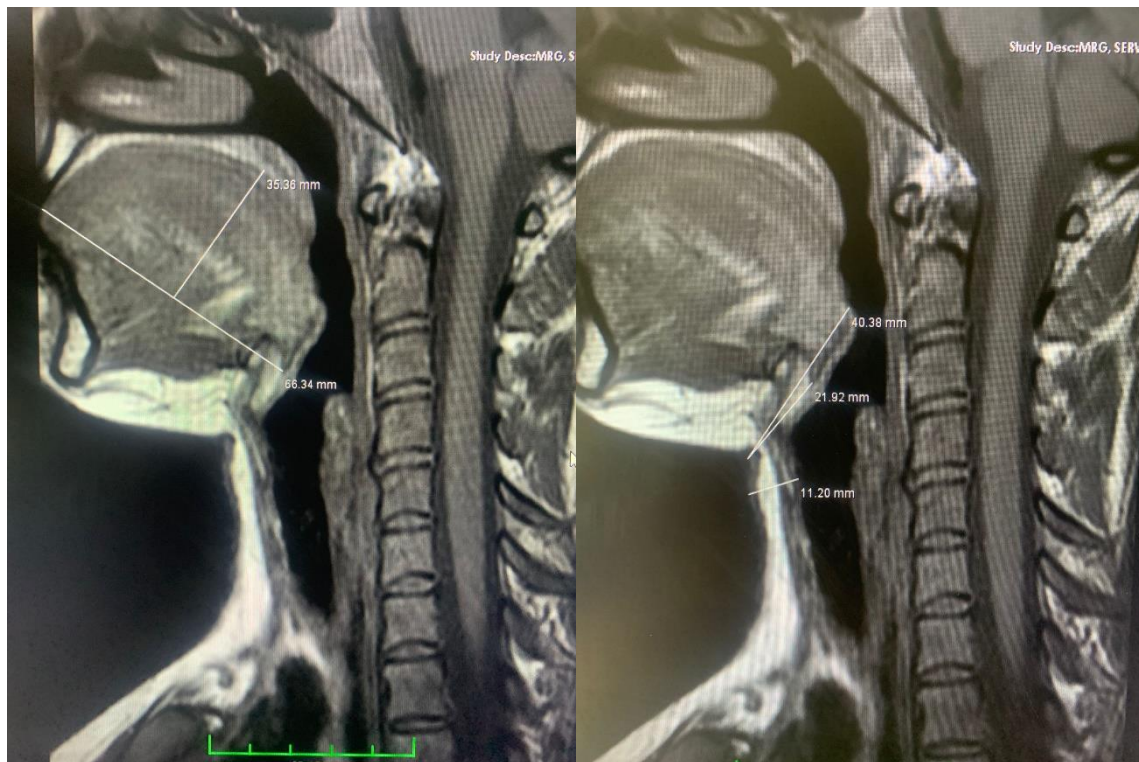
It was planned to include 70 patients between the ages of 18 and 75 in the ASA I-IV group, who were prepared for elective surgery under general anesthesia by the department and would routinely undergo computed tomography (CT) and plain radiography in the preoperative period.

Table 1. Inclusion and Exclusion criteria

Inclusion Criteria:	Exclusion Criteria:
Age of 18-75 years	Under the age of 18 or over 75 years
Planned to operate by the craniotomy	Pregnancy
Elective surgery	Emergency surgery
Patients who will undergo CT and plain radiography before surgery	Missing Data
ASA I-IV	ASA > IV
BMI < 30 kg/m ²	BMI > 30 kg/m ²

SED, SED, TL, TH, EL, EA, and epiglottic-pharyngeal distance (EPD) were measured on CT and plain radiographs performed on the patients by two separate radiologists blindly to the experienced anesthesiologist who performed the intubation. SVD, linear distance from skin to vallecular; SED, linear distance from the skin to the tip of the epiglottis; SGD, linear distance from the skin to the anterior end of the vocal cords; TL, linear distance from the vallecula to the tip of the tongue; TH, the vertical height drawn from the tongue line to the top of the tongue; EL, linear distance from the vallecula to the tip of the epiglottis; EPD, the distance between the epiglottis and the posterior wall of the pharynx in centimeters were recorded; the EA was measured as the angle between the line drawn vertically to the ground and the epiglottis were recorded.

Figure 1 presents the radiological measurement methods for the mentioned parameters. To prevent individual bias in the study, averages of the 2 measured results were evaluated.

Figure 1. Radiological Measurements

Demographic data and the patient characteristics, including age, gender, operation type, ASA score, Mallampati score, whether there is any limitation in neck movements, TMM, SMM, whether they have a large tongue and small chin, dysmorphic-looking face, absence of teeth was recorded by a single experienced anesthesiologist, independent of both radiological measurements and the intubating experienced anesthesiologist. Cormack-Lehane score, number of intubation attempts, and intubation time (sec) were recorded by a single experienced anesthesiologist who did not perform intubation and was blinded to the preoperative measurements.

No premedication was applied to the patients. All patients were preoxygenated by breathing 100% oxygen at a rate of 4 l/min for 3 minutes. During anesthesia induction, patients were administered 2 mg/kg propofol IV, 1.5 µg/kg fentanyl IV, and 0.6 mg/kg rocuronium IV. After muscle relaxation was achieved, intubation was attempted. A single experienced anesthesiologist performed all intubation attempts. In case of failure, a substitute practitioner with the same experience was present. A Macintosh blade was used for laryngoscopy. The time between removing the mask from the face to successful intubation was recorded as the duration of the intubation in seconds. The appearance of three consecutive waveforms compatible with ventilation on capnography was considered an indicator of successful intubation.

In case of two failed intubation attempts, the 3rd and subsequent attempts were performed via video laryngoscope (Karl Storz – 8402 ZX). Patients whose duration of the intubation exceeded 90 seconds or had more than one intubation attempt were included in the difficult intubation group (Group D), and the remaining patients were allocated to the easy intubation group (Group E). After recovering from anesthesia, patients were extubated and taken to the neurosurgery intensive care unit.

Statistical Analysis

The suitability of the data for normal distribution was evaluated with the Shapiro-Wilk test. Student's t-test was used to compare normally distributed variables in two independent groups, and the Mann-Whitney U test was used to compare non-normally distributed characteristics in two independent groups. Relationships between categorical variables were evaluated with the Chi-square test. ROC curve analysis was used to assess the diagnostic values of numerical variables. SPSS for Windows version 24.0 package program was used for statistical analysis, and $p < 0.05$ was considered statistically significant.

Ethics Approval

This study was conducted with the permission of the Gaziantep University Clinical Research Ethics Committee decree number 2022/14 dated 26.01.2022, and between 26.01.2022 and 17.09.2022 at Gaziantep University Faculty of Medicine, Sahinbey Research and Practice Hospital, with collaboration of Department of Anesthesiology and Reanimation and Department of Brain and Neurosurgery according to the ethical principles of the Declaration of Helsinki.

RESULTS

During the study period, five of the 110 patients who met the study criteria were excluded from the study preoperatively due to pregnancy, ASA V, or the urgency of the operation. Thirty five of the remaining 105 patients were excluded due to insufficient radiological imaging or anesthetic measurements in the postoperative period. The flow chart of the study is given in Figure 2.

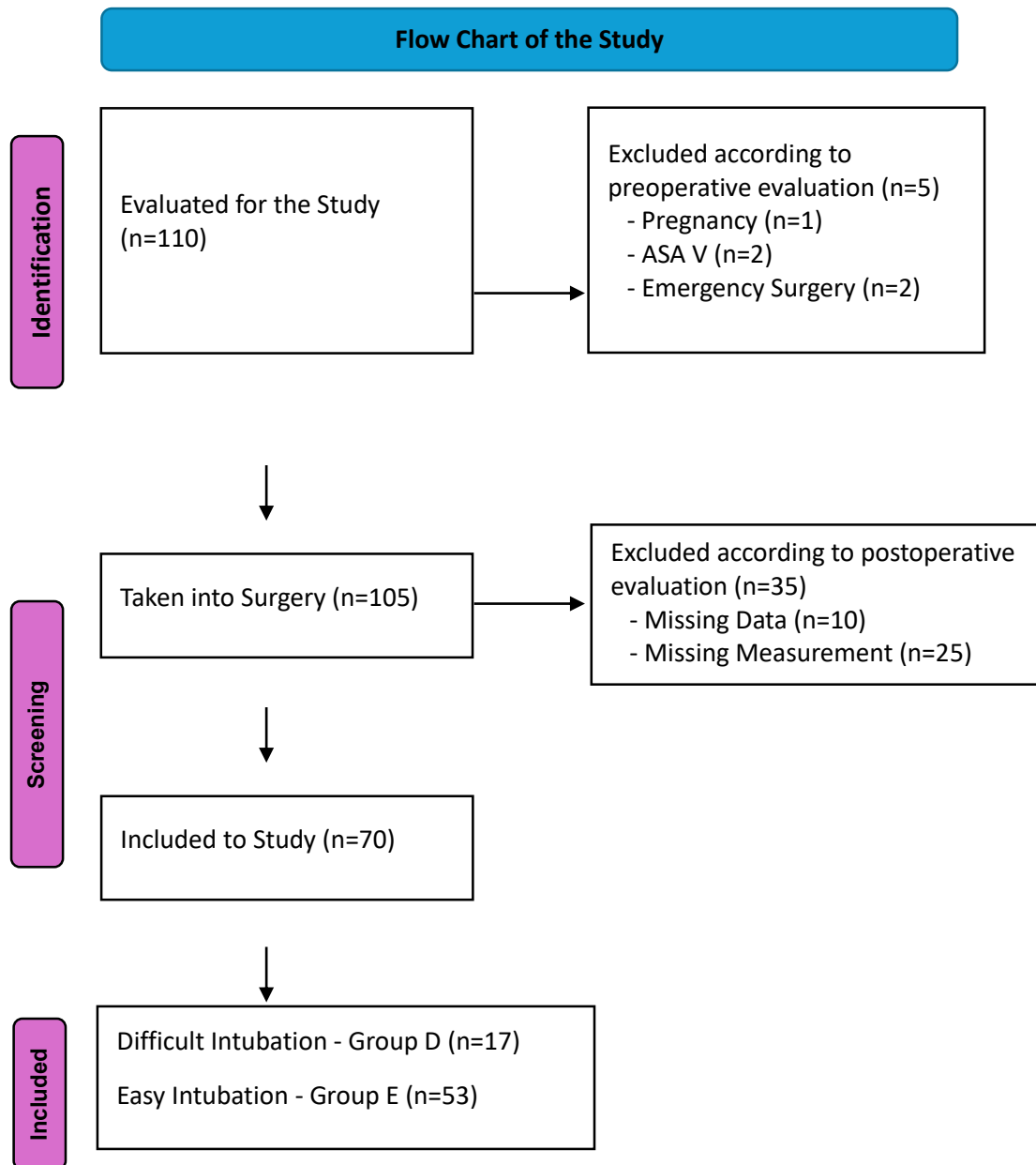
Figure 2. Flow Chart of the Study

Table 2 provides demographic data for the patients included in the study. However, Modified Mallampati and Cormack-Lehane scores also showed a significant difference between the two groups. The average duration of the intubation was calculated as 78 seconds in Group D and 29 seconds in Group E.

Table 2. Demographic data

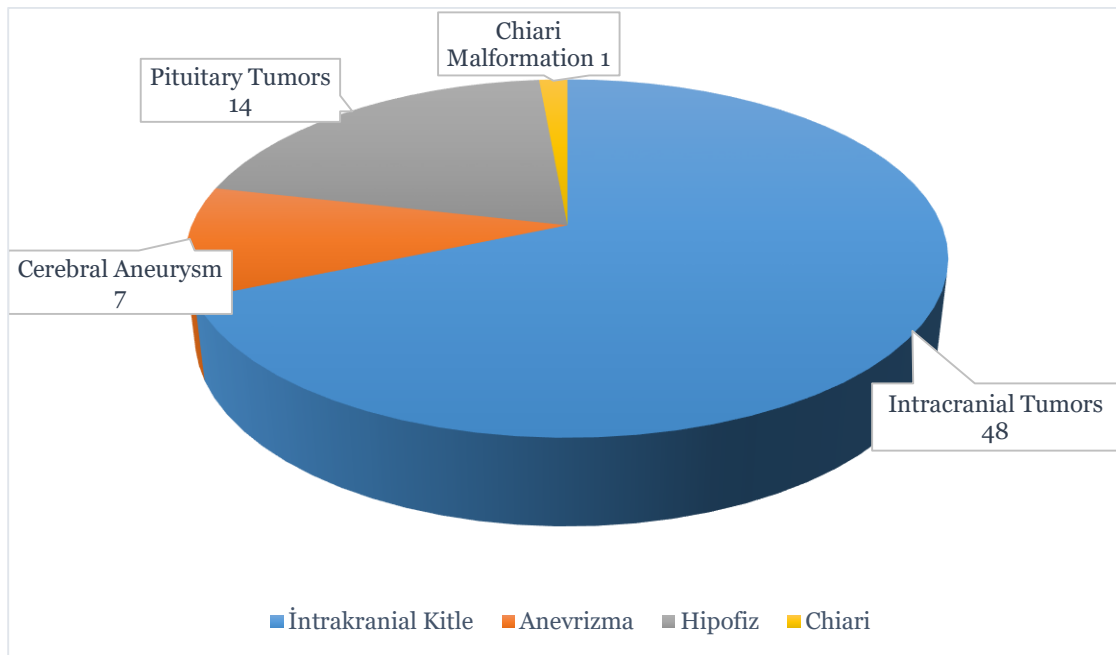
Variables		Group D n:17	Group E n:53	<i>p</i>
Age		52,24 ± 16,75	49,11 ± 17,18	
Sex	Male	13 (%76,5)	22 (%41,5)	0,012*
	Female	4 (%23,5)	31 (%58,5)	
ASA	I	0 (%0)	1 (%1,9)	0,198
	II	1 (%5,9)	14 (%26,4)	
	III	14 (%82,4)	36 (%67,9)	
	IV	2 (%11,8)	2 (%3,8)	
Number of attempts	1	0 (%0)	53 (100%)	
	2	9 (%52,9)	0 (%0)	
	3	6 (%35,2)	0 (%0)	
	4	1 (%5,8)	0 (%0)	
Duration of Intubation (sec)		78,18 ± 40,18	29,96 ± 19,31	
Use of Video-Laryngoscope	Yes	8 (%47,05)	0 (%0)	
	No	9 (%52,95)	53 (%100)	

* $p < 0,05$

The distribution of patients according to surgery types is presented in Table 3 and Figure 3.

Table 3. Distribution of types of by groups

Operation Type	GROUP D (n:17)		GROUPE E (n:53)	
	n	%	n	%
Intracranial Tumors	14	82,3	34	64,2
Cerebral Aneurysm	1	5,9	6	11,3
Pituitary Tumors	2	11,8	12	22,6
Chiari Malformation	0	0	1	1,9

Figure 3. Distribution of surgery types

* $p < 0.05$

SMD and TMD showed significant differences between groups. SMD and TMD were found to be independent risk factors for difficult intubation (Table 4).

Patients with modified Mallampati scores of 3 and 4 were found to be significantly higher in Group D ($p = 0.001$) (Table 4).

Table 0. Traditional Methods

Method		Group D (n:17)	Group E (n:53)	
SMD (mm) (%25-%75)		125 (120–135)	165(150-170)	
TMD (mm) (%25-%75)		55(50-55)	60(60-65)	
Modified Mallampati Score	I	0 (%0)	10 (%18,9)	
	II	3 (%17,6)	30 (%56,6)	
	III	9 (%52,9)	11 (%20,8)	
	IV	5 (%29,4)	2 (%3,8)	
Cormack-Lehane score	I	0 (%0)	22 (%41,5)	
	II	2 (%11,8)	23 (%43,4)	
	III	7 (%41,2)	8 (%15,1)	
	IV	8 (%47,1)	0 (%0)	
Neck Movements	Limited	6 (35,3)	4 (7,5)	p=0,008*
	Relaxed	11 (64,7)	49 (92,5)	
Big Tongue	Yes	6 (35,3)	4 (7,5)	p=0,008*
	No	11 (64,7)	49 (92,5)	
Small Jaw	Yes	2 (11,8)	4 (7,5)	p=0,601
	No	15 (88,2)	49 (92,5)	
Dysmorphism	Yes	5 (29,4)	4 (7,5)	p=0,029*
	No	12 (70,6)	49 (92,5)	

*Chi-square test, *p<0.05*

Patients with Cormack-Lehane scores 3 and 4 constitute 15 of 17 (88.3%) in Group D, while patients with Cormack-Lehane scores 1 and 2 constitute 45 of 63 patients (84.9%) in Group E. Therefore, a significant difference was found between the groups (Table 4).

The patients' limited neck movements, large tongues, and mouth-tooth dysmorphism showed significant differences between the groups; no statistical difference was found between the groups of patients with small jaws (Table 4).

While the sensitivity of the modified Mallampati test was calculated as 82.3% and the specificity was calculated as 75.4%, the sensitivity of the Cormack-Lehane test was calculated as 88.2% and the specificity was calculated as 84.9% (Table 5).

Table 5. MMS and CLS were divided into groups to predict easy and difficult intubation according to study groups.

Scoring	Group D		Group E		
	n	%	n	%	
Modified Mallampati	3+4	14	82.4%	13	24.5%
	1+2	3	17.6%	40	75.5%
Cormack-Lehane	3+4	15	88.2%	8	15.1%
	1+2	2	11.8%	45	84.9%

The threshold value of SMD in predicting difficult intubation was calculated as 135 mm. For the threshold value of 135 mm, the sensitivity of SMD in predicting difficult intubation was calculated as 76.4% and its specificity as 86.7%.

The threshold value of TMD was calculated as 55mm. The sensitivity of TMD in predicting difficult intubation at 55 mm was calculated as 76.47% and the specificity as 90.57%.

The relationship between radiological measurements and difficult intubation according to groups was not found to be statistically significant. The relationships between radiological measurements and difficult intubation are presented in Table 6.

Table 6. Distribution of difficult intubation

Radiological measurements	Group D (n=17)	Group E (n=53)	p
	Median (%25-%75)	Median (%25-%75)	
Skin-vallecular distance	32,6 [31,1 -34,8]	31,8 [29,7 -35,4]	0,891
Skin-epiglottic distance	51,7 [48,8 -52,6]	48,9 [45,4 -53,5]	0,377
Skin-glottic distance	16,4 [14,7 -17,5]	14,5 [12,6 -17,8]	0,115
Tongue length	64,5 [63,1 -68,5]	68,2 [63,2 -73,6]	0,091
Tongue height	38,8 [36,6 -39,7]	39,7 [35,6 -43,7]	0,253
Epiglottic-pharyngeal distance	7,4 [7,2 -7,7]	7,2 [6,2 -9,1]	0,940
	Average ± SD	Average ± SD	p
Length of Epiglottis	18,02 ± 2,54	17,73 ± 2,83	0,706
Epiglottic angle	28,91 ± 4,85	28,6 ± 7,19	0,867

*The student t test for normally distributed variables, Mann Whitney u test for non-normally distributed variables, *p<0,05*

Although length of the tongue, had the lowest p-value compared to other parameters, it was not found to be statistically significant (p = 0.091).

The threshold value of length of the tongue was calculated as 71.2 mm. For 71.2 mm, its sensitivity was measured as 37.7% and its specificity as 100%.

DISCUSSION

In our study, we found the difficult intubation rate to be 24.3%. We also conclude that traditional methods were more significant than radiological markers in predicting difficult intubation.

Difficult airway causes significant morbidity and mortality, resulting in potentially preventable adverse outcomes ranging from airway trauma to brain damage or death. According to ASA's Closed Cases Analysis, there was a significant increase in difficult intubation cases between 2000 and 2012. The difficult intubation rate, which was 11% in previous years, increased to 23% in the analysis

period. According to this analysis, when the study period is compared with the 1993-1999 period, it is thought that there may be an increase in intubation difficulties since the operated patient profile has increased to the ASA III-V risk group and therefore they have more comorbid conditions (3). The most remarkable point in this study is that three-quarters of the malpractice lawsuits filed due to difficult airway are because of the "lack of evaluation" and consequently the lack of preparation for difficult airway scenarios before management of the airway.

In this context, there is an obvious need to develop more precise and practical methods that can be used to predict intubation difficulty. Despite all the developments in medicine and technology, the methods we use to predict intubation difficulty are still subjective, based on individual evaluations, and have low sensitivity and specificity.

With the development of radiological imaging methods, clearer images can be provided in airway evaluation. The use of these advanced imaging methods in routine airway evaluation has naturally been limited due to excessive costs and unnecessary radiation exposure. The fact that we selected patients in our study group who had already undergone radiological imaging for neurosurgical operation clarifies this controversial situation. In addition, in neurosurgery cases, repeated laryngoscopy attempts due to difficult intubation should be strictly avoided, as this will cause severe sympathetic stimulation and increase intracranial pressure. Therefore, we believe that a study on difficult intubation in this patient population would be also valuable.

In our study, we found the difficult intubation rate to be 24.3%. Dawood et al. (4) in their study on 150 patients, difficult intubation was encountered in 18 patients (12% of the study group). Patel et al. (5) calculated the incidence of difficult intubation as 8.1% in their study on 135 ASA I and ASA II patients. In a series of 300 obese patients, difficult intubation was encountered in 42 (15.7%) patients (6).

When the relationship between difficult intubation and gender was evaluated, Rudin et al. (95) showed that difficult intubation is more common in men and that this risk increases with age. Moon et al. (7) calculated the incidence of difficult intubation as 4.2% in their single-center analysis of 45,447 patients. In their retrospective study of 4303 patients, Uribe et al. (8) suggested that obesity was associated with difficult intubation only in the male population. According to the results of another study, it was revealed that difficult intubation was 1.5 times more common in men than in the female population (9). In our study, 4 of 35 women and 13 of 35 men were in the difficult intubation group, and according to our results, male gender was found to be associated with difficult intubation. ($p=0.012$)

Among the 70 patients participating in our study, patients with MMS 3 and 4 constituted 14 of 17 patients (82.3%) in the difficult intubation group ($p = 0.001$). In a similar study, MMS 3 and 4 were associated with difficult intubation and difficult mask ventilation (8). In a recent prospective study, the success of MMS in predicting difficult intubation was evaluated and (10) it was found to have high sensitivity (87.5%) and specificity (94.5%) in predicting difficult intubation. The results of our study were consistent with the literature in terms of the evaluation of MMS.

In our study, 15 of 17 patients (88.3%) in the difficult intubation group were CLS 3 and 4. Patients with CLS 1 and 2 constituted 45 of 53 (84.9%) in the easy intubation group. When evaluated with this grouping, we found a significant correlation between CLS and difficult intubation ($p = 0.001$). In parallel with our study, Dawood et al. (4), in a study with 150 patients, high CLS (Grade 3 n:17, Grade 4 n:1) was observed in all 18 difficult intubation cases, and it was highlighted that CLS 3 and 4 were closely related to difficult intubation.

Unfortunately, studies on the ability of TMM measurement alone or in combination with other tests to predict difficult intubation are contradictory. In our study, TMM was significantly lower in the difficult intubation group ($p=0.001$). While the median TMM was 55 mm in the difficult intubation

group, the median was 60 mm in the easy intubation group. Many studies point out that TMM measurement has low sensitivity and specificity in clinical use. When we look at the current literature, the threshold value of TMM in determining difficult intubation varies between 6-8.2 cm (6, 11, 12, 13). When all these studies are analyzed, as the study's sample size increases, the threshold TMM decreases, sensitivity reaches 100%, and specificity reaches 98%. Baker et al. (14) emphasized that the threshold value varies between 6 cm and 8 cm. Khan et al. (15) noted that TMM measurement is not a reliable test and stated that both low and high values may lead to difficult intubation.

SMM was significantly lower in the difficult intubation group ($p=0.001$) in our study. While the median SMM was 125 mm in our difficult intubation group, the median was 165 mm in our easy intubation group. In many different studies, such as ours, SMM being less than 120 mm was associated with difficult intubation (12). Moreover, Savva et al. (16) suggested using only SMM to indicate difficult intubation. When the SMM was less than 12.5 cm, the sensitivity was 82.4%, and the specificity was 88.6%. In a field where even, combined tests are not sufficiently precise, the assertive conclusions of this study can be considered genuinely ambitious. While the SMM value varies between 12.5 and 14.9 in numerous studies, the sensitivity and specificity are not calculated to be remarkably high (12, 16, 17, 18).

Our study found a significant correlation between neck movement limitation and difficult intubation ($p=0.008$). In line with our findings, Sheff et al. (19), in their study on 912 patients, associated limited neck movements with difficult intubation (OR 3.26, $p = 0.018$).

Regarding the evaluation of radiological markers, skin-vallecular distance, skin-epiglottic distance, skin-glottic distance, tongue length, tongue height, epiglottis-pharyngeal distance, epiglottis length, epiglottis angle was measured radiologically, and statistically analyzed, however, they could not be associated with difficult intubation according to our results. There are conflicting results about the objective radiologic markers hypothesis in the literature. Hyongmin et al. (20) evaluated these parameters in 74 patients and underlined that no radiological measurement successfully predicted difficult intubation. In a study conducted by Mohammadi et al. (21) among 53 ASA I-II-III patients, epiglottic space ($P = 0.076$) and epiglottis-vocal cord distance ($P = 0.847$) were measured radiologically. It was concluded that the correlation of these tests with difficult intubation needed to be stronger.

In contrast, Kim et al. (22) conducted a study on 281 patients, skin-epiglottic distance ($p=0.003$) and skin-vallecular distance ($p=0.001$) were associated with difficult intubation. However, it has been stated that the skin in front of the thyrohyoid membrane has high elasticity and can easily move anteriorly during intubation. Therefore, the authors pointed out that the accuracy of skin measurements may be limited when predicting difficult intubation. Although there are many different results in the literature, the distinct parameter most associated with difficult intubation among radiological measurements is the skin-epiglottis distance (23, 24)

Limitations

The advantage of our study is that it has a prospective, double-blind design, and we could use expensive radiological imaging methods, which are rarely used in preoperative airway evaluation, without placing unnecessary burdens on the patients. However, the limitation of our study is that the sample size in the difficult intubation group remained small, as only 17 of the patients we included in the study in the stated study period were in the difficult intubation group. According to the power analysis, we predict that we can infer a significant result from the radiological indices when the difficult intubation sample size is evaluated by increasing it to 35. Based on the results of

our current study, we are planning another study with a larger sample size in the same patient population.

Conclusion

According to our results, traditional methods were more significant than radiological markers in predicting difficult intubation, so *'Tradition prevails over the future.'* Due to this study, the superiority of radiological methods over traditional methods could not be proven on the route to establishing reliable predictors of difficult intubation. Further prospective studies with a large sample size are needed to conclude that radiological markers do not contribute to traditional methods.

REFERENCES

1. Metzner J, Posner KL, Lam MS, Domino KB. Closed claims' analysis. *Best Practice & Research Clinical Anaesthesiology*. 2011;25(2):263-76.
2. Cheney FW, Posner KL, Lee LA, Caplan RA, Domino KB. Trends in anesthesia-related death and brain damage: A closed claims analysis. *Anesthesiology*. 2006;105(6):1081-6.
3. Joffe AM, Aziz MF, Posner KL, Duggan LV, Mincer SL, Domino KB. Management of Difficult Tracheal Intubation: A Closed Claims Analysis. *Anesthesiology*. 2019;131(4):818-29.
4. Dawood A, Talib B, Sabri I. Prediction Of Difficult Intubation By Using Upper Lip Bite, Thyromental Distance And Mallampati Score In Comparison To Cormack And Lehane Classification System. *Wiadomości Lekarskie*. 2021;74:2305-14.
5. Patel B, Khandekar R, Diwan R, Shah A. Validation of modified Mallampati test with addition of thyromental distance and sternomental distance to predict difficult endotracheal intubation in adults. *Indian Journal of Anaesthesia*. 2014;58(2).
6. Siddiqui KM, Hameed F, Ali MA. Diagnostic Accuracy of Combined Mallampati and Wilson Score to Predict Difficult Intubation in Obese Patients: A Descriptive Cross-sectional Study. *Anesth Pain Med*. 2021;11(6):e118626.
7. Moon TS, Fox PE, Somasundaram A, Minhajuddin A, Gonzales MX, Pak TJ, et al. The influence of morbid obesity on difficult intubation and difficult mask ventilation. *Journal of Anesthesia*. 2019;33(1):96-102.
8. Uribe AA, Zvara DA, Puente EG, Otey AJ, Zhang J, Bergese SD. BMI as a Predictor for Potential Difficult Tracheal Intubation in Males. *Frontiers in Medicine*. 2015;2.
9. Badheka JP, Doshi PM, Vyas AM, Kacha NJ, Parmar VS. Comparison of upper lip bite test and ratio of height to thyromental distance with other airway assessment tests for predicting difficult endotracheal intubation. *Indian J Crit Care Med*. 2016;20(1):3-8.
10. Mahmoodpoor A, Soleimanpour H, Golzari SEJ, Nejabatian A, Pournalak T, Amani M, et al. Determination of the diagnostic value of the Modified Mallampati Score, Upper Lip Bite Test and Facial Angle in predicting difficult intubation: A prospective descriptive study. *Journal of Clinical Anesthesia*. 2017;37:99-102.
11. Selvi O, Kahraman T, Senturk O, Tulgar S, Serifsoy E, Ozer Z. Evaluation of the reliability of preoperative descriptive airway assessment tests in prediction of the Cormack-Lehane score: A prospective randomized clinical study. *Journal of Clinical Anesthesia*. 2017;36:21-6.

12. Acer N, Akkaya A, Tugay BU, Ozturk A. A Comparison Of Cormeek-lehane And Mallampati Tests With Mandibular And Neck Measurements For Predicting Difficult Intubation. *Balkan Medical Journal*. 2010;28.
13. V KN, S SK. Risk Factors Assessment of the Difficult Intubation using Intubation Difficulty Scale (IDS). *J Clin Diagn Res*. 2014;8(7):Gc01-3.
14. Baker PA, Depuydt A, Thompson JMD. Thyromental distance measurement – fingers don't rule. *Anaesthesia*. 2009;64(8):878-82.
15. Khan ZH, Mohammadi M, Rasouli MR, Farrokhnia F, Khan RH. The diagnostic value of the upper lip bite test combined with sternomental distance, thyromental distance, and interincisor distance for prediction of easy laryngoscopy and intubation: a prospective study. *Anesth Analg*. 2009;109(3):822-4.
16. Savva D. Predicting difficult intubation. *Br J Anaesth*. 1994;72(4):494.
17. Kim WH, Ahn HJ, Lee CJ, Shin BS, Ko JS, Choi SJ, et al. Neck circumference to thyromental distance ratio: a new predictor of difficult intubation in obese patients. *BJA: British Journal of Anaesthesia*. 2011;106(5):743-8.
18. Al Ramadhani S, Mohamed LA, Rocke DA, Gouws E. Sternomental distance as the sole predictor of difficult laryngoscopy in obstetric anaesthesia. *Br J Anaesth*. 1996;77(3):312-6.
19. Sheff SR, May MC, Carlisle SE, Kallies KJ, Mathiason MA, Kothari SN. Predictors of a difficult intubation in the bariatric patient: does preoperative body mass index matter? *Surgery for Obesity and Related Diseases*. 2013;9(3):344-9.
20. Oh H, Kim H, Yoon H-K, Lee H-C, Park H-P. No radiographic index predicts difficult intubation using the Optiscope™ in cervical spine surgery patients: a retrospective study. *BMC Anesthesiology*. 2020;20(1):47.
21. Soltani Mohammadi S, Saliminia A, Nejatifard N, Azma R. Usefulness of Ultrasound View of Larynx in Pre-Anesthetic Airway Assessment: A Comparison With Cormack-Lehane Classification During Direct Laryngoscopy. *Anesth Pain Med*. 2016;6(6):e39566.
22. Kim HJ, Min NH, Lee JS, Lee W, Kim D-H. Anterior neck soft tissue measurements on computed tomography to predict difficult laryngoscopy: a retrospective study. *Scientific Reports*. 2021;11(1):1-8.
23. Carsetti A, Sorbello M, Adrario E, Donati A, Falcetta S. Airway Ultrasound as Predictor of Difficult Direct Laryngoscopy: A Systematic Review and Meta-analysis. *Anesth Analg*. 2022;134(4):740-50.
24. Abdelhady BS, Elrabiey MA, Abd Elrahman AH, Mohamed EE. Ultrasonography versus conventional methods (Mallampati score and thyromental distance) for prediction of difficult airway in adult patients. *Egyptian Journal of Anaesthesia*. 2020;36(1):83-9.

**ATTITUDES OF FIRST- AND SECOND-YEAR MEDICAL STUDENTS TOWARDS
CADAVER-BASED AND MODEL-BASED EDUCATION IN ANATOMY****Gulnihal DENIZ**

Erzurum Technical University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Erzurum/TURKEY

ORCID ID: <https://orcid.org/0000-0002-5944-8841>**Rukiye CIFTCI**

Gaziantep İslami Bilim ve Teknoloji University, Faculty of Medicine, Department of Anatomy, Gaziantep, Turkey

ORCID ID: <https://orcid.org/0000-0002-5894-5256>**Abstract**

This study aimed to evaluate the attitudes of first- and second-year medical students towards cadaver-based and model-based education in their anatomy curriculum. By assessing their preferences and perceptions of outcomes, the study aims to provide insights into the effectiveness and acceptability of these teaching methods in medical education. For the study, the 'Attitude Scale Towards Cadaver and Model Education in Anatomy Courses,' which consisted of 15 questions, was administered online to 130 students. The scale included 5-point Likert-type questions with the options: 'Strongly Disagree', 'Disagree', 'Undecided', 'Agree', and 'Strongly Agree'. These options were scored as follows: 'Strongly Disagree' = 1, 'Disagree' = 2, 'Undecided' = 3, 'Agree' = 4, and 'Strongly Agree' = 5." The study surveyed 130 medical students, including 93 females (71.5%) and 37 males (28.5%), with 75 first-year students (58%) and 55 second-year students (42%). The average scores for the 'desire for anatomy course' sub-dimension were 3.5 ± 0.91 for males and 3.5 ± 0.85 for females. The 'effectiveness of cadaver training' sub-dimension scored 3.5 ± 0.89 for males and 3.7 ± 0.88 for females. In contrast, the 'effectiveness of model training' sub-dimension scored 4.2 ± 0.63 for males and 4.4 ± 0.55 for females, indicating a greater acceptance of model training ($p > 0.05$). In conclusion, despite learning through models being highly preferred in anatomy, cadaver-based learning remains vital. This study emphasizes its importance, with students advocating for its continuation and extended training times, highlighting the need for a balanced approach that integrates traditional and innovative methods to prepare proficient healthcare professionals.

Keywords: cadaver, anatomy education, anatomy models, anatomy, medicine.**INTRODUCTION**

Anatomy education constitutes a crucial component of the extensive and demanding medical curriculum. Traditionally, anatomy is taught during the first and second years of medical school. An in-depth understanding of anatomy is essential for safe clinical practice, particularly in surgery. Teaching human anatomy, like any course, requires continuous revision and analysis to determine the most effective teaching tools and approaches for learning. Cadaver-based teaching has long been a cornerstone of anatomy education and is widely recognized by students, educators, and clinicians

as the most effective method for learning anatomy (Ajemba et al., 2024). However, due to the increasing number of students and the decreasing number of anatomists and demonstrators in traditional cadaver-based anatomy teaching, there has been a gradual decline in cadaver-based instruction in recent years (Sheikh et al., 2016). Due to the demanding nature of the anatomy curriculum in medical schools and the limited time allocated for anatomy education, various alternative teaching methods have been developed to supplement cadaver-based instruction. These alternatives include models, medical imaging, live anatomy, and multimedia resources. Despite these advancements, no single teaching tool has completely satisfied the curriculum requirements. The most effective approach to modern anatomy education involves integrating multiple pedagogical methods. Research indicates that students achieve better learning outcomes when multimodal and systems-based teaching strategies are employed together (Adnan & Xiao, 2023; Estai & Bunt, 2016).

Given the importance of practical courses in anatomy education, understanding and evaluating medical students' opinions on various teaching methods, presentation styles, and materials is crucial for enhancing the quality of anatomy instruction. Therefore, this study aimed to assess the attitudes of first- and second-year medical students at Gaziantep Islamic Science and Technology University, Faculty of Medicine, towards cadaver-based and model-based training in anatomy education.

MATERIAL AND METHODS

This study aimed to assess the attitudes of first- and second-year students in the Faculty of Medicine at Gaziantep Islamic Science and Technology University towards cadaver and model training in anatomy education. Before conducting the study, an a priori power analysis was performed using the G*Power 3.1.9.4 software to determine the appropriate sample size. The analysis revealed an effect size of 0.64, a significance level of 0.05, and a power of 0.95, with a population size of 130 individuals. These parameters indicated that the sample size was sufficient to achieve the desired level of statistical power for the study (Demir et al., 2023). Data were collected using an internet-based method (Google Forms). To achieve this objective, the 'Attitude Scale Towards Cadaver and Model Education in Anatomy Courses,' comprising 15 questions, was administered online to 130 students. The scale utilized a 5-point Likert-type format, with response options ranging from 'Strongly Disagree' to 'Strongly Agree'. These responses were assigned numerical values: 'Strongly Disagree'=1, 'Disagree'=2, 'Undecided'=3, 'Agree'=4, and 'Strongly Agree'=5. The total score range for the scale spans from a minimum of 15 to a maximum of 75 points. In addition to evaluating attitudes toward cadavers and model training in anatomy education, the scale also included inquiries regarding methods of studying the anatomy course. Furthermore, the scale comprised three sub-dimensions: 'desire for anatomy course,' 'effectiveness of cadaver training,' and 'effectiveness of model training.' Details regarding the items included in the scale and their respective expressions are provided in Table 1.

Table 1. Items related to the scale and the expressions it contains

item 1	I voluntarily chose to attend medical school.
item 2	I am interested in anatomy courses.
item 3	Which resource do you primarily use when studying the theoretical aspect of anatomy? 1- Lecture notes 2- Printed atlas (book) 3- Interactive/PDF atlas 4- Textbook 5- Video lecture recordings
item 4	Which resource do you primarily use when studying the practical aspect of anatomy? 1- Lecture notes 2- Printed atlas (book) 3- Interactive/PDF atlas 4- Textbook 5- Video lecture recordings
item 5	I enjoy studying for theoretical anatomy courses.
item 6	I enjoy studying for practical anatomy courses.
item 7	Working with cadavers is effective for learning anatomy.
item 8	The duration allocated for cadaver training should be increased.
item 9	Cadaver dissection holds a significant role in anatomy education.
item 10	Performing dissections on cadavers during practical classes greatly enhances my understanding of anatomy.
item 11	Working with models is effective for learning anatomy.
item 12	The number of models used in practical courses should be increased.
item 13	The time allocated for training with models should be extended.
item 14	Having the teacher explain the model first facilitates my understanding.
item 15	Cadaver training is more effective for learning anatomy than model training.

The Cronbach's Alpha coefficient for the scale was calculated to be 0.83, indicating good internal consistency reliability (Ralte et al., 2023). Moreover, the reliability coefficients for the three sub-dimensions of the scale were found to be 0.72, 0.86, and 0.71, respectively. These coefficients suggest satisfactory reliability for assessing the 'desire for an anatomy course,' 'effectiveness of cadaver training,' and 'effectiveness of model training' dimensions.

All statistical analyses were conducted using the Statistical Package for the Social Sciences (SPSS) version 22.0 (IBM Corporation, Armonk, New York, USA). Normality of the data distribution was assessed using Skewness and Kurtosis values (ranging between -2 and +2). Continuous variables are presented as mean \pm standard deviation, while categorical variables are presented as numbers and percentages. Since our data followed a normal distribution, the Student's t-test was used to compare differences between independent groups. Correlation analysis was performed to evaluate the relationships between parameters.

RESULTS

Among the medical students participating in our study, 93 were female (71.5%), and 37 were male (28.5%). Of the participants, 75 (58%) were first-year medical students, and 55 (42%) were second-year medical students. Table 2 presents the numbers and percentages of the student's responses to the statements in the scale items.

Table 2. Numbers and percentages of scale items

Substances	Options	Numbers	%
I voluntarily chose to attend medical school.	Strongly Disagree	10	7.7
	Disagree	5	3.8
	Undecided	17	13.1
	Agree	54	41.5
	Strongly Agree	44	33.8
I am interested in anatomy courses.	Strongly Disagree	11	8.5
	Disagree	9	6.9
	Undecided	40	30.8
	Agree	46	35.4
	Strongly Agree	24	18.5
Which resource do you primarily use when studying the theoretical aspect of anatomy?	Lecture notes	80	61.5
	Printed atlas (book)	4	3.1
	Interactive/PDF atlas	4	3.1
	Textbook	11	8.5
	Video lecture recordings	31	23.8
Which resource do you primarily use when studying the practical aspect of anatomy?	Lecture notes	41	31.5
	Printed atlas (book)	11	8.5
	Interactive/PDF atlas	5	3.8
	Textbook	4	3.1
	Video lecture recordings	69	53.1
I enjoy studying for theoretical anatomy courses.	Strongly Disagree	20	15.4
	Disagree	17	13.1
	Undecided	32	24.6
	Agree	48	36.9
	Strongly Agree	13	10.0
I enjoy studying for practical anatomy courses.	Strongly Disagree	12	9.2
	Disagree	13	10.0
	Undecided	27	20.8
	Agree	53	40.8
	Strongly Agree	25	19.2
Working with cadavers is effective for learning anatomy.	Strongly Disagree	9	6.9
	Disagree	8	6.2
	Undecided	37	28.5
	Agree	42	32.3
	Strongly Agree	34	26.2
The duration allocated for cadaver training should be increased.	Strongly Disagree	12	9.2
	Disagree	7	5.4
	Undecided	26	20.0
	Agree	41	31.5
	Strongly Agree	44	33.8
Cadaver dissection holds a significant role in anatomy education.	Strongly Disagree	2	1.5
	Disagree	6	4.6
	Undecided	20	15.4
	Agree	54	41.5
	Strongly Agree	48	36.9
Performing dissections on cadavers during practical classes greatly enhances my understanding of anatomy.	Strongly Disagree	3	2.3
	Disagree	6	4.6
	Undecided	26	20.0
	Agree	53	40.8
	Strongly Agree	42	32.3
Working with models is effective for learning anatomy	Strongly Disagree	1	0.8
	Disagree	2	1.5
	Undecided	9	6.9
	Agree	67	51.5
	Strongly Agree	51	39.2

The number of models used in practical courses should be increased.	Strongly Disagree	0	0
	Disagree	2	1.5
	Undecided	5	3.8
	Agree	47	36.2
	Strongly Agree	76	58.5
The time allocated for training with models should be extended.	Strongly Disagree	4	3.1
	Disagree	2	1.5
	Undecided	11	8.5
	Agree	57	43.8
	Strongly Agree	56	43.1
Having the teacher explain the model first facilitates my understanding.	Strongly Disagree	4	3.1
	Disagree	2	1.5
	Undecided	2	1.5
	Agree	35	26.9
	Strongly Agree	87	66.9
Cadaver training is more effective for learning anatomy than model training.	Strongly Disagree	20	15.4
	Disagree	14	10.8
	Undecided	48	36.9
	Agree	29	22.3
	Strongly Agree	19	14.6

The average score of the students on the 'desire for anatomy course' sub-dimension was 3.5 ± 0.91 for males and 3.5 ± 0.85 for females. The mean score for the 'effectiveness of cadaver training' sub-dimension was 3.5 ± 0.89 for men and 3.7 ± 0.88 for women. The mean score for the 'effectiveness of model training' sub-dimension was 4.2 ± 0.63 for men and 4.4 ± 0.55 for women. The results indicate that model training is more accepted among medical students. Additionally, the analysis found no statistically significant difference between male and female students ($p > 0.05$). The correlation analysis revealed highly significant correlations between the 'desire for anatomy course' sub-dimension and the 'effectiveness of cadaver training' ($r = 0.352$, $p < 0.01$) and 'effectiveness of model training' ($r = 0.414$, $p < 0.01$) sub-dimensions.

DISCUSSION

Anatomy education, a crucial component of medical education in the basic sciences, remains debated in modern educational models (Buru, 2023). The diversity of visual learning in this field and the frequent use of laboratory environments are paramount. One of the most critical aspects of anatomical education is that it allows medical students to learn from cadavers (Demir et al., 2023). Recently, however, there has been a decline in the use of cadaver dissection as anatomy educators increasingly adopt digital methods. Despite this trend, cadaver dissection remains the most effective approach for medical students to understand the multidimensional structure of anatomy. The shift to online education during the pandemic has further entrenched digital tools, turning them into a habitual part of the educational process (Walenna et al., 2024). In recent years, alternative and less costly teaching technologies have gradually replaced traditional anatomy education, utilizing various study modules based on curriculum integration (Papa et al., 2022). Technical advances now allow anatomy education to be delivered without cadavers, leading most medical schools worldwide to reduce or discontinue the use of cadaver dissection (Goh & Sandars, 2020; Papa et al., 2022).

Although anatomy education is increasingly supported by new educational models, cadaver education and dissection continue to hold a primary place in anatomy education (Shoap et al., 2021). The integration of advanced technologies such as virtual dissections, 3D models, and interactive software has significantly enriched the educational landscape, providing students with diverse learning tools that are both cost-effective and accessible. These innovations allow for repeated

practice and detailed study of anatomical structures without the limitations associated with cadaver procurement and preservation. Also, the irreplaceable value of cadaver dissection in anatomy education cannot be overstated. Cadaver-based learning offers a tactile and immersive experience that digital tools cannot fully replicate. Moreover, cadaver dissection exposes students to real-life anatomical variations and pathologies, providing critical insights into the human body's natural diversity and disease manifestations (Kochhar et al., 2022). In this study, 42% of medical students agreed with the statement, "Working with cadavers is effective for learning anatomy." In addition, 44% of the students "strongly agree" with the statement regarding the importance of time in cadaver education: "The duration allocated for cadaver training should be increased," highlighting the perceived effectiveness of cadaver training. Participants also highlighted the importance of dissection training: "Cadaver dissection holds a significant role in anatomy education." 54% 'agree' and 48% 'strongly agree' with the statement regarding its effectiveness in anatomy education. Medical students deemed Cadaver training important, with 53% 'agree' and 42% 'strongly agree' with the statement, "Performing dissections on cadavers during practical classes greatly enhances my understanding of anatomy."

Studies in the literature indicate that anatomy practice courses primarily utilize models and cadavers for teaching (Uygur et al., 2013). Emphasizing the importance of the number and diversity of models used and increasing the time spent working with them is crucial for the effectiveness of these practice courses. It has been suggested that anatomy education is more effective when instructors explain the subjects using models and cadavers during practical sessions, followed by students studying independently (Çetkin et al., 2016). In this study, the statement "Working with models is effective for learning anatomy" was supported by medical students, with 67% 'agree' and 51% 'strongly agree,' indicating that model training is practical. The statement "The number of models used in practical courses should be increased," highlighting the importance of one-on-one learning of anatomical structures, was supported by medical students, with 47% agreeing and 76% strongly agreeing. This underscores the importance of having a sufficient number of models in anatomy education, as reiterated in this study. Due to the challenging nature of anatomy education, medical students require long working hours. They supported the statement, "The time allocated for training with models should be extended," with 57% 'agree' and 56% 'strongly agree,' emphasizing the need to increase the time allocated to anatomy education. In anatomy education, having the instructor explain the subject to the students before individual study in the practice course increases the understandability of the material (Uygur et al., 2013). In this study, medical students emphasized the importance of preliminary explanation in anatomy education, with 87% strongly agreeing with the statement, "Having the teacher explain the model first facilitates my understanding." Numerous studies in the literature highlight the importance of cadavers in anatomy education and indicate that medical students often prefer this method of learning (Ross et al., 2021; Sheikh et al., 2016). However, some studies show that cadaver training has taken a backseat due to advancing technology (Darras et al., 2019; Whited et al., 2021). In this study, a significant percentage (48%) of medical students were undecided on the statement, "Cadaver training is more effective for learning anatomy than model training," with 29% 'agree,' the highest rate after 'Undecided.' This study also emphasizes that cadaver education remains prominent despite technological advancements.

CONCLUSION

In conclusion, while modern educational models and technological advancements have introduced effective and accessible alternatives for anatomy education, the irreplaceable value of cadaver-based learning remains evident. This study underscores the enduring significance of cadaver dissection in providing medical students with a comprehensive and tactile understanding of anatomical structures. Despite the increasing incorporation of models, a substantial proportion of medical

students recognize the effectiveness of cadaver training and advocate for its continuation. The preference for cadaver-based education, combined with the support for extended training times and an increased number of anatomical models, highlights the necessity of a balanced approach that integrates traditional methods with innovative technologies. Ensuring medical students receive a robust anatomical education that leverages cadaver dissections and advanced digital tools will be crucial in preparing well-rounded and proficient healthcare professionals.

REFERENCES

- Adnan, S., & Xiao, J. (2023). A scoping review on the trends of digital anatomy education. *Clinical anatomy*, 36(3), 471-491.
- Ajemba, M. N., Iroanya, C. J., & Ironegbu, C. (2024). Comparative effectiveness of cadaveric dissection versus anatomical models in teaching anatomy: A global analysis focused on medical schools in low and middle-income Countries versus High-Income Countries: A systematic review.
- Buru, E. (2023). Tıp Fakültesi Öğrencilerinin Anatomi Dersi, Anatomi Dersinin İşleyişi ve Materyalleri ile ilgili Görüşleri. *Tıp Fakültesi Klinikleri Dergisi*, 6(1), 61-79.
- Çetkin, M., Turhan, B., Bahşi, İ., & Kervancıoğlu, P. (2016). Tıp fakültesi öğrencilerinin anatomi eğitimi hakkındaki düşünceleri. *Gaziantep Medical Journal*, 22(2), 82-88.
- Darras, K. E., Spouge, R., Hatala, R., Nicolaou, S., Hu, J., Worthington, A., Krebs, C., & Forster, B. B. (2019). Integrated virtual and cadaveric dissection laboratories enhance first year medical students' anatomy experience: a pilot study. *BMC medical education*, 19, 1-6.
- Demir, B. T., Altıntaş, H., & Bilecenoglu, B. (2023). Investigation of medical faculty students' views on cadaver and cadaver teaching in anatomy. *Morphologie*, 107(356), 47-54.
- Estai, M., & Bunt, S. (2016). Best teaching practices in anatomy education: A critical review. *Annals of Anatomy-Anatomischer Anzeiger*, 208, 151-157.
- Goh, P.-S., & Sandars, J. (2020). A vision of the use of technology in medical education after the COVID-19 pandemic. *MedEdPublish*, 9.
- Kochhar, S., Tasnim, T., & Gupta, A. (2022). Is cadaveric dissection essential in medical education? A qualitative survey comparing pre-and post-COVID-19 anatomy courses. *Journal of Osteopathic Medicine*, 123(1), 19-26.
- Papa, V., Varotto, E., Galli, M., Vaccarezza, M., & Galassi, F. M. (2022). One year of anatomy teaching and learning in the outbreak: Has the Covid-19 pandemic marked the end of a century-old practice? A systematic review. *Anatomical Sciences Education*, 15(2), 261-280.
- Ralte, S., Bhattacharyya, A., Momin, A. D., & Sundaram, S. P. (2023). Perceived effectiveness of cadaveric and three-dimensional Virtual dissection in learning anatomy among first-year MBBS students: A cross-sectional study from Northeastern India. *National Journal of Clinical Anatomy*, 12(3), 157-164.
- Ross, C. F., Pescitelli, M. J., Smith, H. F., & Williams, J. M. (2021). Teaching anatomy with dissection in the time of COVID-19 is essential and possible. *Clinical Anatomy (New York, Ny)*, 34(8), 1135.
- Sheikh, A. H., Barry, D. S., Gutierrez, H., Cryan, J. F., & O'Keeffe, G. W. (2016). Cadaveric anatomy in the future of medical education: What is the surgeons view? *Anatomical Sciences Education*, 9(2), 203-208.

Shoap, S., Arboleda, V., Cushion, S., Hardigan, P., Caine, D., & Purvis, C. (2021). Analyzing Utility of Cadaver Dissection as a Teaching Tool for Anatomical Education. *Cureus Journal of Medical Science*.

Uygur, R., Çağlar, V., Topçu, B., Aktaş, S., & Özen, O. (2013). Anatomi eğitimi hakkında öğrenci görüşlerinin değerlendirilmesi. *International Journal of Basic and Clinical Medicine*, 1(2), 94-106.

Walenna, N. F., Syarief, L. I., Nurhadi, A. A., de Jong, P. G., & Masadah, R. (2024). Perceptions of students and teachers regarding the impact of cadaver-less online anatomy education on quality of learning, skills development, professional identity formation, and economics in medical students. *Medical Science Educator*, 34(1), 113-123.

Whited, T. M., DeClerk, L., Berber, A., & Phelan, K. D. (2021). An innovative technique to promote understanding of anatomy for nurse practitioner students. *Journal of the American Association of Nurse Practitioners*, 33(5), 348-352.

AUTOIMMUNE SCLEROSING CHOLANGITIS AND CROHN'S DISEASE IN A PEDIATRIC PATIENT WITH AUTISM SPECTRUM DISORDER**Asistant Prof. Dilek GÜLLER**

T.C. Demiroğlu Science University, Department of Pediatrics, Istanbul, Turkey

ORCID ID: <https://orcid.org/0000-0002-8306-5445>**Abstract**

Introduction and Purpose: Pediatric patients who are beyond infancy and have immune-mediated liver diseases (IMLDs) are often diagnosed with primary sclerosing cholangitis (PSC) or autoimmune hepatitis (AIH). These conditions are commonly observed in individuals with inflammatory bowel disease (IBD). PSC is a cholestatic disorder caused by inflammation and periductal fibrosis in the bile ducts, which can be found in or outside the liver. AIH, on the other hand, is a condition where there is inflammation in the portal tract and can extend to the hepatic lobule. The purpose of this study was to investigate the prevalence and clinical characteristics of coexisting autoimmune sclerosing cholangitis and Crohn's disease in pediatric patients with Autism Spectrum Disorder. Additionally, this study aimed to explore the potential mechanisms that may contribute to this association.

Materials and Methods: A 3-year-old male child was hospitalized in Bahrain's pediatric department after experiencing intense recurring stomach pain and prolonged fever lasting one week. His medical background showed a previous diagnosis of G6PD deficiency and autism spectrum disorder. He also received amoxicillin for fever, cough, runny nose, and sore throat. Test results indicated high levels of Gamma-Glutamyl Transferase (GGT) and Alkaline Phosphatase (ALP), as well as elevated C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR). The patient also exhibited both leukocytosis and thrombocytosis. Abdominal ultrasound confirmed the presence of gallbladder biliary sludge with mesenteric lymphadenitis, and autoimmune antibody tests were positive for anti-smooth muscle antibodies. Consequently, the patient was diagnosed as having toxic hepatitis. Further examination and liver biopsy led to a diagnosis of autoimmune sclerosing cholangitis. Additional testing revealed high fecal calprotectin levels, and colonoscopy revealed areas of edema and ulcers in the ileocecal valve and terminal ileum, as well as edema and bleeding in various parts of the colon and rectum. This was indicative of skip-like involvement, leading to a diagnosis of Crohn disease.

Results: We present a case of concomitant autoimmune sclerosing cholangitis, Crohn's disease, and autism spectrum disorder in a young adult male patient. To the best of our knowledge, this is the first case report in the literature describing an individual with Crohn's disease and concomitant sclerosing cholangitis and autism spectrum disorder. Although autism spectrum disorder has been associated with autoimmune rheumatologic diseases, the connection between autism spectrum disorder and inflammatory bowel disease has been less investigated. High incidence rates of autoimmunity are prominent in patients with autism spectrum disorder, and oral pathology comorbidities in patients with autism spectrum disorder have been observed secondary to atypical oral behaviors. To date, there is no awareness in the literature of any prior case report that examines an immune-dysregulated patient with concurrent inflammatory disorders, including autism spectrum disorder, Crohn's disease, and co-occurring cholangitis pathologies.

Key Words: Autism, Crohn disease, Autoimmune Sclerosing Cholangitis

INTRODUCTION

Autoimmune sclerosing cholangitis (ASC) is a rare chronic cholestatic liver disease that specifically affects the biliary tree and is not commonly associated with inflammatory bowel disease (IBD). This condition is classified as primary sclerosing cholangitis (PSC) and mainly affects the small intrahepatic bile ducts, with a high frequency occurring in IBD, particularly ulcerative colitis. Additionally, there is a correlation between ASC and other autoimmune diseases, such as autoimmune pancreatitis (AIP), chronic thyroiditis, and Sjogren syndrome. The progression of ASC is slow, with the first stage characterized by obstructive jaundice, fever, and intraductal stones.

Autoimmune sclerosing cholangitis (ASC) is an idiopathic, chronic, progressive inflammatory disease that involves the inflammation, destruction, and fibrosis of the biliary tree. This condition is an autoimmune disease that is distinct from PSC and not typically associated with IBD. The symptoms of ASC include jaundice, pruritus, fatigue, pale or white stools, and dark brown urine, which are often diagnosed late in life. Females are more likely to develop this disease than males, and there are no serological diagnostic markers for ASC. Furthermore, obstructive cholestasis may be asymptomatic, making diagnosis challenging. Magnetic resonance imaging (MRI) and endoscopic examination can provide imaging evidence for this condition.

Increasing evidence shows that children with autism spectrum disorder (ASD) are more susceptible to immune dysregulation. Moreover, children with ASD reportedly have higher rates of autoimmune conditions than the general population. Given that previous studies have demonstrated correlations between specific comorbid medical conditions and more severe behavioral symptoms, understanding these relationships could lead to improved health and quality of life for children with ASD. Additionally, gaining a better understanding might offer potential for identifying early life biomarkers or potential therapeutic interventions for ASD. We present a case that highlights the connection between Crohn's disease (CD) and autoimmune sclerosing cholangitis in a patient with ASD.

METHODOLOGY

A three-year-old male child was admitted to the pediatric department of a hospital in Bahrain due to persistent and severe stomach pain and a fever that had lasted for one week. His medical history included a previous diagnosis of G6PD deficiency and autism spectrum disorder, and he had been prescribed amoxicillin for a recent illness characterized by fever, cough, a runny nose, and sore throat. Laboratory tests revealed elevated levels of Gamma-Glutamyl Transferase (GGT) and Alkaline Phosphatase (ALP), as well as increases in C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR). The patient also displayed leukocytosis and thrombocytosis. An abdominal ultrasound revealed gallbladder biliary sludge with mesenteric lymphadenitis, and autoimmune antibody tests were positive for anti-smooth muscle antibodies. Based on these findings, the patient was diagnosed with toxic hepatitis. Further examination and a liver biopsy led to a diagnosis of autoimmune sclerosing cholangitis. Additional tests indicated high levels of fecal calprotectin, and a colonoscopy revealed areas of edema and ulcers in the ileocecal valve and terminal ileum, as well as edema and bleeding in various parts of the colon and rectum. These findings suggested skip-like involvement and led to a diagnosis of Crohn's disease.

DISCUSSION

This study aims to evaluate the literature and assess the connection between the high incidence rates of autoimmunity observed in individuals with autism spectrum disorder and immune-regulated gastrointestinal cholangitis.

We report on a young adult male patient diagnosed with concomitant autoimmune sclerosing cholangitis and Crohn's disease, as well as autism spectrum disorder. To the best of our knowledge, this represents the first case report in the literature of an individual with both Crohn's disease and concomitant sclerosing cholangitis and autism spectrum disorder. Although there is evidence linking autoimmune rheumatologic diseases to autism spectrum disorder, the connection between autism spectrum disorder and inflammatory bowel disease has received less attention from researchers. It is worth noting that a high incidence of autoimmunity is observed in patients with autism spectrum disorder. To date, there are no prior case reports in the literature that have investigated an immune-dysregulated patient with concurrent inflammatory disorders, including autism spectrum disorder, Crohn's disease, and co-occurring cholangitis pathologies.

CONCLUSION

A key feature of this patient was their overall well-being since the symptoms began. The diagnosis was delayed because the liver enzyme levels returned to normal after a single episode. Previous studies have reported susceptibility to autoimmunity in individuals with autism. The study discovered that both autoimmune sclerosing cholangitis and Crohn's disease are uncommon in pediatric patients with Autism Spectrum Disorder. Further research is necessary to understand the underlying mechanisms and consider potential treatment approaches for this unique patient population. To summarize, this case report highlights the rare co-occurrence of autoimmune sclerosing cholangitis and Crohn's disease in a pediatric patient with Autism Spectrum Disorder.

To our knowledge, no previous case reports have examined a patient with immune dysregulation who had concurrent inflammatory disorders such as autism spectrum disorder, Crohn's disease, and co-occurring cholangitis pathologies.

REFERENCES

- Kemme, S. & Mack, C. L. (2021). Pediatric autoimmune liver disease: autoimmune hepatitis and primary sclerosing cholangitis. *Pediatric Clinics*. [\[HTML\]](#)
- Sarcognato, S., Sacchi, D., Grillo, F., Cazzagon, N., Fabris, L., Cadamuro, M., ... & Guido, M. (2021). Autoimmune biliary diseases: Primary biliary cholangitis and primary sclerosing cholangitis. *Pathologica*, 113(3), 170. [nih.gov](#)
- Di Giorgio, A., Vergani, D., & Mieli-Vergani, G. (2022). Cutting-edge issues in juvenile sclerosing cholangitis. *Digestive and liver diseases*. [\[HTML\]](#)
- , 내윤허 (2023). Epidemiology of autoimmune liver disease. *The Korean journal of gastroenterology*. [koreamed.org](#)
- Rabiee, A., & Silveira, M. G. (2021). Primary sclerosing cholangitis. *Translational gastroenterology and hepatology*, 6. [nih.gov](#)
- Li, D. J., Tsai, C. S., Hsiao, R. C., Chen, Y. L., & Yen, C. F. (2022). Associations between allergic and autoimmune diseases with autism spectrum disorder and attention-deficit/hyperactivity disorder

within families: A population-based cohort study. *International Journal of Environmental Research and Public Health*, 19(8), 4503. [mdpi.com](https://doi.org/10.3390/ijerph19084503)

Villarreal, V. R., Katusic, M. Z., Myers, S. M., Weaver, A. L., Nocton, J. J., & Voigt, R. G. (2024). Risk of Autoimmune Disease in Research-Identified Cases of Autism Spectrum Disorder: A Longitudinal, Population-Based Birth Cohort Study. *Journal of Developmental & Behavioral Pediatrics*, 45(1), e46-e53. [\[HTML\]](https://doi.org/10.1097/00004583-202401000-00006)

Nielsen, T. C., Nassar, N., Shand, A. W., Jones, H., Guastella, A. J., Dale, R. C., & Lain, S. J. (2021). Association between maternal autoimmune disease and attention-deficit/hyperactivity disorder in children. *JAMA pediatrics*, 175(3), e205487-e205487. [jamanetwork.com](https://doi.org/10.1001/jamanetwork.com.2020.28000)

Whiteley, P., Marlow, B., Kapoor, R. R., Blagojevic-Stokic, N., & Sala, R. (2021). Autoimmune encephalitis and autism spectrum disorder. *Frontiers in Psychiatry*, 12, 775017. [frontiersin.org](https://doi.org/10.3389/fpsyt.2021.775017)

Zou, T., Liu, J., Zhang, X., Tang, H., Song, Y., & Kong, X. (2020). Autoantibody and autism spectrum disorder: A systematic review. *Research in Autism Spectrum Disorders*, 75, 101568. [sciencedirect.com](https://doi.org/10.1016/j.rasd.2020.101568)

Daniluk, U., Kwiatek-Sredzinska, K., Jakimiec, P., Daniluk, J., Czajkowska, A., & Lebensztejn, D. M. (2021). Liver pathology in children with diagnosed inflammatory bowel disease—a single center experience. *Journal of Clinical Medicine*, 10(22), 5359. [mdpi.com](https://doi.org/10.3390/jcm10225359)

Nielsen, T. C., Nassar, N., Shand, A. W., Jones, H., Guastella, A. J., Dale, R. C., & Lain, S. J. (2021). Association between maternal autoimmune disease and attention-deficit/hyperactivity disorder in children. *JAMA pediatrics*, 175(3), e205487-e205487. [jamanetwork.com](https://doi.org/10.1001/jamanetwork.com.2020.28000)

Whiteley, P., Marlow, B., Kapoor, R. R., Blagojevic-Stokic, N., & Sala, R. (2021). Autoimmune encephalitis and autism spectrum disorder. *Frontiers in Psychiatry*, 12, 775017. [frontiersin.org](https://doi.org/10.3389/fpsyt.2021.775017)

Zou, T., Liu, J., Zhang, X., Tang, H., Song, Y., & Kong, X. (2020). Autoantibody and autism spectrum disorder: A systematic review. *Research in Autism Spectrum Disorders*, 75, 101568. [sciencedirect.com](https://doi.org/10.1016/j.rasd.2020.101568)

Daniluk, U., Kwiatek-Sredzinska, K., Jakimiec, P., Daniluk, J., Czajkowska, A., & Lebensztejn, D. M. (2021). Liver pathology in children with diagnosed inflammatory bowel disease—a single center experience. *Journal of Clinical Medicine*, 10(22), 5359. [mdpi.com](https://doi.org/10.3390/jcm10225359)

ASSESSING AND MONITORING THE HEALTH-RELATED SUSTAINABLE DEVELOPMENT GOALS (SDGs): IMPERATIVE INDICATORS FOR TRACKING UNIVERSAL HEALTH COVERAGE (UHC) AND SIGNIFICANCE OF MEDICAL AND HEALTH SCIENCES

Full-Professor PhD. Habil. Cristina Raluca Gh. POPESCU

University of Bucharest, Romania and The Bucharest University of Economic Studies, Romania,
Bucharest, Romania.

ORCID ID: <https://orcid.org/0000-0002-5876-0550>

Abstract

Introduction and Purpose: In this day and age, the Sustainable Development Goals (SDGs) play a crucial part in medical and health sciences, starting with the vital emphasis placed on ensuring healthy lives for all at all ages, and ending with promoting well-being and prosperity for people and communities. What is more, fostering mental health and understanding diseases related to mental health have always been on the agenda of researchers, in the attempt to offer a better understanding of the sensible aspects with which humanity confronts itself with, especially in the last decades. Furthermore, the key objectives of this current research are, as follows: on the one hand, to stress the significance of the SDGs Declaration in the Era of the SDGs, while finding solutions capable to support the overall Health Goal; and, on the other hand, to tackle the health-related SDGs, with a major accent placed on assessing and monitoring these Global Goals, while offering a better understanding on the imperative indicators for Tracking Universal Health Coverage (UHC).

Materials and Methods: The study focuses on an up-to-date, novel, and highly original approach regarding the Health Goal (SDG 3) as well as the health-related major relationships with the other SDGs, which implicates the thorough analysis of several pivotal documents published by reputed international organizations, such as the World Health Organization (WHO) and the United Nations (UN). In addition, the current scientific work accentuates the importance and the role played by SDG3 which relies on ensuring healthy lives and promoting well-being for all at all ages, while showing which are the Indicators for Tracking Universal Health Coverage (UHC) and which are the latest developments in this area.

Results: This interdisciplinary study is vital for the medical and health sciences and not only, due to its paramount capacity to address, in an in-depth manner, the linkages between several issues of interest today, namely: medical and health domain as well as political, economic, socio-cultural, environmental, and other external influences.

Discussion and Conclusion: All in all, several policies and strategies regarding the Indicators for UHC are brought to light in order to show the way in which differences can be made in ensuring healthier and safer lives for all the generations.

Key Words: Universal Health Coverage (UHC); Mental Health; Sustainable Development Goals (SDGs); Health-Related SDG Targets and Indicators; Health Goal (SDG 3); World Health Organization (WHO); United Nations (UN).

INTRODUCTION

The paper highly suggestively entitled “Assessing and Monitoring the Health-Related Sustainable Development Goals (SDGs): Imperative Indicators for Tracking Universal Health Coverage (UHC) and Significance of Medical and Health Sciences” focuses: (a) on the one hand, on the way in which the health-related SDGs ought to be assessed and monitored in order to display the most recent trends specific to medical care as well as the top level facilities from which individuals and communities can benefit for a better and a safer life and future for all; and, (b) on the other hand, on the crucial and valuable indicators for tracking Universal Health Coverage (UHC) and the vital and immense significance of the medical and health sciences.

In addition, it needs to be stressed that the SDGs are the main target these days at an international level, being the primary point of interest for renowned specialists worldwide, reputed scientists at a global level, visionary leaders capable to foresee the importance of the Global Goals (GG) in turbulent and troubled times such as the current ones, and determined and law-centered governmental and political representatives able to seek climate justice and focused enough to work towards a better and a safer future for all the present and the future generations to come (Popescu, 2023; Popescu, 2022a-2022f). What is more, it is strongly believed that it is high time to offer, with the help of the research and development fields, a better understanding on the implications of the relationship that exist between individuals and communities, on the one hand, and the environment, the biodiversity, and the ecosystems, on the other hand (Popescu, 2021a-2021c). Although there are voices determined to move the focus on other issues less important and most certainly less pressing than these aspects highlighted in the lines above, it has become clear over the last decades that there are profound and irreplaceable links between people and the environment (Popescu, 2020a-2020d). Additionally, in particular, precisely due to these specific links, the human beings have always been and will forever and ever be extremely dependent on the environment in which they live, work, build their activities, and seek to develop and prosper (Popescu, 2019). Furthermore, no matter how well-developed and how well-prepared for the future the individuals and the communities are and, also, no matter how well-equipped and how well-established the people’s habitats are, specialists believe that there will always be inequalities in terms of the real opportunities of accessing resources and benefiting from them over the years to come (Popescu & Popescu, 2019a-2019b). Of course, among the declared purposes of the SDGs can be found pivotal ideas such as offering fair access to resources to all people so that they are able to lead decent and healthy lives, eliminating inequalities between individuals, and fostering a better and a safer future for all in order to enable unlimited development and growth opportunities to the individuals and the communities all around the Globe (Popescu, 2017; Popescu *et al.*, 2017). Unfortunately, the reality is that these daring and majestic GG can only be brought to live and may only offer concrete results when the efforts of the individuals and the communities are combined and not otherwise, in other circumstances, in particular, due to the greatness of these international objectives which can only be accomplished with the aid of united good thoughts and coordinated good practices for the benefit and the prosperity of the people and the environment (Popescu *et al.*, 2015a-2015e; Popescu *et al.*, 2014).

Besides these, there are numerous aspects that have come to unfold while analyzing the aspects surrounding the generous theme embodied by “Assessing and Monitoring the Health-Related Sustainable Development Goals (SDGs): Imperative Indicators for Tracking Universal Health Coverage (UHC) and Significance of Medical and Health Sciences” and among these issues could be mentioned the following major ones: (a) firstly, the SDGs are very bold aims that were created due to the current situation of the Planet, since it is believed that the individuals, the communities, and the environment are in great danger due to extensive phenomenon related to climate change,

air, water, and soil pollution, deforestation, hunger, draughts, unequal access to vital resources, and so on and so forth; (b) secondly, the SDGs are regarded as the ultimate objectives capable to support human lives as well as a healthy and well-balanced environment, in an era governed by human greed, limited and unfair human access to vital resources, severe health problems, conflicts and wars, pandemics, and sometimes irresponsible behavior belonging to certain individuals, communities, business and country leaders, governmental officials, and so on and so forth; and (c) thirdly, although there have always been voices and there will always be voices stating that the Planet's precarious situation is exaggerated and, in fact, the resources are unlimited and everyone can benefit from them if truly putting their efforts and determination into the process, the harsh reality is that humanity is at a crossroads and has been in this particular situation for a while, which means that concrete and concentrated measures ought to be urgently taken so that the situation of the environment and the health of the people is expected to be improved.

The introduction and the purpose of the current study on “Assessing and Monitoring the Health-Related Sustainable Development Goals (SDGs): Imperative Indicators for Tracking Universal Health Coverage (UHC) and Significance of Medical and Health Sciences” are extremely complex. To begin with, the general motivation for the creation of this scientific paper may be encountered in the fact that health with all its facets and in all its forms has always been and will forever be, for sure, essential to each and every single person on Earth. Although probably for too many of us health and the general state of being healthy are taken lightly and loosely, these are the circumstances that apply in those cases in which individuals have good health and the necessary vitality to cope with the regular aspects and activities surrounding life. Nevertheless, there are however those cases in which people are not benefiting from the right health and the expected vitality to reach their own potential and to be able to cope with the regular and day-to-day chores and activities. In essence, all these mean that health ought to be seen as one of the most precious and valuable gift that life offered the living beings – if not even the most important one ever provided to the living beings, implicating that such an important and unique asset must be respected and treasured accordingly. Besides these aspects, maintaining the state of health is vitally dependent on all the other aspects that implicate life (Borges *et al.*, 2019). For example, in the case of individuals, the level of health strongly depends on the environment, on the genetically background, on the family members and close relatives and friends, on the ability to have access to education, to development, and to growth, and so on (Prado-Prado *et al.*, 2020). In other words, every single aspect of individuals' lives is linked with the environment in which these individuals will get to develop and to grow, with the community in which they will have the chance to establish their roots and from which will benefit from the moral support in order to further pursue their own personal aims, dreams, objectives, and receive the answers to their expectations (Kalogirou *et al.*, 2021). Importantly, in this day and age, the SDGs play a crucial part in medical and health sciences, starting with the vital emphasis placed on ensuring healthy lives for all at all ages, and ending with promoting well-being and prosperity for the people and the communities (Wyatt *et al.*, 2020). What is more, fostering mental health and understanding diseases related to mental health have always been on the agenda of researchers, in the attempt to offer a better understanding of the sensible aspects with which humanity confronts itself with, especially in the last decades (Herzog, 2019). Furthermore, the key objectives of this current research are, as follows: on the one hand, to stress the significance of the SDGs Declaration in the Era of the SDGs, while finding solutions capable to support the overall Health Goal; and, on the other hand, to tackle the health-related SDGs, with a major accent placed on assessing and monitoring these Global Goals, while offering a better understanding on the imperative indicators for Tracking Universal Health Coverage (UHC).

Likewise, the introduction section is followed by the materials and methods section which is pivotal to the study on “Assessing and Monitoring the Health-Related Sustainable Development Goals (SDGs): Imperative Indicators for Tracking Universal Health Coverage (UHC) and Significance of Medical and Health Sciences”. Under these circumstances, it needs to be emphasized that the study focuses on an up-to-date, novel, and highly original approach regarding the Health Goal (SDG 3) as well as the health-related major relationships with the other SDGs, which implicates the thorough analysis of several pivotal documents published by reputed international organizations, such as the WHO and the United Nations (UN). In addition, the current scientific work accentuates the importance and the role played by SDG3 which relies on ensuring healthy lives and promoting well-being for all at all ages, while showing which are the Indicators for Tracking Universal Health Coverage (UHC) and which are the latest developments in this area. In continuations, the results section represents a priority for the research paper on “Assessing and Monitoring the Health-Related Sustainable Development Goals (SDGs): Imperative Indicators for Tracking Universal Health Coverage (UHC) and Significance of Medical and Health Sciences”. This interdisciplinary study is vital for the medical and health sciences and not only, due to its paramount capacity to address, in an in-depth manner, the linkages between several issues of interest today, namely: medical and health domain as well as political, economic, socio-cultural, environmental, and other external influences. Also, the discussion and conclusion section come to shed a new light on the way the aspects related to health should be regarded in the context of “Assessing and Monitoring the Health-Related Sustainable Development Goals (SDGs): Imperative Indicators for Tracking Universal Health Coverage (UHC) and Significance of Medical and Health Sciences”. All in all, several policies and strategies regarding the Indicators for UHC are brought to light in order to show the way in which differences can be made in ensuring healthier and safer lives for all the generations. It is essential to understand that there are several key words that require a particular attention in this given context and, among them could be found: the Universal Health Coverage (UHC); the Mental Health; the Sustainable Development Goals (SDGs); the Health-Related SDG Targets and Indicators; the Health Goal (SDG 3); the World Health Organization (WHO); and the United Nations (UN).

The introduction section has the purpose of positioning the current research paper highly suggestively entitled “Assessing and Monitoring the Health-Related Sustainable Development Goals (SDGs): Imperative Indicators for Tracking Universal Health Coverage (UHC) and Significance of Medical and Health Sciences” in today’s general social, economic, financial, and demographic context, hence health is the most precious gift that people will ever receive in their life, which implicates that health ought to be cherished, ought to be preserved, ought to be harnessed, and ought to be respected accordingly. Also, additionally, due to the irreplaceable and the profound relationship that may be encountered between someone’s health and the environment, individuals need to become more aware of the importance of the environment for their mental-health and physical-health as well as more dedicated to preserving the environment with all its resources possessed. In addition, the introduction section is followed by other very important sections, such as: the materials and methods section in which the research questions of this current study are presented and analyzed; the findings and the discussion section in which the main results of this current study are brought to light and closely displayed; the discussion, the conclusion, and the recommendations section which is vital for this current research paper since its positions this study among other valuable studies in the filed due to the fact that it targets the pivotal connections existing between the health, the SDGs, the environment, and the future of people on Earth; and the references section which embodies some of the most relevant papers in the field, believed to be the most representative ones and thought to inspire best the ideas of Partnerships for the SDGs as well as Partnerships for a better future for all, with a special accent on the health with all its facets and the

vital role of health for mankind. In particular, an accent is placed on the most important up-to-date and relevant documents that debate and that present health in the vision of important international organizations such as WHO and UN, and not only.

CONCEPTUAL FRAMEWORK

This section centers of the conceptual framework of the study, also known as the background section, which implicates mainly a thorough analysis of the United Nations (UN) Goal 3 that targets to “Ensure Healthy Lives and Promote Well-Being for All at All Ages” in order to establish, on the one hand, the significance of the SDGs Declaration for the Planet and, on the other hand, the solutions capable to support the overall Health Goal (United Nations (UN), 2024a).

Given the aspects tackled in the above lines, it should be acknowledged that health – taken through multiple facets and numerous perspectives, among which could be stressed mental health, physical health, the health of the communities, at a general level, or the health of the environment as a whole, the well-being of people, their overall state of mind, and so on – represents the most vital resources that human beings possess and that they will ever have access to in their entire lives.

On the one hand, in this given context, the idea of “health” could be successfully associated with the person’s initial state at birth and, in this matter, it needs to be highlighted that due to the immense environmental changes (such as the above-mentioned ones, namely, extensive phenomenon related to climate change, air, water, and soil pollution, deforestation, hunger, draughts, unequal access to vital resources, and so on and so forth) there are numerous cases in which the children and the youth have grave health-related problems particularly associated by the doctors and the specialists with unhealthy and unreliable environments (Ford, 2016; Popescu, 2024; Popescu & Popescu, 2024). In this matter, according to reputed specialists belonging to the international health organizations, such as the World Health Organization (WHO), there are numerous illnesses encountered nowadays at the children and the youth which are associated with environmental issues as well as others that have their origin very hard to explain or very difficult to pin-point, in particular, due to the paramount changes that have occurred in the last decades at a global level and which have caused deep inequalities among individuals, limited access to pivotal resources for the healthy development of individuals, migrations, and so on. Interestingly, these specialists have mentioned that the children and the youth are more fragile than adults and their immune system can be more affected in the early stages of the development while compared with the immune system of adults, which makes the children and the youth the most exposed pollution to the environmental degradation and the consequences associated with the complex phenomenon of pollution (Popescu, 2024; Popescu & Popescu, 2024).

On the other hand, in this day and age, the idea of “health” could be interestingly linked with numerous aspects that are associated with development, growth, life, prosperity, sustainable development, and sustainability. That being said, unfortunately implicates that some individuals and some communities have access to limited resources as well as unhealthy environments – with extremely altered landscapes, degraded biodiversity, and affected ecosystems, which positions them in the impossibility of ever or almost ever becoming able to exist these problematic environments and circumstances, and be able to move forward and become capable to lead a better future for themselves and for their families. Nevertheless, opposed to all these critical situations, there are cases in which the individuals and the communities are very fortunate and are able to lead in

prosperity and in wealth, which offers them and their families, at least in the form in which things appear to be today, a safer and a secure future. In this matter, the role of the SDGs is to create opportunities for all individuals and for all communities to lead a safer and a secure life, and that might be achieved with the help of the International Partnerships for the GG (Zigrang, 2022; Hezam *et al.*, 2022).

In addition to all the aforementioned aspects displayed in the lines above, the key objectives of this current research are, as follows: (a) on the one hand, the first objective of this current research is to stress the significance of the SDGs Declaration in the Era of the SDGs, while finding solutions capable to support the overall Health Goal; and, (b) on the other hand, the second objective of this current research is to tackle the health-related SDGs, with a major accent placed on assessing and monitoring these Global Goals, while offering a better understanding on the imperative indicators for Tracking Universal Health Coverage (UHC).

In the lines below, Table no. 1: Significance of the SDGs Declaration and Solutions Capable to Support the Overall Health Goal focuses on an up-to-date, novel, and highly original approach regarding the Health Goal (SDG 3) as well as the health-related major relationships with the other SDGs (see, in this matter, Table no. 1: Table no. 1: Significance of the SDGs Declaration and Solutions Capable to Support the Overall Health Goal).

Table no. 1. Significance of the SDGs Declaration and Solutions Capable to Support the Overall Health Goal

Significance of the SDGs Declaration	Solutions Capable to Support the Overall Health Goal
<p>The United Nations (UN) Goal 3 which is to “Ensure Healthy Lives and Promote Well-Being for All at All Ages” addresses the ways capable of “improving people’s health in recent years”, with notable results, as follows: (a) first of all, according to recent statistics, “146 out of 200 countries or areas have already met or are on track to meet the SDG target on under-5 mortality”, which is an impressive progress for humanity (United Nations (UN), 2024a); (b) second of all, also based on recent data, the “effective HIV treatment has cut global AIDS-related deaths by 52 per cent since 2010 and at least one neglected tropical disease has been eliminated in 47 countries”, which proves to be vital in the eyes of prominent specialists worldwide (United Nations (UN), 2024a).</p>	<p>There are numerous solutions brought to light by the UN in the SDGs Declaration, which focus on aspects such as the ones displayed in the lines below: “To overcome these setbacks and address long-standing health care shortcomings, increased investment in health systems is needed to support countries in their recovery and build resilience against future health threats.” (United Nations (UN), 2024).</p> <p>According to these aspects, it has been noted that it is crucial to make investments in the health care systems all around the world so that individuals will get to benefit from high quality health systems able to support people to maintain and to regain their health, while considering the idea of healthy lives for all people all around the Globe.</p>
<p>In addition, a highly sensitive aspect is represented by “inequalities in health care access” which, unfortunately, “still persist” (United Nations (UN), 2024a). Among the reasons to the existence of these inequalities which have come to affect the lives of individuals and the balance of the communities could be noted the following crucial aspects: (a) on the one hand, it has been brought to the attention that “the COVID-19 pandemic and other ongoing crises have</p>	<p>In addition, “Access to essential health services” has been regarded as pivotal these days, implicating that: “A significant portion of the global population still lacks access to vital healthcare services. To bridge this gap and ensure equitable healthcare provision, addressing disparities is critical. Various determinants of health, including environmental and commercial factors, need attention to pave the way for achieving our common objective of Health for All and achieving</p>

<p>impeded progress towards Goal 3”; and (b) on the other hand, it has been brought to light that the “childhood vaccinations have experienced the largest decline in three decades, and tuberculosis and malaria deaths have increased compared with pre-pandemic levels” (United Nations (UN), 2024a).</p>	<p>the Sustainable Development Goal targets.” (United Nations (UN), 2024a).</p> <p>A new was shed on the most recent problems with which the health systems confront themselves with, highlighting the following issues: there are people that still lack access to vital healthcare services, which puts their lives and the communities lives in danger, not being able to support their members; and there are individuals that do not have access to healthcare provision, which accentuates the inequalities and the disparities among people.</p>
<p>It is essential to take into account the following major issues as envisioned by the UN SDGs Declaration: “The Sustainable Development Goals make a bold commitment to end the epidemics of AIDS, tuberculosis, malaria and other communicable diseases by 2030. The aim is to achieve universal health coverage, and provide access to safe and affordable medicines and vaccines for all.” (United Nations (UN), 2024a).</p>	<p>According to the “Goal 3: Ensure healthy lives and promote well-being for all at all ages”, there are pivotal issues to be taken into consideration for future reference and analysis when it comes to the relationship between healthy lives and healthy economies: (a) on the one hand, the accent is positioned on “ensuring healthy lives for all requires a strong commitment, but the benefits outweigh the cost”, which implicate the fact that although the investments in the healthcare systems are very high, the lives of individuals are the ones that truly matter (United Nations (UN), 2024a); and (b) on the other hand, the accent is placed on the relationship between healthy lives and healthy economies, since “healthy people are the foundation for healthy economies”, which leads to the decision to motivate “countries worldwide” “to take immediate and decisive actions to predict and counteract health challenges” (United Nations (UN), 2024a).</p> <p>A vital solution offered according to the SDGs Declaration to people worldwide is represented by the Universal Health Coverage (UHC).</p>

Source: The Author’ Own Elaboration, Based on the References Highlighted in the Table and in the Bibliography Section, with a particular accent on the United Nations (UN) “Goal 3: Ensure Healthy Lives and Promote Well-Being for All at All Ages” (United Nations (UN), 2024a)

The table above is essential in offering a better and a more comprehensive understanding of the United Nations (UN) “Goal 3: Ensure Healthy Lives and Promote Well-Being for All at All Ages”, which is pivotal to the SDGs Declaration (see, in this matter, Table no. 1: Table no. 1: Significance of the SDGs Declaration and Solutions Capable to Support the Overall Health Goal). There are several aspects due to be remembered when seeking to address this particular aim, as follows: (a) first of all, nowadays, it is “especially critical in safeguarding vulnerable population groups and individuals residing in regions burdened by high disease prevalence”, which ensures in this way the capacity to “strengthen health systems and foster resilience in the face of health adversities”; (b) second of all, an interesting example offered by the UN specialists as a result of the COVID-19 pandemic is represented by “immunization” which “is one of the world’s most successful and cost-effective health interventions”, with the special worrying note that “the alarming decline in childhood vaccination – the largest sustained decline in childhood vaccinations in approximately 30 years – is leaving millions of children at risk from devastating but preventable diseases”; and (c)

third of all, on the one hand, while trying to offer an adequate answer to the major question “Does everyone have access to healthcare?” and, on the other hand, while trying to find solutions and recommendations in order to offer equitable and reliable healthcare systems to all people at a global level, the accent falls on the importance and the role of the Universal Health Coverage (UHC) which essentially “aims to ensure that everyone can access quality health services without facing financial hardship” (United Nations (UN), 2024a). Additionally, when centering the attention on the benefits of the UHC and individuals’ access to the UHC, the UN data has shown that “progress has since slowed” by the current demographic, economic, financial, and social trends and “inequalities continue to be a fundamental challenge for UHC”, while the “coverage of reproductive, maternal, child and adolescent health services tends to be higher among those who are richer, more educated, and living in urban areas, especially in low-income countries” (United Nations (UN), 2024a).

At this particular moment, looking in retrospective, it needs to be stressed that the background section, also known as the conceptual framework section placed the “Goal 3: Ensure Healthy Lives and Promote Well-Being for All at All Ages” in these days context, showing its importance and its relevance in these days context and general framework. What is more, the background section, also known as the conceptual framework section shed a new light on the Universal Health Coverage (UHC) and its essential role in the lives of people, accentuating the part played in making their health and well-being a global priority. This section is followed by other paramount sections, such as: the materials and methods section in which the research questions of this current study are presented and analyzed; the findings and the discussion section in which the main results of this current study are brought to light and closely displayed; the discussion, the conclusion, and the recommendations section which is vital for this current research paper since its positions this study among other valuable studies in the field due to the fact that it targets the pivotal connections existing between the health, the SDGs, the environment, and the future of people on Earth; and the references section which embodies some of the most relevant papers in the field, believed to be the most representative ones and thought to inspire best the ideas of Partnerships for the SDGs as well as Partnerships for a better future for all, with a special accent on the health with all its facets and the vital role of health for mankind. In particular, an accent is placed on the most important up-to-date and relevant documents that debate and that present health in the vision of important international organizations such as WHO and UN, and not only, since there are so many globally recognized organizations that address so well the case of health and healthcare systems.

METHODOLOGY

The materials and methods section has the purpose of highlighting the main research questions (RQs) for the current research paper highly suggestively entitled “Assessing and Monitoring the Health-Related Sustainable Development Goals (SDGs): Imperative Indicators for Tracking Universal Health Coverage (UHC) and Significance of Medical and Health Sciences”, as follows: (a) the first research question, namely (RQ1), is what is the significance of the SDGs Declaration and which are the solutions capable to support the overall Health Goal; (b) the second research question, namely (RQ2), is which is today’s approach regarding the Health Goal (SDG 3) and which are the health-related major relationships with the other SDGs; and, (c) the third research question, namely (RQ3), is which are the importance and the role played by SDG3 which relies on ensuring healthy lives and promoting well-being for all at all ages and, also, which are the Indicators for Tracking Universal Health Coverage (UHC) and which are the latest developments in this area. All in all, it should be stressed that this paper tackles a novel and up-to-date earth shattering topic – based on the fact that people’s health and well-being are at the very core of the SDGs, while its originality resides in the literature review performed, the bold ideas brought to light, and the

recommendations and solutions emphasized in order to enable a better future for all and a safer environment for everyone – with a particular accent placed on the children and youth, since they are the most affected ones and the most fragile ones in terms of health and health concerns.

In addition to the above mentioned aspects related to the materials and methods, there are several ideas that ought to be remembered. The study focuses on an up-to-date, novel, and highly original approach regarding the Health Goal (SDG 3) as well as the health-related major relationships with the other SDGs, which implicates the thorough analysis of several pivotal documents published by reputed international organizations, such as the World Health Organization (WHO) and the United Nations (UN). In addition, the current scientific work accentuates the importance and the role played by SDG3 which relies on ensuring healthy lives and promoting well-being for all at all ages, while showing which are the Indicators for Tracking Universal Health Coverage (UHC) and which are the latest developments in this area.

While targeting the first research question, namely (RQ1), represented by what is the significance of the SDGs Declaration and which are the solutions capable to support the overall Health Goal it needs to be emphasized that the answers to this particular question were highlighted the conceptual framework of the study, also known as the background section. In addition, of great importance is believed to be Table no. 1: Significance of the SDGs Declaration and Solutions Capable to Support the Overall Health Goal which focuses on an up-to-date, novel, and highly original approach regarding the Health Goal (SDG 3) as well as the health-related major relationships with the other SDGs (see, in this matter, Table no. 1: Table no. 1: Significance of the SDGs Declaration and Solutions Capable to Support the Overall Health Goal).

This section is of major importance to the current study and is followed by the conclusion and discussion section which centers on offering pivotal answers to the other two research questions (RQ), namely: (a) the second research question, namely (RQ2), is which is today's approach regarding the Health Goal (SDG 3) and which are the health-related major relationships with the other SDGs; and, (b) the third research question, namely (RQ3), is which are the importance and the role played by SDG3 which relies on ensuring healthy lives and promoting well-being for all at all ages and, also, which are the Indicators for Tracking Universal Health Coverage (UHC) and which are the latest developments in this area.

CONCLUSION AND DISCUSSION

The findings and discussion section emphasize the results, starting from the idea that this interdisciplinary study is vital for the medical and health sciences and not only, due to its paramount capacity to address, in an in-depth manner, the linkages between several issues of interest today, namely: medical and health domain as well as political, economic, socio-cultural, environmental, and other external influences. What is more, the authors of this current manuscript strongly believe that the discussion and conclusion section is essential in offering a better understanding to the importance and the role played by SDG3. All in all, several policies and strategies regarding the Indicators for UHC are brought to light in order to show the way in which differences can be made in ensuring healthier and safer lives for all the generations. Furthermore, likewise, there are numerous crucial concepts on which the attention is drawn, as seen in the following lines: the Universal Health Coverage (UHC); the mental health; the Sustainable Development Goals (SDGs);

the Health-Related SDG Targets and Indicators; the Health Goal (SDG 3); the World Health Organization (WHO); and the United Nations (UN).

The findings and discussion section is crucial to the layout of this current research paper and focuses on several major aspects that are carefully emphasized in the lines below and which correspond to the three research questions, as follows: (a) to begin with, findings and discussion section is of particular importance on offering answers to the first research question, namely (RQ1), what is the significance of the SDGs Declaration and which are the solutions capable to support the overall Health Goal, starting from the aspects stressed in the conceptual framework section (the background section) and continuing with the issues brought to light in the two tables that are displayed in this section and which are very powerful; (b) in continuation, the second research question, namely (RQ2), which is today's approach regarding the Health Goal (SDG 3) and which are the health-related major relationships with the other SDGs and has profound links with the tables that may be encountered in this section; and, (c) in the end, the third research question, namely (RQ3), which are the importance and the role played by SDG3 which relies on ensuring healthy lives and promoting well-being for all at all ages and, also, which are the Indicators for Tracking Universal Health Coverage (UHC) and which are the latest developments in this area, showing also powerful connections with the tables due to be encountered in this particular section. In conclusion, it should be stressed that this paper tackles a novel and up-to-date earth shattering topic – based on the fact that people's health and well-being are at the very core of the SDGs, while its originality resides in the literature review performed, the bold ideas brought to light, and the recommendations and solutions emphasized in order to enable a better future for all and a safer environment for everyone – with a particular accent placed on the children and youth, since they are the most affected ones and the most fragile ones in terms of health and health concerns (Nabi, 2021).

In the lines below the Table no. 2: Health-Related Major Relationships with the Other SDGs and a Thorough Analysis of Several Pivotal Documents published by the World Health Organization (WHO) and the United Nations (UN) centers on the links between the health-related major relationships and the other SDGs, while addressing the main ideas encountered in vital documents published most recently by World Health Organization (WHO) and the United Nations (UN) (see, in this matter, Table no. 2. Health-Related Major Relationships with the Other SDGs and a Thorough Analysis of Several Pivotal Documents published by the World Health Organization (WHO) and the United Nations (UN)).

Table no. 2. Health-Related Major Relationships with the Other SDGs and a Thorough Analysis of Several Pivotal Documents published by the World Health Organization (WHO) and the United Nations (UN)

Health-Related Major Relationships with the Other SDGs:	Thorough Analysis of Several Pivotal Documents published by the World Health Organization (WHO) and the United Nations (UN):
All the aims are linked to each other, while in particular the Health Goal (SDG 3) is vitally connected with poverty (SDG 1) due to the fact that it may lead to hunger and malnutrition (SDG 2), which may turn to severe health problems (SDG 3). Going further with the analysis, these health issues (SDG 3) could affect in a major way the children and youth and may prevent	According to the WHO health is vitally placed within the SDGs and, also, the health goal is extremely broad in order to offer a better understanding of what ensuring healthy lives as well as fostering well-being for the present and future generations implicates, namely for all people at all ages both in present days

<p>them from having access to education or to being able to continue their studies and training (SDG 4), hence affecting their future and their path in life. Also, another way of seeing things could implicate that due to accentuated health problems (SDG 3) adults might not be able to get a job or to maintain their existing jobs (SDG 8).</p> <p>The Health Goal (SDG 3) is pivotal to humankind in the context of the SDGs Declaration in particular to the importance and the role of Universal Health Coverage (UHC).</p> <p>The scope of the UHC is to enable people access quality healthcare for themselves and for their families so that no one will be left behind.</p>	<p>as well as in the distant future (World Health Organization (WHO) <i>et al.</i>, 2021).</p> <p>According to the UN SDGs, the relationships presented between SDG 1, SDG 2, SDG 3, SDG 4, and SDG 8 are extremely important. To these relationships new connections may be added depending on the case, as follows: the lack of appropriate healthcare opportunities (SDG 3) and the impossibility to have access to high-quality education (SDG 4) may also lead to gender inequalities (SDG 5) and may affect the sustainable consumption of resources (SDG 12) which should be preserved for the future generations as well so that they could enjoy lives at its full (Maphumulo & Bhengu, 2019).</p>
<p>There is a profound relationship between sustainable development and public health (Sampson, 2022).</p> <p>Specialists believe that sustainable development may only be achieved in those situations in which the people, the communities, and the environment are not facing any risks so that population can a state of physical, mental, and social well-being (GBD 2015 SDG Collaborators, 2016; Francis-Oliviero <i>et al.</i>, 2024).</p>	<p>There is a profound relationship between sustainable development and public health and hygiene (Maslyankov, 2024; Shahabi <i>et al.</i>, 2023).</p> <p>Specialists strongly believe that having access to equitable sanitation and hygiene (SDG 6) for all is vital for decent living, while a special attention ought to be paid to the needs of those in vulnerable situations as well as to women and young girls (United Nations (UN) Women, 2024).</p>
<p>There is a profound relationship between sustainable development and public health and nutrition (Chuah <i>et al.</i>, 2018; Lebano <i>et al.</i>, 2020).</p> <p>Based on most recent studies, addressing the nutritional needs of individuals and communities is crucial, while it has been noted that a particular emphasis ought to be placed on the nutritional needs of the children under five years of age, the nutritional needs of the adolescent girls, the nutritional needs of young pregnant and lactating women, and the nutritional needs of the older persons (United Nations (UN), 2022).</p>	<p>There is a profound relationship between sustainable development and public health and mental health.</p> <p>SDG 3 includes mental health, since SDG 3 places also a particular emphasis on non-communicable diseases and mental health, having in mind that by 2030 the reduction by one third of premature mortality ought to be achieved from non-communicable diseases through prevention, while adequate treatment needs to be offered to those in need and mental health and well-being ought to be strongly promoted (World Health Organization (WHO), 2024).</p>

Source: The Author' Own Elaboration, Based on the References Highlighted in the Table and in the Bibliography Section

In the lines below the Table no. 3: Importance and Role played by SDG3 Centered on Ensuring Healthy Lives and Promoting Well-Being for All at All Ages and Indicators for Tracking Universal Health Coverage (UHC) and the Latest Developments in This Area addresses, on the one hand, the main characteristics of SDG3 in order to display its importance and role for human lives in connection to sustainability, sustainable development, and the preservation of the environment and, on the other hand, the Indicators for Tracking Universal Health Coverage (UHC) which are paramount for the present and the future generations (see, in this matter, Table no. 3. Importance and Role played by SDG3 Centered on Ensuring Healthy Lives and Promoting Well-Being for All at All Ages and Indicators for Tracking Universal Health Coverage (UHC) and the Latest Developments in This Area).

Table no. 3. Importance and Role played by SDG3 Centered on Ensuring Healthy Lives and Promoting Well-Being for All at All Ages and Indicators for Tracking Universal Health Coverage (UHC) and the Latest Developments in This Area

Importance and Role played by SDG3 Centered on Ensuring Healthy Lives and Promoting Well-Being for All at All Ages	Indicators for Tracking Universal Health Coverage (UHC) and the Latest Developments in This Area
<p>According to Goal 3, the general declared aim is to ensure healthy lives and promote well-being for all, at all ages, hence targeting all stages of individuals lives starting from the very beginning, based on the fact that health and well-being are important at every stage of someone's life.</p>	<p>According to the World Health Organization (WHO) the countries have made significant progress towards the Universal Health Coverage (Sustainable Development Goals (SDGs) target 3.8) and a lot more is expected by 2030, having in mind the following pivotal aspects: "Improvements to health services coverage have stagnated since 2015, and the proportion of the population that faced catastrophic levels of out-of-pocket health spending increased continuously since 2000. This global pattern is consistent across all regions and the majority of countries." (World Health Organization (WHO), 2023).</p>
<p>What is more, Goal 3 has as purpose to foster all major health priorities, namely: "reproductive, maternal, newborn, child and adolescent health; communicable and non-communicable diseases; universal health coverage; and access for all too safe, effective, quality and affordable medicines and vaccines" (United Nations Children's Fund (UNICEF), 2024).</p>	<p>In addition, there are several recent data that ought to be considered as follows:</p> <p>(a) First of all, "the UHC service coverage index increased from 45 to 68 between 2000 and 2021", but unfortunately the "recent progress in increasing coverage has slowed compared to pre-2015 gains, rising only 3 index points between 2015 and 2021 and showing no change since 2019" (World Health Organization (WHO), 2023);</p> <p>(b) Second of all, "the proportion of the population not covered by essential health services decreased by about 15% between 2000 and 2021, with minimal progress made after 2015", which essentially shows "that in 2021, about 4.5 billion people were not fully covered by essential health services" (World Health Organization (WHO), 2023).</p>
<p>Furthermore, Goal 3 intends to prevent unnecessary suffering from diseases that are preventable as well as from premature death by taking into considerations those ways capable to enhance the health of countries overall population.</p>	<p>In general lines it needs to be highlighted that "about 2 billion people are facing financial hardship including 1 billion experiencing catastrophic out-of-pocket health spending (SDG indicator 3.8.2) or 344 million people going deeper into extreme poverty due to health costs" (World Health Organization (WHO), 2023).</p> <p>Additionally, a major disruption for the healthcare system was represented by the COVID-19 pandemic, the latest figures stressing the following aspects: "essential services" were severely affected and disrupted "in 92% of countries at the height of the pandemic in 2021", while "in 2022, 84% of countries still reported disruptions" (World Health Organization (WHO), 2023).</p>

Source: The Author's Own Elaboration, Based on the References Highlighted in the Table and in the Bibliography Section

According to the United Nations (UN) article on “What gets measured, gets done: How to track Universal Healthcare Coverage and make it a reality”, there are several major aspects brought to the attention, among which could be mentioned: (a) first of all, “the June 2015 report, Tracking Universal Health Coverage, from the World Health Organization (WHO) and World Bank Group (WBG) shows that 400 million people do not have access to essential health services” (United Nations (UN), 2024b); and, (b) second of all, the fact that “the report identifies the following eight core tracer indicators for differing aspects of health service coverage” among which could be highlighted the (b.1.) “reproductive and newborn health: family planning, antenatal care, skilled birth attendance”; (b.2.) “child immunization: 3 doses of diphtheria, tetanus and pertussis (DTP)-containing vaccine”; (b.3.) “infectious disease: antiretroviral therapy (ART), tuberculosis (TB) treatment”; and (b.4.) “non-health sector determinants of health: improved water sources, improved sanitary facilities” (United Nations (UN), 2024b).

Since among the pivotal aims of the World Health Organization (WHO) is “to build back better” in terms of the healthcare systems and the SDG 3 approach, the WHO’s major “recommendation is to reorient health systems using a primary health care (PHC) approach” (World Health Organization (WHO), 2023). In this particular matter, based on the latest figures, “most (90%) of essential UHC interventions can be delivered through a PHC approach, potentially saving 60 million lives and increasing average global life expectancy by 3.7 years by 2030”, hence showing that there is still a lot to be done in this matter (World Health Organization (WHO), 2023).

ACKNOWLEDGEMENT

The Author of the manuscript (Cristina Raluca Gh. Popescu (C.R.G.P.)) is extremely appreciative and extremely grateful to the Organizers of this first-rate and delightful international scientific event and wants to hereby acknowledge the Organizers kindness and thoughtfulness in offering the position of invited speaker, hence having the wonderful opportunity to express the ideas and the thoughts concerning this novel and up-to-date topic at such a prestigious international scientific event.

FUNDING

The Author received no funding for the current research.

COMPETING INTERESTS

The Author has declared that no competing interests exist.

STATEMENT OF CONFLICT OF INTEREST

The Author declares that there are no conflicts of interest. The Author declares that has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this.

AUTHOR CONTRIBUTIONS

Conceptualization, Cristina Raluca Gh. Popescu (C.R.G.P.); methodology, C.R.G.P.; software, C.R.G.P.; validation, C.R.G.P.; formal analysis, C.R.G.P.; investigation, C.R.G.P.; resources,

C.R.G.P.; data curation, C.R.G.P.; writing—original draft preparation, C.R.G.P.; writing—review and editing, C.R.G.P. The Author fully contributed to this manuscript. The Author has read and agreed to the published version of the manuscript.

REFERENCES

Borges, G. A., Tortorella, G., Rossini, M., & Portioli-Staudacher, A. (2019). Lean implementation in healthcare supply chain: a scoping review. *Journal of health organization and management*, 33(3), 304–322. <https://doi.org/10.1108/JHOM-06-2018-0176>.

Chuah, F. L. H., Tan, S. T., Yeo, J., & Legido-Quigley, H. (2018). The health needs and access barriers among refugees and asylum-seekers in Malaysia: a qualitative study. *International journal for equity in health*, 17(1), 120. <https://doi.org/10.1186/s12939-018-0833-x>.

Ford D. M. (2016). Four persistent rural healthcare challenges. *Healthcare management forum*, 29(6), 243–246. <https://doi.org/10.1177/0840470416658903>.

Francis-Oliviero, F., Constantinou, P., Haneef, R., French GBD Collaborators, Schwarzinger, M., Gallay, A., Rachas, A., & Alla, F. (2024). The health state of France before COVID-19 pandemic between 1990 and 2019: an analysis of the Global Burden of Disease study 2019. *The Lancet regional health. Europe*, 39, 100848. <https://doi.org/10.1016/j.lanepe.2024.100848>.

GBD 2015 SDG Collaborators. (2016). Measuring the health-related Sustainable Development Goals in 188 countries: a baseline analysis from the Global Burden of Disease Study 2015. *Lancet (London, England)*, 388(10053), 1813–1850. [https://doi.org/10.1016/S0140-6736\(16\)31467-2](https://doi.org/10.1016/S0140-6736(16)31467-2).

Herzog M. P. (2019). Consumerism: Today's Pursuit of Healthcare's Unicorn. *Frontiers of health services management*, 36(2), 26–32. <https://doi.org/10.1097/HAP.0000000000000071>.

Hezam, I. M., Taher, S. A. H., Foul, A., & Alrasheedi, A. F. (2022). Healthcare's Sustainable Resource Planning Using Neutrosophic Goal Programming. *Journal of healthcare engineering*, 2022, 3602792. <https://doi.org/10.1155/2022/3602792>.

Kalogirou, M. R., Dahlke, S., Davidson, S., & Yamamoto, S. (2021). Integrating planetary health into healthcare: A document analysis. *Health policy (Amsterdam, Netherlands)*, 125(6), 799–806. <https://doi.org/10.1016/j.healthpol.2021.04.002>.

Lebano, A., Hamed, S., Bradby, H., Gil-Salmerón, A., Durá-Ferrandis, E., Garcés-Ferrer, J., Azzedine, F., Riza, E., Karnaki, P., Zota, D., & Linos, A. (2020). Migrants' and refugees' health status and healthcare in Europe: a scoping literature review. *BMC public health*, 20(1), 1039. <https://doi.org/10.1186/s12889-020-08749-8>.

Maphumulo, W. T., & Bhengu, B. R. (2019). Challenges of quality improvement in the healthcare of South Africa post-apartheid: A critical review. *Curationis*, 42(1), e1–e9. <https://doi.org/10.4102/curationis.v42i1.1901>.

Maslyankov I. (2024). Unmet healthcare needs in Southeastern Europe: a systematic review. *The journal of medicine access*, 8, 27550834241255838. <https://doi.org/10.1177/27550834241255838>.

Nabi G. (2021). Medicolegal issues in healthcare: Corporatisation of healthcare. *Scottish medical journal*, 66(4), 165. <https://doi.org/10.1177/00369330211058808>.

Popescu, C. R. G. (2024). Monitoring Progress towards the Sustainable Development Goals, where Children and Youth Hold the Key to Sustainable Future: Principles and Policy Guidance on Children's Rights to Healthy Environment. Paper presented at the World Children Conference-V. June 07-09, 2024. Hakkari, Turkey. Organizers: Hakkari University, Turkey and IKSAD Institute of

July 1-3, 2024 -PARIS

Economic Development and Social Research of Turkey, Turkey. Paper due to be published in the Conference Volume Proceedings. <https://www.worldchildrenconference.org/>.

Popescu, C. R. G. & Popescu, G. N. (2024). Socio-Economic Inclusion, Health and Education Nexus: Tackling the European Union (EU) Vital Strategy on the Rights of the Child EU Actions to Withstand Poverty and Boost Inclusive and Child-Friendly Societies, Health and Education Systems. Paper presented at the World Children Conference-V. June 07-09, 2024. Hakkari, Turkey. Organizers: Hakkari University, Turkey and IKSAD Institute of Economic Development and Social Research of Turkey, Turkey. Paper due to be published in the Conference Volume Proceedings. <https://www.worldchildrenconference.org/>.

Popescu, C. R. G. (2023). Artificial Intelligence and Sustainability in a Game-Changing Post-COVID-19 Era: Key Drivers for Economic Development, Social Development, and Environmental Protection. In C. Popescu (Ed.), *Positive and Constructive Contributions for Sustainable Development Goals* (pp. 1-20). IGI Global. <https://doi.org/10.4018/978-1-6684-7499-0.ch001>.

Popescu, C. R. G. (2022a). Impressive, Inspiring, and Profound Mindfulness Movement in Organizations: Boosting Productivity, Cultivating Joy, and Sharpening Awareness. In C. Popescu (Ed.), *Handbook of Research on Building Inclusive Global Knowledge Societies for Sustainable Development* (pp. 60-96). IGI Global. <https://doi.org/10.4018/978-1-6684-5109-0.ch003>.

Popescu, C. R. G. (2022b). Mindfulness at Work, a Sound Business Investment: Focusing on the Employee Well-Being While Increasing Creativity and Innovation. In C. Popescu (Ed.), *Handbook of Research on Changing Dynamics in Responsible and Sustainable Business in the Post-COVID-19 Era* (pp. 1-34). IGI Global. <https://doi.org/10.4018/978-1-6684-2523-7.ch001>.

Popescu, C. R. G. (2022c). Mindfulness Business Principles: Producing Outstanding Value and Encouraging Community Connections. In C. Popescu (Ed.), *COVID-19 Pandemic Impact on New Economy Development and Societal Change* (pp. 196-228). IGI Global. <https://doi.org/10.4018/978-1-6684-3374-4.ch010>.

Popescu, C. R. G. (2022d). Environmental, Social, and Corporate Governance by Avoiding Management Bias and Tax Minimization: Reaching a General Consensus Regarding a Minimum Global Tax Rate. In C. Popescu (Ed.), *COVID-19 Pandemic Impact on New Economy Development and Societal Change* (pp. 94-132). IGI Global. <https://doi.org/10.4018/978-1-6684-3374-4.ch006>.

Popescu, C. R. G. (2022e). Fostering Creativity in Business: Empowering Strong Transformational Leaders. In C. Popescu (Ed.), *Handbook of Research on Changing Dynamics in Responsible and Sustainable Business in the Post-COVID-19 Era* (pp. 349-381). IGI Global. <https://doi.org/10.4018/978-1-6684-2523-7.ch017>.

Popescu, C. R. G. (2022f). Analyzing the Impact of Green Marketing Strategies on the Financial and Non-Financial Performance of Organizations: The Intellectual Capital Factor. In I. Management Association (Ed.), *Research Anthology on Business Continuity and Navigating Times of Crisis* (pp. 202-226). IGI Global. <https://doi.org/10.4018/978-1-6684-4503-7.ch011>.

Popescu, C. R. G. (2021a). Sustainable and Responsible Entrepreneurship for Value-Based Cultures, Economies, and Societies: Increasing Performance Through Intellectual Capital in Challenging Times. In C. Popescu & R. Verma (Eds.), *Sustainable and Responsible Entrepreneurship and Key Drivers of Performance* (pp. 33-58). IGI Global. <https://doi.org/10.4018/978-1-7998-7951-0.ch002>.

Popescu, C. R. G. (2021b). Impact of Innovative Capital on the Global Performance of the European Union: Implications on Sustainability Assessment. In C. Popescu (Ed.), *Handbook of Research on Novel Practices and Current Successes in Achieving the Sustainable Development Goals* (pp. 90-124). IGI Global. <https://doi.org/10.4018/978-1-7998-8426-2.ch005>.

- Popescu, C. R. (2021c). Measuring Progress Towards the Sustainable Development Goals: Creativity, Intellectual Capital, and Innovation. In C. Popescu (Ed.), *Handbook of Research on Novel Practices and Current Successes in Achieving the Sustainable Development Goals* (pp. 125-136). IGI Global. <https://doi.org/10.4018/978-1-7998-8426-2.ch006>.
- Popescu, C. R. G. (2020a). Approaches to Sustainable and Responsible Entrepreneurship: Creativity, Innovation, and Intellectual Capital as Drivers for Organization Performance. In B. Hernández-Sánchez, J. Sánchez-García, & A. Moreira (Eds.), *Building an Entrepreneurial and Sustainable Society* (pp. 75-95). IGI Global. <https://doi.org/10.4018/978-1-7998-2704-7.ch004>.
- Popescu, C. R. G. (2020b). Developing a Model for Entrepreneurship Competencies: Innovation, Knowledge Management, and Intellectual Capital – Success Competences for Building Inclusive Entrepreneurship and Organizational Performance. In J. Šebestová (Ed.), *Developing Entrepreneurial Competencies for Start-Ups and Small Business* (pp. 1-22). IGI Global. <https://doi.org/10.4018/978-1-7998-2714-6.ch001>.
- Popescu, C. R. G. (2020c). Analyzing the Impact of Green Marketing Strategies on the Financial and Non-Financial Performance of Organizations: The Intellectual Capital Factor. In V. Naidoo & R. Verma (Eds.), *Green Marketing as a Positive Driver Toward Business Sustainability* (pp. 186-218). IGI Global. <https://doi.org/10.4018/978-1-5225-9558-8.ch008>.
- Popescu, C. R. G. (2020d). Sustainability Assessment: Does the OECD/G20 Inclusive Framework for BEPS (Base Erosion and Profit Shifting Project) Put an End to Disputes Over The Recognition and Measurement of Intellectual Capital? *Sustainability*, 12, 10004. <https://doi.org/10.3390/su122310004>.
- Popescu, C. R. G. (2019). Corporate Social Responsibility, Corporate Governance and Business Performance: Limits and Challenges Imposed by the Implementation of Directive 2013/34/EU in Romania. *Sustainability*, 11, 5146. <https://doi.org/10.3390/su11195146>.
- Popescu, C. R. G. & Popescu, G. N. (2019a). The Social, Economic, and Environmental Impact of Ecological Beekeeping in Romania. In G. Popescu (Ed.), *Agrifood Economics and Sustainable Development in Contemporary Society* (pp. 75-96). IGI Global. <https://doi.org/10.4018/978-1-5225-5739-5.ch004>.
- Popescu, C. R. G. & Popescu, G. N. (2019b). An Exploratory Study Based on a Questionnaire Concerning Green and Sustainable Finance, Corporate Social Responsibility, and Performance: Evidence from the Romanian Business Environment. *J. Risk Financial Manag.*, 12, 162. <https://doi.org/10.3390/jrfm12040162>.
- Popescu, C. R. G. (2017). The Role Of Total Quality Management In Developing The Concept Of Social Responsibility To Protect Public Interest In Associations Of Liberal Professions. *Amfiteatru Economic*. Editura ASE. Volume: 19. pp. 1091-1106. Special Issue: 11. WOS:000413858500012. ISSN: 1582-9146. eISSN: 2247-9104.
- Popescu, C. R. G., Popescu, G. N., Popescu, V. A. (2017). Assessment Of The State Of Implementation Of Excellence Model Common Assessment Framework (CAF) 2013 By The National Institutes Of Research - Development - Innovation In Romania. *Amfiteatru Economic*. Editura ASE. Volume: 19. Issue: 44. pp. 41-60. WOS:000395746900004. ISSN: 1582-9146. eISSN: 2247-9104.
- Popescu, C. R. G., Popescu, G. N., Popescu, V. A. (2015a). Corporate Governance in Romania: Theories and Practices. In Boubaker, S., Nguyen, D.K. (Eds.), *Corporate Governance And Corporate Social Responsibility: Emerging Markets Focus* (pp. 375-401). WORLD SCIENTIFIC PUBL CO PTE LTDPO BOX 128 FARRER RD, SINGAPORE 9128, SINGAPORE. WOS:000349291300016. ISBN: 978-981-4520-37-9.

https://doi.org/10.1142/9789814520386_0014.

https://www.worldscientific.com/doi/abs/10.1142/9789814520386_0014.

Popescu, C. R. G., Popescu, V. A., Popescu, G. N. (2015b). The Entrepreneur's Role In The Performance Growth Of The Financial Audit Activity In Romania. *Amfiteatru Economic*. Editura ASE. Volume: 17. Issue: 38. pp. 228-246. WOS:000352213800015. ISSN: 1582-9146. eISSN: 2247-9104.

Popescu, V. A., Popescu, G. N., Popescu, C. R. G. (2015c). The Relation Productivity - Environment In The Context Of Sustainable Development - Case Study On The Romanian Industry. *Metallurgija*. CROATIAN METALLURGICAL SOCBERISLAVICEVA 6, ZAGREB, CROATIA. Volume: 54. Issue: 1. pp. 286-288. WOS:000341740000075. ISSN:0543-5846. eISSN:1334-2576.

Popescu, V. A., Popescu, G. N., Popescu, C. R. G. (2015d). Competitiveness And Sustainability - A Modern Economic Approach To The Industrial Policy. *Metallurgija*. CROATIAN METALLURGICAL SOCBERISLAVICEVA 6, ZAGREB, CROATIA. Volume: 54. Issue: 2. pp. 426-428. WOS:000343781300031. ISSN:0543-5846. eISSN:1334-2576.

Popescu, V. A., Popescu, G. N., Popescu, C. R. G. (2015e). The Impact Of Global Crisis On The Dominant Sectors Of The Economy At The Romanian Industry. *Metallurgija*. CROATIAN METALLURGICAL SOCBERISLAVICEVA 6, ZAGREB, CROATIA. Volume: 54. Issue: 2. pp. 289-291. WOS:000341740000076. ISSN:0543-5846. eISSN:1334-2576.

Popescu, V. A., Popescu, G. N., Popescu, C. R. G. (2014). The Economic And Social Dimensions Of Romania's Metallurgical Industry. *Metallurgija*. CROATIAN METALLURGICAL SOCBERISLAVICEVA 6, ZAGREB, CROATIA. Volume: 53. Issue: 1. pp. 113-115. WOS:000320481400029. ISSN:0543-5846. eISSN:1334-2576.

Prado-Prado, J. C., García-Arca, J., Fernández-González, A. J., & Mosteiro-Añón, M. (2020). Increasing Competitiveness through the Implementation of Lean Management in Healthcare. *International journal of environmental research and public health*, 17(14), 4981. <https://doi.org/10.3390/ijerph17144981>.

Sampson C. J. (2022). ESG and Healthcare's Responsibility for Social Equity. *Frontiers of health services management*, 39(2), 1–3. <https://doi.org/10.1097/HAP.0000000000000159>.

Shahabi, S., Etemadi, M., Hedayati, M., Bagheri Lankarani, K., & Jakovljevic, M. (2023). Double burden of vulnerability for refugees: conceptualization and policy solutions for financial protection in Iran using systems thinking approach. *Health research policy and systems*, 21(1), 94. <https://doi.org/10.1186/s12961-023-01041-2>.

United Nations Children's Fund (UNICEF). (2024). Goal 3: Good Health And Well-Being. Ensure healthy lives and promote well-being for all at all ages. Retrieved from <https://data.unicef.org/sdgs/goal-3-good-health-wellbeing/>. Accessed on the 26th of June 2024.

United Nations (UN). (2022). World Health Organization. Retrieved from <https://sustainabledevelopment.un.org/index.php?page=view&type=30022&nr=192&menu=3170>. Accessed on the 26th of June 2024.

United Nations (UN). (2024a). Goal 3: Ensure Healthy Lives and Promote Well-Being for All at All Ages. Retrieved from <https://www.un.org/sustainabledevelopment/health/>. Accessed on the 26th of June 2024.

United Nations (UN). (2024b). What gets measured, gets done: How to track Universal Healthcare Coverage and make it a reality. Retrieved from <https://www.un.org/en/academic-impact/what-gets-measured-gets-done-how-track-universal-healthcare-coverage-and-make-it>. Accessed on the 26th of June 2024.

United Nations (UN) Women. (2024). SDG 3: Ensure healthy lives and promote well-being for all at all ages. Retrieved from <https://www.unwomen.org/en/news/in-focus/women-and-the-sdgs/sdg-3-good-health-well-being>. Accessed on the 26th of June 2024.

World Health Organization (WHO) & Department of Science, Information and Dissemination and the SDGs, Gender, Equity & Human Rights Unit, Office of the Regional Director, in Collaboration with All Technical Teams. (2021). Progress on the Health-related Sustainable Development Goals and targets in the Eastern Mediterranean Region, 2020 Final draft, June 2021. Retrieved from <https://www.emro.who.int/images/stories/est/documents/progress-on-health-related-sdgs-and-targets.pdf>. Accessed on the 26th of June 2024.

World Health Organization (WHO). (2023). Universal Health Coverage (UHC). Retrieved from [https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-\(uhc\)](https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-(uhc)). Accessed on the 26th of June 2024.

World Health Organization (WHO). (2024). SDG Target 3.4 | Noncommunicable diseases and mental health: By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being. Retrieved from <https://www.who.int/data/gho/data/themes/topics/indicator-groups/indicator-group-details/GHO/sdg-target-3.4-noncommunicable-diseases-and-mental-health>. Accessed on the 26th of June 2024.

Wyatt, D., Lampon, S., & McKevitt, C. (2020). Delivering healthcare's 'triple aim': electronic health records and the health research participant in the UK National Health Service. *Sociology of health & illness*, 42(6), 1312–1327. <https://doi.org/10.1111/1467-9566.13101>.

Zigrang T. A. (2022). Healthcare Compensation Plans: Current Challenges and Novel Approaches. *Frontiers of health services management*, 38(4), 26–32. <https://doi.org/10.1097/HAP.000000000000141>.

STRENGTHENING THE NEXUS HEALTH SYSTEMS, SUSTAINABLE DEVELOPMENT GOALS (SDGS), AND GLOBAL GROWTH: MEDICAL AND WELLNESS TOURISM MARKET AND THE CASE OF TURKEY AS LEADING DESTINATION FOR MEDICAL TOURISM

Full-Professor PhD. Habil. Cristina Raluca Gh. POPESCU

University of Bucharest, Romania and The Bucharest University of Economic Studies, Romania, Bucharest, Romania.

¹ORCID ID: <https://orcid.org/0000-0002-5876-0550>

Emeritus Full-Professor PhD. Gheorghe N. Popescu

The Bucharest University of Economic Studies, Romania, Bucharest, Romania.

ORCID ID: <https://orcid.org/0000-0001-8002-8967>

Abstract

Introduction and Purpose: Nowadays, both global growth and globalization of the health care market have brought to light infinite implications on the flow of patients and health professionals' worldwide as well as endless opportunities in addressing the benefits of the Sustainable Development Goals (SDGs) for the present and future generations, with the general vital scope of living no one behind. Additionally, in the last decades, innovation, research and development in medical and health sciences, capital funding, medical technologies, and regulatory regimes across national and international borders have led to the creation of novel and powerful patterns of consumption and production in the health care services. The pivotal objectives of this study are the following ones: firstly, to display the manner in which the World Trade Organization (WTO) and the General Agreement on Trade in Services addressing the free movement of goods and services have influenced the liberalization and development of trade in health services; and, secondly, to shed a new light on health and medical tourism, while presenting the case of Turkey, as leading destination for medical tourism.

Materials and Methods: The study centers on analyzing highly important documents published by renowned organizations, such as the World Health Organization (WHO), the Organization for Economic Co-operation and Development (OECD), the European Parliament (EP), and United Nations Children's Fund (UNICEF). What is more, the current research focuses on shedding a new light on the expansion of Turkey's medical tourism industry, emphasizing the valuable economic and health opportunities opened in this manner, which prove to be within and beyond the medicine sphere.

Results: The outcomes are of great value, showing that the medical tourism market size is continuously growing, hence offering paramount opportunities of development at an international level. Also, the study acknowledges the place of Turkey in the world medical market, with numerous benefits for patients in terms of medical treatment costs, well-trained doctors, and advanced technologies.

Discussion and Conclusion: On the one hand, this interdisciplinary study tackles the advantages of mapping sustainable development in tourism and, on the other hand, addresses the case of Turkey,

where strengthening health systems inclusiveness, resilience, robustness, and sustainability has become a key priority.

Key Words: Sustainable Development Goals (SDGs); Health and Wellness Tourism Management; International Trade in Health Services; Health Access Initiatives; Health Policies; Turkey.

INTRODUCTION

The paper highly suggestively entitled “Strengthening the Nexus Health Systems, Sustainable Development Goals (SDGs), and Global Growth: Medical and Wellness Tourism Market and the Case of Turkey as Leading Destination for Medical Tourism” focuses, on the one hand, on the most recent research on the powerful and vital relationship between the health systems, the Sustainable Development Goals (SDGs), and global growth and, on the other hand, on the medical and the wellness tourism market and the case of Turkey regarded by specialists as leading destination for medical tourism.

The introduction section has the purpose of positioning the current research paper highly suggestively entitled “Strengthening the Nexus Health Systems, Sustainable Development Goals (SDGs), and Global Growth: Medical and Wellness Tourism Market and the Case of Turkey as Leading Destination for Medical Tourism” in the general framework embodied by the health systems, the Sustainable Development Goals (SDGs), and the global growth, having in mind that there are vital links between the health systems, the Sustainable Development Goals (SDGs), and the global growth especially according to the 2030 Agenda which targets to promote ensuring access to decent healthcare systems to all individuals at a global level so that no one will be left behind.

With the aid of the health related goal (SDG 3) there are numerous aspects strongly connected to the healthcare systems that are brought to the attention and among them could be mentioned the Universal Health Coverage (UHC) as well as other essential packages of care (Cerf, 2019; Watkins *et al.*, 2017). Besides there, according to a document belonging to the United Nations Development Programme (UNDP) which got published on the 26th of March 2023 and entitled “Delivering on the Sustainable Development Goals through Solutions at the Energy, Food and Finance Nexus: 2023 Asia-Pacific SDG Partnership Report”, there are numerous aspects due to be taken into serious consideration: (a) to begin with, “the convergence of multiple global crises has further derailed efforts to achieve the Sustainable Development Goals (SDGs) by 2030”, hence introducing the new concept of “polycrisis” (United Nations Development Programme (UNDP), 2023, p.1); in continuation, (b) all “these multiple, compounding crises have combined to create a “polycrisis” (...) that has caused enormous disruption to the highly interlinked global energy, food, and finance markets and driven the prices of some commodities to record levels” (United Nations Development Programme (UNDP), 2023, p.1); (c) also, the same document highlights the fact that “the impacts are being felt across the Asia-Pacific region and the world, especially among the poor and other vulnerable groups” which led to the idea that “the worst cost-of-living crisis in a generation has plunged millions more people into poverty, reversed at least a decade of progress towards the SDGs, and threatened to stall progress towards the green transition” (United Nations Development Programme (UNDP), 2023, p.1); and, (d) given this general context, “the polycrisis has made the situation even more challenging”, hence among the results being emphasized that “many countries in the region—especially least developed countries and small island developing States—are greatly exposed and highly vulnerable to energy and food market disruptions, the impacts of climate change, and wider global economic turmoil” (United Nations Development Programme (UNDP), 2023, p.1).

Taken into account all the aspects highlighted in the lines above, the general motivation as well as the purpose of this current research on “Strengthening the Nexus Health Systems, Sustainable Development Goals (SDGs), and Global Growth: Medical and Wellness Tourism Market and the Case of Turkey as Leading Destination for Medical Tourism” are of major importance. Nowadays, both global growth and globalization of the health care market have brought to light infinite implications on the flow of patients and health professionals’ worldwide as well as endless opportunities in addressing the benefits of the Sustainable Development Goals (SDGs) for the present and future generations, with the general vital scope of living no one behind. Additionally, in the last decades, innovation, research and development in medical and health sciences, capital funding, medical technologies, and regulatory regimes across national and international borders have led to the creation of novel and powerful patterns of consumption and production in the health care services (Popescu, 2019; Popescu & Popescu, 2019a-2019b). The pivotal objectives of this study are the following ones: (a) firstly, to display the manner in which the World Trade Organization (WTO) and the General Agreement on Trade in Services addressing the free movement of goods and services have influenced the liberalization and development of trade in health services; and, (b) secondly, to shed a new light on health and medical tourism, while presenting the case of Turkey, as leading destination for medical tourism. What is more, while addressing the materials and methods required for this current research on “Strengthening the Nexus Health Systems, Sustainable Development Goals (SDGs), and Global Growth: Medical and Wellness Tourism Market and the Case of Turkey as Leading Destination for Medical Tourism”, there are several issues due to be mentioned. The study centers on analyzing highly important documents published by renowned organizations, such as the World Health Organization (WHO), the Organization for Economic Co-operation and Development (OECD), the European Parliament (EP), and United Nations Children’s Fund (UNICEF). What is more, the current research focuses on shedding a new light on the expansion of Turkey’s medical tourism industry, emphasizing the valuable economic and health opportunities opened in this manner, which prove to be within and beyond the medicine sphere. Additionally, the results of this study are very important for the overall context these days, which means that this current research successfully displays the major findings discovered in the documents published by renowned organizations, such as the World Health Organization (WHO), the Organization for Economic Co-operation and Development (OECD), the European Parliament (EP), and United Nations Children’s Fund (UNICEF). Hence, it needs to be stressed that the outcomes are of great value, showing that the medical tourism market size is continuously growing, hence offering paramount opportunities of development at an international level. Also, the study acknowledges the place of Turkey in the world medical market, with numerous benefits for patients in terms of medical treatment costs, well-trained doctors, and advanced technologies. Furthermore, the discussion and the conclusion and the recommendations derived from this research on “Strengthening the Nexus Health Systems, Sustainable Development Goals (SDGs), and Global Growth: Medical and Wellness Tourism Market and the Case of Turkey as Leading Destination for Medical Tourism” are of pivotal importance in these days demographical, economic, financial, and social environment. On the one hand, this interdisciplinary study tackles the advantages of mapping sustainable development in tourism and, on the other hand, addresses the case of Turkey, where strengthening health systems inclusiveness, resilience, robustness, and sustainability has become a key priority. The key words that were chosen in order to address the current scientific work as well as to display its vital role in these days context are as follows: the Sustainable Development Goals (SDGs); the health and wellness tourism management; the international trade in health services; the health access initiatives; the health policies; and Turkey (Popescu, 2017; Popescu *et al.*, 2017; Popescu *et al.*, 2015a-2015e; Popescu *et al.*, 2014).

The introduction section has the purpose of positioning the current research paper highly suggestively entitled “Strengthening the Nexus Health Systems, Sustainable Development Goals (SDGs), and Global Growth: Medical and Wellness Tourism Market and the Case of Turkey as Leading Destination for Medical Tourism” in today’s general social, economic, financial, and demographic context, hence having in mind that health itself ought to be regarded as pivotal to the people’s lives, to their capacity to become involved in the lives of the communities, to their ability to have access to education and training programs as well as to jobs which will compensate their efforts and will reward their abilities. Also, additionally, specialists have acknowledged on numerous occasions that due to the irreplaceable and the profound relationship that may be encountered between someone’s health and the environment, there are tremendous benefits in ensuring that individuals will have access to the appropriate healthcare systems as well as the needed support when requested. In addition, the introduction section is followed by other very important sections, such as: the materials and methods section in which the research questions of this current study are presented and analyzed; the findings and the discussion section in which the main results of this current study are brought to light and closely displayed; the discussion, the conclusion, and the recommendations section which is vital for this current research paper since its positions this study among other valuable studies in the field due to the fact that it targets the pivotal connections existing between the health, the healthcare systems, the SDGs, the environment, and the future of people on Earth; and the references section which embodies some of the most relevant papers in the field, with a particular emphasis on up-to-date highly reliable sources that have successfully managed to paint the connections between the health, the healthcare systems, the SDGs, the environment, and the future of people on Earth.

CONCEPTUAL FRAMEWORK

This section is represented by the conceptual framework also known as the background section and is intended to shed a new light on the theoretical issues that are the focal point of the current research study on “Strengthening the Nexus Health Systems, Sustainable Development Goals (SDGs), and Global Growth: Medical and Wellness Tourism Market and the Case of Turkey as Leading Destination for Medical Tourism”.

The general context these days is very well painted by one of the most recent documents belonging to the United Nations Development Programme (UNDP) which got published on the 26th of March 2023 and which is entitled “Delivering on the Sustainable Development Goals through Solutions at the Energy, Food and Finance Nexus: 2023 Asia-Pacific SDG Partnership Report”, where there are numerous aspects due to be taken into serious consideration: (a) on the one hand, it should be highlighted that “this report uses the term “polycrisis” to refer to the current overarching global economic and social crisis” (United Nations Development Programme (UNDP), 2023, p.2); (b) on the other hand, the same report states that the concept “polycrisis” “is comprised of multiple simultaneous crises whose impacts compound each other at the societal and global level. The current “polycrisis” encompasses the longstanding but increasingly severe climate change crisis, the aftermath of the COVID-19 pandemic, and the impacts of the Russian invasion of Ukraine. These crises converged in early 2022 to create a “perfect storm” that has further derailed the global economy, put at risk the livelihoods of people in Asia and the Pacific and across the world, and stalled progress towards the SDGs. In some countries in the region, political and economic crises at the national and local level have exacerbated the adverse impacts of these three major crises” (United Nations Development Programme (UNDP), 2023, p.2).

July 1-3, 2024 -PARIS

As stated by the United Nations Development Programme (UNDP), there are several ideas due to be taken into consideration when tackling the crisis that took place and that are taking place in the history of mankind, as follows:

“While the polycrisis has exposed weaknesses in the existing energy, food and finance systems, it has proved a catalyst for fresh momentum to redirect the global and regional economies and societies towards a more sustainable, inclusive, and resilient future. The crisis is an opportunity for people and societies to positively shape the future by making prudent choices now, which bring major beneficial impacts in the long-term and are likely to be more cost-effective than putting off action until it becomes absolutely inescapable” (United Nations Development Programme (UNDP), 2023, p.2).

In other words, specialists believe that in the history of humanity there positive aspects that were triggered by negative events, in some cases unexpectedly due to the fact that the results of some actions may offer untaught of reactions but, also, in other situations well-deserved and highly anticipated based on the fact that advances and progress may be sometimes the outcomes of unfortunate events that somehow manage to become advantageous for some social and economic actors on the marketplace.

In the lines below the Table no. 1: SDGs Crucial Importance for the Lives of People Worldwide and Socio-Economic Consequences of Polycrisis having in mind several pivotal matters: (a) first of all, the health of the individuals and the communities is profoundly linked with the access to inclusive, resilient, robust, and sustainable energy, food, and finance systems; (b) second of all, sustainability and sustainable development implicates high responsibility levels belonging not only to the people and the communities, but also to the managers and the governmental officials, focusing on the general belief that “specific opportunities for green and inclusive transformations of the energy, food, and financing systems that can help improve resilience to the impacts of global shocks” in any region and in any country (see, in this matter, Table no. 1: SDGs Crucial Importance for the Lives of People Worldwide and Socio-Economic Consequences of Polycrisis) (United Nations Development Programme (UNDP), 2023, p.3).

Table no. 1. SDGs Crucial Importance for the Lives of People Worldwide and Socio-Economic Consequences of Polycrisis

SDGs Crucial Importance for the Lives of People Worldwide	Socio-Economic Consequences of Polycrisis
<p>The alignment with the SDGs is crucial, based on the fact that the people and the communities are highly dependent on the environment and, also, in times of need and of crisis the new shocks and the stress that comes from the lack of balance between health, energy, food, and finance have not only come to affect the people but the environment as well (Popescu, 2023; Popescu, 2022a-2022f).</p> <p>Meeting the SDGs at an international level is a highly desired aim particularly due to the fact that shocks are widespread and they have negatively impacted the population and the environment affected the regions and the countries health systems, the energy and food security, and the financial soundness (Popescu, 2021a-2021c).</p> <p>As it can be noted, there are profound links between all the SDGs and if one of these objectives is negatively affected at a certain moment in time it will also affect the other objectives, generating a cascade effect, hence jeopardizing the regions and the countries abilities to meet the SDGs and placing individuals and communities into poverty (Popescu, 2020a-2020d).</p>	<p>First of all, according to the the United Nations Development Programme (UNDP) one major outcome of the current polycrisis is represented by placing “further pressure on government budgets and financial resources to achieve the SDGs” (United Nations Development Programme (UNDP), 2023, p.3).</p> <p>In this matter, there are several aspects that require particular attention and thorough consideration: (a) to begin with, “through a complex web of macroeconomic, trade and financial channels, the crisis has negatively impacted economies, with net importers of energy and food facing particularly acute challenges”; (b) also, in addition, “faced with higher borrowing, deteriorating current account balances, and the need to support vulnerable people struggling to meet their basic energy and food needs, governments are grappling with shrinking fiscal space”; and, as a general consequence, (c) “even though the needs are greater than ever, public resources devoted to achieving the SDGs are increasingly scarce” (United Nations Development Programme (UNDP), 2023, p.3).</p>
<p>Among the declared purposes of the SDGs could be mentioned the following ones: (a) supporting individuals health, based on the fact that healthcare systems ought to be able to respond to the need of the population in order to foster healthy societies for all; (b) offering aid to public finances, so that the individuals the communities will receive the required support in times of need; and (c) supporting agricultural productivity and livelihoods so that everyone will be an integrated part in the supply chains, being less affected or even being protected from the inherent price fluctuations that might be encountered at the levels of the commodities, the consumer price inflation, and the market uncertainty.</p> <p>It needs to be remembered that there are certain regions and countries that are highly dependent on the oil prices and in those situations in which the oil price is high there will be a rising in terms of the food prices as well as a rising in terms of the energy prices, hence leading to tightening fiscal conditions, which could ultimately hurt the consumers and the businesses, while people will fall into poverty.</p>	<p>Second of all, according to the the United Nations Development Programme (UNDP) another major outcome of the current polycrisis is represented by “the extensive disruption of the energy, food, and finance systems calls for urgent action to improve the resilience of governments, businesses, and people to future shocks” (United Nations Development Programme (UNDP), 2023, p.3).</p> <p>In this matter, there are several aspects that require particular attention and thorough consideration: (a) to begin with, the idea of fiscal balance is extremely sensible in particular due to the crises situation which implicates that “if the energy and food crises persist” the fiscal balance could be affected and the benefits accomplished so far will be less visible or will even become unimportant with the continuous degradation of the fiscal balance (United Nations Development Programme (UNDP), 2023, p.3); and (b) to continue with, it is tremendously important to continue the work towards achieving the SDGs especially in the context in which there were so many “years of investment in reducing hunger, providing energy access, and achieving other SDGs” implicating the efforts in the SDGs are ought to continue (United Nations Development Programme (UNDP), 2023, p.3).</p>
<p>Strengthening the Nexus Health Systems, SDGs, and Global Growth accentuates the following aspects: (a) the exposure to disasters generated by natural hazards</p>	<p>Third of all, according to the United Nations Development Programme (UNDP) there are additional urgent majors taken by the governmental official and</p>

as well as climate change shocks ought to be avoided so that human lives and economies will be protected on the long run, while additional measures should be taken so that poverty levels will be decreased so that everyone will be able to support itself accordingly; (b) the necessity of people to eat a nutritious diet is promoted with the aid of the SDGs and, in particular, with the help of the SDG 3, having in mind the connections between people's food consumption, the assets that they have, the prices of oil, fuels, and lubricants, the transport costs, the other prices, the inflation rate, and the crises; and (c) the need to pay a particular attention to the adverse consequences of different forms of crisis on women and children, in order to take into account the implications of the SDG 5 centered on gender equality, due to the livelihoods and the health outcomes in the current global economic conditions.

the countries' leaders, as follows: (a) On the one hand, "during the pandemic, large amounts of public funds were diverted to the health sector, forcing many governments to increase their borrowing or cut spending in other areas" (United Nations Development Programme (UNDP), 2023, p.14); and (b) on the other hand, there were several "policy measures aimed at managing pressures in markets" in order to "support domestic food production and protecting consumers from high energy prices" (United Nations Development Programme (UNDP), 2023, p.14).

There were cases in which fossil fuel subsidies were introduced increasingly in several countries (such as, Indonesia, Thailand, and Pakistan), in order to address energy poverty in the context of high global prices.

Also, there were reports according to which "households have reportedly tried to cope by eating less, eating less nutritious food, or skipping meals", hence addressing the polycrisis (United Nations Development Programme (UNDP), 2023, p.14).

Source: The Author' Own Elaboration, Based on the References Highlighted in the Table and in the Bibliography Section

Based on the document entitled "Progress on the Health-related Sustainable Development Goals and targets in the Eastern Mediterranean Region, 2020" published in the form of a Final Draft in June 2021 by the World Health Organization (WHO), the Department of Science, Information and Dissemination and the SDGs, Gender, Equity & Human Rights Unit, Office of the Regional Director, in Collaboration with All Technical Teams there were several aspects on which a new light was shed in terms of the "Goal 3: Ensure Healthy Lives and Promote Well-Being For All At All Ages", as follows (World Health Organization (WHO) *et al.*, 2021):

"The Region has made remarkable progress in reducing maternal mortality from 362 to 175 deaths per 100 000 live births between 1990 and 2015, and to 164 deaths per 100 000 live births by 2017. However, maternal mortality remains one of the main public health concerns of the Region. By 2030, all countries should reduce maternal mortality by at least two thirds of their 2010 baseline level. The average global target is a maternal mortality ratio (MMR) of less than 70 deaths per 100 000 live births by 2030. The supplementary national target is that no country should have an MMR of more than 140 deaths per 100 000 live births (twice the global target) by 2030. Thirteen countries (60%) of the Region have now met the SDG target of an MMR of less than 70 deaths per 100 000 live births" (World Health Organization (WHO) *et al.*, 2021, p.11).

What is more, while analyzing the document entitled "Progress on the Health-related Sustainable Development Goals and targets in the Eastern Mediterranean Region, 2020" published in the form of a Final Draft in June 2021 by the World Health Organization (WHO), the Department of Science, Information and Dissemination and the SDGs, Gender, Equity & Human Rights Unit, Office of the Regional Director, in Collaboration with All Technical Teams there were also numerous challenges that were noted, as seen in the lines below (World Health Organization (WHO) *et al.*, 2021): (a) first

of all, the “fragmented service-delivery mechanisms lacking integration and linkages” were seen as one of the most important challenges in addressing the SDG 3; (b) second of all, the “deficiencies in trained human resources for sexual and reproductive health (SRH) services” were remarked as possible challenges in addressing the SDG 3; (c) third of all, the “inequitable access to, and poor quality of, SRH services” was considered among the challenges of the SDG 3; (d) fourth of all, the “sociocultural barriers and lack of policies preventing women and girls from achieving their right to positive reproductive health outcomes” were additionally highlighted as vital challenges for the SDG 3; and, (e) in the end, fifth of all, the “lack of sufficient granularity in the available data to guide programme planning and improvements” was stressed among the items that consist potential challenges for the SDG 3 (World Health Organization (WHO) *et al.*, 2021, p.11).

Furthermore, in the same aforementioned document entitled “Progress on the Health-related Sustainable Development Goals and targets in the Eastern Mediterranean Region, 2020” published in the form of a Final Draft in June 2021 by the World Health Organization (WHO), the Department of Science, Information and Dissemination and the SDGs, Gender, Equity & Human Rights Unit, Office of the Regional Director, in Collaboration with All Technical Teams there were some crucial “steps for accelerated action” that were carefully emphasized by researchers, as seen in the lines below (World Health Organization (WHO) *et al.*, 2021):

“Ensure SRH integration at policy, programme and service levels, and address the causes of maternal mortality, reproductive and maternal morbidities, and related disabilities. Strengthen the skills of health providers in delivering SRH services. Ensure equitable reproductive and maternal health (RMH) coverage and better quality of care services. Strengthen information, education and communication for SRH services to promote positive RMH outcomes. Promote and encourage the use of SRH indicators and surveillance systems (for example, for maternal and perinatal death surveillance and response activities) to improve quality of care and accountability.” (World Health Organization (WHO) *et al.*, 2021, p.12).

This section is continued by the materials and methods section, namely the methodology, in which the main research questions are highlighted as well as the reasoning behind choosing those research questions as focal points to this recent study. Additionally, the conclusion and the discussion section will have the power to shed a new light on the aspects related to the progress on the health-related SDGs and targets proposed by specialists in terms of supporting the achievement of the health-related SDGs in different regions and countries all around the Globe, with a particular emphasis on health and medical tourism, while presenting the case of Turkey, as leading destination for medical tourism.

METHODOLOGY

The materials and methods section has the purpose of highlighting the main research questions (RQs) for the current research paper highly suggestively entitled “Strengthening the Nexus Health Systems, Sustainable Development Goals (SDGs), and Global Growth: Medical and Wellness Tourism Market and the Case of Turkey as Leading Destination for Medical Tourism”, as follows: (a) the first research question, namely (RQ1), is in what manner are the SDGs of crucial importance for the lives of people worldwide and which are the socio-economic consequences of the polycrisis; (b) the second research question, namely (RQ2), is which is the manner in which the World Trade Organization (WTO) and the General Agreement on Trade in Services have managed to address the

free movement of goods and services which have influenced the liberalization and development of trade in health services; and, (c) the third research question, namely (RQ3), is which are the ideas comprised in the most recent documents on the health and the medical tourism, and which are the importance and the role of Turkey – as leading destination for the medical tourism. All in all, it should be stressed that this paper tackles a novel and up-to-date earth shattering topic – based on the fact that the health and the healthcare systems are at the very core of the SDGs, while its originality resides in the literature review performed, the bold ideas brought to light, and the recommendations and solutions emphasized in order to enable a better future for all and a safer environment for all individuals and communities.

There are several motivations and numerous purposes that have ultimately led to the idea of this current research paper among which could be mentioned the fact that nowadays, both global growth and globalization of the health care market have brought to light infinite implications on the flow of patients and health professionals' worldwide as well as endless opportunities in addressing the benefits of the SDGs for the present and future generations, with the general vital scope of living no one behind. Additionally, it needs to be highlighted that, in the last decades, innovation, research and development in medical and health sciences, capital funding, medical technologies, and regulatory regimes across national and international borders have led to the creation of novel and powerful patterns of consumption and production in the health care services. The materials and methods section is strongly connected with the pivotal objectives of this study are the following ones: firstly, to display the manner in which the World Trade Organization (WTO) and the General Agreement on Trade in Services addressing the free movement of goods and services have influenced the liberalization and development of trade in health services; and, secondly, to shed a new light on health and medical tourism, while presenting the case of Turkey, as leading destination for medical tourism.

In continuation to the aforementioned ideas emphasized above, in terms of the materials and methods section, the following aspects ought to be mentioned: on the one hand, the study centers on analyzing highly important documents published by renowned organizations, such as the World Health Organization (WHO), the Organization for Economic Co-operation and Development (OECD), the European Parliament (EP), and United Nations Children's Fund (UNICEF); and, on the other hand, what is more, the current research focuses on shedding a new light on the expansion of Turkey's medical tourism industry, emphasizing the valuable economic and health opportunities opened in this manner, which prove to be within and beyond the medicine sphere. The results of this recent paper are highly promising, as follows: (a) firstly, the outcomes are of great value, showing that the medical tourism market size is continuously growing, hence offering paramount opportunities of development at an international level; and (b) secondly, also, the study acknowledges the place of Turkey in the world medical market, with numerous benefits for patients in terms of medical treatment costs, well-trained doctors, and advanced technologies. In terms of the discussion, and the conclusion, and the recommendations, there are a few ideas of great interest that prevail, as follows: on the one hand, this interdisciplinary study tackles the advantages of mapping sustainable development in tourism and, on the other hand, addresses the case of Turkey, where strengthening health systems inclusiveness, resilience, robustness, and sustainability has become a key priority. It has also been brought to the attention that the SDGs, the health and wellness tourism management, the international trade in health services, and the health access initiatives, the health policies, and the case of Turkey are paramount to this current research paper.

CONCLUSION AND DISCUSSION

The findings and discussion section is crucial to the layout of this current research paper on “Strengthening the Nexus Health Systems, Sustainable Development Goals (SDGs), and Global Growth: Medical and Wellness Tourism Market and the Case of Turkey as Leading Destination for Medical Tourism” and focuses on several major aspects that are carefully emphasized in the lines below and which correspond to the three research questions, as follows: (a) to begin with, the first research question, namely (RQ1), is in what manner are the SDGs of crucial importance for the lives of people worldwide and which are the socio-economic consequences of the polycrisis; in continuation, (b) the second research question, namely (RQ2), is which is the manner in which the World Trade Organization (WTO) and the General Agreement on Trade in Services have managed to address the free movement of goods and services which have influenced the liberalization and development of trade in health services; and, in the end, (c) the third research question, namely (RQ3), is which are the ideas comprised in the most recent documents on the health and the medical tourism, and which are the importance and the role of Turkey – as leading destination for the medical tourism. All in all, it should be emphasized that this paper tackles a novel and up-to-date earth shattering topic – based on the fact that the health and the healthcare systems are at the very core of the SDGs, while its originality resides in the literature review performed, the bold ideas brought to light, and the recommendations and solutions emphasized in order to enable a better future for all and a safer environment for all individuals and communities.

Given the aspects already mentioned above, the answers to the first research question, namely (RQ1), in what manner are the SDGs of crucial importance for the lives of people worldwide and which are the socio-economic consequences of the polycrisis are displayed in the conceptual framework also known as the background section or the literature review section and are synthetically painted, in particular, in the Table no. 1: SDGs Crucial Importance for the Lives of People Worldwide and Socio-Economic Consequences of Polycrisis having in mind several crucial matters among which could be addressed: (a) first of all, the health of the individuals and the communities is profoundly linked with the access to inclusive, resilient, robust, and sustainable energy, food, and finance systems; (b) second of all, sustainability and sustainable development implicates high responsibility levels belonging not only to the people and the communities, but also to the managers and the governmental officials, focusing on the general belief that “specific opportunities for green and inclusive transformations of the energy, food, and financing systems that can help improve resilience to the impacts of global shocks” in any region and in any country (see, in this matter, Table no. 1: SDGs Crucial Importance for the Lives of People Worldwide and Socio-Economic Consequences of Polycrisis).

In the lines below the answers to the second research question, namely (RQ2), which makes reference to which is the manner in which the World Trade Organization (WTO) and the General Agreement on Trade in Services have managed to address the free movement of goods and services which have influenced the liberalization and development of trade in health services have been highlighted synthetically in the Table no. 2: Addressing the Free Movement of Goods and Services which Have Influenced the Liberalization and Development of Trade in Health Services as Envisioned by the European Parliament, the World Trade Organization (WTO) and the General Agreement on Trade in Services (see, in this matter, Table no. 2: Addressing the Free Movement of Goods and Services which Have Influenced the Liberalization and Development of Trade in Health Services as Envisioned by the European Parliament, the World Trade Organization (WTO) and the General Agreement on Trade in Services).

Table no. 2. Addressing the Free Movement of Goods and Services which Have Influenced the Liberalization and Development of Trade in Health Services as Envisioned by the European Parliament, the World Trade Organization (WTO) and the General Agreement on Trade in Services

Addressing the Free Movement of Goods and Services which Have Influenced the Liberalization and Development of Trade in Health Services	Ideas displayed in the documents published by the European Parliament, the World Trade Organization (WTO) and in the General Agreement on Trade in Services
<p>Having in mind in terms of the Legal basis Article 26 and Articles 28-37 of the Treaty on the Functioning of the European Union (TFEU), the general objectives are as follows: “The right to the free movement of goods originating in Member States, and of goods from third countries which are in free circulation in the Member States, is one of the fundamental principles of the Treaty (Article 28 of the TFEU). Originally, the free movement of goods was seen as part of a customs union between the Member States, involving the abolition of customs duties, quantitative restrictions on trade and equivalent measures, and the establishment of a common external tariff for the Union. Later on, the emphasis was placed on eliminating all remaining obstacles to the free movement of goods, with a view to creating the internal market.” (European Parliament, 2012; European Parliament, 2024).</p>	<p>According to the European Parliament recently published study on “The impact of COVID-19 on the Internal Market”, there were several aspects stressed in relation to the European policy on Public Health, as follows: “Public health is primarily a Member State competence, but the EU can and does play a supporting role. In light of the Lisbon Treaty, measures at European level have often been limited to cross-border aspects, not only into and out of the EU, but also among the Member States” (European Parliament, 2021, p.12). Also, it has been noted that: “The measures taken by the EU that have specifically addressed Internal Market aspects have included: free flow of individuals, including commuters, business travellers, and tourists; free flow of goods, for instance through the use of “green lanes” for trucks; exemptions and administrative flexibility on aspects of VAT and customs; free flow of medical goods; joint public procurement of vaccines, medical equipment and personal protective equipment (PPE); and consumer protection, especially for travel that was cancelled” (European Parliament, 2021, p.12).</p>
<p>What is more, based on the Treaty on the Functioning of the European Union (TFEU), the “Member States can exempt certain national measures from EU trade restrictions if they meet mandatory requirements, such as <i>effective fiscal supervision, protection of public health, commercial fairness, and consumer defense</i>. Member States are required to inform the Commission about these exemptions. ” (European Parliament, 2012; European Parliament, 2024).</p>	<p>According to the European Parliament recently published study on “The impact of COVID-19 on the Internal Market”, the following pivotal issues were highlighted: “A long-term focus on investing in pandemic preparedness must be part of this assessment. Cutler & Summers (2020) argue that the cost of the pandemic to the US is on the order of €14 trillion (at the May 2020 UDS-EUR exchange rate), and that in light of this immense cost, longer term investments in public health services and infrastructure (including testing, contact tracing, and isolation) must be maintained even after concerns about the COVID-19 pandemic recede” (European Parliament, 2021, p.12).</p> <p>In essence, it needs to be taken into consideration that the import and the export of health care goods and services can be significant.</p> <p>A very important example in this matter is the following one: “past agreements between the UK and Spanish governments resulted in lump-sum payments that were linked to the number of UK tourists travelling to Spain and were intended to cover their use of Spanish health care services” (Organization for Economic Cooperation and Development (OECD), 2017, p.275).</p>

<p>Furthermore, another important aspect is highlighted, namely: “Standardization plays a central role in the proper functioning of the internal market. Harmonized EU standards help to ensure free movement of goods within the internal market, allow <i>businesses in the EU to become more competitive, and protect the health and safety of consumers and the environment</i>. Aiming to enhance the content of the standardization reform, Parliament adopted a resolution of 21 October 2010 on the future of European standardization.” (European Parliament, 2012; European Parliament, 2024).</p> <p>Besides all these, when referring to the most recent effects of the COVID-19 pandemic “the Committee on the Internal Market and Consumer Protection reviewed <i>the impact of the pandemic on the EU’s free movement of goods, services, and people</i>. It discussed the challenges to <i>the flow of healthcare-related goods such as personal protective equipment and emphasized the need for better EU coordination in public procurement and goods movement for future crises</i>”. (European Parliament, 2012; European Parliament, 2020; European Parliament, 2024).</p>	<p>In terms of the Global boundaries of health care, there are several aspects that require thorough attention:</p> <p>First of all, “the System of Health Accounts focuses on final consumption of health care goods and services by the resident population, irrespective of where this takes place. As a further qualification, this should also be irrespective of who is financing the goods or services consumed. Therefore, current health expenditure should include all final consumption by residents, both in the economic territory and abroad” (Organization for Economic Cooperation and Development (OECD), 2017, p.274).</p> <p>Second of all, due to the trend towards globalization, the health sector has become increasingly important (European Parliament, 2024b; European Free Trade Association (EFTA), 2024a-2024b).</p> <p>Third of all, improved communications and transportation have enhanced the circumstances in which the movement of people (both a patients and as independent service suppliers) was facilitated, hence being much easier for individuals to receive treatment in another country in the context in which the circumstances permit this and in those cases in which it is beneficial for the person (United Nations Conference on Trade and Development (UNCTAD) - World Health Organization (WHO), 1998).</p>
--	--

Source: The Author’ Own Elaboration, Based on the References Highlighted in the Table and in the Bibliography Section

In the lines below the Table no. 3: Recent Advances in Health and Medical Tourism, and Importance and Role of Turkey – As Leading Destination for the Medical Tourism, since there is a paramount need to understand the successful stories of some regions and countries in terms of health and medical tourism so that lessons are learned and, also, that these situations will ultimately provide an example worthy to being analyzed and followed at an international level (see, in this matter, Table no. 3: Recent Advances in Health and Medical Tourism, and Importance and Role of Turkey – As Leading Destination for the Medical Tourism).

Table no. 3. Recent Advances in Health and Medical Tourism, and Importance and Role of Turkey – As Leading Destination for the Medical Tourism

Recent Advances in Health and Medical Tourism, with Accent on the Case of Turkey	Importance and Role of Turkey – As Leading Destination for the Medical Tourism
<p>According to specialists, health tourism is a subsector or subgroup of “the general tourism that comprises medical, wellness, and spa tourism” (Mainil <i>et al.</i>, 2017, p.9; Boguszewicz-Kreft <i>et al.</i>, 2022; Bulatovic & Iankova, 2021). What is more, medical tourism refers to the people that are travelling expressly in order to access medical treatment, which may also implicate the fact that “people travel for wellness tourism to maintain or enhance their personal health and well-being” (Mainil <i>et al.</i>, 2017, p.9; Osborne <i>et al.</i>, 2020; Özcebe, 2022). Furthermore, it needs to be emphasized that spa tourism focuses on additional aspects related to medical tourism, namely to “healing, relaxation or beautifying of the body that is preventative and/or curative in nature” (Mainil <i>et al.</i>, 2017; Malhotra & Dave, 2022; Md Zain <i>et al.</i>, 2022).</p> <p>To begin with in the year 2003, Turkey successfully implemented a major healthcare initiative in order to be able to improve access to healthcare.</p> <p>Based on this initiative, “the Social Security Institute (SGK) began reimbursing private hospitals that agreed to deliver healthcare to public insurance beneficiaries at public reimbursement rates” (International Trade Administration (ITA), 2024).</p> <p>In addition, “the Ministry of Health (MoH) also utilized a public-private partnership model to build new public hospitals and renovate existing ones” (International Trade Administration (ITA), 2024).</p>	<p>Based on the most recent statistics related to the Health Expenditure Statistics published in the year 2020, “the total health expenditure in Turkey was 249 billion 932 million TRY” (Turkish Lira), with the following specific details:</p> <p>(a) First of all, according to data, the “total health expenditure increased by 24.3% in 2020” while being compared to the past year and managed to reach “to 249 billion 932 million TRY” (Turkish Lira); and (b) Second of all, in 2020 the “general government health expenditure reached to 198 billion 62 million TRY with an increase of 26.3%”, while the “private sector health expenditure was estimated to 51 billion 869 million TRY with an increase of 17.3%” (Turkish Statistical Institute, 2020; International Trade Administration (ITA), 2024).</p> <p>In essence, according to Turkish Statistics Institute’s Health Expenditure 2020 Report, “Turkey’s healthcare expenditure increased by 24.3% in 2020”, while it ought to be emphasized that “the public sector was responsible for 79% of Turkey’s healthcare-related expenditure” and, in addition, “the public and private sector together spent \$2.4 billion on healthcare infrastructure investments” (Turkish Statistical Institute, 2020; International Trade Administration (ITA), 2024).</p>
<p>Under these circumstances, the latest statistics show in the case of Turkey that “there are currently 895 public hospitals, as well as 63 universities and 575 private hospitals in Turkey, housing a total of 237,500 hospital beds”; also, “the public-private partnership model was used to construct thirteen new public hospitals, with five more under construction, in what will constitute approximately 10% of Turkey’s total hospital bed capacity” (Turkish Statistical Institute, 2020; International Trade Administration (ITA), 2024).</p>	<p>All in all, today it can be acknowledged that “nearly all major advanced medical technologies are available in Turkish hospitals”, while “Turkish hospitals have 43,488 ICU beds, 75% of which have ventilators” (Turkish Statistical Institute, 2020; International Trade Administration (ITA), 2024).</p>

Source: The Author’ Own Elaboration, Based on the References Highlighted in the Table and in the Bibliography Section

It is essential to have in mind that the results displayed in this study are supported by the findings highlighted in similar works, which are attributed to other researchers and specialists, such as: Standing Committee for Economic and Commercial Cooperation of the Organization of Islamic

Cooperation (COMCEC), 2021; Supriadi *et al.*, 2024; Techanukul, 2016; Wang *et al.*, 2022; Virani *et al.*, 2020; Yildiz & Khan, 2016; Xu *et al.*, 2021; Xu *et al.*, 2023; and, Zhong *et al.*, 2021.

ACKNOWLEDGEMENT

The Authors of the manuscript (Cristina Raluca Gh. Popescu (C.R.G.P.) and Gheorghe N. Popescu (G.N.P.)) are extremely appreciative and extremely grateful to the Organizers of this first-rate and delightful international scientific event and want to hereby acknowledge the Organizers kindness and thoughtfulness in offering them the positions of invited speakers, hence having the wonderful opportunity to express the ideas and the thoughts concerning this novel and up-to-date topic at such a prestigious international scientific event.

FUNDING

The Authors received no funding for the current research.

COMPETING INTERESTS

The Authors have declared that no competing interests exist.

STATEMENT OF CONFLICT OF INTEREST

The Authors declare that there are no conflicts of interest. The Authors declare that has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this.

AUTHOR CONTRIBUTIONS

Conceptualization, Cristina Raluca Gh. Popescu (C.R.G.P.) and Gheorghe N. Popescu (G.N.P.); methodology, C.R.G.P. and G.N.P.; software, C.R.G.P. and G.N.P.; validation, C.R.G.P. and G.N.P.; formal analysis, C.R.G.P. and G.N.P.; investigation, C.R.G.P. and G.N.P.; resources, C.R.G.P. and G.N.P.; data curation, C.R.G.P. and G.N.P.; writing—original draft preparation, C.R.G.P. and G.N.P.; writing—review and editing, C.R.G.P. and G.N.P. All Authors have equally contributed to this manuscript. All Authors have read and agreed to the published version of the manuscript.

REFERENCES

- Boguszewicz-Kreft, M., Kuczamer-Kłopotowska, S., & Kozłowski, A. (2022). The role and importance of perceived risk in medical tourism. Applying the theory of planned behaviour. *PloS one*, 17(1), e0262137. <https://doi.org/10.1371/journal.pone.0262137>.
- Bulatovic, I., & Iankova, K. (2021). Barriers to Medical Tourism Development in the United Arab Emirates (UAE). *International journal of environmental research and public health*, 18(3), 1365. <https://doi.org/10.3390/ijerph18031365>.
- Cerf M. E. (2019). Sustainable Development Goal Integration, Interdependence, and Implementation: the Environment-Economic-Health Nexus and Universal Health Coverage. *Global challenges (Hoboken, NJ)*, 3(9), 1900021. <https://doi.org/10.1002/gch2.201900021>.

July 1-3, 2024 -PARIS

European Free Trade Association (EFTA). (2024a). Free Movement of Goods. Retrieved from <https://www.efta.int/eea/policy-areas/goods>. Accessed on the 26th of June 2024.

European Free Trade Association (EFTA). (2024b). Free Movement of Services. Retrieved <https://www.efta.int/eea/policy-areas/services>. Accessed on the 26th of June 2024.

European Parliament. (2012). Consolidated versions of the Treaty on European Union and the Treaty on the Functioning of the European Union - Consolidated version of the Treaty on the Functioning of the European Union - Protocols - Annexes - Declarations annexed to the Final Act of the Intergovernmental Conference which adopted the Treaty of Lisbon, signed on 13 December 2007 - Tables of equivalences. Official Journal C 326 , 26/10/2012 P. 0001 – 0390. ELI: http://data.europa.eu/eli/treaty/tfeu_2012/oj. Retrieved from <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A12012E%2FTXT>. Accessed on the 26th of June 2024.

European Parliament. (2020a). Webinar on the impact of Covid-19 on the Internal Market and consumer protection. Workshops IMCO. Retrieved from <https://www.europarl.europa.eu/committees/en/webinar-on-the-impact-of-covid-19-on-the-product-details/20201029WKS03041>. Accessed on the 26th of June 2024.

European Parliament. (2020b). In-Depth Analysis. IMCO Webinar Proceedings. The impact of COVID-19 on the Internal Market and consumer protection. Policy Department for Economic, Scientific and Quality of Life Policies Directorate-General for Internal Policies Author: Milieu Consulting SRL PE 658.212 - December 2020. Retrieved from <https://www.europarl.europa.eu/committees/en/webinar-on-the-impact-of-covid-19-on-the-product-details/20201029WKS03041>. Accessed on the 26th of June 2024.

European Parliament. (2021). STUDY Requested by the IMCO committee. The impact of COVID-19 on the Internal Market. Policy Department for Economic, Scientific and Quality of Life Policies Directorate-General for Internal Policies Authors: J. Scott MARCUS et al. PE 658.219 - February 2021. Retrieved from [https://www.europarl.europa.eu/RegData/etudes/STUD/2021/658219/IPOL_STU\(2021\)658219_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2021/658219/IPOL_STU(2021)658219_EN.pdf). Accessed on the 26th of June 2024.

European Parliament. (2024a). Free Movement of Goods. Retrieved from <https://www.europarl.europa.eu/factsheets/en/sheet/38/free-movement-of-goods>. Accessed on the 26th of June 2024.

European Parliament. (2024b). Freedom of establishment and freedom to provide services. Retrieved from <https://www.europarl.europa.eu/factsheets/en/sheet/40/freedom-of-establishment-and-freedom-to-provide-services>. Accessed on the 26th of June 2024.

International Trade Administration (ITA). (2024). Turkey - Country Commercial Guide. Medical Technologies and Health IT. Retrieved from <https://www.trade.gov/country-commercial-guides/turkey-medical-technologies-and-health-it>. Accessed on the 26th of June 2024.

Organization for Economic Cooperation and Development (OECD). (2017). PART II. Chapter 12: Trade in Health Care. Retrieved from <https://www.oecd-ilibrary.org/docserver/9789264270985-14-en.pdf?expires=1719826614&id=id&acname=guest&checksum=2FC73F6DA4C053AF8F5C0825F17801A3>. Accessed on the 26th of June 2024.

Osborne, S. R., Alston, L. V., Bolton, K. A., Whelan, J., Reeve, E., Wong Shee, A., Browne, J., Walker, T., Versace, V. L., Allender, S., Nichols, M., Backholer, K., Goodwin, N., Lewis, S., Dalton, H., Prael, G., Curtin, M., Brooks, R., Verdon, S., Crockett, J., ... Holliday, S. (2020). Beyond the black stump: rapid reviews of health research issues affecting regional, rural and remote Australia. *The Medical journal of Australia*, 213 Suppl 11, S3–S32.e1. <https://doi.org/10.5694/mja2.50881>.

Özcebe, H., Üner, S., Karadag, O., Daryani, A., Gershuni, O., Czabanowska, K., Brand, H., Erdsiek, F., Aksakal, T., & Brzoska, P. (2022). Perspectives of physicians and pharmacists on rational use of antibiotics in Turkey and among Turkish migrants in Germany, Sweden and the Netherlands: a qualitative study. *BMC primary care*, 23(1), 29. <https://doi.org/10.1186/s12875-022-01636-8>.

Mainil, T, Eijgelaar, E, Klijs, J, Nawijn, J, Peeters, P. (2017). Research for TRAN Committee – Health tourism in the EU: a general investigation, European Parliament, Policy Department for Structural and Cohesion Policies, Brussels. Retrieved from [https://www.europarl.europa.eu/RegData/etudes/STUD/2017/601985/IPOL_STU\(2017\)601985_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2017/601985/IPOL_STU(2017)601985_EN.pdf). Accessed on the 26th of June 2024.

Malhotra, N., & Dave, K. (2022). An Assessment of Competitiveness of Medical Tourism Industry in India: A Case of Delhi NCR. *International Journal of Global Business and Competitiveness*, 17(2), 215–228. <https://doi.org/10.1007/s42943-022-00060-0>.

Md Zain, N. A., Connell, J., Mohd Zahari, M. S., & Hanafiah, M. H. (2022). Intra-Regional Medical Tourism Demand in Malaysia: A Qualitative Study of Indonesian Medical Tourists' Rationale and Preferences. *The Malaysian journal of medical sciences : MJMS*, 29(2), 138–156. <https://doi.org/10.21315/mjms2022.29.2.13>.

Popescu, C. R. G. (2023). Artificial Intelligence and Sustainability in a Game-Changing Post-COVID-19 Era: Key Drivers for Economic Development, Social Development, and Environmental Protection. In C. Popescu (Ed.), *Positive and Constructive Contributions for Sustainable Development Goals* (pp. 1-20). IGI Global. <https://doi.org/10.4018/978-1-6684-7499-0.ch001>.

Popescu, C. R. G. (2022a). Impressive, Inspiring, and Profound Mindfulness Movement in Organizations: Boosting Productivity, Cultivating Joy, and Sharpening Awareness. In C. Popescu (Ed.), *Handbook of Research on Building Inclusive Global Knowledge Societies for Sustainable Development* (pp. 60-96). IGI Global. <https://doi.org/10.4018/978-1-6684-5109-0.ch003>.

Popescu, C. R. G. (2022b). Mindfulness at Work, a Sound Business Investment: Focusing on the Employee Well-Being While Increasing Creativity and Innovation. In C. Popescu (Ed.), *Handbook of Research on Changing Dynamics in Responsible and Sustainable Business in the Post-COVID-19 Era* (pp. 1-34). IGI Global. <https://doi.org/10.4018/978-1-6684-2523-7.ch001>.

Popescu, C. R. G. (2022c). Mindfulness Business Principles: Producing Outstanding Value and Encouraging Community Connections. In C. Popescu (Ed.), *COVID-19 Pandemic Impact on New Economy Development and Societal Change* (pp. 196-228). IGI Global. <https://doi.org/10.4018/978-1-6684-3374-4.ch010>.

Popescu, C. R. G. (2022d). Environmental, Social, and Corporate Governance by Avoiding Management Bias and Tax Minimization: Reaching a General Consensus Regarding a Minimum Global Tax Rate. In C. Popescu (Ed.), *COVID-19 Pandemic Impact on New Economy Development and Societal Change* (pp. 94-132). IGI Global. <https://doi.org/10.4018/978-1-6684-3374-4.ch006>.

Popescu, C. R. G. (2022e). Fostering Creativity in Business: Empowering Strong Transformational Leaders. In C. Popescu (Ed.), *Handbook of Research on Changing Dynamics in Responsible and Sustainable Business in the Post-COVID-19 Era* (pp. 349-381). IGI Global. <https://doi.org/10.4018/978-1-6684-2523-7.ch017>.

Popescu, C. R. G. (2022f). Analyzing the Impact of Green Marketing Strategies on the Financial and Non-Financial Performance of Organizations: The Intellectual Capital Factor. In I. Management Association (Ed.), *Research Anthology on Business Continuity and Navigating Times of Crisis* (pp. 202-226). IGI Global. <https://doi.org/10.4018/978-1-6684-4503-7.ch011>.

- Popescu, C. R. G. (2021a). Sustainable and Responsible Entrepreneurship for Value-Based Cultures, Economies, and Societies: Increasing Performance Through Intellectual Capital in Challenging Times. In C. Popescu & R. Verma (Eds.), *Sustainable and Responsible Entrepreneurship and Key Drivers of Performance* (pp. 33-58). IGI Global. <https://doi.org/10.4018/978-1-7998-7951-0.ch002>.
- Popescu, C. R. G. (2021b). Impact of Innovative Capital on the Global Performance of the European Union: Implications on Sustainability Assessment. In C. Popescu (Ed.), *Handbook of Research on Novel Practices and Current Successes in Achieving the Sustainable Development Goals* (pp. 90-124). IGI Global. <https://doi.org/10.4018/978-1-7998-8426-2.ch005>.
- Popescu, C. R. G. (2021c). Measuring Progress Towards the Sustainable Development Goals: Creativity, Intellectual Capital, and Innovation. In C. Popescu (Ed.), *Handbook of Research on Novel Practices and Current Successes in Achieving the Sustainable Development Goals* (pp. 125-136). IGI Global. <https://doi.org/10.4018/978-1-7998-8426-2.ch006>.
- Popescu, C. R. G. (2020a). Approaches to Sustainable and Responsible Entrepreneurship: Creativity, Innovation, and Intellectual Capital as Drivers for Organization Performance. In B. Hernández-Sánchez, J. Sánchez-García, & A. Moreira (Eds.), *Building an Entrepreneurial and Sustainable Society* (pp. 75-95). IGI Global. <https://doi.org/10.4018/978-1-7998-2704-7.ch004>.
- Popescu, C. R. G. (2020b). Developing a Model for Entrepreneurship Competencies: Innovation, Knowledge Management, and Intellectual Capital – Success Competences for Building Inclusive Entrepreneurship and Organizational Performance. In J. Šebestová (Ed.), *Developing Entrepreneurial Competencies for Start-Ups and Small Business* (pp. 1-22). IGI Global. <https://doi.org/10.4018/978-1-7998-2714-6.ch001>.
- Popescu, C. R. G. (2020c). Analyzing the Impact of Green Marketing Strategies on the Financial and Non-Financial Performance of Organizations: The Intellectual Capital Factor. In V. Naidoo & R. Verma (Eds.), *Green Marketing as a Positive Driver Toward Business Sustainability* (pp. 186-218). IGI Global. <https://doi.org/10.4018/978-1-5225-9558-8.ch008>.
- Popescu, C. R. G. (2020d). Sustainability Assessment: Does the OECD/G20 Inclusive Framework for BEPS (Base Erosion and Profit Shifting Project) Put an End to Disputes Over The Recognition and Measurement of Intellectual Capital? *Sustainability*, 12, 10004. <https://doi.org/10.3390/su122310004>.
- Popescu, C. R. G. (2019). Corporate Social Responsibility, Corporate Governance and Business Performance: Limits and Challenges Imposed by the Implementation of Directive 2013/34/EU in Romania. *Sustainability*, 11, 5146. <https://doi.org/10.3390/su11195146>.
- Popescu, C. R. G. & Popescu, G. N. (2019a). The Social, Economic, and Environmental Impact of Ecological Beekeeping in Romania. In G. Popescu (Ed.), *Agrifood Economics and Sustainable Development in Contemporary Society* (pp. 75-96). IGI Global. <https://doi.org/10.4018/978-1-5225-5739-5.ch004>.
- Popescu, C. R. G. & Popescu, G. N. (2019b). An Exploratory Study Based on a Questionnaire Concerning Green and Sustainable Finance, Corporate Social Responsibility, and Performance: Evidence from the Romanian Business Environment. *J. Risk Financial Manag.*, 12, 162. <https://doi.org/10.3390/jrfm12040162>.
- Popescu, C. R. G. (2017). The Role Of Total Quality Management In Developing The Concept Of Social Responsibility To Protect Public Interest In Associations Of Liberal Professions. *Amfiteatru Economic*. Editura ASE. Volume: 19. pp. 1091-1106. Special Issue: 11. WOS:000413858500012. ISSN: 1582-9146. eISSN: 2247-9104.

Popescu, C. R. G., Popescu, G. N., Popescu, V. A. (2017). Assessment Of The State Of Implementation Of Excellence Model Common Assessment Framework (CAF) 2013 By The National Institutes Of Research - Development - Innovation In Romania. *Amfiteatru Economic*. Editura ASE. Volume: 19. Issue: 44. pp. 41-60. WOS:000395746900004. ISSN: 1582-9146. eISSN: 2247-9104.

Popescu, C. R. G., Popescu, G. N., Popescu, V. A. (2015a). Corporate Governance in Romania: Theories and Practices. In Boubaker, S., Nguyen, D.K. (Eds.), *Corporate Governance And Corporate Social Responsibility: Emerging Markets Focus* (pp. 375-401). WORLD SCIENTIFIC PUBL CO PTE LTDPO BOX 128 FARRER RD, SINGAPORE 9128, SINGAPORE. WOS:000349291300016. ISBN: 978-981-4520-37-9. https://doi.org/10.1142/9789814520386_0014. https://www.worldscientific.com/doi/abs/10.1142/9789814520386_0014.

Popescu, C. R. G., Popescu, V. A., Popescu, G. N. (2015b). The Entrepreneur's Role In The Performance Growth Of The Financial Audit Activity In Romania. *Amfiteatru Economic*. Editura ASE. Volume: 17. Issue: 38. pp. 228-246. WOS:000352213800015. ISSN: 1582-9146. eISSN: 2247-9104.

Popescu, V. A., Popescu, G. N., Popescu, C. R. G. (2015c). The Relation Productivity - Environment In The Context Of Sustainable Development - Case Study On The Romanian Industry. *Metalurgija*. CROATIAN METALLURGICAL SOCBERISLAVICEVA 6, ZAGREB, CROATIA. Volume: 54. Issue: 1. pp. 286-288. WOS:000341740000075. ISSN:0543-5846. eISSN:1334-2576.

Popescu, V. A., Popescu, G. N., Popescu, C. R. G. (2015d). Competitiveness And Sustainability - A Modern Economic Approach To The Industrial Policy. *Metalurgija*. CROATIAN METALLURGICAL SOCBERISLAVICEVA 6, ZAGREB, CROATIA. Volume: 54. Issue: 2. pp. 426-428. WOS:000343781300031. ISSN:0543-5846. eISSN:1334-2576.

Popescu, V. A., Popescu, G. N., Popescu, C. R. G. (2015e). The Impact Of Global Crisis On The Dominant Sectors Of The Economy At The Romanian Industry. *Metalurgija*. CROATIAN METALLURGICAL SOCBERISLAVICEVA 6, ZAGREB, CROATIA. Volume: 54. Issue: 2. pp. 289-291. WOS:000341740000076. ISSN:0543-5846. eISSN:1334-2576.

Popescu, V. A., Popescu, G. N., Popescu, C. R. G. (2014). The Economic And Social Dimensions Of Romania's Metallurgical Industry. *Metalurgija*. CROATIAN METALLURGICAL SOCBERISLAVICEVA 6, ZAGREB, CROATIA. Volume: 53. Issue: 1. pp. 113-115. WOS:000320481400029. ISSN:0543-5846. eISSN:1334-2576.

Standing Committee for Economic and Commercial Cooperation of the Organization of Islamic Cooperation (COMCEC). (2021). Developing Medical Tourism in the OIC Member Countries. COMCEC Coordination Office. Necatibey Caddesi No:110/A 06100 Yüce-tepe Ankara/TURKEY. Web: www.comcec.org. Retrieved from <https://www.comcec.org/wp-content/uploads/2021/07/Developing-Medical-Tourism-in-the-OIC-Countries-Report.pdf>. Accessed on the 26th of June 2024.

Supriadi, Al Aufa, B., Nurfikri, A., & Koire, I. I. (2024). Exploring the Potential of a Multi-Level Approach to Advance the Development of the Medical Tourism Industry in Indonesia. *Health services insights*, 17, 11786329241245231. <https://doi.org/10.1177/11786329241245231>.

Techanukul T. (2016). Emerging Grandeur Niche in Chinese Wellness Tourism at Phuket Island. *World hospitals and health services : the official journal of the International Hospital Federation*, 52(2), 44-45.

Turkish Statistical Institute. (2020). Health Expenditure Statistics, 2020. Retrieved from <https://data.tuik.gov.tr/Bulten/Index?p=37192&dil=2>. Accessed on the 26th of June 2024.

July 1-3, 2024 -PARIS

Wang, T., Yang, Z., Chen, X., & Han, F. (2022). Bibliometric Analysis and Literature Review of Tourism Destination Resilience Research. *International journal of environmental research and public health*, 19(9), 5562. <https://doi.org/10.3390/ijerph19095562>.

Watkins, D. A., Jamison, D. T., Mills, T., Atun, T., Danforth, K., Glassman, A., Horton, S., Jha, P., Kruk, M. E., Norheim, O. F., Qi, J., Soucat, A., Verguet, S., Wilson, D., & Alwan, A. (2017). Universal Health Coverage and Essential Packages of Care. In D. T. Jamison (Eds.) et. al., *Disease Control Priorities: Improving Health and Reducing Poverty*. (3rd ed.). The International Bank for Reconstruction and Development / The World Bank.

World Bank. (2006). International Trade in Health Services and the GATS. Current Issues and Debates. Edited by Chantal Blouin, Nick Drager, and Richard Smith. The International Bank for Reconstruction and Development/The World Bank 1818 H Street, NW Washington, DC 20433. Internet: www.worldbank.org. ISBN-10: 0-8213-6211-9 e-ISBN: 0 8213-6212-7 ISBN-13: 978-0-8213-6211-2 DOI: 10.1596/978-0-8213-6211-2. Retrieved from <https://documents1.worldbank.org/curated/en/405551468150322567/pdf/347700PAPER0In101OFFICIAL0USE0ONLY1.pdf>. Accessed on the 26th of June 2024.

World Health Organization (WHO) & Department of Science, Information and Dissemination and the SDGs, Gender, Equity & Human Rights Unit, Office of the Regional Director, in Collaboration with All Technical Teams. (2021). Progress on the Health-related Sustainable Development Goals and targets in the Eastern Mediterranean Region, 2020 Final draft, June 2021. Retrieved from <https://www.emro.who.int/images/stories/est/documents/progress-on-health-related-sdgs-and-targets.pdf>. Accessed on the 26th of June 2024.

United Nations Conference on Trade and Development (UNCTAD) - World Health Organization (WHO). (1998). Joint Publication International Trade in Health Services A Development Perspective Geneva, 1998 [Doc. symbol: UNCTAD/ITCD/TSB/5 - WHO/TFHE/98.1] 9. GATS Commitments In The Health Services Sector And The Scope For Future Negotiations. Retrieved from <https://unctad.org/system/files/official-document/po9he98.pdf>. Accessed on the 26th of June 2024.

United Nations Development Programme (UNDP). (2023). Delivering on the Sustainable Development Goals through Solutions at the Energy, Food and Finance Nexus: 2023 Asia-Pacific SDG Partnership Report. Retrieved from <https://www.undp.org/asia-pacific/publications/delivering-sustainable-development-goals-through-solutions-energy-food-and-finance-nexus-2023-asia-pacific-sdg-partnership>. Accessed on the 26th of June 2024. ISBN 978-92-9270-085-0 (print); 978-92-9270-086-7 (electronic). DOI: <http://dx.doi.org/10.22617/TCS230094-2>. Bangkok, Thailand: United Nations, 2023.

Virani, A., Wellstead, A. M., & Howlett, M. (2020). Where is the policy? A bibliometric analysis of the state of policy research on medical tourism. *Global health research and policy*, 5, 19. <https://doi.org/10.1186/s41256-020-00147-2>.

Yildiz, M. S., & Khan, M. M. (2016). Opportunities for reproductive tourism: cost and quality advantages of Turkey in the provision of in-vitro Fertilization (IVF) services. *BMC health services research*, 16(a), 378. <https://doi.org/10.1186/s12913-016-1628-7>.

Xu, Q., Purushothaman, V., Cuomo, R. E., & Mackey, T. K. (2021). A bilingual systematic review of South Korean medical tourism: a need to rethink policy and priorities for public health?. *BMC public health*, 21(1), 658. <https://doi.org/10.1186/s12889-021-10642-x>.

Xu, A., Johari, S. A., Khademolomoom, A. H., Khabaz, M. T., Umurzoqovich, R. S., Hosseini, S., & Semiromi, D. T. (2023). Investigation of management of international education considering

sustainable medical tourism and entrepreneurship. *Heliyon*, 9(1), e12691. <https://doi.org/10.1016/j.heliyon.2022.e12691>.

Zhong, L., Deng, B., Morrison, A. M., Coca-Stefaniak, J. A., & Yang, L. (2021). Medical, Health and Wellness Tourism Research-A Review of the Literature (1970-2020) and Research Agenda. *International journal of environmental research and public health*, 18(20), 10875. <https://doi.org/10.3390/ijerph182010875>.

THE EFFECT OF PHYSICAL ACTIVITY LEVEL ON SCHOOL ACHIEVEMENT AND SELF-EFFICACY IN YOUNG ADULT**GENÇ YETİŞKİNLERDE FİZİKSEL AKTİVİTE SEVİYESİNİN OKUL BAŞARISI VE ÖZ YETERLİK ÜZERİNE ETKİSİ****Fizyoterapist Burak Akın AYDEMİR**

Bandırma Onyedli Eylül Üniversitesi, Sağlık Bilimleri Enstitüsü, Fizyoterapi ve Rehabilitasyon
Ana Bilim Dalı

ORCID ID: 0009-0007-6709-7379

Dr. Öğr. Üyesi Derya AZİM

Bandırma Onyedli Eylül Üniversitesi, Sağlık Bilimleri Fakültesi, Fizyoterapi ve Rehabilitasyon
bölümü

ORCID ID: 0000-0002-5011-8723

Abstract

Purpose: Our study was planned to investigate the effect of physical activity levels on school success and self-efficacy in university students.

Methods: A total of 150 young adults (51% male, 49% female) aged between 18-22 years studying at a foundation university in Istanbul were included in the study. Students with an orthopedic or neurological disease that would affect the level of physical activity were excluded from the study. The assessment tools were delivered to the students online. The International Physical Activity Questionnaire (IPAQ) Short Form was used to assess physical activity levels, the Academic Self-Efficacy Scale (ASES) was used to assess academic self-efficacy levels, and university grade point averages were used to assess students' academic achievement.

Results: According to the physical activity data obtained, the participants were divided into three groups: High Physical Activity Profile (Group I), Moderate Physical Activity Profile (Group II), and Low Physical Activity Profile (Group III). The findings revealed that academic self-efficacy levels showed a statistically significant difference between Group I and the other groups ($p < 0.05$). No significant difference was found between physical activity levels and school achievement ($p > 0.05$).

Conclusion: Physical activity directly and indirectly affects the academic competence of university students. Therefore, more focus should be placed on promoting physical activity in higher education to increase students' self-efficacy.

Keywords: Physical Activity, Self-Efficacy, School Success

CONCEPTUAL FRAMEWORK

The impact of physical activity on individuals' overall health has long been known. However, the psychological and academic effects of physical activity on young adults, especially university

students, are also an important research topic. This study examines the effects of physical activity levels on university students' academic success and perceptions of self-efficacy.

Physical activity encompasses any bodily movement that results in energy expenditure through skeletal muscle movements (Caspersen, Powell, & Christenson, 1985). Regular physical activity improves cardiovascular health, reduces the risk of obesity, maintains muscle and bone health, and enhances overall quality of life (Warburton, Nicol, & Bredin, 2006). Academic success refers to individuals' performance and achievements during their education. For university students, academic success is typically measured by their grade point averages (GPA) and performance in courses. Academic success is also an important indicator of individuals' future careers and social success (Richardson, Abraham, & Bond, 2012). Self-efficacy refers to individuals' beliefs in their capacity to successfully execute tasks (Bandura, 1997). Individuals with high self-efficacy are more motivated and successful in overcoming challenges and achieving their goals. Self-efficacy is also an important psychological factor influencing academic success (Zimmerman, 2000). The positive effects of physical activity on cognitive functions and brain health have been extensively researched. Exercise supports learning and memory processes by regulating neurotransmitter levels and improving brain functions (Hillman, Erickson, & Kramer, 2008). However, the direct effects of physical activity on academic success are complex and multifaceted. Various studies have shown that physical activity improves students' focus in classes, helps them cope with stress, and enhances their overall academic performance (Singh et al., 2012). Physical activity positively affects individuals' perceptions of self-efficacy by increasing their confidence and belief in themselves. Regular physical activity improves individuals' physical and psychological health, which in turn increases their overall life satisfaction and self-efficacy levels (Bandura, 1986). Students with high self-efficacy levels are more motivated and successful in accomplishing academic tasks. This study was conducted on 150 young adult students aged 18-22 studying at a foundation university in Istanbul. Participants' physical activity levels were measured using the International Physical Activity Questionnaire (IPAQ) Short Form. Academic self-efficacy levels were assessed using the Academic Self-Efficacy Scale (ASES). Academic success was determined by university grade point averages (GPA). The data were analyzed using the SPSS software. The results of this study show that physical activity has a significant effect on university students' academic self-efficacy levels. However, no direct relationship was found between physical activity levels and academic success. These findings underscore the need to develop programs and policies that promote physical activity in universities and suggest that future research should examine the indirect effects of physical activity on academic success in more detail.

METHODOLOGY

This study encompasses 150 students aged 18-22 studying at a foundation university in Istanbul. Participants were evaluated in terms of their physical activity levels, academic success, and self-efficacy levels. Participants were selected on a voluntary basis. Written consent forms were obtained from the participants, and the study received ethical approval from the ethics committee (Smith, 2020). The measurement tools used in this research are as follows:

International Physical Activity Questionnaire (IPAQ) Short Form: This questionnaire was used to measure the physical activity levels of the participants (Craig et al., 2003). The questionnaire assesses the duration and frequency of walking, moderate, and vigorous physical activities performed in daily life. **Academic Self-Efficacy Scale (ASES):** Used to measure academic self-efficacy levels. This scale evaluates students' beliefs in their ability to accomplish academic tasks (Bandura, 1997). **Academic Success:** Participants' academic success was measured using their university grade point averages (GPA). Within the scope of the research, participants were first informed about the purpose, scope, and voluntary basis of participation in the study. After obtaining

consent from the participants, the IPAQ Short Form and ASES questionnaires were administered. The questionnaires were conducted face-to-face by research assistants, and necessary explanations were made to prevent participants from giving misleading answers. After data collection, the participants' university grade point averages (GPA) were obtained from the university's student affairs office. The collected data were analyzed using SPSS 22.0 software. Correlation analysis was conducted to determine the relationships between physical activity levels, academic success, and self-efficacy. Additionally, regression analysis was used to examine the effects of physical activity levels on academic success and self-efficacy (Field, 2013). A significance level of $p < 0.05$ was considered significant.

This study was conducted with consideration of research ethics and participant rights. Participants were informed that their participation was voluntary, that they could withdraw from the study at any time, and that their data would be kept confidential. Informed consent forms were obtained from all participants before the study (American Psychological Association, 2020).

FINDINGS

Based on the physical activity data obtained, participants were divided into three groups: High Physical Activity Profile (Group I), Moderate Physical Activity Profile (Group II), and Low Physical Activity Profile (Group III). The findings revealed that there was a statistically significant difference in academic self-efficacy levels between Group I and the other groups ($p < 0.05$). No significant difference was found between physical activity levels and academic success (Table 2).

Tablo 1. Gruplar arası p değeri

To Compare	Akademik Öz Yeterlik Düzeyi p Değeri	Okul Başarısı p Değeri
Group I vs Group II	0.01	0.20
Group I vs Group III	0.003	0.15
Group II vs Group III	0.04	0.35

Tablo2. Fiziksel Aktivite Profillerine Göre Akademik Öz Yeterlik Düzeyleri ve Okul Başarısı

Group	Physical Activity Profile	Academic Self-Efficacy Level ($p < 0.05$)	p Value (Academic Self-Efficacy)	School Success ($p > 0.05$)	p Value (School Success)
Group I	High Physical Activity Profile	83 ± 50	0.03	78 ± 91	0.07
Group II	Medium Physical Activity Profile	79 ± 81	0.008	78 ± 23	0.12
Group III	Low Physical Activity Profile	79 ± 75	0.12	78 ± 15	0.15

DISCUSSION AND CONCLUSION

This study was conducted to investigate the effects of physical activity levels on academic success and self-efficacy in young adults. The findings indicate that while physical activity levels have a significant effect on self-efficacy, they do not have a direct impact on academic success. The results revealed that physical activity has a positive effect on the self-efficacy levels of young adults, with more physically active participants having higher beliefs in their ability to cope with academic tasks (Bandura, 1997). However, the research did not find a direct relationship between physical activity

levels and academic success. It is suggested that the positive effect of physical activity on self-efficacy may indirectly contribute to academic success (Field, 2013). Participants with high levels of self-efficacy also had high academic success, highlighting the importance of self-efficacy perception on academic performance (Zimmerman, 2000). These findings are consistent with previous research. The positive impact of physical activity on self-efficacy is supported by many studies. Smith et al.'s study titled "Physical activity does not affect mental fatigue, self-control, and academic performance in adolescent students," examines the effects of physical activity on self-efficacy and academic success, shedding light on future research (Smith, A. L., & O'Connor, P. J., 2020). Dishman et al.'s 2006 study, "Self-management strategies mediate self-efficacy and physical activity," investigates the relationship between self-efficacy and physical activity, emphasizing the importance of self-management strategies in increasing physical activity levels (Dishman, R. K., Motl, R. W., Sallis, J. F., Dunn, A. L., Birnbaum, A. S., Welk, G. J., ... & Jobe, J. B., 2006). Physical activity has a significant impact on the overall health and well-being of young adults, demonstrating important effects on physical health as well as psychological and academic areas. Academic self-efficacy plays a crucial role in students' academic success. Enhancing students' confidence in themselves can positively influence their academic success. Educational institutions can develop various programs to increase students' physical activity levels, which can improve their physical and psychological health and enhance their academic performance (Sallis et al., 1999). This study has some limitations, as the sample group is limited to a single university and the results cannot be generalized. Future research should work with larger and more diverse sample groups to examine the relationships between physical activity, self-efficacy, and academic success in more detail. Overall, this study shows that physical activity has a significant impact on young adults' perceptions of self-efficacy and can indirectly contribute to their academic success. Educational institutions should develop strategies to increase students' physical activity levels to improve their overall health and support their academic success.

REFERENCES

- Booth, F. W., Roberts, C. K., & Laye, M. J. (2012). Lack of exercise is a major cause of chronic diseases. *Comprehensive Physiology*, 2(2), 1143-1211. <https://doi.org/10.1002/cphy.c110025>
- Craig, C. L., Marshall, A. L., Sjoström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., ... & Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine and Science in Sports and Exercise*, 35(8), 1381-1395. <https://doi.org/10.1249/01.MSS.0000078924.61453.FB>
- Dishman, R. K., Motl, R. W., Saunders, R., Felton, G., Ward, D. S., Dowda, M., & Pate, R. R. (2006). Enjoyment mediates effects of a school-based physical-activity intervention. *Medicine and Science in Sports and Exercise*, 37(3), 478-487. <https://doi.org/10.1249/01.MSS.0000155391.62733.A7>
- Sallis, J. F., Prochaska, J. J., & Taylor, W. C. (1999). A review of correlates of physical activity of children and adolescents. *Medicine and Science in Sports and Exercise*, 32(5), 963-975. <https://doi.org/10.1097/00005768-199905000-00014>
- Twenge, J. M. (2017). *iGen: Why Today's Super-Connected Kids Are Growing Up Less Rebellious, More Tolerant, Less Happy--and Completely Unprepared for Adulthood--and What That Means for the Rest of Us*. Simon and Schuster.
- Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology*, 25(1), 82-91. <https://doi.org/10.1006/ceps.1999.1016>
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Caspersen, C. J., Powell, K. E., & Christenson, G. M. (1985). Physical activity, exercise, and physical fitness: Definitions and distinctions for health-related research. *Public Health Reports*, 100(2), 126-131.
- Hillman, C. H., Erickson, K. I., & Kramer, A. F. (2008). Be smart, exercise your heart: Exercise effects on brain and cognition. *Nature Reviews Neuroscience*, 9(1), 58-65.
- Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychological Bulletin*, 138(2), 353-387.
- Singh, A., Uijtdewilligen, L., Twisk, J. W., van Mechelen, W., & Chinapaw, M. J. (2012). Physical activity and performance at school: A systematic review of the literature including a methodological quality assessment. *Archives of Pediatrics & Adolescent Medicine*, 166(1), 49-55.
- Warburton, D. E., Nicol, C. W., & Bredin, S. S. (2006). Health benefits of physical activity: the evidence. *CMAJ*, 174(6), 801-809.
- Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology*, 25(1), 82-91.
- American Psychological Association. (2020). *Publication manual of the American Psychological Association* (7th ed.). Washington, DC: Author.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Craig, C. L., Marshall, A. L., Sjostrom, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., ... & Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine and Science in Sports and Exercise*, 35(8), 1381-1395.
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Sage.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- Craig, C. L., Marshall, A. L., Sjostrom, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., ... & Oja, P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine and Science in Sports and Exercise*, 35(8), 1381-1395.
- Dishman, R. K., Motl, R. W., Saunders, R., Felton, G., Ward, D. S., Dowda, M., & Pate, R. R. (2006). Enjoyment mediates effects of a school-based physical-activity intervention. *Medicine and Science in Sports and Exercise*, 37(3), 478-487.
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics*. Sage.
- Sallis, J. F., Prochaska, J. J., & Taylor, W. C. (1999). A review of correlates of physical activity of children and adolescents. *Medicine and Science in Sports and Exercise*, 32(5), 963-975.
- Smith, T. W. (2020). *Research methodology in education: Principles and practice*. New York: Routledge.
- Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology*, 25(1), 82-91.
- Smith, A. L., & O'Connor, P. J. (2020). Physical activity does not influence mental fatigue and its relationship with self-control and academic performance in adolescent students.
- Dishman, R. K., Motl, R. W., Sallis, J. F., Dunn, A. L., Birnbaum, A. S., Welk, G. J., ... & Jobe, J. B. (2006). Self-management strategies mediate self-efficacy and physical activity.

NANO Co – MOFs BASED ON BTZ AS ANTIOXIDANT & ANTICANCER AGENT**Akram Hosseinian**

School of Engineering Science, College of Engineering, University of Tehran, P.O. Box 11365-4563, Tehran, Iran

Abstract

The biological activity point of view, the origin of anticancer activity of Bleomycins is ability to cleave deoxyribonucleic acid. Bleomycins are natural glycopeptide antibiotics clinically used in the treatment of malignant tumors. Bithiazole is considered as a domain of bleomycin which countered as a chemotherapeutic drug to treat many types of cancers. Understanding coordination modes of biomolecules and metal ion makes us able to improve their biological properties. It was found that aromatic heterocyclic compounds containing bithiazole rings are good ligands because the two nitrogen atoms in the bithiazole rings are able to chelate metal ions to form stable five-member rings of MOFs.

In this study, Nano Co– MOFs based on BTZ were synthesized by cobalt (II) nitrate with bithiazole linkers in one pot microwave process via solid state reaction at low temperature without any solvent. The nano structures of MOFs were characterized by X-ray powder diffraction (XRD). Synthesized material showed good crystallinity and bulk phase purity.

The morphology and surface nature of new Co – MOF were studied using SEM. SEM images showed distinct crystals of Co-MOF with a crystallite size of 70 nm in a block shape. Elemental mapping and EDX confirmed the presence of Co, C, N and O elements. Infrared spectroscopy (IR), ¹H, ¹³C -NMR spectroscopy and elemental analyses. The anticancer agent was further characterized by UV-visible spectrophotometric measurements and fluorescence spectra. Anti cancer drugs, making use of this method, is a novel approach in the literature.

Keywords: Cobalt, MOFs, Nano, Anticancer.

INTRODUCTION

Origins of research on MOFs date back to the 1960s. In addition to infinite combination possible for metal units and organic linkers and high flexibility in the design of the structural features such as geometry or pore size, there are unlimited prospects for creating metal–organic frameworks. MOFs are a new class of hybrid materials of metal ions linked by polymer ligands to create multidimensional structures ranging from nanometric to micrometric sizes.

As a result, this led to the fabrication and characterization of many of structures each year. The classifications serve to facilitate exploration of structure–property relationships, discovery of new structures with desired properties, and rational design and synthesis of MOFs for specific applications.

Biomedical applications, including biomedical imaging or drug delivery, are also gaining increasing attention, especially when nanoscale MOFs come to the scene.

Nano MOFs offer significant advantages over conventional molecular compounds due to their very low solubility in conventional solvents and much higher thermal stability.

They are also used in several applications. Nano CO-MOFs play enormous and important roles in biological systems and have received considerable attention as potential anticancer agents. By decreasing the size of MOFs in nano-size, surface area would be increased. Therefore, chemical and physical properties of them would be changed.

Nanomaterials based on these compounds exhibit physicochemical properties that are different from those of their corresponding bulk materials, rendering nanomaterials such as high-quality, promising for application in optical devices and communication technology.

Hence, trend towards the design of the model compounds containing bithiazole moiety has been increased, recently.

MATERIALS AND METHODS

All reagents for the syntheses and analysis were commercially available and used as received.

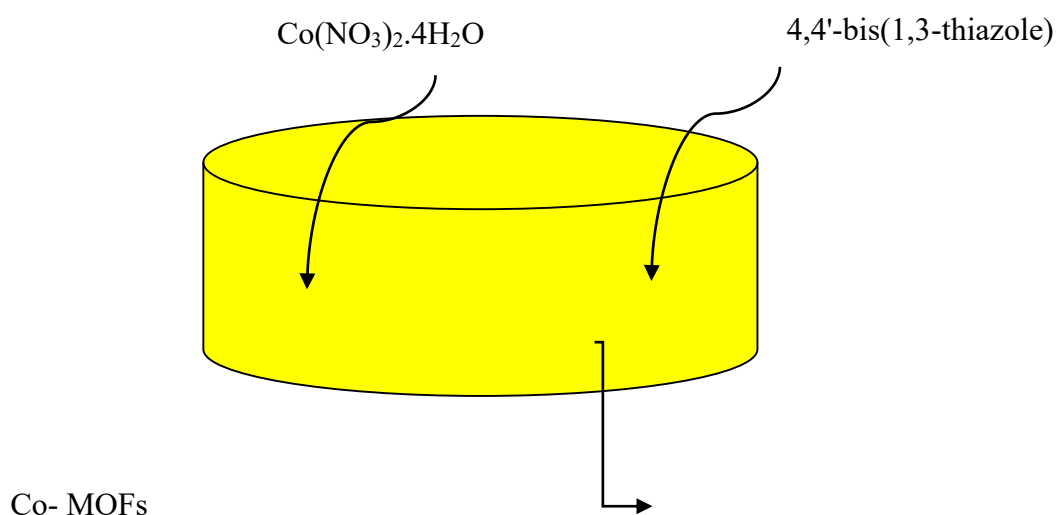
The infrared spectra were recorded on a Nicolet Fourier Transform IR, Nicolet 100 spectrometer in the range $500\text{-}4000\text{ cm}^{-1}$ using the KBr disk technique.

Thermo gravimetric analysis (TGA) of the title compounds was performed on a computer-controlled PL-STA 1500 apparatus were carried out in a Perkin Elmer Pyris 1 under N_2 atmosphere and heating rate of $10\text{ }^\circ\text{C /min}$.

X-ray powder diffraction (XRD) measurements were performed using a Philips diffractometer of X'pert company with monochromated $\text{Cu-}\alpha$ ($\lambda = 1.54056\text{ \AA}$) radiation. Elemental analyses were collected on a CHNS Thermo Scientific Flash 2000 elemental analyzer.

^1H NMR spectra were recorded on a Bruker 500 MHz NMR spectrometer.

The reaction of $\text{Co}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$ with 4,4'-bis(1,3-thiazole) in 1:1 ratio leads to the title Co- MOFs.



RESULTS AND DISCUSSIN

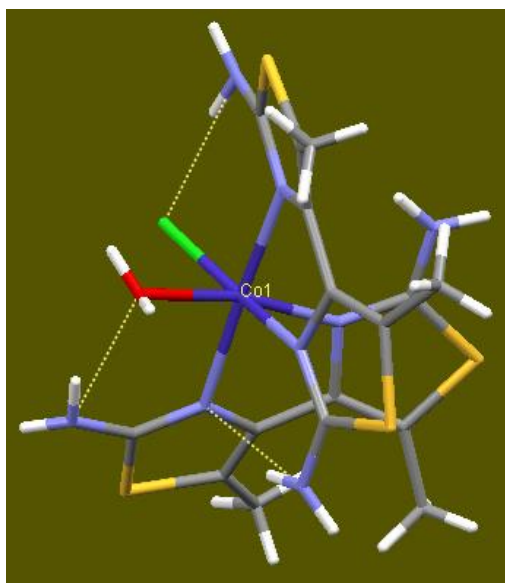
The comparison of ^1H -NMR in compound free ligand with the ones of the complexes represent a shift for the amine group from 6.5 for the ligand to 7.0 for the MOF.

A comparison of ^{13}C NMR spectra of compound and the free ligand shows the carbon atoms in the thiazole rings, among the donor nitrogen atom, sulfur atom and amine group, shifts to down field from 164.1 ppm in free ligand to 179.9 ppm in MOF.

The IR spectrum of MOF shows the bonds at 1418 and 1334 cm^{-1} for skeletal vibration of bithiazole ring suggested that the coordination has occurred through the ring nitrogen atom of bithiazole. This is confirmed by the crystal structure.

The NanoCo(II)-MOFs with its metal geometry is six coordinate. In the asymmetric unit of complex, $[\text{Co}(\text{L})_3]$, there is one center Co atom, three bithiazole ligands as coordinated groups. The coordination number of Ni atom in complex is six with coordinated environments of distorted octahedral, CoN_6 .

In reaction, the ligand DADMBTZ acts as bidentate in compound to form five-membered chelate rings with different internal angles in coordination polyhedron. In compound, to form a tris-chelate complex for coordinating polyhedron, 4,4'-bis(1,3-thiazole) acts as a bidentate ligand, giving a symmetrical octahedral geometry at the metal.



The crystal packing is mainly stabilized by $\text{N}\cdots\text{H}\cdots\text{N}$ hydrogen bonding interactions. Crystal system of complex and the space group was determined.

Results of XRD powder patterns indicate that the experimental data are in good agreement with the simulated XRD powder patterns (a) based on single crystal data(b), hence this compound is obtained as a mono-phase.

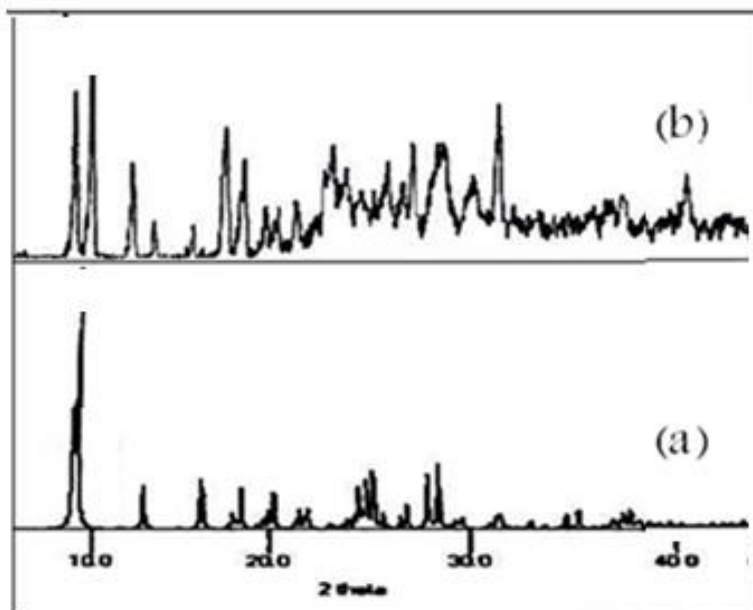
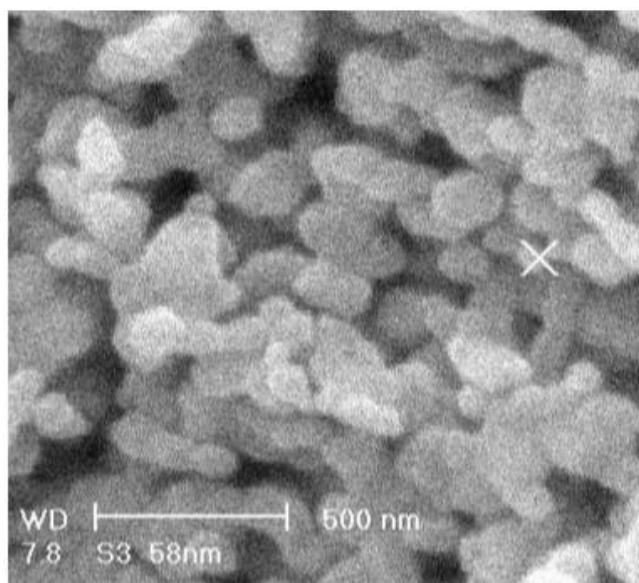


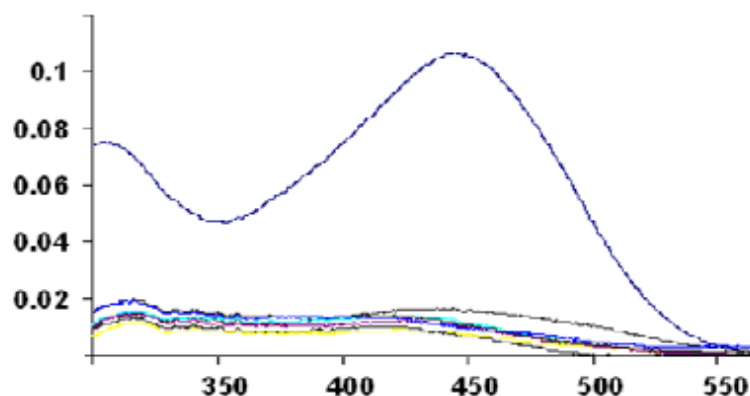
Figure shows the SEM image of nanoparticles of nano Co-MOFs with an average diameter of about 58nm. The particle size ranged from 25 to 60 nm.



The thermal stability of compound has been studied by thermal gravimetric (TG) and differential thermal analyses (DTA).

Figure shows the DTA and TGA curves of compound recorded in static argon from ambient temperature to 700°C. Decomposing of complex takes place at 300 °C with one exothermic effect.

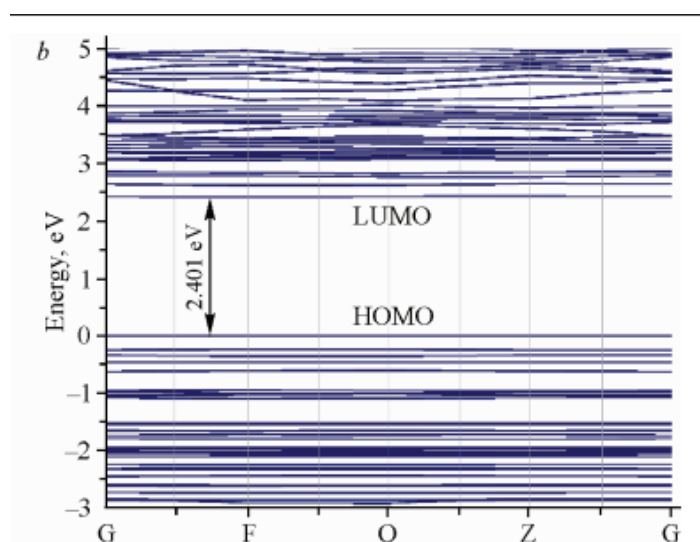
The UV–Vis spectra of compounds in DMSO display intense absorption bands 228.5 for free ligand, 282 nm for complex, respectively, indicating that electronic transitions are mostly $\pi-\pi^*$, maybe assigned to interligand charge transfer transitions.



UV–Vis absorption spectra of compound in the presence of increasing amounts of CT-DNA

Electronic absorption spectroscopy is universally employed to examine the binding characteristics of metal complexes with DNA. Thus, the emission observed in the complex is tentatively assigned to the (π – π^*) interligand fluorescence. The luminescence spectra of the all compounds in DMSO exhibit an emission at 298 K upon excitation at 250 nm.

The obtained band structure of (CoL_3) is plotted in Fig. The energy gap between HOMO and LUMO was calculated as 2.401 eV.



Electronic band structure of compound

CONCLUSIONS

A new nano Co- MOFs, $[\text{Co}(\text{BTZ})_3]$, has been synthesized and characterized by IR, ^1H , ^{13}C - NMR spectroscopy, elemental analysis and single crystal X-ray determination. The thermal stability of compound has been studied by thermal gravimetric (TG) and differential thermal analyses (DTA) in 300-700 $^\circ\text{C}$. The coordination number of Co atom in complex is six with coordinated environments of distorted octahedral, CoN_6 . The interaction mode of the MOFs with DNA is electrostatic, and the MOFs displayed good anticancer activity against human colorectal cancer cells. The new nano Co- MOFs was further characterized by UV-visible spectrophotometric measurements and fluorescence spectra. The results obtained from Uv-vis spectra revealed that

bithiazole π - π^* transition increases for nano Co- MOFs. The interaction ability of the complex with native calf thymus DNA (CT-DNA) has been monitored as a function of the metal complex–DNA molar ratio by UV–Vis absorption spectrophotometry, fluorescence spectroscopy. Synthesis of bithiazole Co- MOFs nanoparticles, making use of this method, is a novel approach in the literature.

REFERENCES

Ding, M., Cai, X., and Jiang, H.-L. (2019) Improving MOF stability: approaches and applications. *Chem. Sci.*, 10, 10209–10230.

H. Hu, J. Chen, Ch. Yang & K. Zhong, (2024) Synthesis, crystal structure and characterization of two new cobalt(II) metal–organic frameworks with 1,4-bis((1*h*-imidazol-1-yl)methyl) benzene and 1,3,5-tris[(1*h*-imidazol-1-yl)methyl]benzene ligands, 60-72.

Aghaei-Hashjin, M., Yahyazadeh, A., and Abbaspour-Gilandeh, E. (2021). Mo@ GAA-Fe₃O₄ MNPs: a highly efficient and environmentally friendly heterogeneous magnetic nanocatalyst for the synthesis of polyhydroquinoline derivatives. *RSC Adv.* 11, 10497–10511.

Al-Attri, R., Halladj, R., and Askari, S. (2022). Green route of flexible Al-MOF synthesis with superior properties at low energy consumption assisted by ultrasound waves. *Solid State Sci.* 123, 106782.

Al-Rowaili, F. N., Jamal, A., Ba Shammakh, M. S., and Rana, A. (2018). A review on recent advances for electrochemical reduction of carbon dioxide to methanol using metal–organic framework (MOF) and non-MOF catalysts: challenges and future prospects. *ACS Sustain. Chem. Eng.* 6, 15895–15914.

Ali El-Remaily, M. A. E. A. A., Hamad, H. A., Soliman, A. M., and Elhady, O. M. (2021). Boosting the catalytic performance of manganese (III)-porphyrin complex MnTSP for facile one-pot green synthesis of 1, 4-dihydropyridine derivatives under mild conditions. *Appl. Organomet. Chem.* 35, e6238.

Anaikutti, P., and Makam, P. (2020). Dual active 1, 4-dihydropyridine derivatives: design, green synthesis and in vitro anti-cancer and anti-oxidant studies. *Bioorg. Chem.* 105, 104379.

SYNTHESIS, CRYSTAL STRUCTURE AND DNA BINDING STUDIES OF NEW Ag (I) COMPLEX WITH BITHIAZOLE**Akram Hosseinian**

School of Engineering Science, College of Engineering, University of Tehran, P.O. Box 11365-4563, Tehran, Iran

Abstract

Over the past years, the recognition of specific DNA sequences by new metal complexes has been a subject of interest from the view point of the gene-targeted improvement drugs or the artificial modification of DNA. A series of Bleomycins (BLM) analogs having identical bithiazole terminal regions but differing structurally in the geometry of the metal binding domain exhibited altered sequence selectivity and strand selectivity of DNA cleavage. Based on these, there has been a growing trend towards the design and synthesis of the model compounds that can specifically recognize and cleave DNA.

It was found that aromatic heterocyclic compounds containing bithiazole rings are good ligands because the two nitrogen atoms in the bithiazole rings are able to chelate metal ions to form stable five-member rings.

In this manuscript, new Ag complex was synthesized by Ag(I) nitrate with bithiazole ligands via simple method. The crystal structures of complex were characterized by single crystal X-ray diffraction. Synthesized material showed good crystallinity and bulk phase purity. Infrared spectroscopy (IR), ^1H , ^{13}C -NMR spectroscopy and elemental analyses. The DNA binding studies of was further characterized by UV-visible spectrophotometric measurements and fluorescence spectra.

Keywords: Ag, crystal structures, bithiazole, DNA binding.

INTRODUCTION

The biological activity point of view, the origin of anticancer activity of BLM is ability to cleave deoxyribonucleic acid (DNA). Bleomycins are natural glycopeptide antibiotics clinically used in the treatment of malignant tumors.

The biological activity point of view, the origin of anticancer activity of BLM is ability to cleave deoxyribonucleic acid (DNA). Bleomycins are natural glycopeptide antibiotics clinically used in the treatment of malignant tumors.

Bithiazole is considered as a domain of bleomycin which countered as a chemotherapeutic drug to treat many types of cancers. Understanding coordination modes of biomolecules and metal ion makes us able to improve their biological properties.

It was found that aromatic heterocyclic compounds containing bithiazole rings are good ligands because the two nitrogen atoms in the bithiazole rings are able to chelate metal ions to form stable five member rings.

For instance, Ni and Co complexes of 2,2'-diamino-4,4'-bithiazole have been found to be effective inhibitors of DNA.

synthesis in tumor cells and Fe (II), Fe(III) and platinum complexes have found effective and applicable in magnetic and photoactive materials.

The powerful ultrasound radiation used in this method permit access to a range of chemical reaction space normally not accessible, which allows for the synthesis of nano-structured materials.

Generally, such advantageous characteristics have encouraged chemists to further investigate the application of ultrasound and consequently, in the recent past, there were enormous applications of ultrasound in chemical reactions as an accelerating agent.

Applying ultrasound irradiation in reactions is sometimes fulfilling this purpose for the following reasons:

- i) the influence of ultrasound irradiation on morphology and size during the synthesis of material;
- ii) accelerating effect on catalytic organic reactions and
- iii) reactions under ultrasound irradiation are much more beneficial over the traditional thermal methods in terms of yields, reaction rates, product selectivity, purity of the products, etc.

The powerful ultrasound radiation used in this method permit access to a range of chemical reaction space normally not accessible, which allows for the synthesis of nano-structured materials.

MATERIALS AND METHODS

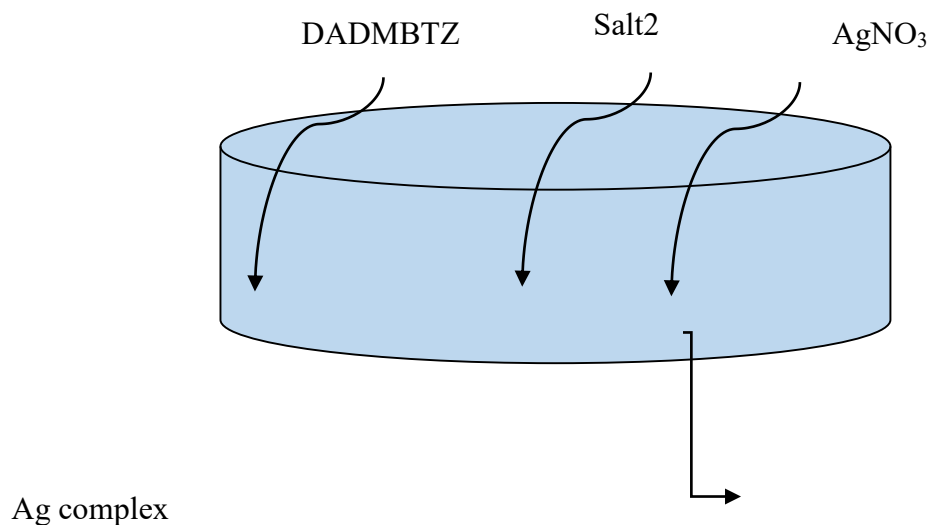
All reagents for the syntheses and analysis were commercially available and used as received.

The infrared spectra were recorded on a Nicolet Fourier Transform IR, Nicolet 100 spectrometer in the range 500-4000 cm^{-1} using the KBr disk technique.

Thermo gravimetric analysis (TGA) of the title compounds was performed on a computer-controlled PL-STA 1500 apparatus were carried out in a Perkin Elmer Pyris 1 under N₂ atmosphere and heating rate of 10 °C /min.

X-ray powder diffraction (XRD) measurements were performed using a Philips diffractometer of X'pert company with monochromated Cu- α ($\lambda = 1.54056 \text{ \AA}$) radiation. Elemental analyses were collected on a CHNS Thermo Scientific Flash 2000 elemental analyzer. ¹H NMR spectra were recorded on a Bruker 500 MHz NMR spectrometer.

The reaction of AgNO₃ with DADMBTZ in 1:2 ratio in the presence of an excess amount of another salts leads to the title complex.

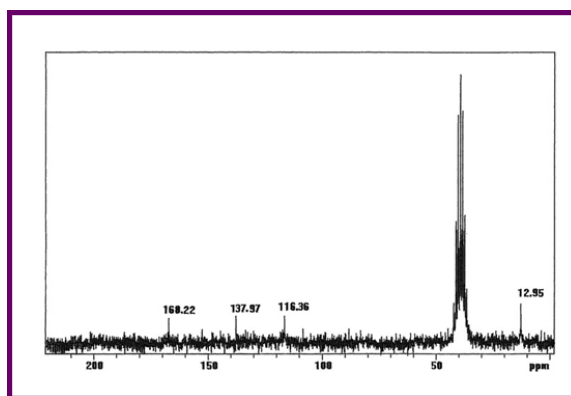


RESULTS AND DISCUSSIN

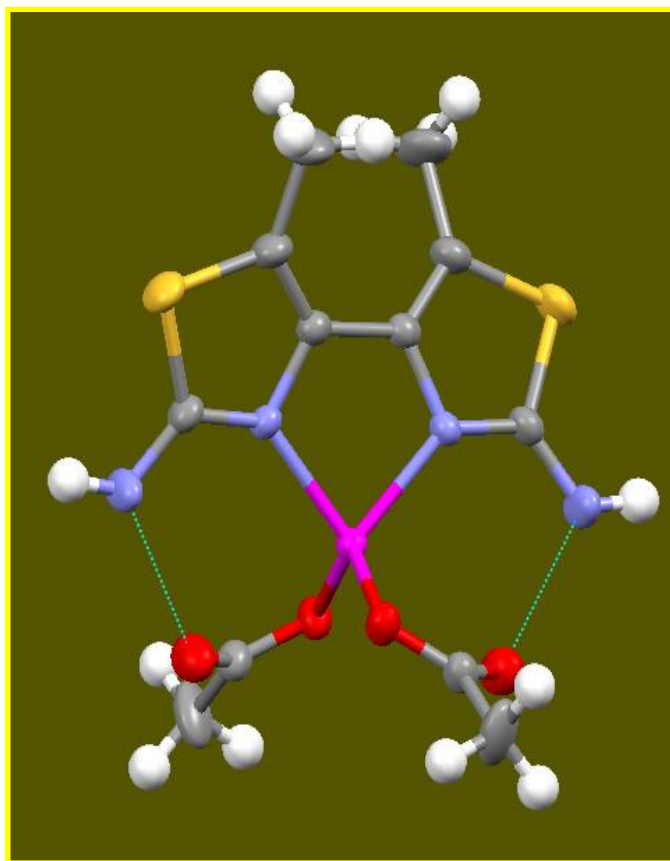
IR spectrum provides evidence of the organic ligands coordinating through the bithiazole rings nitrogen atoms. The IR spectrum of complex shows the bonds at 1420 and 1333 cm^{-1} for skeletal vibration of bithiazole ring suggested that the coordination has occurred through the ring nitrogen atom of thiazole. The absorption bands at 1144 , 1266 cm^{-1} are assigned to the stretching of the oxygen-bound nitrito ions in complex. This is confirmed by the crystal structure.

The $^1\text{H NMR}$ of the complex represent a peak for the amine group from 3-6.5.

$^{13}\text{C-NMR}$ spectra of complex, shows the carbon atoms in the thiazole rings, among the donor nitrogen atom, sulfur atom and amine group, shifts to down field to 168 ppm in Ag complex.



In compound $[\text{Ag}(\text{DADMBTZ})(\text{ac})_2]$, the Ag atom is four coordinate in a distorted tetrahedral arrangement being bonded to the two nitrogen atoms of the DADMBTZ ligand and to the two acetate ligands each via a single oxygen atoms.



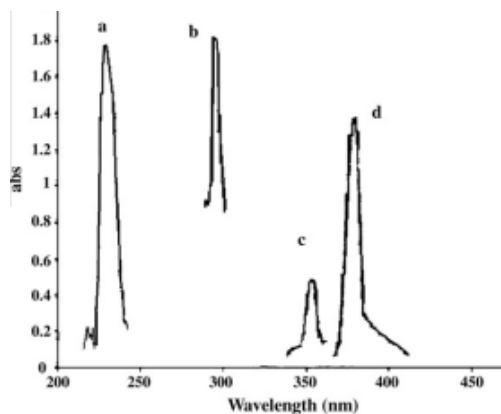
The nitrogen atoms of NH_2 group of the ligands are not coordinated. The geometry of the metal coordination shows some deviations from ideal T_d symmetry. The crystal structure is stabilized by a network of intra and intermolecular hydrogen bonds involving the oxygen atom of carboxylate and the terminal amino group.

Table shows the crystal data and structure refinement for compound

Empirical formula	$\text{C}_{16}\text{H}_{20}\text{AgN}_{10}\text{O}_4\text{S}_4$
Wavelength	0.71073 \AA
Crystal system	Orthorhombic
Space group	P-3C1
Unit cell dimensions	$a = 13.384(3) \text{ \AA}$, $\alpha = 90^\circ$ $b = 15.8965(3) \text{ \AA}$, $\beta = 90^\circ$ $c = 23.158(6) \text{ \AA}$, $\gamma = 90^\circ$
Volume	$4948(2) \text{ \AA}^3$
Z	8
T	120K

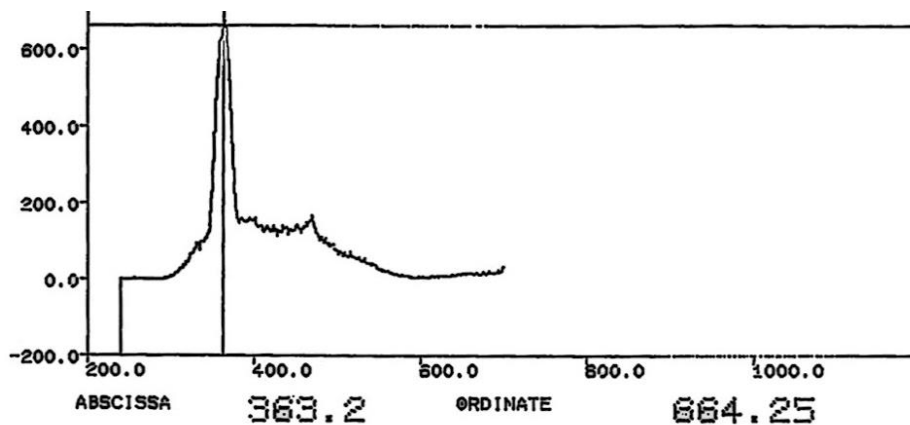
The emission observed in the complex is tentatively assigned to the $(\pi-\pi^*)$ interligand fluorescence. The luminescence spectra of the all compounds in DMSO exhibit an emission at 298 K upon excitation at 250 nm.

July 1-3, 2024 -PARIS



The interaction mode of the complexes with DNA is electrostatic, and the complexes displayed good anticancer activity against human colorectal cancer cells.

These spectral characteristics obviously suggest that the titled compound most likely interact with DNA through a mode of stacking interaction between the aromatic bithiazole ligand of the compound and the base pairs of DNA.



The luminescence spectra of the compound in DMSO

CONCLUSIONS

In this manuscript, new Ag complex was synthesized by Ag(I) nitrate with bithiazole ligands via powerful ultrasound radiation. The crystal structures of complex were characterized by single crystal X-ray diffraction. Synthesized material showed good crystallinity and bulk phase purity. Infrared spectroscopy (IR), ^1H , ^{13}C -NMR spectroscopy and elemental analyses. The DNA binding studies of was further characterized by UV-visible spectrophotometric measurements and fluorescence spectra. These spectral characteristics obviously suggest that the titled compound most likely interact with DNA through a mode of stacking interaction between the aromatic bithiazole ligand of the compound and the base pairs of DNA.

REFERENCES

- R. Sievers, M. Reimann, N. G. Kub, S. M. Rupf, M. Kaupp and M. Malischewski (2024), Synthesis and structural characterization of stable coinage metal (Cu, Ag, Au) cyclopentadienyl complexes, *Chem. Sci.*, 15, 2990.
- G. Wang, A. Noonikara-Poyil, I. Fern´andez and H. V. R. Dias, (2022) *Chem. Commun.*, 58, 3222.
- J. Mehara, B. T. Watson, A. Noonikara-Poyil, A. O. Zacharias, J. Roithov´a and H. V. R. Dias, (2022) *Chem.–Eur. J.*, 28, e202103984.
- D. Joven-Sancho, M. Baya, A. Mart´ın, J. Orduna and B. Menj´on, (2020) *Chem.–Eur. J.*, 26, 4471–4475.
- D. Joven-Sancho, L. Demonti, A. Mart´ın, N. Saffon-Merceron, N. Nebra, M. Baya and B. Menj´on, (2023) *Chem. Commun.*, (2023) 59, 4166–4168.
- A. P´erez-Bitri´an, S. Alvarez, M. Baya, J. Echeverr´ıa, A. Mart´ın, J. Orduna and B. Menj´on, (2023) *Chem.–Eur. J.*, 29, e202203181.
- J. S. Lakhi, M. R. Patterson and H. V. R. Dias, (2020) *New J. Chem.*, 44, 14814–14822.
- H. V. R. Dias, C. S. P. Gamage, N. B. Jayaratna and C. V. Hettiarachchi, (2020) *New J. Chem.*, 44, 17079–17087.
- M. Vanga, A. Noonikara-Poyil, J. Wu and H. V. R. Dias (2022) *Organometallics*, 41, 1249–1260.
- M. Vanga, A. Mu˜noz-Castro and H. V. R. Dias (2022) *Dalton Trans.*, 51, 1308–1312.
- Olmsted J III, Kearns DR. (1977) Mechanism of ethidium bromide fluorescence enhancement on binding to nucleic acids. *Biochemistry*.16:3647–3654.

EVALUATION OF STEREO ACTIVITY OF LONE PAIR EFFECTS ON REMOVAL OF LEAD TOXICITY IN HUMAN BODY WITH BTZ

Akram Hosseinian

School of Engineering Science, College of Engineering, University of Tehran, P.O. Box 11365-4563, Tehran, Iran

Abstract

Lead toxicity is an important environmental disease and its effects on the human body are devastating. There is almost no function in the human body which is not affected by lead toxicity. Lead is highly persistent in the environment and because of its continuous use its levels rise in almost every country, posing serious threats.

Human exposure to lead and its compounds occurs mostly in lead related occupations with various sources like leaded gasoline, industrial processes such as smelting of lead and its combustion, pottery, boat building, lead based painting, lead containing pipes, battery recycling, grids, arm industry, pigments, printing of books, *etc.*

In this work, the synthesized ligand 2,2'-diamino-5,5'-dimethyl-4,4'-bithiazole (dadmbtz), is used as precursor for removal of Lead. New compound was characterized by scanning electron microscopy (SEM), X-ray powder diffraction (XRD), Infrared spectroscopy (IR), ^1H , ^{13}C -NMR spectroscopy and elemental analyses.

The thermal stability of compound has been studied by thermal gravimetric (TG) and differential thermal (DTA) analyses. The removal capacity of DADMBTZ toward Lead was found to be strongly dependent on the initial pH, initial concentration of Lead and the presence of interfering anions. The compound was further characterized by UV-visible spectrophotometric measurements and fluorescence spectra.

Keywords: Stereo activity, Lone Pair Effects, Lead toxicity, Human body.

INTRODUCTION

Recent structural studies on Lead compounds have provided a detailed analysis of coordination-sphere distortions as a consequence of the presence of such lone pairs. Stereochemical activity of the lone pair in divalent Lead compounds has been discussed by Shimoni-Livny et al. based on a thorough review of crystal data available from the Cambridge Structural Database (CSD) and by means of *ab initio* calculations. These authors classified lead coordination as 'holodirected' when the bonds to ligands are directed throughout the surface of an encompassing sphere, and as 'hemidirected' in cases where the bonds are directed throughout only part of the coordination sphere, leaving a gap in the distribution of bonds to ligands.

The lone-pair activity can also depend on:

- (1) hard or soft ligands,
- (2) attractive or repulsive interactions among ligands,
- (3) the p character of lone pairs,

and

(4) the number of electrons (charge) transferred from the ligands to the metal .

Coordination chemistry of Pb(II) has long been of interest for many reasons, including understanding of toxicity of lead compounds, though there are certainly more positive features. The synthesis of lead (II) coordination compounds is an increasingly active area due to presence of a $6s^2$ electron configuration and stereoactivity of the valence shell lone electron pair and according to directed ligands classify as holodirected and hemidirected.

MATERIALS AND METHODS

All reagents for the synthesis and analysis were commercially available from Merck Company and used as received. Doubly distilled water was used to prepare aqueous solutions.

Melting points were measured on an Electrothermal 9100 apparatus. Microanalyses were carried out using a Heraeus CHNO-Rapid analyzer. IR spectra were recorded using Perkin-Elmer 597 and Nicolet 510P spectrophotometers.

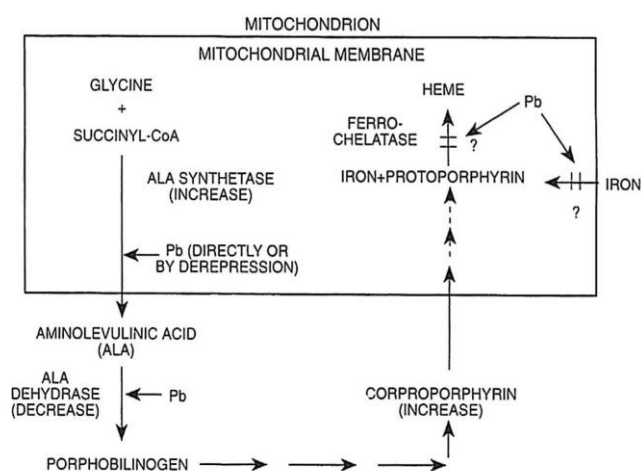
The thermal behaviour was measured with a PL-STA 1500 apparatus between 25 and 700°C in a static atmosphere of argon.

The simulated XRD powder pattern based on single crystal data were prepared using Mercury software. X-ray powder diffraction (XRD) measurements were performed using a Philips X'pert diffractometer with monochromated Co-ka radiation ($k = 1.78897 \text{ \AA}$). The samples were characterized by a scanning electron microscope (SEM) (Philips XL 30 and S-4160) with gold coating.

In this work, the synthesized ligand 2,2'-diamino-5,5'-dimethyl-4,4'-bithiazole (dadmbtz), is used as precursor for removal of Lead. After standing for 10 days at room temperature, colorless crystals were obtained, filtered, washed with methanol and cold ether, and dried invacuum. The compound is soluble in DMSO and insoluble in water, methanol, and CHCl_3 (Yield: 60%).

RESULTS AND DISCUSSIN

The molecular mechanisms Lead toxicity are not well understood. Understanding the factors that control the stereo activity of the lone pair in lead(II) chemistry may be important in removing toxic metal from biological systems.

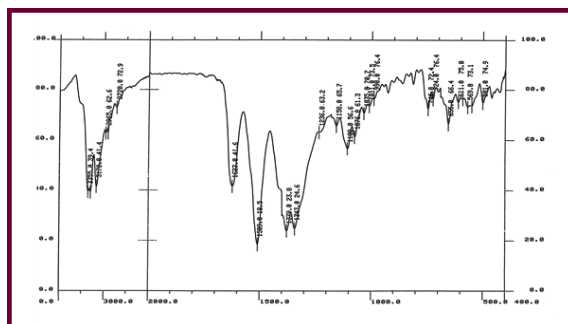


IR Spectroscopic Studies

The presence of a strong and broad absorption at approximately 3000 cm^{-1} in infrared spectra of compound indicates the presence of a hydrogen bonded lattice. There are several close peaks in the region 3000 cm^{-1} , which may be attributed to the N-H vibrations of the bithiazole groups.

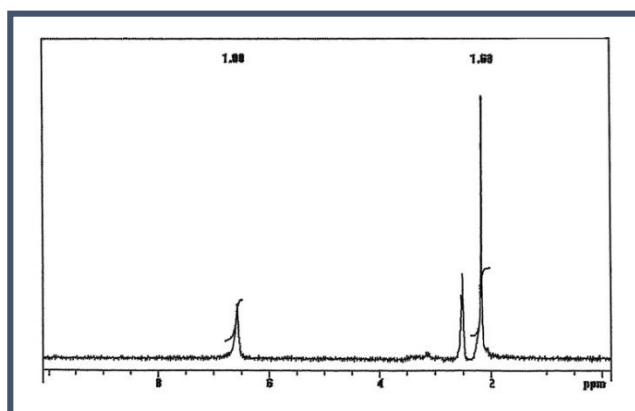
Splinting and broadening of these peaks gives that the NH_2 groups are hydrogen bonded.

The bonds appear near $3112\text{-}3422\text{ cm}^{-1}$ due to $\nu_{\text{asym}}(\text{NH}_2)$ and $\nu_{\text{sym}}(\text{NH}_2)$ vibration of the NH_2 groups. These modifications are due to the hydrogen bonds involving the amino group.



¹H -NMR Studies

¹H-NMR in compound represent a shift for the amine group in 6.3ppm.



¹³C -NMR Studies

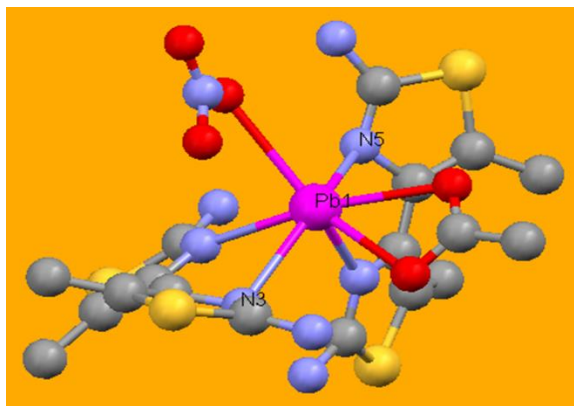
¹³C-NMR spectra of ligand, shows the carbon atoms in the thiazole rings, among the donor nitrogen atom, sulfur atom and amine group, in 166.9 ppm.

CRYSTA DATA AND STRUCTURE REFINEMENT

Single X-ray crystal analysis reveals that compound crystallizes in the :

Crystal system: Monoclinic, Space group: C2/c Unit cell dimensions:

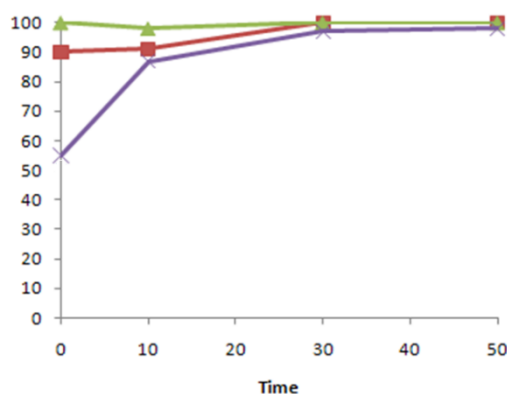
- $a = 21.541(4)\text{ \AA}$, $\alpha = 90^\circ$
- $b = 15.357(3)\text{ \AA}$, $\beta = 118.51(3)^\circ$
- $c = 19.109(4)\text{ \AA}$, $\gamma = 90^\circ$
- $Z = 8$



X-ray crystal structure of compound

UV-Visible Spectrophotometric

The compound was further characterized by UV-visible spectrophotometric measurements. Electronic absorption spectroscopy is universally employed to examine the binding characteristics of metal with DADMBTZ. The removal capacity of DADMBTZ toward Lead was found to be strongly dependent on the initial pH, initial concentration of Lead and the presence of interfering anions.



CONCLUSIONS

In this work, the synthesized ligand 2,2'-diamino-5,5'-dimethyl-4,4'-bithiazole (dadmbtz), is used as precursor for removal of Pb(II). Compound was structurally characterized by single-crystal X-ray diffraction. The coordination geometries of the complexes show a possible vacant site around Pb(II), occupied possibly by a stereoactive lone pair of electrons making coordination around lead hemidirected. This method of preparation may have some advantages such as: it takes place with shorter reaction times, produces better yields and it also is likely to removal of Pb(II).

REFERENCES

- Grant, L. D. (2020). Lead and compounds, in: Lippmann, M., Leikauf, G.D. (Eds.), *Environmental Toxicants: Human Exposures and Their Health Effects*. Wiley, Hoboken, NJ, pp. 627–675.
- Zhang, B./Xia, W./Li, Y./Bassig, B./Zhou, A./Wang, Y./Li, Z./Yao, Y./Hu, J./Du, X./Zhou, Y./Liu, J./Xue, W./Ma, Y./Pan, X./Peng, Y./Zheng, T./Xu, S. (2015). Prenatal exposure to lead in relation

to risk of preterm low birth weight: A matched case-control study in China. *Reproductive Toxicology* 57, 190–195.

K. Zhang, F. Zhou, R. Wub, B. Yang, S.W. Ng, (2009) *Inorg. Chim. Acta* 362, 4255.

H.Sadeghzadeh, A. Morsali, P. Retailleau, (2010) *Polyhedron* 29, 925.

K.S. Suslick, S.B. Choe, A.A. Cichowlas, M.W. Grinstaff, (1991) *Nature* 353, 414.

A.R. Abbasi, A. Morsali, (2011) *Ultrason. Sonochem.* 18, 282.

J.H. Zhang, Z. Chen, Z.L. Wang, N.B. Ming, (2003) *J. Mater. Res.* 18, 1804.

J.H. Bang, K.S. Suslick, (2010) *Adv. Mater.* 22, 1039.

K. Nakamoto, 'Infrared and Raman Spectra of Inorganic and Coordination Compounds', 5th ed., John Wiley and Sons, New York, 1997

T. Ding, J.J. Zhu, (2003) *J.M. Hong, Mater. Lett.* 57, 4445.

V. Safarifard , A. Morsali , S. W. Joo, (2013) *Ultrasonics Sonochemistry* 20, 1254–1260.

A. Morsali , A. Panjehpour, (2012) *Inorganica Chimica Acta* 391, 210–217.

THE RELATIONSHIP OF PREGNANCY STRESS WITH INFANTY COLIC AND CHILDHOOD EPILEPSY**GEBELİKTE YAŞANAN STRES DÜZEYİNİN İNFANTİL KOLİK VE ÇOCUKLUK ÇAĞI EPİLEPSİSİ İLE İLİŞKİSİ****Sevinç ÇİÇEK**

Istanbul Arel University, Faculty of Arts and Sciences, Department of Psychology, Istanbul, Turkey

ORCID ID: <https://orcid.org/0009-0000-5174-4147>**Abstract**

This research, It is desired to examine the relationship between the stress level experienced during pregnancy and infantile colic and childhood epilepsy. In this direction, it is planned to carry out our study with 200 pregnant women who applied to the obstetrics polyclinic of the Ministry of Health Istanbul Health Sciences University Okmeydanı Training and Research Hospital, located in the province of Istanbul, between January 1 and March 31, 2022. Within the scope of the study, it was planned to give Pregnancy Stress Assessment Scale and Personal Information Form scale to pregnant women. In this study, which was carried out using descriptive and correlational method, whether there is a connection between H3 variables will be determined by Pearson Correlation analysis with the help of SPSS 26 package program. Independent Samples t-test, One-Way Analysis of Variance (ANOVA) will be used to test the relationship between the variables used in the study and demographic variables. It is considered that the stress level score experienced during pregnancy should be analyzed using logistic regression analysis for time-dependent data on the effect of childhood epilepsy and infantile colic. The confidence interval in the study will be accepted as 0.05.

Keywords: Pregnancy, Stress, Infantile Colic, Childhood Epilepsy**Introduction and purpose**

The aim of the research was to investigate whether the level of stress experienced during pregnancy whether there is a relationship between infantile colic and childhood epilepsy is not present in infantile colic. In the literature, studies on the diagnosis of childhood epilepsy and infantile colic have focused on physiological causes. In order to determine the relationship of psychosocial reasons on these diagnoses, a multidisciplinary effect will be considered.

Materials and Methods

This research was descriptive and correlational. The data obtained Logistic Regression Analysis is expected to be used to determine the effects of variables over time. The population of the study consists of the Ministry of Health Istanbul Health Center in Istanbul. A total of 200 pregnant women over the age of 18 who applied to the obstetrics and gynecology outpatient clinic of the University of Sciences Okmeydanı Training and Research Hospital.

Whether there is a connection between the variables of the study will be determined by Pearson Correlation analysis with the help of SPSS 26 package program. Independent Samples t-test will be

used to test the relationship between the variables used in the study and demographic variables, One-Way Analysis of Variance (ANOVA) will be used. Confidence interval in the research 0.05 will be accepted as 0.05. Logistic regression was used to examine the time-dependent effect of stress during pregnancy on infantile colic and childhood epilepsy. analysis will be used.

Expected Result and Recommendations

In this study, the level of stress experienced during pregnancy, infantile colic and pediatric epilepsy and its relationship with epilepsy. Accordingly, 3 hypotheses were put forward hypothesized. The first hypothesis states that there is a significant positive relationship between the level of stress experienced during pregnancy and infantile colic. Stress experienced during pregnancy processes can be negative for many women. Nelson (2013) describes the transition to motherhood It is mentioned that the personal characteristics of the mother, family structure, social environment, the status of her relationship with her husband and spousal support are important among the factors affecting the health of the baby. Therefore, since it is thought that physiologically and psychologically positive processes during pregnancy will affect the health of the baby, the proposition in the first hypothesis has a positive direction is thought to be the cause of infantile colic. Although the etiology of infantile colic is still unknown. The interaction between developmental and physiological processes is advocated.

In a study, no difference was found between the attachment of infants with colic and their mothers. In a study conducted by Yalçın (2010), mother and infant the relationship between attachment phenomenon and infantile colic, and as a result, there was a difference between Maternal Attachment Scale scores in healthy and colicky infants. Has not been found. In the second hypothesis, the level of stress experienced during pregnancy and childhood epilepsy. It is suggested that there is a significant positive relationship between the diagnosis of childhood epilepsy. In the studies conducted in the literature, no psychosocial view was found among the causes of childhood epilepsy. One of the assumptions of attachment theory is that the baby can be affected by the physical and psychological changes experienced by the mother during pregnancy. In a study conducted by Şahin (2011), depression and anxiety scores of families of epileptic children were high in epileptic children. In addition, other studies have shown that behavioral problems and psychopathology are higher in epileptic children compared to other children has been found. These causes include epilepsy being a chronic disease and damage to the central nervous system in the brain. Research has been conducted on the neurological causes of childhood epilepsy and the physical. It has been argued that traumas are effective. For epilepsy, family, nurse and studies have been conducted to raise awareness of teachers and awareness-raising journals have been published. The expected result in the second hypothesis is that the level of stress experienced during pregnancy score has a significant relationship with epilepsy diagnosis. In the third hypothesis, the level of stress experienced during pregnancy. It has been suggested that the scores differ according to demographic characteristics. In line with the anamneses taken during clinical observation processes, the stress experienced by the mother during pregnancy, social support during pregnancy, previous losses, year of marriage, whether the pregnancy was planned or not are among the questions asked. In a study conducted by Durmuş (2015) In the study, the stress perception of pregnant women with primary school graduates was found to be higher. In the study of Yıldız Çiltaş and Köse Tuncer (2019), it was determined that the distress level of pregnant women was high if their spouses were illiterate. Ertekin Pınar et al. (2014) reported that there was a statistically significant difference between the income level of pregnant women and the perceived stress score. It is thought that the stress level score experienced during pregnancy in the study did not show a significant difference with the age of the participant.

Keywords: Pregnancy, Stress, Infantile Colic, Childhood Epilepsy,

ÖZET

Giriş ve Amaç:

Araştırmanın amacını; gebelikte yaşanan stres düzeyinin, bebeklerde tanısı konulmuş olan infantil kolik ve çocukluk çağı epilepsisi arasında bir ilişkinin olup olmadığını saptamaktır. Literatürde çocukluk çağı epilepsisi ile infantil kolik tanısı alma üzerine yapılan araştırmalarda fizyolojik sebepleri üzerinde durulmuştur. Psikososyal sebeplerin bu tanımlar üzerindeki ilişkisini saptamak adına multidisipliner bir etkisi olacağı düşünülmektedir. Yapılacak olan araştırma gebelikte yaşanan stres düzeyi ile infantil kolik ve çocukluk çağı epilepsisi arasındaki ilişkinin incelenmesinde yönelik olacaktır. Literatürde gebelikte yaşanan stresin, infantil kolik ve çocukluk çağı epilepsisi ile ilişkisi ilgili yapılan araştırmalar sınırlı sayıda. Literatürde yer alan çalışmalarda fizyolojik rahatsızlıkların bireylerin ya da ailelerin yaşam kalitelerine olan etkisi, bu hastalıklarda ebeveynlerin rolü ve hastalıkların nörolojik bulgularına yönelik çalışmalar vardır. Bu çalışmada araştırılmak istenen olgu ise psikolojik olguların fizyolojik rahatsızlıkları ile ilişkisini saptamak ve bu rahatsızlıklara psikososyal nedenlerle farklı bir bakış açısı kazandırmak amaçlanmaktadır. Literatürde böyle bir çalışmaya rastlanılmamakla birlikte ileride bu rahatsızlıkların psikolojik-fizyolojik ilişkisine multidisipliner bir bakış açısı kazandırmak adına katkı sağlayacaktır. Bu sayede gebe bireyler hamilelik süreçleri boyunca sadece fiziksel sağlık kadar psikolojik sağlığında dünyaya getireceği bebek üzerindeki fizyolojik bir rahatsızlıklar ilişkili olup olmayacağı konusunda bilgilendirici olması beklenmektedir. Bu bilgiler ışığında literatüre ışık tutması hedeflenmektedir. Gebelik süreci bir kadının hayatındaki en önemli zaman diliminden biridir. Gebelik süreci hem doğacak çocuk için hem de anne için fiziksel sağlığın en önemli olduğu süreçtir. Bu süreçte sağlıklı bireyler yetiştirmek sadece fiziksel anlamda değil ruhsal anlamda da önemli olacaktır. Gebelikte yaşanan stres, depresyon, anksiyete gittikçe artmaktadır (Madazlı, 2005). Bu zamana kadar gebelik ile ilgili yapılan araştırmalar daha çok kadınlık algısı, annelik algısı ya da hayat kalitesi üzerine etkilerine odaklanılmıştır. Annenin gebelik sürecinde yaşadığı ruhsal durumlar klinik gözlem ve görüşmede sorulan sorular arasında yer almış ve bağlanma teorisi ile ilgili literatürde önde tutulmuştur. Bağlanma teorilerinin günümüze gelene kadar yapılan çalışmalar sayesinde bilgilerimiz artmış ve değişmiştir. Alanda daha önceden yapılan nitel çalışmalarda bebek doğduktan sonraki annenin ruhsal durumunun bebek üzerinde etkili olduğu savunulurken günümüzde bebeğin anne rahminde döllemeye başladığı andan itibaren çocuk üzerinde etkili olduğunu savunan görüşler ortaya atılmıştır. Bu görüşten yola çıkılarak annenin gebelik sürecinde yaşadığı fiziksel değişimin yanı sıra mental sağlık durumunun bebek üzerindeki etkileri anlaşılmasına çalışılmakta ve gebelikte yaşanan stres olgusunun, bebek üzerinde fizyolojik ve nörolojik tepkilerle olan ilişkisi anlaşılmasına çalışılmıştır.

Gereç ve Yöntem

Bu araştırma tanımlayıcı ve ilişki arayıcı türde yapılmıştır. Elde edilen verilerin değişkenlerin zaman içerisindeki etkilerini saptamak için lojistik regresyon analizi kullanılması beklenilmektedir. Araştırmanın evrenini İstanbul'da bulunan Sağlık Bakanlığı İstanbul Sağlık Bilimleri Üniversitesi Okmeydanı Eğitim ve Araştırma Hastanesi'nin kadın doğum polikliniğine başvuran 18 yaşını doldurmuş, 200 gebe oluşturmuştur. Araştırmanın değişkenleri arasında bir bağlantı olup olmadığı SPSS 26 paket programı yardımıyla Pearson Korelasyon analizi ile belirlenecektir. Araştırmada kullanılan değişkenler ile demografik değişkenler arasındaki ilişkiyi test etmek için Bağımsız Örnekler t-testi, Tek Yönlü Varyans Analizi (ANOVA) kullanılacaktır. Araştırmada güven aralığı ise 0.05 olarak kabul edilecektir. Gebelikte yaşanan stresin infantil kolik ve çocukluk çağı epilepsisine olan etkisinin zamana bağlı olarak incelenmesinde lojistik regresyon analizi kullanılacaktır.

Beklenen Sonuç ve Öneriler

Bu çalışmada gebelikte yaşanan stres düzeyinin, infantil kolik ve çocuk çağı epilepsisi ile olan ilişkisi incelenmesi amaçlanmıştır. Buna göre 3 hipotez ortaya atılmıştır. Birinci hipotezde belirtilen gebelikte yaşanan stres düzeyi ile infantil kolik arasında pozitif yönde anlamlı bir ilişkinin olduğu yöndedir. Gebelikte yaşanan süreçler bir çok kadın için olumsuz olabilmektedir. Nelson (2013) anneliğe geçişi etkileyen etmenler arasında annenin kişisel özellikleri, aile yapısı, sosyal çevre, eş ile ilişkisinin durumu ve eş desteğinin önemli olduğundan bahsetmektedir. Bu yüzden gebelikte geçirilen süreçlerin, fizyolojik ve psikolojik olarak olumlu geçmesi bebeğin sağlığını etkileyeceği düşünüldüğünden ilk hipotezdeki önermenin pozitif yönde olacağı düşünülmektedir. Infantil kolik hala etiyojisi tam olarak bilinmemekle beraber gelişimsel ve fizyolojik süreçlerin birbiriyle olan etkileşimi savunulmaktadır. Yapılan bir çalışmada kolikli bebeklerin anneleri ile bağlanma arasında bir fark bulunmamıştır. Yalçın (2010) yılında yaptığı bir araştırmada, anne ve bebek arasındaki bağlanma olgusunun infantil kolik ile olan ilişkisi incelemiştir sonucunda ise sağlıklı ve kolikli bebeklerde Maternal Bağlanma Ölçeği puanları arasında farklılık bulunmamıştır. İkinci hipotezde ise gebelikte yaşanan stres düzeyi ile çocukluk çağı epilepsi tanısı arasında pozitif yönde anlamlı bir ilişkisi olduğu öne sürülmektedir. Literatürde yapılan çalışmalarda çocukluk çağı epilepsisinin nedenleri arasında psikososyal açıdan bir görüşe rastlanılmamıştır. Bebeğin, gebelik süreci boyunca annenin yaşadığı fiziksel ve psikolojik değişimlerden etkilenebileceği bağlanma teorisinin öne sürdüğü varsayımlardan biridir. Şahin (2011) yılında yaptığı bir araştırmada epileptik çocukların ailelerinin depresyon ve anksiyete puanlarının yüksek olduğu bulunmuştur. Ayrıca yapılan diğer araştırmalarda epileptik çocuklarda davranış sorunlarının ve psikopatolojinin diğer çocuklara oranla daha yüksek çıktığı bulunmuştur. Epilepsinin kronik bir hastalık olmasının yanı sıra beyindeki merkezi sinir sistemine zarar vermesi bu nedenler arasındadır. Çocukluk çağı epilepsisinin nörolojik nedenleri üzerinde araştırmalar yapılmış, doğumda yaşanan fiziksel travmaların etkili olduğunu savunulmuştur. Epilepsi için aile, hemşire ve öğretmenlerin bilinçlendirilmesi ile ilgili çalışmalar yapılmış ve bilinçlendirme dergileri yayımlanmıştır. İkinci hipotezde beklenen sonuç ise gebelikte yaşanan stres düzeyi puanının epilepsi tanısı arasında anlamlı bir ilişkisi olduğu sonucudur. Üçüncü hipotezde ise gebelikte yaşanan stres düzeyi, katılımcıların demografik özelliklerine göre puanları farklılaştığı öne sürülmüştür. Klinik gözlem süreçlerinde alınan anamnezler doğrultusunda annenin gebelikte yaşadığı stresin, gebelikteki sosyal desteğin, daha önce yaşadığı kayıpların, evlilik yılının, gebeliğin planlı olup olmaması sorular arasında durmuştur. Durmuş (2015)'un yaptığı çalışmada ilköğretim mezunu gebelerin stres algısı daha yüksek tespit edilmiştir. Yıldız Çiltaş ve Köse Tuncer (2019)'in çalışmasında ise gebe olan bireylerin eşinin okur-yazar olmaması gebelerin distres düzeyinin yüksek olduğunu saptamıştır. Ertekin Pınar ve ark. (2014) yaptığı çalışmada gebelerin gelir seviyesi ile algılanan stres puanı arasında istatistiksel olarak anlamlı farklılık bulunduğu bildirilmiştir.

Araştırmanın gebelikte yaşanan stres düzeyi puanının katılımcının, yaşıyla anlamlı bir fark çıkmadığı düşünülmektedir.

Ülkemizde yapılan araştırmalar da genç yaşta anne olmanın yanında getirdiği özellikler stres düzeyini etkilemektedir. Genç yaşta anne olmanın yanında getirdiği parametrelerde boşanma oranlarının daha yüksek olduğu, çocuk sayısının daha fazla olduğu ve araştırmak istenen parametrelerde gebelere yönelik olanlar: Yaş, eğitim düzeyi, çalışma durumu, gebelik

haftası, yaşanan bebek kaybı, alınan sosyal destek olarak belirlenmiştir. Bu parametrelerde gebelikte yaşanan kayıp olgusunun ve sosyal desteğin, stres puanı üzerinde farklı olacağı düşünülmektedir. Literatürde daha önce yapılmamış olan bu çalışmanın tezli yüksek lisans kapsamında ele alınması, bulgular ve sonuçlar eşliğinde kuvvetlendirilmesinin alana katkı sağlayacağı düşüncesindeyim. Fizyolojik rahatsızlıklara multidisipliner yaklaşım ile bakmak psikoloji bölümünün ele aldığı konulardan birisi olmalıdır. Zaman geçtikçe bu alana dair çalışmaların

artması, tanı konulan rahatsızlıkların saptanmasına ve deęişkenlerin bu tanı üzerindeki etkisinin yordanmasını destekleyecektir.

Anahtar Kelimeler: Gebelik, Stres, İnfantil Kolik, Çocukluk Çaęı Epilepsisi

INFLUENCE OF NUTRITIONAL FACTORS IN CHRONIC AUTOIMMUNE HASHIMOTO'S THYROIDITIS

Ph.D. Dorina (Shuraja) Minxuri

Department of Health Sciences, Faculty of Applied Sciences, Logos University Collge

Abstract

Introduction and Purpose: Hashimoto's autoimmune thyroiditis (HT) is a common thyroid disorder characterized by the presence of autoantibodies against thyroid peroxidase (anti-TPO) and thyroglobulin (anti-TG), leading to hypothyroidism. Diet may influence antibody levels and the development of HT although it's exact role remains unclear. Nutritional factors such as selenium, vitamin D, iron deficiency, and iodine excess have been suggested to stimulate thyroid autoimmunity. Meanwhile, eating fresh fruits and vegetables, fiber and healthy fats has a protective role against HT. The aim of this study was to evaluate the role of different food groups on the development of HT.

Materials and Methods: A total of 465 individuals participated in this study, comprising 81% females (376 individuals) and 19% males (89 individuals). Blood samples were collected from all participants and analyzed for thyroid-stimulating hormone (TSH), free thyroxine (FT4), free triiodothyronine (FT3), anti-TPO, and anti-TG antibodies. Participants were divided into two groups: cases (42%) with positive anti-TPO and/or anti-TG antibodies, and controls (58%) with normal hormone tests and negative antibodies. Dietary habits were assessed through a questionnaire that measured the frequency of consumption of various foods on a weekly or daily basis. Statistical analysis was conducted to identify significant differences in dietary patterns between the two groups.

Results: Significant dietary differences between individuals with Hashimoto's thyroiditis and the control group were observed for several food groups:

-Eggs ($t = -7.355, p < .05$), fast food ($t = -2.585, p < .05$), sweets ($t = -3.155, p < .05$), Legumes ($t = -2.269, p < .05$), dairy ($t = -3.293, p < .05$) were more frequently consumed by HT group. Conversely, the control group consumed more Vegetables ($t = 7.411, p < .05$) and fruits ($t = 3.544, p < .05$). No relationship was found between smoking or wheat flour and Hashimoto's thyroiditis.

Discussions and Conclusions: These findings indicate that adopting a diet rich in vegetables and fruits, with reduced intake of potentially inflammatory foods, may support overall health and therapy in individuals with Hashimoto's thyroiditis. Further research is needed to explore the underlying mechanisms and potential therapeutic benefits of dietary modifications in managing autoimmune thyroid disorders.

Keywords: Hashimoto's thyroiditis, anti-inflammatory diet, nutritional factors

INTRODUCTION

Chronic Hashimoto's thyroiditis (HT) is the most frequent autoimmune thyroid pathology characterized by lymphocytic infiltration of the thyroid gland, gradual destruction, and replacement with fibrotic tissue. It was first described by Hakaru Hashimoto, a Japanese surgeon in the 19th century in Berlin while studying the cases he had operated on. The main biochemical characteristic

is the presence in the serum of antibodies against two antigens of the thyroid gland; thyroid peroxidase (TPO) and thyroglobulin (TG). (Zaletel. 2007).

The function of the thyroid gland varies from hyperfunction to normal function and in most cases hypofunction. HT is the most common cause of hypothyroidism in iodine-sufficient countries. (Vanderpump et al., 1995;)

Various environmental and endogenous factors may interact to induce autoimmunity in the thyroid gland in genetically predisposed individuals. Despite numerous studies, the exact immunological mechanisms responsible for the development of the disease are not fully understood. (; Hollowell et al., 2002)

Significant correlations have been observed between HT and female sex, iodine excess, vitamin D deficiency, selenium deficiency, viral infections, medications, and exposure to certain chemicals. (Tomer, 2010; Desailoud & Hober, 2009;). Meanwhile, a diet rich in vegetables, fruits, unsaturated fats and fiber has a protective anti-inflammatory effect. (Danailova et al., 2022)

CONCEPTUAL FRAMEWORK

Overview of Chronic Autoimmune Hashimoto's Thyroiditis

HT is the most common cause of hypothyroidism in areas with sufficient iodine intake. The average annual incidence worldwide is estimated to be 30-150 cases per 100,000 individuals. (Vanderpump et al., 1998). However, the incidence varies among different geographical areas and populations with different iodine statuses. In countries with sufficient levels of iodine, autoimmune hypothyroidism is reported to be 350 new cases/per 100,000 inhabitants per year in women and 60 new cases/per 100,000 inhabitants in men. Meanwhile, in iodine- deficient areas are reported 44 new cases/100,000 inhabitants in women and 12 newcases/100,000 inhabitants in men (Wiersinga, 2018).

The prevalence varies depending on geographic area and socio-economic level from 4.8–25.8% in women and 0.9–7.9% in men. It mainly affects the white race and the middle age group, but it can be seen in any age, including children. (Ragusa et al., 2019).

Clinically HT can be presented in several forms such as euthyroid goiter, transient thyrotoxicosis, subclinical hypothyroidism, chronic hypothyroidism, and chronic atrophic thyroiditis. Symptoms of mild thyrotoxicosis are observed in the early stage of the disease. The decrease in the function of the thyroid gland occurs gradually, but in 20% of patients it is present at the time of diagnosis.

The symptoms of hypothyroidism are non-specific such as hair loss, dry skin, constipation, weight gain and can imitate other pathologies. Other symptoms of more advanced hypothyroidism include cold intolerance, hoarseness, pressure on the neck from an enlarged thyroid, slow movements, menstrual cycle disturbances, memory loss, jointpain, and muscle cramps.

Risk factors and role of nutrition in Hashimoto's Thyroiditis

Family and twin studies have shown a strong genetic predisposition to HT. First-degree relatives of individuals with HT have a higher risk of developing the disease than the normal population.(Bothra et al., 2017). Antibodies to the thyroid gland are reported in 56% of siblings of patients with autoimmune thyroid disease (Hall & Stanbury. 1967; Hollowell et al., 2002).

From epidemiological studies, positive thyroid antibodies are encountered up to threetimes more often in women than in men. The larger study National Health and Nutrition Examination Survey (NHANES III study) showed that females were positive for TPO and TG antibodies in 7% and

15.2% of cases, respectively, while males were positive only in 8.7% and 7.6% of cases (Lazarus. 2011).

In half of pregnant women with positive anti-TPO, Hashimoto's thyroiditis worsens in the postpartum period. It appears within the first year after birth and is usually presented with transient thyrotoxicosis, while permanent hypothyroidism may develop in about a third of women (Springer D. et al., 2017; Nguyen CT).

HT may initiate after viral infections like herpes simplex virus, Epstein Barr virus, rubella, parvovirus and human lymphotropic virus 1. (Tomer, 2010; Desaillood & Hober, 2009).

Also a number of toxins such as polyaromatic hydrocarbons and polyhalogenated biphenyls have found to be related to the presence of antibodies against thyroid and deterioration of its function (Duntas, 2014; Boas et al., 2012; Zheng et al., 2017).

Iodine intake

Iodine intake has a crucial role in the function of the thyroid gland. A significant lack of iodine causes the development of hypothyroidism, while a mild to moderate lack of iodine increases the prevalence of goiter and thyroid nodules. (Zimmermann & Boelaert. 2015; Duntas. 2008; Effraimidis & Wiersinga, 2014; Laurberg P et al., 2010).

Several epidemiological studies have demonstrated the relationship between high iodine intake and increased prevalence of autoimmune thyroiditis. Adding iodine to deficient populations through food iodization increases the risk of developing thyroid autoimmunity. (Luo et al., 2014; Zaletel et al., 2011; Camargo et al., 2008; Teng X et al., 2011)

A 4-fold increase in the prevalence of anti-thyroid antibodies has been observed in iodine-deficient populations after fortification of foods with iodine (Pedersen IB, Knudsen N et al., 2011). The mechanisms by which continued intake of supplemental iodine through the diet causes autoimmune thyroiditis are unclear. In genetically predisposed individuals exposure to iodine could theoretically increase the immunogenicity of thyroglobulin or stimulate antigenic presentation of thyrocytes.. Finally, excess iodine can induce hypothyroidism through the Wolff-Chaikoff effect on hormone synthesis (Markou et al., 2001). To avoid the risk of HT, it is important to ensure iodine intake according to recommended levels to achieve a population-based average iodine concentration of 100-200 mg/L (Organization, W.H 2007).

Selenium

Selenium is an essential trace mineral present in 25 selenoproteins which have a widerange of functions from antioxidant and anti-inflammatory properties to thyroid hormone production (Ermakov, 1992).

Selenoproteins found in thyrocytes include deiodinase isozymes, glutathione peroxidases, thioredoxins, and selenoproteins 15, P, M, and S. Comparative studies between populations with different selenium intakes indicate that individuals with higher serum selenium levels are less likely to have autoimmune thyroiditis, subclinical hypothyroidism, and thyroid goiter. (Wu et al., 2015; Derumeaux et al., 2003; Rasmussen et al., 2011; Bülow Pedersen et al., 2013)

However, the data on the effects of selenium use on HT are contradictory and not all studies have shown benefits from the use of selenium in autoimmune thyroiditis (van Zuuren et al., 2013; Wang et al., 2015; Duntas & Benvenga, 2014). In this context, if there are few sources of selenium in the patient's diet, low-dose supplementation of 50-100 mcg/day is suggested. |Selenium is toxic for the body when it is taken in excess and practice has shown that even in normal doses such as

200mcg/day it is associated with dermatitis, alopecia and squamous cell carcinoma.. (Stranges et al., 2007).

Vitamin D

Injection of high doses of vitamin D in rats improved the structure of the thyroid gland and restored the balance between Th1/Th2 cytokines(Fournier et al., 1990).

A study in patients with Hashimoto's thyroiditis resulted that low levels of vitamin D 25 OH were associated with presence of TPO antibodies. After supplementation with Vitamin D3 for a 4 months period, serum anti- TPO levels were significantly reduced (Liontiris & Mazokopakis. 2017). While other studies report that the concentration of vitamin D 25(OH) in the serum of patients with HT was not lower than in controls (D'Aurizio et al., 2015). Contradictions in the results of these studies may be attributed to differences in geographic region, sun exposure, ethnicity, body mass index, and laboratory methods used.

Iron deficiency

From the studies conducted, patients with HT have lower levels of iron in the blood compared to healthy individuals.. HT is often associated with other autoimmune disorders, and a significant proportion of HT patients have celiac disease or autoimmune gastritis, factors that directly contribute to low iron absorption from the gastrointestinal tract. (Fisher et al., 2008; Checchi et al., 2010; Tozzoli et al., 2010). On the other hand, iron deficiency affects the metabolism of the thyroid gland because it decreases the activity of the iron-dependent enzyme thyroid peroxidase (TPO). As a result, the production of thyroid hormones T4 and T3 is reduced. (Beard et al., 1998; Hess et al., 2002)

Diet and gut dysbiosis

Foods rich in antioxidants have anti- inflammatory effects and help maintain intestinal function, while pro-inflammatory foods such as simple sugars, processed foods, high salt, fried foods, carbonated drinks, and alcohol promote the release of inflammatory mediators favoring pathologies related to chronic inflammation such as metabolic syndrome, diabetes, autoimmune diseases, cancer, etc. Damage to the normal microbial flora of the gut, otherwise known as dysbiosis, is influenced by chronic inflammation as well as antibiotic use, toxins, and each individual's genetic profile. Dysbiosis can lead to increased intestinal permeability favoring the eruption or progression of HT. Damage to the microbiota influenced by lifestyle is thought to be one of the factors driving the autoimmune response and Hashimoto's thyroiditis (Cayres et al., 2021)

METHODOLOGY

A total of 465 individuals participated in this study, comprising 81% females (376 individuals) and 19% males (89 individuals). Blood collection was performed by venipuncture with the vacutainer system in 5 cc gel tubes. Serum was analyzed by the electrochemiluminescence method (ECLIA) for thyroid-stimulating hormone (TSH), free thyroxine (FT4), free triiodothyronine (FT3), anti-TPO, and anti-TG antibodies. Participants were divided into two groups: cases (42%) with positive anti-TPO and/or anti-TG antibodies, and controls (58%) with normal hormone tests and negative antibodies. Dietary habits were assessed through a questionnaire that measured the frequency of

consumption of various foods on a weekly or daily basis. The food groups included in the questionnaire were:

- fish and seafood,
- meat
- legumes (beans, peas, lentils, etc.)
- eggs
- fruits
- vegetables
- dried fruits (walnuts, almonds, etc.)
- dairy and animal fat (milk, yogurt, cheese, butter)
- bread, dough products
- packaged, processed foods (snacks)
- sweets and desserts

The frequency of intake for different foods was:

- once a day,
- once a week,
- rarely,
- never.

The questionnaire used was not intended to determine the daily amount of intake of different food groups. However, the classification of the food groups was based on their nutritional characteristics and the presence of elements that influence thyroid function, such as iodine, selenium, vitamin D, and iron. For example, fish and seafood are a source of iodine. Nuts, seafood, and meat are sources of selenium. Vitamin D is present in some kind of fish, eggs, fortified milk and cereals. Meat, dried fruits, legumes, and green vegetables are sources of iron. Meanwhile, processed foods, sweets, and bakery products are not rich in the micronutrients mentioned above and in addition, are known for their pro-inflammatory effect. Other foods such as soy and legumes can have an inhibitory effect on thyroid hormone synthesis. While fruits and vegetables have anti-oxidant and anti-inflammatory properties (Babiker et al., 2020; Hess & Zimmermann, 2004). Smoking was also included in the questionnaire based on literature data where some studies show an inverse relationship between smoking and Hashimoto's thyroiditis (Wiersinga, 2013).

Statistical processing and data analysis

Data from questionnaires and laboratory examinations were collected into a database according to pre-defined categories and then transferred to SPSS 26 to perform statistical analysis. Mean, standard deviation, minimum, maximum, frequency and percentage were used to present an overview of the questionnaire results in tabel and graphical form. Determining the differences between two groups was done using the χ^2 test and analysis of variance (ANOVA). The Pearson correlation coefficient was calculated to see the relationships between different variables. Logistic

regression analysis was used to see if there was a significant relationship between the presence of HT and the consumption of different food groups.

RESULTS

From the analyzed data, it was found that in the Albanian population studied, the food groups that were less consumed were fish and seafood with an average frequency of 1.3 times/week, while processed foods (snacks) and eggs were often consumed on average 3 times/week as shown in Table 1.

Table 1: Frequency of consumption of different food groups (times/week)

The table presents descriptive data of food products consumed several times per week. The food groups are listed according to the average weekly consumption from the least consumed food group, fish and seafood ($M = 1.23$, $ds = .745$) to the most frequently consumed food group eggs ($M = 3.32$, $ds = .866$).

Food group	N	Minimum	Maximum	Mean	Standard deviation
Fish and seafood times/week	465	0	4	1.23	.745
Legumes times/week	465	0	3	1.39	.818
Nuts times/week	465	0	4	1.93	.912
Sweets and desserts times/week	465	0	7	2.39	1.675
Meat times/week	465	1	5	2.95	.773
Snacks times/week	465	0	7	3.04	1.340

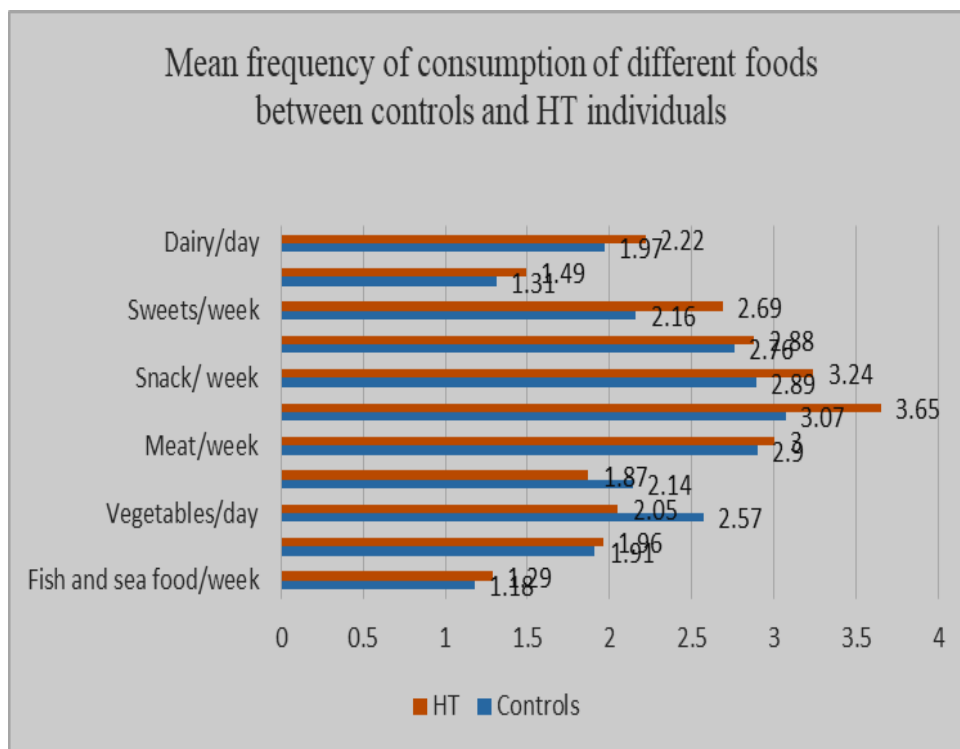
Among the food groups consumed daily, bread and bakery products have the highest frequency of consumption 2.8 times/day as shown in Table 2

Table 2: Frequency of consumption of different food groups (times/day)

The table presents descriptive data on food products consumed times/day. The food groups are listed according to the average consumption from the food group that is less consumed, fruits ($M = 2.02$, $ds = .782$) to the one that is more often consumed, bread and bakery ($M = 2.81$, $ds = .942$).

Food group	N	Minimum	Maximum	Mean	Standard deviation
Fruits times/day	465	1	4	2.02	.782
Dairy times/day	465	0	4	2.08	.765
Vegetables times/day	465	1	4	2.35	.758
Bread and bakery times/day	465	1	6	2.81	.942

The frequency of consumption of different food groups was compared between the two groups; HT and controls. Graph 1 presents the frequency of consumption of different foods in the two study groups; individuals with HT and controls. Frequency of consumption is expressed as the average value for each food group in times/day or times/week.



Graph 1: Differences in the frequency of consumption of different foods between controls and individuals with Hashimoto's Thyroiditis

Taking as a reference the criterion of significance ($p \leq .05$) after data analysis it resulted that there were significant differences in the frequency of consumption of different foods between cases (HT)

and controls for vegetables ($t = 7.411$, $p \leq .05$) and fruits ($t = 3.544$, $p \leq .05$) which were consumed more often by individuals in the control group compared to individuals with HT.

Significant differences between the two groups were also observed in the consumption of eggs ($t = -7.355$, $p \leq .05$), snacks ($t = -2.585$, $p \leq .05$), sweets ($t = -3.155$, $p \leq 0.05$), legumes ($t = -2.269$, $p \leq 0.05$) and dairy ($t = -3.293$, $p \leq .05$), which were consumed more frequently by individuals with Hashimoto's thyroiditis than the control group as presented in Table 3

Table 3. T-test on differences in mean frequency of consumption of different food groups between controls and HT individuals.

Food groups that resulted with a significant statistical difference between cases (HT individuals) and controls are marked with yellow.

Food group	Controls (N = 240)		HT individuals (N = 187)		Difference between HT and controls	Difference between HT and controls	HT vs Controls
	M	ds	M	ds	t	p	
Fish and sea food Times/week	1.18	0.68	1.29	0.81	-1.476	.141	
Nuts Times/week	1.91	0.93	1.96	0.88	-0.509	.611	
Vegetables Times/day	2.57	0.67	2.05	0.76	7.411	.000	HT < Controls
Fruits Times/day	2.14	0.81	1.87	0.73	3.544	.000	HT < Controls
Meat Times/week	2.90	0.87	3.00	0.62	-1.328	.185	
Eggs Times/week	3.07	0.87	3.65	0.74	-7.355	.000	HT > Controls
Snacks Times/week	2.89	1.21	3.24	1.47	-2.585	.010	HT > Controls
Bread and bakery Times/day	2.76	0.92	2.88	0.96	-1.293	.197	
Sweets Times/week	2.16	1.44	2.69	1.90	-3.155	.002	HT > Controls
Legumes Times/week	1.31	0.78	1.49	0.85	-2.269	.024	HT > Controls
Dairy Times/day	1.97	0.73	2.22	0.79	-3.293	.001	HT > Controls

Univariate logistic regression analysis was used to find if there was a significant relationship between the presence of HT and the consumption of different foods, calculating the odds ratio (OR). From the data analysis, it results that patients who consume vegetables are 62.5% less likely (OR = .375) to be affected by Hashimoto's thyroiditis than the control group. Patients who consume fruits are 36.6% less likely (OR= 0.634) to suffer from Hashimoto's thyroiditis than the control group. Patients who consume eggs are 2.5 times more likely (OR = 2.469) to be affected by HT compared

to the control group. Patients who consume fast food (snacks) are 1.2 times more likely to be affected by HT (OR = 1.214) compared to those of the control group (OR = 1.209). Patients consuming legumes are 1.3 times more likely (OR = 1.316) to be affected by HT compared to the control group. Patients who consume dairy products are 1.54 times more likely (OR = 1.542) to be affected by HT compared to the control group as shown in Table 4.

Table 4.: Logistic regression of the univariate analysis of the association between food products and Hashimoto's Thyroiditis.

Food group	p	OR	95% C.I. for OR	
			Lower	Upper
Fish and seafood/week	.133	1.218	.942	1.576
Nuts/week	.610	1.056	.856	1.303
Vegetables/day	.000	.375	.281	.500
Fruits/day	.001	.634	.490	.821
Meat/week	.203	1.176	.917	1.509
Eggs/week	.000	2.469	1.885	3.233
Snacks/week	.009	1.214	1.049	1.404
Bread and bakery/day	.197	1.144	.933	1.403
Sweets/week	.001	1.209	1.076	1.359
Legumes/week	.023	1.316	1.038	1.669
Dairy/day	.001	1.542	1.187	2.004

CONCLUSION AND DISCUSSION

Nutritional factors such as selenium, vitamin D, iron deficiency, and iodine excess have been suggested to stimulate thyroid autoimmunity. Meanwhile, eating fresh fruits and vegetables, fiber and healthy fats has a protective role against HT. Some specialist recommend lactose elimination because of interaction with levothyroxine absorption or lactose intolerance that HT patients may be prone to. There are also suggestions for eliminating gluten as a result of the possible interaction of gliadin with thyroid antigens (Krysiak et al., 2018). This study resulted that sweets, processed foods, snacks, dairy, and legumes were consumed more among patients with HT than in the control group. While vegetables and fruits were consumed less by patients with HT than by the control group. The most significant result of the study was the consumption of dairy among patients with HT compared to the control group.

Theoretically, this effect can be explained by the high amount of animal fat in these products or

lactose intolerance. Diets high in animal fats can contribute to chronic inflammation and the progression of chronic pathologies in the body, including Hashimoto's thyroiditis. The elimination of lactose from the diet is related to the fact that about 75% of individuals with HT have lactose intolerance. Lactose intolerance significantly reduces the absorption of levothyroxine from the gastrointestinal tract. Therefore, individuals with HT who need to take levothyroxine should be tested for lactose intolerance and eliminated from the diet if they test positive. Reduction of animal fats or lactose-free diets should not necessarily be recommended in all patients with Hashimoto's thyroiditis, but individual characteristics and risk factors for everyone should be taken into account. The consumption of sweets and processed foods is also known for its pro-inflammatory properties and association with chronic diseases. From this point of view, these food groups can influence the worsening of Hashimoto's thyroiditis. Replacing healthy foods with these types of foods results in less intake of nutrients needed for thyroid gland function such as iodine, selenium, vitamin D, and iron.

Gluten consumption may also predispose to autoimmunity in general and HT. The mechanism is thought to be the cross-reaction between thyroid elements and gliadin. (Ratajczak et al., 2017). Individuals with HT are often required to eliminate gluten from their diet due to co-existence with gluten intolerance, which is ten times more common in individuals with HT than in the general population (Sharma et al., 2016). In our study, bread, and bakery products were the most frequent food group consumed

by the population, and no statistically significant difference was observed between the HT group and the control group in the frequency of consumption of these foods.

Therefore, we do not recommend a gluten-free diet for every individual with HT, but only for individuals who test positive for gluten intolerance.

REFERENCES

- Boas, M., Feldt-Rasmussen, U., & Main, K. M. (2012, May). Thyroid effects of endocrine disrupting chemicals. *Molecular and Cellular Endocrinology*, 355(2), 240–248. <https://doi.org/10.1016/j.mce.2011.09.005>
- Bothra, N., Shah, N., Goroshi, M., Jadhav, S., Padalkar, S., Thakkar, H., Toteja, G. S., Shivane, V., Lila, A., & Bandgar, T. (2017, May 31). Hashimoto's thyroiditis: relative recurrence risk ratio and implications for screening of first-degree relatives. *Clinical Endocrinology*, 87(2), 201–206. <https://doi.org/10.1111/cen.13323>
- Bülow Pedersen, I., Knudsen, N., Carlé, A., Schomburg, L., Köhrle, J., Jørgensen, T., Rasmussen, L. B., Ovesen, L., & Laurberg, P. (2013, March 27). Serum selenium is low in newly diagnosed Graves' disease: a population-based study. *Clinical Endocrinology*, 79(4), 584–590. <https://doi.org/10.1111/cen.12185>
- Bülow Pedersen, I., Laurberg, P., Knudsen, N., Jørgensen, T., Perrild, H., Ovesen, L., & Rasmussen, L. B. (2007, August 1). An Increased Incidence of Overt Hypothyroidism after Iodine Fortification of Salt in Denmark: A Prospective Population Study. *The Journal of Clinical Endocrinology & Metabolism*, 92(8), 3122–3127. <https://doi.org/10.1210/jc.2007-0732>
- Camargo, R. Y. A., Tomimori, E. K., Neves, S. C., G S Rubio, I., Galvão, A. L., Knobel, M., & Medeiros-Neto, G. (2008, September). Thyroid and the environment: exposure to excessive nutritional iodine increases the prevalence of thyroid disorders in São Paulo, Brazil. *European Journal of Endocrinology*, 159(3), 293–299. <https://doi.org/10.1530/eje-08-0192>

Cayres, L. C. D. F., de Salis, L. V. V., Rodrigues, G. S. P., Lengert, A. V. H., Biondi, A. P. C., Sargentini, L. D. B., Brisotti, J. L., Gomes, E., & de Oliveira, G. L. V. (2021, March 5). Detection of Alterations in the Gut Microbiota and Intestinal Permeability in Patients With Hashimoto Thyroiditis. *Frontiers in Immunology*, *12*. <https://doi.org/10.3389/fimmu.2021.579140>

D'Aurizio, F., Villalta, D., Metus, P., Doretto, P., & Tozzoli, R. (2015, May). Is vitamin D a player or not in the pathophysiology of autoimmune thyroid diseases? *Autoimmunity Reviews*, *14*(5), 363–369. <https://doi.org/10.1016/j.autrev.2014.10.008>

Derumeaux, H., Valeix, P., Castetbon, K., Bensimon, M., Boutron-Ruault, M., Arnaud, J., & Hercberg, S. (2003, March 1). Association of selenium with thyroid volume and echostructure in 35- to 60-year-old French adults. *European Journal of Endocrinology*, 309–315. <https://doi.org/10.1530/eje.0.1480309>

Desailloud, R., & Hober, D. (2009). Viruses and thyroiditis: an update. *Virology Journal*, *6*(1), 5. <https://doi.org/10.1186/1743-422x-6-5>

Duntas, L. H. (2014, October 8). Chemical contamination and the thyroid. *Endocrine*, *48*(1), 53–64. <https://doi.org/10.1007/s12019-014-0309-0>. Fan, Y., Xu, S., Zhang, H., Cao, W., Wang, K., Chen, G., Di, H., Cao, M., & Liu, C. (2014). Selenium Supplementation for Autoimmune Thyroiditis: A Systematic Review and Meta-Analysis. *International Journal of Endocrinology*, *2014*, 1–8. <https://doi.org/10.1155/2014/904573>

Duntas, L. H. (2008, July 8). Environmental factors and autoimmune thyroiditis. *Nature Clinical Practice Endocrinology & Metabolism*, *4*(8), 454–460. <https://doi.org/10.1038/ncpendmet0896>

Effraimidis, G., Tijssen, J. G. P., & Wiersinga, W. M. (2009, April 1). Discontinuation of Smoking Increases the Risk for Developing Thyroid Peroxidase Antibodies and/or Thyroglobulin Antibodies: A Prospective Study. *The Journal of Clinical Endocrinology & Metabolism*, *94*(4), 1324–1328. <https://doi.org/10.1210/jc.2008-1548>

Hall R, Stanbury JB. (1967) Familial studies of autoimmune thyroiditis. *Clin. Exp. Immunol.*;2:719–725.

Hollowell, J. G., Staehling, N. W., Flanders, W. D., Hannon, W. H., Gunter, E. W., Spencer, C. A., & Braverman, L. E. (2002, February). Serum TSH, T4, and Thyroid Antibodies in the United States Population (1988 to 1994): National Health and Nutrition Examination Survey (NHANES III). *The Journal of Clinical Endocrinology & Metabolism*, *87*(2), 489–499. <https://doi.org/10.1210/jcem.87.2.8182>

Krysiak, R., Szkróbka, W., & Okopień, B. (2018, July 30). The Effect of Gluten-Free Diet on Thyroid Autoimmunity in Drug-Naïve Women with Hashimoto's Thyroiditis: A Pilot Study. *Experimental and Clinical Endocrinology & Diabetes*, *127*(07), 417–422. <https://doi.org/10.1055/a-0653-7108>

Laurberg, P., Cerqueira, C., Ovesen, L., Rasmussen, L. B., Perrild, H., Andersen, S., Pedersen, I. B., & Carlé, A. (2010, February). Iodine intake as a determinant of thyroid disorders in populations. *Best Practice & Research Clinical Endocrinology & Metabolism*, *24*(1), 13–27. <https://doi.org/10.1016/j.beem.2009.08.013>

Lazarus, J. H. (2011, March 1). The Continuing Saga of Postpartum Thyroiditis. *The Journal of Clinical Endocrinology & Metabolism*, *96*(3), 614–616. <https://doi.org/10.1210/jc.2011-0091>

Luo, Y., Kawashima, A., Ishido, Y., Yoshihara, A., Oda, K., Hiroi, N., Ito, T., Ishii, N., & Suzuki, K. (2014, July 21). Iodine Excess as an Environmental Risk Factor for Autoimmune Thyroid Disease. *International Journal of Molecular Sciences*, *15*(7), 12895–12912. <https://doi.org/10.3390/ijms150712895>

July 1-3, 2024 -PARIS

Nguyen, C. T., & Mestman, J. H. (2019, June). Postpartum Thyroiditis. *Clinical Obstetrics & Gynecology*, 62(2), 359–364. <https://doi.org/10.1097/grf.0000000000000430>

Organization, W. H. (2007, January 1). Assessment of iodine deficiency disorders and monitoring their elimination : a guide for programme managers. Assessment of Iodine Deficiency Disorders and Monitoring Their Elimination : A Guide for Programme Managers. <https://apps.who.int/iris/handle/10665/43781>

Pedersen, I. B., Knudsen, N., Carlé, A., Vejbjerg, P., Jørgensen, T., Perrild, H., Ovesen, L., Rasmussen, L. B., & Laurberg, P. (2011, June 10). A cautious iodization programme bringing iodine intake to a low recommended level is associated with an increase in the prevalence of thyroid autoantibodies in the population. *Clinical Endocrinology*, 75(1), 120–126. <https://doi.org/10.1111/j.1365-2265.2011.04008.x>

Prummel, M. F., & Wiersinga, W. M. (2005, March). Thyroid peroxidase autoantibodies in euthyroid subjects. *Best Practice & Research Clinical Endocrinology & Metabolism*, 19(1), 1–15. <https://doi.org/10.1016/j.beem.2004.11.003>

Ragusa, F., Fallahi, P., Elia, G., Gonnella, D., Paparo, S. R., Giusti, C., Churilov, L. P., Ferrari, S. M., & Antonelli, A. (2019, December). Hashimotos' thyroiditis: Epidemiology, pathogenesis, clinic and therapy. *Best Practice & Research Clinical Endocrinology & Metabolism*, 33(6), 101367. <https://doi.org/10.1016/j.beem.2019.101367>

Rasmussen, L. B., Schomburg, L., Köhrle, J., Pedersen, I. B., Hollenbach, B., Hög, A., Ovesen, L., Perrild, H., & Laurberg, P. (2011, April). Selenium status, thyroid volume, and multiple nodule formation in an area with mild iodine deficiency. *European Journal of Endocrinology*, 164(4), 585–590. <https://doi.org/10.1530/eje-10-1026>

Ratajczak, A., Moszak, M., & Grzymisławski, M. (2017, December 29). Dietary recommendations for hypothyroidism and Hashimoto's disease. *Nursing and Public Health*, 7(4), 305–311. <https://doi.org/10.17219/pzp/76716>

Sharma, B., Joshi, A., Varthakavi, P., Chadha, M., Bhagwat, N., & Pawal, P. (2016). Celiac autoimmunity in autoimmune thyroid disease is highly prevalent with a questionable impact. *Indian Journal of Endocrinology and Metabolism*, 20(1), 97. <https://doi.org/10.4103/2230-8210.172241>

Springer, D., Jiskra, J., Limanova, Z., Zima, T., & Potlukova, E. (2017, January 19). Thyroid in pregnancy: From physiology to screening. *Critical Reviews in Clinical Laboratory Sciences*, 54(2), 102–116. <https://doi.org/10.1080/10408363.2016.1269309>

Stranges, S., Marshall, J. R., Natarajan, R., Donahue, R. P., Trevisan, M., Combs, G. F., Cappuccio, F. P., Ceriello, A., & Reid, M. E. (2007, August 21). Effects of Long-Term Selenium Supplementation on the Incidence of Type 2 Diabetes. *Annals of Internal Medicine*, 147(4), 217. <https://doi.org/10.7326/0003-4819-147-4-200708210-00175>

Teng, X., Shan, Z., Chen, Y., Lai, Y., Yu, J., Shan, L., Bai, X., Li, Y., Li, N., Li, Z., Wang, S., Xing, Q., Xue, H., Zhu, L., Hou, X., Fan, C., & Teng, W. (2011, June). More than adequate iodine intake may increase subclinical hypothyroidism and autoimmune thyroiditis: a cross-sectional study based on two Chinese communities with different iodine intake levels. *European Journal of Endocrinology*, 164(6), 943–950. <https://doi.org/10.1530/eje-10-1041>

Tomer, Y., & Huber, A. (2009, May). The etiology of autoimmune thyroid disease: A story of genes and environment. *Journal of Autoimmunity*, 32(3–4), 231–239. <https://doi.org/10.1016/j.jaut.2009.02.007>

van Zuuren, E. J., Albusta, A. Y., Fedorowicz, Z., Carter, B., & Pijl, H. (2013, June 6). Selenium supplementation for Hashimoto's thyroiditis. *Cochrane Database of Systematic Reviews*, 2013(6). <https://doi.org/10.1002/14651858.cd010223.pub2>

Vanderpump, M. P. J., Tunbridge, W. M. G., French, J. M., Appleton, D., Bates, D., Clark, F., Evans, J. G., Hasan, D. M., Rodgers, H., Tunbridge, F., & Young, E. T. (1995, July). The incidence of thyroid disorders in the community: a twenty-year follow-up of the Whickham Survey. *Clinical Endocrinology*, 43(1), 55–68. <https://doi.org/10.1111/j.1365-2265.1995.tb01894.x>

Wang, Z., Zhang, Q., Lu, J., Jiang, F., Zhang, H., Gao, L., & Zhao, J. (2010, August 1). Identification of Outer Membrane Porin F Protein of *Yersinia enterocolitica* Recognized by Antithyrotropin Receptor Antibodies in Graves' Disease and Determination of Its Epitope Using Mass Spectrometry and Bioinformatics Tools. *The Journal of Clinical Endocrinology & Metabolism*, 95(8), 4012–4020. <https://doi.org/10.1210/jc.2009-2184>

with Graves' patients. *European Journal of Endocrinology*, 164(5), 789–794. <https://doi.org/10.1530/eje-10-1172>

Wiersinga, W. M. (2013, May 11). Smoking and thyroid. *Clinical Endocrinology*, 79(2), 145–151. <https://doi.org/10.1111/cen.12222>

Wu, Q., Rayman, M. P., Lv, H., Schomburg, L., Cui, B., Gao, C., Chen, P., Zhuang, G., Zhang, Z., Peng, X., Li, H., Zhao, Y., He, X., Zeng, G., Qin, F., Hou, P., & Shi, B. (2015, November). Low Population Selenium Status Is Associated With Increased Prevalence of Thyroid Disease. *The Journal of Clinical Endocrinology & Metabolism*, 100(11), 4037–4047. <https://doi.org/10.1210/jc.2015-2222>

Zaletel, K., Gaberšček, S., Pirnat, E., Krhin, B., & Hojker, S. (2011, October). Ten-year follow-up of thyroid epidemiology in Slovenia after increase in salt iodization. *Croatian Medical Journal*, 52(5), 615–621. <https://doi.org/10.3325/cmj.2011.52.615>

Zheng, J., He, C. T., Chen, S. J., Yan, X., Guo, M. N., Wang, M. H., Yu, Y. J., Yang, Z. Y., & Mai, B. X. (2017, May). Disruption of thyroid hormone (TH) levels and TH-regulated gene expression by polybrominated diphenyl ethers (PBDEs), polychlorinated biphenyls (PCBs), and hydroxylated PCBs in e-waste recycling workers. *Environment International*, 102, 138–144. <https://doi.org/10.1016/j.envint.2017.02.009>

**YETİŞKİN BİREYLERDE ÇOCUKLUK ÇAĞI OLUMSUZ YAŞANTILARI İLE
TIKINIRCASINA YEME BOZUKLUĞU ARASINDAKİ İLİŞKİDE DUYGUSAL
ŞEMALAR VE BİLİŞSELÇARPITMALARIN ARACI ROLÜ**

**THE MEDIATORY ROLE OF EMOTIONAL SCHEMAS AND COGNITIVE
DISTORTIONS IN THE RELATIONSHIP BETWEEN ADVERSE CHILDHOOD
EXPERIENCES IN CHILDHOOD AND BINGE EATING DISORDER IN ADULT
INDIVIDUALS**

Gamze KIZILHAN

İstanbul Arel Üniversitesi

ORCID ID: 0009-0004-1444-8356

Dr. Öğr. Üyesi Safiye Elif ÇAĞATAY

İstanbul Arel Üniversitesi

ORCID ID: 0000-0001-8961-6140

Abstract

It is known that negative childhood experiences have an important place in emotional schemas, cognitive distortions and binge eating disorder by affecting eating disorders both directly and indirectly. It is emphasized that childhood traumas can negatively affect cognitivedistortions and emotional schemas and lead to the development of binge eating disorder. It is thought that there is a positive relationship between cognitive distortions and binge eating disorder due to irrational and dysfunctional cognitive processes, as well as childhood traumas. This study examines the complex relationship between negative childhood experiences, emotional schemas, cognitive distortions and binge eating disorder. In order to make the study comprehensive, data was collected from 400 people between the ages of 18-65 residing in different provinces of Turkey. Sociodemographic Information Form, Adverse Childhood Experiences Scale, Binge Eating Disorder Scale, Leahy Emotional Schema Scale, Cognitive Distortions Scale were used as data collection tools. This study highlighted the impact of childhood trauma on eating disorders and provided information regarding potential cognitive and emotional factors that contribute to binge eating disorder. Research results show that emotional schemas and cognitive distortions have a mediating effect in the relationship between negative childhood experiences and binge eating disorder. The findings reveal that individuals with negative childhood experiences show more binge eating behavior. It also predicts that individuals with higher emotional schema scores and cognitive distortion scores show more binge eating behavior. The study's findings may play an important role in binge eating disorder treatment and eating disorder intervention. Treatment approaches can be developed by focusing on negative childhood experiences that affect emotional schemas and cognitive distortions in binge eating disorder. It is thought that raising awareness on these issues by drawing attention to the childhood traumas underlying emotional schemas and eating disorders in universities and schools is important for intervention and prevention programs. This study offers new ways to understand the complex relationships between cognitive distortions, emotional schemas, eating disorders, and adverse childhood experiences. In this context, it can guide future research and be considered as a basis for

more detailed studies.

Key Words: Adverse Childhood Experiences, Binge Eating Disorder, Emotional Schemas, Cognitive Distortions.

Özet

Çocukluk çağı olumsuz yaşantılarının hem doğrudan hem de dolaylı olarak yeme bozukluklarını etkileyerek duygusal şemalarda, bilişsel çarpıtmalarda ve tıknırcasına yeme bozukluğunda önemli bir yer edindiği bilinmektedir. Çocukluk çağı travmalarının bilişsel çarpıtmaları ve duygusal şemaları negatif bağlamda etkileyebileceğini ve tıknırcasına yeme bozukluğu geliştirmesine yol açabileceği vurgulanmaktadır. Çocukluk çağı travmalarının yanısıra, mantık dışı ve işlevsel olmayan bilişsel süreçler sebebi ile bilişsel çarpıtmalar ile tıknırcasına yeme bozukluğu arasında olumlu yönde bir ilişkinin olduğu düşünülmektedir. Bu çalışmada, çocukluk çağı olumsuz yaşantıları, duygusal şemalar, bilişsel çarpıtmalar ve tıknırcasına yeme bozukluğu arasındaki karmaşık ilişki incelenmektedir. Çalışmanın kapsamlı olması amacı ile Türkiye'nin farklı illerinde ikamet etmekte olan 18-65 yaş arası 400 kişiden veri toplanmıştır. Veri toplama araçları olarak Sosyodemografik Bilgi Formu, Çocukluk Çağı Olumsuz Yaşantılar Ölçeği, Tıknırcasına Yeme Bozukluğu Ölçeği, Leahy Duygusal Şema Ölçeği, Bilişsel Çarpıtmalar Ölçeği kullanılmıştır. Bu çalışma, çocukluk çağı travmalarının yeme bozuklukları üzerindeki etkisini vurgulayarak, tıknırcasına yeme bozukluğu oluşturan potansiyel bilişsel ve duygusal faktörlerle ilgili bilgi sağlamıştır. Araştırma sonuçları çocukluk çağı olumsuz yaşantıları ile tıknırcasına yeme bozukluğu arasındaki ilişkide duygusal şemalar ve bilişsel çarpıtmaların aracı etkisi olduğunu göstermektedir. Elde edilen bulgulara göre çocukluk çağı olumsuz yaşantılarına sahip olan bireylerin daha fazla tıknırcasına yeme davranışı gösterdiğini ortaya koymaktadır. Ayrıca, duygusal şema puanları ve bilişsel çarpıtma puanları daha yüksek olan bireylerde daha fazla tıknırcasına yeme davranışı gösterdiğini öngörmektedir. Çalışmanın bulguları, tıknırcasına yeme bozukluğu tedavisi ve yeme bozukluklarına müdahalede önemli bir rol oynayabilir. Duygusal şemalar ve bilişsel çarpıtmaların tıknırcasına yeme bozukluğunu etkileyen çocukluk çağı olumsuz yaşantılara odaklanarak tedavi yaklaşımları geliştirilebilir. Üniversite ve okullarda duygusal şemaların ve yeme bozukluklarının altında yatan çocukluk çağı travmalarına dikkat çekerek, bu konulardaki farkındalığın artırılmasının müdahale ve önleme programları için önemli olduğu düşünülmektedir. Bu çalışma, bilişsel çarpıtmalar, duygusal şemalar, yeme bozuklukları ve çocukluk çağı olumsuz yaşantıları arasındaki karmaşık ilişkileri anlamada yeni yollar sunmaktadır. Bu bağlamda gelecekteki araştırmalara yön gösterebilir ve daha detaylı çalışmalar için temel olarak ele alınabilir.

Anahtar Kelimeler: Çocukluk Çağı Olumsuz Yaşantıları, Tıknırcasına Yeme Bozukluğu, Duygusal Şemalar, Bilişsel Çarpıtmalar.

GİRİŞ

Son yıllarda yeme bozuklukları ile çeşitli psikolojik faktörler arasındaki ilişki oldukça merak uyandırmaktadır. Literatürde duygusal şemalar (DŞ) olumsuz benlik algısı, aşırı genelleme ve felaketleştirme gibi bilişsel çarpıtmaları (BÇ) içeren faktörler ile ilişkilendirilmiştir (Beck, 2008). Bu bulgular, duygusal şemaların ve bilişsel çarpıtmaların çok yönlü bir ilişkiye sahip olabileceğini ve tıknırcasına yeme bozukluğu üzerindeki rolünün daha fazla araştırılması ihtiyacını göstermektedir. Ayrıca, yeme bozukluğu (YB) geliştirme olasılığının, çocukluk çağı travmalarına maruz kalan kişiler için genel popülasyona göre üç kat daha fazla olduğu bildirilmiştir (Caslini ve diğerleri, 2015). Tıknırcasına yeme bozukluğu (TYB) ile çocukluk çağı olumsuz yaşantılarının arasındaki ilişki literatürde yeterince araştırılmamıştır. Bu bağlamda TYB ile çocukluk çağı olumsuz yaşantılarının (ÇÇOY) arasında bulunan ilişkinin daha fazla araştırılması gerektiği görülmektedir.

TYB, bilimsel olarak ilk defa 1959 yılında Albert Stunkard tarafından “tıkınırcasına yeme, obez bireylerde görülmekte olan ve normalden daha fazla yeme alışkanlığıdır” olarak tanımlanmıştır (Stunkard ve McLaren-Hume, 1959). TYB, bireyin ne yediğini ve ne miktarda yediği üzerindeki kontrol kaybı ile birlikte, aşırı miktardaki yiyeceği kısıtlı zaman dilimi içerisinde tükettiği yineleyici tıkınırcasına yeme ataklarını içeren bir yeme bozukluğudur (Grilo ve Mitchell, 2011). Yeme Bozuklukları, bireyin yeme davranışlarındaki ve alışkanlıklarındaki uyumsuz birtakım davranış ve düşünceler ile karakterizedir (Fairburn ve Harrison, 2003). Yeme bozuklukları, kısıtlı kalori alımının yanı sıra tıkınırcasına yeme gibi geniş bir spektrumunu içerir. DSM-5’e göre yeme bozuklukları şu şekilde tanımlanmaktadır: Anoreksiya Nervoza, Bulumiya Nervoza, Tıkınırcasına Yeme Bozukluğu, Kaçınan/ Kısıtlayıcı Yiyecek Alım Bozukluğu, Pika ve Ruminasyon Bozukluğu. Gece Yemek Yeme Bozukluğu/Gece Yeme Sendromu ise “Başka Türlü Adlandırılan Yeme Bozukluğu” sınıfındadır (APA, 2013).

Ayrıca, YB ve TYB, benlik saygısında düşüş, beden algısında bozulma, bozulmuş yeme davranışları, bozulmuş yeme düşünceleri ve depresyon riskinde artış gibi ortak psikopatolojik özelliklere sahiptir. Bu bağlamda TYB, çeşitli psikiyatrik ve tıbbi komorbiditeler ile ilişkili bir psikopatolojidir. Kişiyi TYB geliştirmesine yatkın hale getiren ailevi, kişiler arası, sosyal ya da psikolojik etkenlerin varlığı ileri sürülmüştür (Fairburn ve Brownell, 2002). Çocukluk çağındaki olumsuz yaşantılar; cinsel istismar, fiziksel istismar, duygusal ve fiziksel ihmalin yeme bozukluğu üzerinde önemli etkiler taşımaktadır (Karaoğlu, 2019). Literatürde TYB geliştiren bireylerin kilo kontrolü davranışı göstermediği ve bunun çocukluk döneminde maruz kalınan cinsel istismardan kaynaklanabileceğini öne süren araştırmalar bulunmaktadır (Paxton ve McLean, 2009; Fuemmeler ve ark., 2009). Ayrıca, çocukluk çağında bireyin cinsel istismara maruz kalmasının, yeme psikopatolojisi bağlamında spesifik bir rolü olmamakla birlikte diğer istismar ve ihmal türlerinin de yeme psikopatolojisi gelişimine neden olduğu belirtilmektedir (Brewerton, 2007). Duygusal istismar mağduru bireylerde reddedilme hissinden kurtulmak için yemek yemenin verdiği haz etkisinden yararlandıkları ileri sürülmüştür. Bu bağlamda obezite riski artmaktadır (Arslan, 2016). TYB’ye neden olan psikolojik etmenler arasında bilişsel çarpıtmaların da bulunduğu belirtilmektedir (Jones ve ark., 2007). BÇ, kişinin duygularının, duyguları ile bağlantılı davranışlarını ve tepkilerini etkileyen düşünce biçimidir. İşlevsel olmayan, gerçeklikten uzak ve mantık dışı dogmatik düşünceler ile karakterizedir (Beck, 2001). Yeme bozukluklarının sürdürülmesinin işlevsiz bilişlerden oluştuğu ileri sürülmektedir. Tıkınırcasına yeme atakları, kiloya ve beden şekline odaklanan aşırı ve mantık dışı meşguliyetlerin dışavurumudur (Voleryve ark., 2006). Tıkınırcasına yeme bozukluğu semptomları gösteren kişilerin, obezite olan fakat tıkınırcasına yeme bozukluğuna sahip olmayan kişilere göre bilişsel çarpıtmalardan daha fazla etkileniyor olduğu saptanmıştır (Ramacciotti ve ark., 2008).

Ayrıca, bireyler tıkınırcasına yeme atakları sırasında veya sonrasında negatif duygular hisseder. Hissedilen negatif duygular bağlamında her birey duyguları hakkında yorumda bulunmaktadır. Duyguların nasıl yorumlandığı, algılandığı ve anlamlandırıldığı, deneyimlenen duyguların nasıl bir bilişsel süreçten geçtiği kişinin duygu yaşantısının belirleyicisidir. Duygusal şema kavramı, duygusal deneyimler ve duygular hakkındaki temel inançları ve duygusal işlevselliği kapsamakla birlikte kişinin kendi duygusal deneyimi ile nasıl baş ettiğine dair açıklama sunmaktadır (Leahy, 2002).

Tıkınırcasına yeme davranışı geliştiren kişilerin duygularını ifade etme yeteneklerine yönelik olumsuz inançları olduğunu, tıkınırcasına yeme davranışı geliştirmeyen kişilere göre duygusal farkındalıklarının daha düşük olduğu saptanmıştır (Waller, 2003). Ayrıca, tıkınırcasına yeme ataklarını etkileyen ve tıkınırcasına yeme ataklarına eşlik eden olumsuz duygular doğrultusunda kişi, duyguları hakkında yorumda bulunmaktadır. Çalışma, çocukluk çağı olumsuz yaşantıları bağlamında duygusal şemalar ve bilişsel çarpıtmalar ile tıkınırcasına yeme bozukluğu arasındaki ilişkiyi kapsamlı bir biçimde anlamaya yardımcı olacağı için önem arz etmektedir. İlgili alan

yazın incelendiğinde bu değişkenlerin birlikte incelendiği bir çalışmanın olmadığı görüldüğünden mevcut çalışmanın özgün nitelikte olduğu söylenebilmektedir.

Duygusal, fiziksel ve cinsel istismar ve ihmal gibi yaşantıların bulunduğu çocukluk çağı olumsuz yaşantıları ile tıknırcasına yeme bozukluğu arasındaki ilişkide bilişsel çarpıtmalar ve duygusal şemaların rolünü anlamak önleyici stratejiler ve müdahaleler geliştirmek adına oldukça önemlidir. Ayrıca, bu faktörler arasındaki karşılıklı ilişkinin araştırılması, tıknırcasına yeme bozukluğunun altında yatan faktörler hakkında değerli bilgiler verebilir ve daha etkili tedavi yaklaşımlarının geliştirilmesine katkı sağlayabilir. Bu çalışmanın amacı, ÇÇOY ile TYB arasında bulunan ilişkiyi incelemek ve bu ilişkide DŞ ve BÇ'nin rolüne odaklanmaktır. Böylelikle mevcut çalışmada, "çocukluk çağı travmaları ile tıknırcasına yeme bozukluğu arasındaki ilişkide duygusal şemalar ve bilişsel çarpıtmaların aracılık rolü var mıdır?" sorusuna cevap aranmaktadır.

YÖNTEM

Araştırma Deseni

Mevcut araştırma kesitsel korelasyonel yöntem ile tasarlanmıştır. Korelasyonel yöntem, iki vedaha fazla değişken arasındaki ilişkiyi ölçmek amacıyla nicel araştırma yöntemi ile tasarlanan araştırmaların istatistiksel analizinde kullanılmaktadır. Korelasyonel yöntem değişkenler arasındaki ilişkinin gücünü ve doğasını belirlemektedir.

Örneklem

Araştırmaya katılım gönüllülük esası ile gerçekleşmiştir. Örneklem Türkiye'nin çeşitli illerinde yaşayan kişilerden oluşmuştur. Araştırmaya katılma koşulu olarak katılımcıların 18 yaşından büyük olması olarak belirlenmiştir. Araştırmanın örneklemi 18 ile 65 yaş aralığında bulunan 139 erkek ve 261 kadın katılımcı olmak üzere toplam 400 kişiden oluşturmaktadır.

Veri Toplama Araçları

Sosyodemografik Bilgi Formu:

Sosyodemografik bilgi formunda katılımcılardan cinsiyet, yaş, boy ve kilolarını cevaplandırmaları istenmiştir.

Çocukluk Çağı Olumsuz Yaşantılar Ölçeği (ÇÇOYÖ):

Çocukluk Çağı Olumsuz Yaşantılar Ölçeği 1998 yılında Felitti ve arkadaşları tarafından geliştirilmiştir. Ölçek, Türkçeye ilk olarak Ulukal ve arkadaşları tarafından 2013 yılında çevirilmiştir ancak güvenilirlik ve geçerlilik çalışması gerçekleştirilmemiştir. 2018 yılında Gündüz ve arkadaşları tarafından ölçeğin geçerlilik ve güvenilirlik çalışmaları yapılmıştır. ÇÇOYÖ, çocukluk çağı travmalarını irdeleyen toplam 10 maddeden oluşan bir öz bildirim ölçeğidir. Birey, yaşamının ilk 18 yılında fiziksel istismar, aile içinde gösterilen duygusal istismar, duygusal ihmal, fiziksel ihmal ve anneye yönelik şiddet alt boyutlarını sıklıkla veya çok sıklıkla yaşantılamış ise; aile içi işlev bozukluğu ya da cinsel istismar alt boyutlarında ise söz konusu durumu bir kez bile yaşantılamış ise "evet" seçeneğini cevaplandırması istenir. Bu ölçek tekli faktör yapısına sahiptir. Sorular yalnızca "evet" seçeneğini içermektedir, aksi taktirde soru boş bırakılmaktadır. Ölçeğin toplam puanı 0-10 aralığında değişmektedir ve kesme değeri bulunmamaktadır. Yanıtlanan her evet seçeneği 1 puanı karşılacaktır. Bu doğrultuda puan artışı ile birlikte çocukluk çağı olumsuz yaşantılarının arttığı belirlenmektedir. Cronbach alpha iç tutarlılık değeri 0.74 olarak saptanmıştır ve testin 74 oranında iç tutarlılık güvenilirliğine sahip olduğunu göstermektedir. Elde edilen veriler sonucunda

ÇÇOYÜ'nün yeterli düzeyde güvenilir olduğu işaretlenmektedir. Madde-toplam puan korelasyonu incelendiğinde ise madde 10 harici tüm maddeler pozitif yönde korelasyon göstermektedir. Elde edilen bulgular ölçeğin içsel geçerliliğinin yüksek olduğuna işaret etmektedir.

Tıkınırcasına Yeme Bozukluğu Ölçeği: TYBÖ 1982 yılında Gormally ve arkadaşları tarafından obez bireylerdeki tıkınırcasına yemeyi belirlemek amacı ile BingeEating Scale adıyla geliştirilmiş bu ölçeğin Türkçeye çeviri ve uyarlama çalışması 2021 yılında Tosyalı tarafından gerçekleştirilmiştir. Toplam 16 maddeden oluşan TYBÖ'nün 8 maddesi tıkınırcasına yemeye dair biliş ve duyguları incelerken, diğer 8 maddesi ise yeme davranışlarını ele almaktadır. İki faktörlü yapısına karşın ölçek genel olarak tek faktörlü olarak kullanılmaktadır. Bu bağlamda Türkçeye uyarlama çalışmasında da tek faktörün varlığı belirlenmiştir. Ölçeğin Türkçe uyarlamasında güvenilirlik katsayısı ($\alpha=.83$) olarak hesaplanmıştır. Bu bağlamda orijinal ölçekteki güvenilirlik katsayısına ($\alpha=.85$) yakın bulunmuştur. Ölçek maddeleri normal yemeden başlayıp patolojik yemeye doğru sıralanan dört ifadeyi içermekle birlikte ölçeğin 6. ve 16. maddelerinde üçer ifade bulunmaktadır. Ölçeğin puanlaması 0-3 arasında değişkenlik göstermektedir. Yüksek puanlı veriler tıkınırcasına yeme şiddetinin arttığına işaret etmektedir.

Leahy Duygusal Tema Ölçeği: 2002 yılında Leahy tarafından duygular ile ilgili tutum ve inançları belirlemek amacıyla geliştirilmiştir. Duygusal şema ölçeği on dört alt boyutu içermektedir. "Duygulara karşı zayıflık" alt boyutu için beş, "kontrol edilemezlik" alt boyutu için altı, "anlaşılabilirlik" alt boyutu için üç, "duygulardan kaçınma" alt boyutu için beş, "hisleri kabullenme alt boyutu için beş, "akılcılık isteği" alt boyutu için dört, "farklılık alt boyutu için beş, "ruminasyon" alt boyutu için dört, "duyguları inkar" alt boyutu için iki, "onaylanma" alt boyutu için iki, "süreklilik" alt boyutu için iki, "duyguları zararlı olarak görme" alt boyutu için iki, "suçluluk" alt boyutu için üç ve uzlaşma alt boyutu için iki madde olmak üzere toplam elli madde içermektedir. DŞÖ 6'lı Likert tipi (1= "Benim için hiç geçerli değil", 6= "Benim için çok geçerli") olarak hazırlanan ölçeğin 5.,10.,12.,29.,33. ve 50. maddeleri ters puanlanmaktadır. Ölçeğin Türkçeye uyarlaması Yavuz ve arkadaşları tarafından 2011 yılında yürütülmüştür. Cronbach alpha iç tutarlılık katsayısı .86olarak hesaplanmıştır.

Bilişsel Çarpıtmalar Ölçeği: BÇÖ 2011 yılında Covin ve arkadaşları tarafından bilişsel çarpıtmaları değerlendirmek amacı ile geliştirilmiştir. 2017 yılında Ardanç tarafından Türkçe geçerlilik ve güvenilirlik araştırması yapılmıştır. Bu bağlamda Türkçe uyarlaması yapıldıktan sonra tekrar kontrol edilen ölçekte 10 adet bilişsel çarpıtma yer almaktadır. Bu maddeler kısa pasajları içermektedir ve her madde başarı ve kişilerarası (sosyal) olmak üzere iki alanda incelenmektedir. Ölçek ikişer maddeyi barındıran 10 alt boyuta sahiptir. Bunlar; Zihin Okuma, Duygudan Sonuca Ulaşma, İki Uçlu Biçimde Düşünme, Etiketleme, Zihinsel Filtreleme, Felaketleştirme, Zorunluluk İfadeleri, OlumluyuAzımsama veyaYok Sayma, Kişiselleştirme ve Aşırı Genelleme'dir. Ölçek 7'li Likert tipinde hazırlanmıştır. Yanıt seçeneği 1="Asla", 7="Her Zaman" arasında değişkenlik göstermektedir. Ölçek içerisinde ters maddeler bulunmamaktadır. Tüm ölçek için iç tutarlılık katsayısı .88 olarak hesaplanmıştır. Ölçeğin genel güvenilirliği ve geçerliliği $\alpha=.85$ olarak raporlanmıştır. Ölçeğin alt unsurları için ise Başarı $\alpha=.79$ ve Kişiler Arası $\alpha=.75$ olarak hesaplanmıştır.

İşlem

Araştırmaya İstanbul Arel Üniversitesi Etik Kuruluna başvuru yapılarak ve etik izin alındıktan sonra başlanmıştır (E-52857131-050.04-601416). Akabinde Mart 2024 - Mayıs 2024 tarihleri arasında araştırma verileri toplanmıştır. Veri toplama sürecine başlamadan önce, araştırma katılımcılarına bilgilendirilmiş onam formu sunulmuştur. Araştırmaya gönüllülük esası ile katılım sağlamayı onaylayan kişilere ilgili araştırmanın ölçekleri sunulmuştur. İstatistiksel analiz için SPSS 27.0 programına Process Macro eklentisi kullanılmıştır.

Hipotezlerin analizinden önce verilerin analizi için değişkenlerin ortamlarının normallik sınaması amacıyla basıklık ve çarpıklık değerleri incelenmiştir. Ardından tıknırcasına yeme bozukluğu, çocukluk dönemi olumsuz yaşantılar, bilişsel çarpıtma ve duygusal şema düzeyleri arasındaki ilişkilerin incelenmesi doğrultusunda korelasyon analizi uygulanmıştır. Çocukluk dönemi olumsuz yaşantıları ve TYB arasında bulunan ilişkide duygusal şemalar ve bilişsel çarpıtmalar düzeyinin aracılık rolünün analizi için Process Macro eklentisi kullanılmıştır.

SONUÇLAR VE DEĞERLENDİRME

Araştırma değişkenlerinin arasındaki ilişkilerin incelenmesi amacıyla korelasyon analizi kullanılmıştır. Araştırma değişkenlerinin arasındaki ilişkiler Tablo 1’de sunulmuştur.

Tablo 1. *Tıkınırcasına Yeme Bozukluğu, Çocukluk Dönemi Olumsuz Yaşantılar ve Bilişsel Çarpıtmalar Arasındaki İlişkiye Dair Pearson Korelasyon Katsayıları*

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. TYB_Toplam	1												
2. ACE_Toplam	.255 **	1											
3. Zihin Okuma	.239 **	.15 7**	1										
4. Felaketleştirme	.439 **	.20 3**	.55 5**	1									
5. İki uçludüşünme	.462 **	.16 2**	.42 5**	.54 5**	1								
6. Duygudan sonuca ulaşma	.371 **	.20 0**	.58 8**	.60 8**	.611 **	1							
7. Etiketleme	.473 **	.22 7**	.51 9**	.66 5**	.57 7**	.68 8**	1						
8. Zihinsel Filtreleme	.396 **	.22 0**	.51 4**	.62 5**	.51 8**	.65 3**	.74 6**	1					
9. Aşırı genelleme	.433 **	.18 7**	.48 6**	.64 7**	.58 5**	.67 4**	.67 4**	.70 4**	1				
10. Kişiselleştirme	.368 **	.15 7**	.47 9**	.62 4**	.50 5**	.65 0**	.63 9**	.63 6**	.67 8**	1			
11. Zorunluluk ifadeleri	.340 **	.18 1**	.41 8**	.49 5**	.49 5**	.55 6**	.56 9**	.58 8**	.55 3**	.54 8**	1		
12. Olumluyu azımsama	.447 **	.22 9**	.46 1**	.58 7**	.50 3**	.59 4**	.62 1**	.62 1**	.63 5**	.64 2**	.57 1**	1	
13. BÇ_Toplam	.505 **	.24 4**	.68 3**	.80 2**	.73 3**	.83 5**	.85 0**	.83 7**	.83 9**	.80 7**	.73 2**	.79 0**	1

**p<0.01

*p<0.05

Tablo 3'te katılımcıların tıkınırcasına yeme puanları ile bilişsel çarpıtmalar alt boyut ve toplam puanları arasındaki ilişki incelendiğinde, tıkınırcasına yeme ile zihin okuma ($r=.24$; $p<0.01$), felaketleştirme ($r=.44$; $p<0.01$), iki uçlu düşünme ($r=.46$; $p<0.01$), duygudan sonuca ulaşma ($r=.37$; $p<0.01$), etiketleme ($r=.47$; $p<0.01$), zihinsel filtreleme ($r=.40$; $p<0.01$), aşırı genelleme ($r=.43$; $p<0.01$), kişiselleştirme ($r=.37$; $p<0.01$), zorunluluk ifadeleri ($r=.34$; $p<0.01$), olumluyu azımsama ($r=.45$; $p<0.01$) ve bilişsel çarpıtma toplam ($r=.50$; $p<0.01$) pozitif yönlü ve anlamlı ilişkili bulunmuştur.

Tablo 2. *Tıkınırcasına Yeme, Çocuklukta Olumsuz Yaşantılar ve Duygusal Şemalar Arasındaki İlişkiye Yönelik Korelasyon Katsayıları*

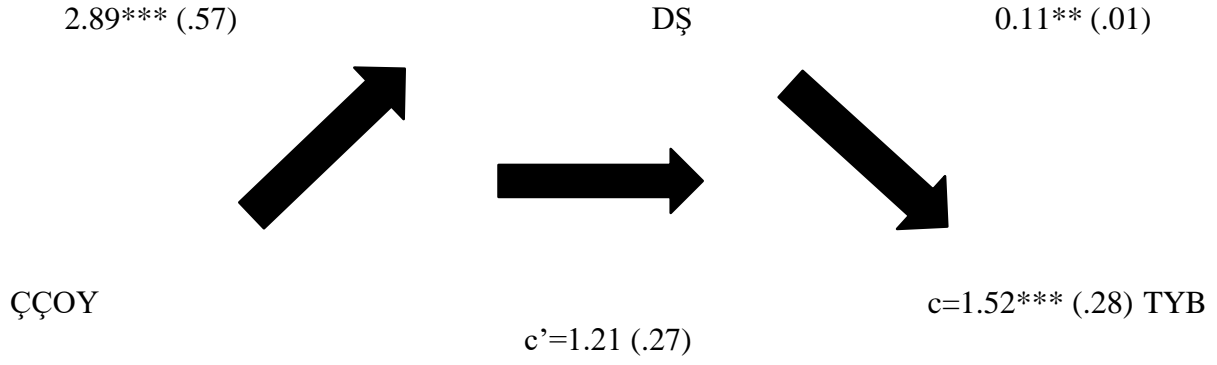
	1	2	3
Tıkınırcasına Yeme	1		
ACE_Toplam	.25 5**	1	
LDŞÖ_Toplam	.37 5**	.15 0**	1

ACE=Adverse Childhood Experiences, LDŞÖ=Leahy Duygusal Şema Ölçeği

**p<0.01 *p<0.05

Tablo 2’de katılımcıların tıkınırcasına yeme puanları ile çocuklukta olumsuz yaşantılar ($r=.25$; $p<0.01$) ve duygusal şemalar ($r=.37$; $p<0.01$) pozitif yönlü ve anlamlı ilişkili bulunmuştur. Çocuklukta olumsuz yaşantılar ile duygusal şemalar ($r=.15$; $p<0.01$) pozitif yönlü ve anlamlı ilişkili bulunmuştur.

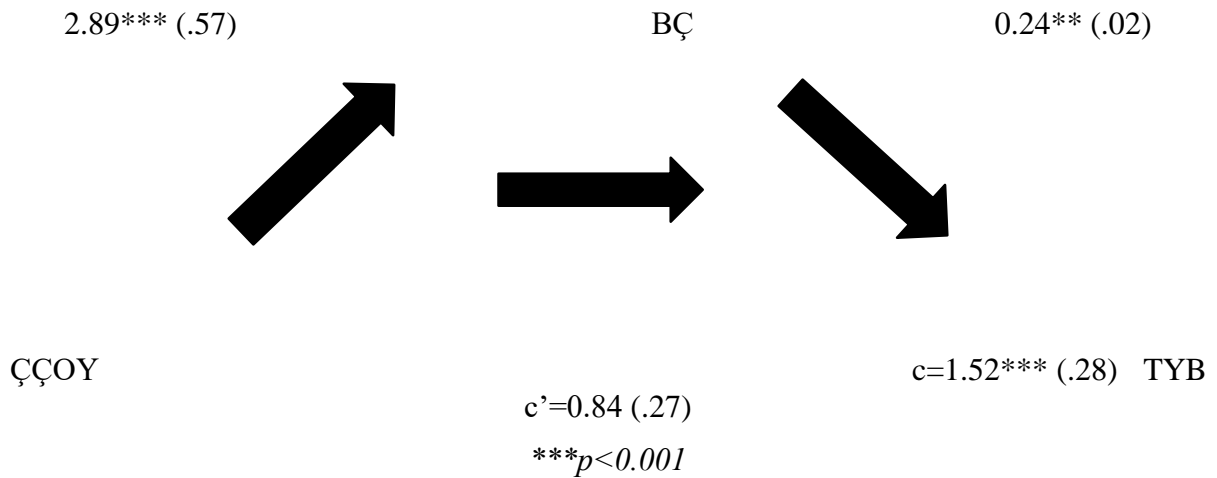
Regresyon analizi sonuçları incelendiğinde çocuklukta olumsuz yaşantıların ($\beta=.25$; $p<0.01$) tıkınırcasına yeme davranışını manidar bir yordayıcısı olduğu görülmektedir ($R=.255$, $R^2=.065$, $F(1,398)=27.73$, $p<.01$). Regresyon analizi sonuçları incelendiğinde çocuklukta olumsuz yaşantıların ($\beta=.24$; $p<0.01$) bilişsel çarpıtmaları manidar bir yordayıcısı olduğu görülmektedir ($R=.244$, $R^2=.059$, $F(1,398)=25.126$, $p<.01$). Ayrıca, çocuklukta olumsuz yaşantıların ($\beta=.15$; $p<0.05$) duygusal şemaları manidar bir yordayıcısı olduğu görülmektedir ($R=.150$, $R^2=.022$, $F(1,398)=9.157$, $p<.01$). Analiz sonuçları incelendiğinde çocuklukta olumsuz yaşantılar kontrol altına alındığında bilişsel çarpıtmalar ($\beta=.39$; $p<0.01$) ve duygusal şemalar ($\beta=.13$; $p<0.01$) tıkınırcasına yeme davranışının manidar bir yordayıcısıdır ($R=.533$, $R^2=.284$, $F(3,396)=52.455$, $p<.01$).



*** $p < 0.001$

Şekil 1. Çocuklukta Olumsuz Yaşantılar ve Tıkınırcasına Yeme Davranışı İlişkisinde Duygusal Şemaların Aracı Rolüne İlişkin Oluşturulan Model

Yukarıda ifade edilen hiyerarşik regresyon analizi bulgularının da desteklediği gibi, çocukluk çağı olumsuz yaşantıların tıkınırcasına yeme bozukluğu ile yordayıcı ilişkisi olduğu bulunmuştur. Üstelik, çocukluk çağı olumsuz yaşantıların duygusal şemalar düzeyini anlamlı biçimde yordadığı bulunmuştur. Bu bağlamda, anlamlı biçimde yordayıcı ilişki saptanan üç değişkenin aracı rolünü incelemek amacıyla analiz yapılmıştır. Aracı rolünün analizi için SPSS 27.0 üzerinde Bootstrap metodu kullanılarak saptanan analiz sonuçları Şekil 1’de sunulmaktadır. Şekilde görüldüğü gibi, ÇÇOY’nin TYB üzerinde toplam etkisi anlamlı bulunurken ($B=1.52$, $SE=0.28$, $p < 0.001$); çocukluk çağı olumsuz yaşantıların TYB üzerindeki direkt etkisi de anlamlı bulunmuştur ($B=1.21$, $SE=0.27$; $p=0.01$; $p < 0.05$). ÇÇOY ve DŞ arasındaki yordayıcı ilişki değerlendirildiğinde, ÇÇOY toplam puanı ($B=2.69$, $SE=0.88$, $p < .001$) DŞ’yi olumlu yönde ve anlamlı biçimde etkilemektedir. DŞ’nin toplam puanı ($B=0.11$, $SE=0.01$, $p < .01$) TYB’yi olumlu yönde ve anlamlı biçimde etkilemektedir. Bu doğrultuda, ÇÇOY’nin TYB ile ilişkisinde DŞ’nin aracılık rolü ($B=.31$, $SE=0.12$, $95\% CI [.091, .564]$) istatistiksel olarak anlamlı bulunmaktadır.



Şekil 2. Çocuklukta Olumsuz Yaşantılar ve Tıkınırcasına Yeme Davranışı İlişkisinde Bilişsel Çarpıtmaların Aracı Rolüne İlişkin Oluşturulan Model

Yukarıda ifade edilen hiyerarşik regresyon bulgularının desteklediği gibi, çocukluk çağı olumsuz yaşantıları tıknırcasına yeme bozukluğunun anlamlı biçimde yordayıcısı olmakla birlikte çocukluk çağı olumsuz yaşantılarının, bilişsel çarpıtmaların üzerinde anlamlı biçimde yordayıcı etkisi olduğu saptanmıştır. Bu bağlamda, anlamlı biçimde yordayıcı ilişki bulunan üç değişken arasında aracı rol analizi için SPSS 27.0 üzerinde PROCESS MACRO eklentisi ile elde edilen Bootstrap metodu kullanılarak önerilen modelin analiz sonuçları Şekil2’de sunulmaktadır.

Analiz bulgularına göre, çocukluk dönemi olumsuz yaşantılarının toplam etkisi anlamlı bulunurken ($B=1.52$, $SE=0.28$, $p < 0.001$); çocukluk dönemi olumsuz yaşantılarının tıknırcasına yeme bozukluğundaki direkt etkisi de anlamlı olarak bulunmuştur ($B=0.84$, $SE=0.26$; $p=0.01$; $p < 0.05$). Çocukluk dönemi olumsuz yaşantıları ile bilişsel çarpıtmaların arasındaki yordayıcı etki incelendiğinde, çocukluk dönemi olumsuz yaşantıların toplam puanının ($B=2.89$, $SE=0.57$, $p < 0.001$) bilişsel çarpıtmaların üzerinde anlamlı yordayıcılığı bulunmuştur.

Bulgulara göre, çocukluk dönemi olumsuz yaşantıları, bilişsel çarpıtmaları olumlu yönde ve anlamlı biçimde etkilediği bulunmuştur. Bilişsel çarpıtmaların tıknırcasına yeme bozukluğu üzerinde direkt etkisine bakıldığında, bilişsel çarpıtmaların puanı ($B= 0.24$, $SE=0.02$, $p < .01$) tıknırcasına yeme bozukluğunu olumlu yönde ve anlamlı biçimde etkilediği saptanmıştır. Çocukluk dönemi olumsuz yaşantılarının tıknırcasına yeme bozukluğu ilişkisinde bilişsel çarpıtmaların aracılık rolü incelendiğinde ($B=0.68$, $SE=0.17$, $95\% CI [.369,1.03]$) istatistiksel olarak anlamlı bulunmaktadır.

GENEL DEĞERLENDİRME VE SONUÇLAR

Bu çalışmanın amacı çocukluk dönemindeki olumsuz yaşantıları ile tıknırcasına yemebozukluğu arasında görülen ilişkide duygusal şemala ve bilişsel çarpıtmala değişkenlerinin aracı rolünün incelenmesidir. Bu çalışmanın bulguları, duygusal şemaların tıknırcasına yeme bozukluğu üzerindeki direkt etkisi incelendiğinde, duygusal şemalar puanı tıknırcasına yeme davranışını anlamlı ve olumlu düzeyde etkilediği bulunmuştur. Bulgulara göre, duygusal şemalar puanları tıknırcasına yeme davranışı puanlarını olumlu ve anlamlı düzeyde etkilemektedir. Bahsedilen bulgu literatürde bulunan diğer araştırma bulgularını desteklemektedir.

Leahy (2002)’nin duygusal şema modeline göre her birey için duygu ve duygu düzenleme stratejilerinin farklılık göstermesiyle birlikte duyguyla başa çıkmada kaçınma, bastırma, ruminasyon ve suçlama gibi problemlerli duygu düzenleme stratejilerine yol açtığı ileri sürülmektedir. Ayrıca duygusal şema modeli, duygular üzerindeki inançların çeşitli psikopatolojiler hakkında önemli bir etkiye sahip olduğunu ve işlevsel olmayan duygu düzenleme stratejilerini geliştirebileceğini ileri sürmektedir (Edwards ve Wupperman, 2018; Leahy, 2015). Bu bağlamda duyguları normalleştiren ya da patolojik duruma getiren iki yol bulunmaktadır. Birey hissettiği olumsuz duyguyu normalleştirirse kabul etmeye, ifade etmeye ve deneyiminden ders çıkarmaya geçebilir. Bu duruma alternatif bir yol olarak birey, duygularını patolojik duruma getirebilir. Bu bağlamda birey, duygunun rahatsızlık verici olduğunu fark etmesiyle beraber bilişsel kaçınma yolunu seçebilir. Böylelikle bilişsel kaçınmanın sonucu olarak tıknırcasına yeme epizodları gelişebilir (Leahy, 2002).

Mevcut çalışmadaki bulgular, çocukluk çağındaki olumsuz yaşantılar ile duygusal şemalar arasında pozitif ve anlamlı yönde ilişkili bulunmuştur. Bunun yanı sıra alan yazındaki araştırmalar, duygusal şemalar ve farklı çocukluk çağı olumsuz yaşantıları arasındaki ilişkiyi rahatsız edici duygularla başa çıkmak için etkisiz baş etme stratejilere yol açar (Leahy, 2016). Yapılan araştırmalar, çocukluk döneminde istismar yaşantılarının duygu düzenleme stratejilerini anlamlı düzeyde yordadığını ileri sürmektedir (Ehring ve Quack, 2010; Caldwell ve ark., 2014). Duygusal şemalar duygu düzensizliğini öngördüğünden (Mazloom ve ark., 2016) çocukluk dönemindeki istismar yaşantıları, duygu düzenleme ve rahatsız edici duygularla başa çıkma stratejileri üzerinde

psikolojik bir risk faktörü olduğu ileri sürülmektedir (Cloitre ve ark., 2005). Çocukluk çağında istismar ve ihmal mağdurları, duyguları ifade edememe, duygusal ketlenme, kendini suçlama ve utanç, duygusal olarak geçersizlik gibi sorunlu duygusal şemalara sahiptirler (Krause ve ark., 2003; Feiring ve ark., 2002; Hong ve ark., 2011). Daneshmandi ve ark. (2014)'nin yaptığı çalışmaya göre duygusal şemalar, çocukluk çağında istismar ve ihmal yaşantılarına sahip bireylerde duygusal suçluluk şemalarının azalmasına ve duyguların kabulünü artmasına olanak sağlamakla birlikte uyumsuz duygu şemalarının değiştirilmesi ile bireylerin hoş olmayan duygularını daha etkili düzeyde yönetmelerinde duygusal şemaların etkinliği gösterilmektedir.

Mevcut çalışmadaki bulgular doğrultusunda, çocukluk çağı olumsuz yaşantıların tıknırcasına yeme bozukluğu ilişkisinde duygusal şemaların aracı rolü istatistiksel olarak anlamlı bulunmuştur. Oshri ve ark. (2015)'e göre, çocukluk çağı istismarı ve ihmali türleri ile duygusal şemaların yordayıcısı olan duygu düzensizliğinin farklı boyutları arasındaki ilişkiyi göstermektedir. Çalışmanın bulguları doğrultusunda cinsel istismar, dürtü kontrolü ile olumlu düzeyde ilişkilidir ve duygusal istismar, hedefe yönelik davranışlar ve dürtüsellik ile bağlantılıdır. Bu türde zorluklular, çocukluk çağı istismarı ile yeme bozukluğu arasındaki ilişkiye aracılık etmektedir (Waller ve ark., 2007). Bu doğrultuda literatürdeki bulgular araştırma bulgularıyla örtüşmektedir.

Çalışmanın bir diğer bulgusuna göre, çocukluk çağı olumsuz yaşantılar, bilişsel çarpıtmaları pozitif yönlü ve anlamlı bir biçimde etkilemektedir. Bilişsel çarpıtmalar, gerçeğin yanlış algılanmasına neden olan mantık dışı düşünceler ile karakterizedir (Steel ve ark.,2020). Biere (1996)'ye göre, çocukluk çağında yaşanan travmalar bilişsel çarpıtmaların önemli belirtileridir. Çocukluk çağı travma yaşantılarına sahip bireylerin bilişsel sorunlarının çocukluk çağında travma yaşamayan bireylere kıyasla daha fazladır (Purnell, 2010). Budoğrultuda çocukluk çağı olumsuz yaşantılarının bilişe zarar vereceği ifade edilmektedir(Briere, 1996). Poletti ve ark. (2014)'nin yaptığı araştırma bulgusunda çocukluk çağı olumsuz yaşantıları ile bilişsel çarpıtma toplam puanı arasında pozitif ilişki vurgulanmaktadır. Bu bağlamda mevcut araştırma bulgusu, literatürde yer alan diğer araştırma bulgularını destekler niteliktedir. Tıknırcasına yeme bozukluğuna sahip bireylerde öz saygı oluşumunda ve gelişiminde ağırlık ve şekile aşırı önem verdiği ve bilişsel meşguliyetlerini etkilediği gözlemlenmiştir. Şekil ve ağırlığa aşırı değer veren ve bilişsel meşguliyetleri olantıknırcasına yeme bozukluğuna sahip bireylerin, bilişsel meşguliyetleri olmayan tıknırcasına yeme bozukluğuna sahip bireylere kıyasla daha yüksek seviyede psikopatoloji sergiledikleri ileri sürülmektedir (Grilo ve ark., 2010). Ayrıca, Masheb ve Grilo (2008)'in araştırmasına göre şekil ve ağırlığa verilen yüksek değerlerin tıknırcasına yeme bozukluğunun sıklığı ve şiddet düzeylerine ilişkin yordayıcı bir etkisi olduğu ifade edilmektedir. Bu sebeplerden dolayı Grilo (2009), bu gibi işlevsiz bilişlerin, tıknırcasına yeme bozukluğunun şiddet derecesini pozitif yönde etkilediğini ileri sürmüştür.

Fairburn (2008)'e göre bilişsel çarpıtmalar yeme bozukluklarının sürdürülmesinde temel oluşturmaktadır. Mevcut araştırmanın bulgularına göre, bilişsel çarpıtmaların tıknırcasına yeme davranışını anlamlı ve pozitif düzeyde etkilediği saptanmıştır. Bu doğrultuda mevcut araştırma, literatürle yer alan diğer araştırma bulgularını desteklediğini göstermektedir. Wyssen ve arkadaşlarının (2016) yaptığı çalışmaya göre, bireyin bedeniyle ilgili belirli bilişsel çarpıtmaları tanımlayan beden şekil bozulmasının, dış görünüşünden memnun olmayan bireylerde patolojik yeme davranışı üzerinde etkisi olduğu savunulmaktadır. Mevcut araştırma bulgularına göre, bilişsel çarpıtmalar dış görünümünden memnun olmayan bireylerde daha yüksek bulunmuştur. Bu bağlamda araştırma bulgusu literatürde yer alan araştırma bulgularını destekler niteliktedir.

Araştırma bulguları, tıknırcasına yeme bozukluğu tedavi ve müdahale stratejilerinde önemli bir yer edinebilir. Spesifik olarak, duygusal şemaların ve bilişsel çarpıtmaların tıknırcasına yeme bozukluğunu etkileyen çocukluk çağı travmalarına odaklanarak tedavi stratejileri geliştirilebilir. Üniversitelerde duygusal şemaların ve bilişsel çarpıtmaların altında yatan çocukluk çağı travmalarına dikkat çekerek, tıknırcasına yeme bozukluğuna yönelik müdahale ve önleme

çalışmaları için önem arz ettiği düşünülmektedir. Mevcut araştırma, duygusal şemalar, bilişsel çarpıtmalar, çocukluk dönemindeki olumsuz yaşantılar ve TYB arasında görülen kompleks ilişkileri anlamak için yeni alternatifler sunmaktadır. Bu, gelecek araştırmalara yeni bir yol sunabilir ve daha ayrıntılı anlayışlar oluşturmak adına temel sağlayabilir.

KAYNAKÇA

American Psychiatric Association, D. S. M. T. F., & American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5* (Vol. 5, No. 5). Washington, DC: American psychiatric association.

Ardanç, P. (2017). Bilişsel Çarpıtmalar Ölçeği'nin Türkçe'ye uyarlanması geçerlik ve güvenirlik çalışması. (Yüksek lisans tezi). İstanbul Arel Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, 51(6), 1173.

Beck, A. T. (2008). The evolution of the cognitive model of depression and its neurobiological correlates. *American journal of psychiatry*, 165(8), 969-977.

Beck, A. T., Butler, A. C., Brown, G. K., Dahlsgaard, K. K., Newman, C. F., & Beck, J. S. (2001). Dysfunctional beliefs discriminate personality disorders. *Behaviour research and therapy*, 39(10), 1213-1225.

Brewerton, T. D. (2007). Eating disorders, trauma, and comorbidity: Focus on PTSD. *Eating disorders*, 15(4), 285-304.

Briere, J. (1996). A self-trauma model for treating adult survivors of severe child abuse. In J. Briere, L. Berliner, J. A. Bulkley, C. Jenny, & T. Reid (Eds.), *The APSAC handbook on child maltreatment* (pp. 140–157). Sage Publications, Inc.

Caslini, M., Bartoli, F., Crocamo, C., Dakanalis, A., Clerici, M., & Carrà, G. (2016). Disentangling the association between child abuse and eating disorders: a systematic review and meta-analysis. *Psychosomatic medicine*, 78(1), 79-90.

Cloitre, M., Miranda, R., Stovall-McClough, K. C., & Han, H. (2005). Beyond PTSD: Emotion regulation and interpersonal problems as predictors of functional impairment in survivors of childhood abuse. *Behavior therapy*, 36(2), 119-124.

Daneshmandi, M., Nezamzadeh, M., & Zareiyan, A. (2014). Assessment the preparedness of selected hospital to deal with disasters in Tehran. *Military Caring Sciences*, 1(1), 28-35.

Edwards, E. R., & Wupperman, P. (2019). Research on emotional schemas: A review of findings and challenges. *Clinical Psychologist*, 23(1), 3-14.

Ehring, T., & Quack, D. (2010). Emotion regulation difficulties in trauma survivors: The role of trauma type and PTSD symptom severity. *Behavior therapy*, 41(4), 587-598.

Fairburn, C. G. (2008). *Cognitive behavior therapy and eating disorders*. Guilford Press.

Fairburn, C. G., & Brownell, K. D. (2002). *Eating disorders and obesity. A Comprehensive Handbook, 2nd ed.* New York, Guilford.

Fairburn, C. G., & Harrison, P. J. (2003). Risk factors for anorexia nervosa. *The Lancet*,

361(9372), 1914.

Fuemmeler, B. F., Dedert, E., McClernon, F. J., & Beckham, J. C. (2009). Adverse childhood events are associated with obesity and disordered eating: results from a US population-based survey of young adults. *Journal of Traumatic Stress: Official Publication of The International Society for Traumatic Stress Studies*, 22(4), 329-333.

Grilo, C. M., & Mitchell, J. E. (Eds.). (2011). *The treatment of eating disorders: A clinical handbook*. Guilford Press.

Grilo, C. M., White, M. A., & Masheb, R. M. (2009). DSM-IV psychiatric disorder comorbidity and its correlates in binge eating disorder. *International Journal of Eating Disorders*, 42(3), 228-234.

Grilo C.M., Masheb RM, White MA. Significance of overvaluation of shape/weight in binge-eating disorder: comparative study with overweight and bulimia nervosa. *Obesity (Silver Spring)*. 2010 Mar;18(3):499-504.

Gündüz, A., Yaşar, A.B., Gündoğmuş, İ., Savran, C.ve Konuk, E.(2018). Çocukluk Çağı Olumsuz Yaşantılar Ölçeği Türkçe Formunun geçerlilik ve güvenilirlik çalışması,*Anadolu Psikiyatri Dergisi*, 19(1), 68-75.

Hong, F., Tarullo, A. R., Mercurio, A. E., Liu, S., Cai, Q., & Malley-Morrison, K. (2018). Childhood maltreatment and perceived stress in young adults: The role of emotion regulation strategies, self-efficacy, and resilience. *Child Abuse & Neglect*, 86, 136-146.

Jones, C., Leung, N., & Harris, G. (2007). Dysfunctional core beliefs in eating disorders: A review. *Journal of Cognitive Psychotherapy*, 21(2), 156.

Karaoğlu, M., & Erzi, S. (2019). Yeme tutumları ve travmatik yaşantılar: Öz şefkat ve duygu düzenlemenin aracı rolü. *Kıbrıs Türk Psikiyatri ve Psikoloji Dergisi*, 1(3), 145-151.

Krause ED, Mendelson T, Lynch TR. Childhood emotional invalidation and adult psychological distress: the mediating role of emotional inhibition. *Child Abuse Negl*. 2003 Feb;27(2):199-213

Leahy, R. L. (2002). A model of emotional schemas. *Cognitive and behavioral practice*, 9(3), 177-190.

Leahy, R. L. (2015). *Emotional schema therapy*. The Guilford Press.

Leahy, R. L. (2016). *Emotional Schema Therapy: A Meta-experiential Model*.

Australian Psychologist, 51(2), 82–88.

Mazloom, M., Yaghubi, H., & Mohammadkhani, S. (2016). Post-traumatic stress symptom, metacognition, emotional schema and emotion regulation: A structural equation model. *Personality and Individual Differences*, 88, 94-98.

Oshri, A., Sutton, T. E., Clay-Warner, J., & Miller, J. D. (2015). Child maltreatment types and risk behaviors: Associations with attachment style and emotion regulation dimensions. *Personality and Individual Differences*, 73, 127-133.

Paxton, S. J., & McLean, S. A. (2009). Treatment for Body-Image Disturbances. *The Treatment of Eating Disorders: A Clinical Handbook*. Poletti S, Colombo C, Benedetti F. Adverse childhood experiences worsen cognitive distortion during adult bipolar depression. *Compr Psychiatry*. 2014 Nov;55(8):1803-8.

Ramacciotti, C. E., Coli, E., Bondi, E., Burgalassi, A., Massimetti, G., & Dell'Osso, L.(2008). Shared psychopathology in obese subjects with and without binge-eating disorder. *International Journal of Eating Disorders*, 41(7), 643-649.

Steel, C. M., Newman, E., O'Rourke, S., & Quayle, E. (2020). A systematic review of cognitive distortions in online child sexual exploitation material offenders. *Aggression and violent behavior, 51*, 101375.

Stunkard, A., & McLaren-Hume, M. (1959). The results of treatment for obesity: a review of the literature and report of a series. *AMA archives of internal medicine, 103*(1), 79-85.

Tosyali, A. F., & Harma, M. (2021). The role of co-regulation of stress in the relationship between perceived partner responsiveness and binge eating: A dyadic analysis. *International Journal of Psychology, 56*(3), 435-443.

Volery, M., Carrard, I., Rouget, P., Archinard, M., & Golay, A. (2006). Cognitive distortions in obese patients with or without eating disorders. *Eating and Weight Disorders- Studies on Anorexia, Bulimia and Obesity, 11*, e123-e126.

Waller, G. (2003). Schema-level cognitions in patients with binge eating disorder: A case control study. *International Journal of Eating Disorders, 33*(4), 458-464.

Waller, G., Corstorphine, E., & Mountford, V. (2007). The role of emotional abuse in the eating disorders: Implications for treatment. *Eating Disorders, 15*(4), 317-331.

Wyssen, A., Bryjova, J., Meyer, A. H., & Munsch, S. (2016). A model of disturbed eating behavior in men: the role of body dissatisfaction, emotion dysregulation and cognitive distortions. *Psychiatry research, 246*, 9-15.

WORKLOAD IN NURSES AND MISSED NURSING CARE**Uzm. Hem. Nazlıhan EFE SAYAN**

Bandırma Onyedi Eylül University Institute of Health Sciences Department of Nursing
Management, Balıkesir, Turkey

ORCID ID:<https://orcid.org/0000-0002-9231-6998>

Prof. Dr. Serap ALTUNTAŞ

Bandırma Onyedi Eylül University Faculty of Health Sciences, Department of Nursing
Management, Balıkesir, Turkey

ORCID ID: <https://orcid.org/0000-0002-7695-7736>

Abstract

Nursing workload is defined as the time and care allocated to the patient as direct and indirect care, including workplace and professional development activities. The physical and mental workloads of nurses, which constitute an indispensable part of health organizations, have an impact on many health care outcomes. Evaluating the physical and mental workload of nurses together and making the necessary improvement activities is an important issue for the quality and continuity of care. Nurses working under more workload than normal affects patient care outcomes. The concept of missed nursing care, which is included in the outcomes of patient-oriented care, is defined as neglecting or postponing all or part of the required care. Unmet nursing care causes many negative consequences for both patient outcomes and health organizations. Within the scope of improvement activities, it is thought that the necessary manpower planning that will reduce the workload of nurses and thus undesirable care outcomes can be prevented. The outcomes of nursing-oriented care affect both institutional and national health services involving human and financial multifactorial resources. Therefore, science-based initiatives to make innovative investments are important to improve health quality and increase access to best practices.

Key Words: Nursing, Physical Workload, Mental Workload, Missed Nursing Care

INTRODUCTION

People in organizations exist within mental, emotional and physical limitations. The compatibility of individuals' competencies and abilities with what is expected of them in the face of work is considered an important factor for success (Çiftçioğlu et al., 2018). Workload is defined as the amount of work that needs to be done at a certain efficiency and quality, but it can also be defined as the determined task demand, effort and activity (Gawron, 2008). (Gawron, 2008). Individuals create a perception of workload for the work that is imposed on them above normal and above what they can do. Workload perception means that the individual feels a certain amount of pressure for work (Ardıç & Polatçı, 2009).

It is known that nurses are continuous and long-term caregivers in health organizations and their critical role in providing health services in the community. It is estimated that the need for nurses and the workload of nurses will increase further due to the aging population and the changing health needs of society (Serra et al., 2023).

NURSING AND WORKLOAD

The nursing profession is expressed as a profession with intense workload due to many factors arising from the content of the work and the working environment (Aydın Sayılan & Mert Boğa, 2018). In another definition, nursing workload is defined as the amount and type of nursing resources required for patient care in a day (O'Brien-Pallas, 2005). Despite the increasing demand for nursing services, the workload of nurses is increasing as a result of factors such as inadequate nurse employment, increased turnover and intensive working hours (Carayon & Gürses, 2016).

It is an important issue to consider that nursing workload has an impact on performance outcomes and quality in healthcare organizations (World Federation of Critical Care Nurses, 2019).

Nurses are the most numerous occupational group in health institutions and the workload of this group is affected by the characteristics of the work, organization and the person doing the work, as well as laws and rules (Korkmaz, 2012).

Workload is analyzed under 4 main headings: physical, mental, environmental and positional factors related to body posture (Demirgöz Bal, 2014).

Physical labor: It is defined as the entire energy spent by the individual while doing work in processes that require physical activation. Physical workload should be measurable (Aksoy, 2014).

Mental workload: It is explained as the amount of mental work required for an individual to carry out perceptual and mental activities in a certain period of time (Emeç & Akkaya, 2018). It consists of perceptual and mental activities such as communication, decision-making, calculation, research, and organization (Nasirizad Moghadam et al., 2021).

Environmental workloads: Workloads caused by the environmental environment of workers. For example, inadequate lighting, noise, presence of harmful dusts and gases in the environment.

Body posture at the moment of work: It is explained as the position that the body should take according to the characteristics of the job. It is stated that the load on the individual will increase as a result of inappropriate body posture (Atik & Akoğlan Kozak, 2016).

Many reasons can be listed for the individual to perceive his/her work as a burden, such as the negative impact of the work on the individual, time pressure related to work, lack of social support, unclear roles and responsibilities, low number of employees in proportion to the work, lack of delegation of authority or lack of certainty, oppressive and perfectionist leaders, insufficient development and training activities (Kaynak, 2021).

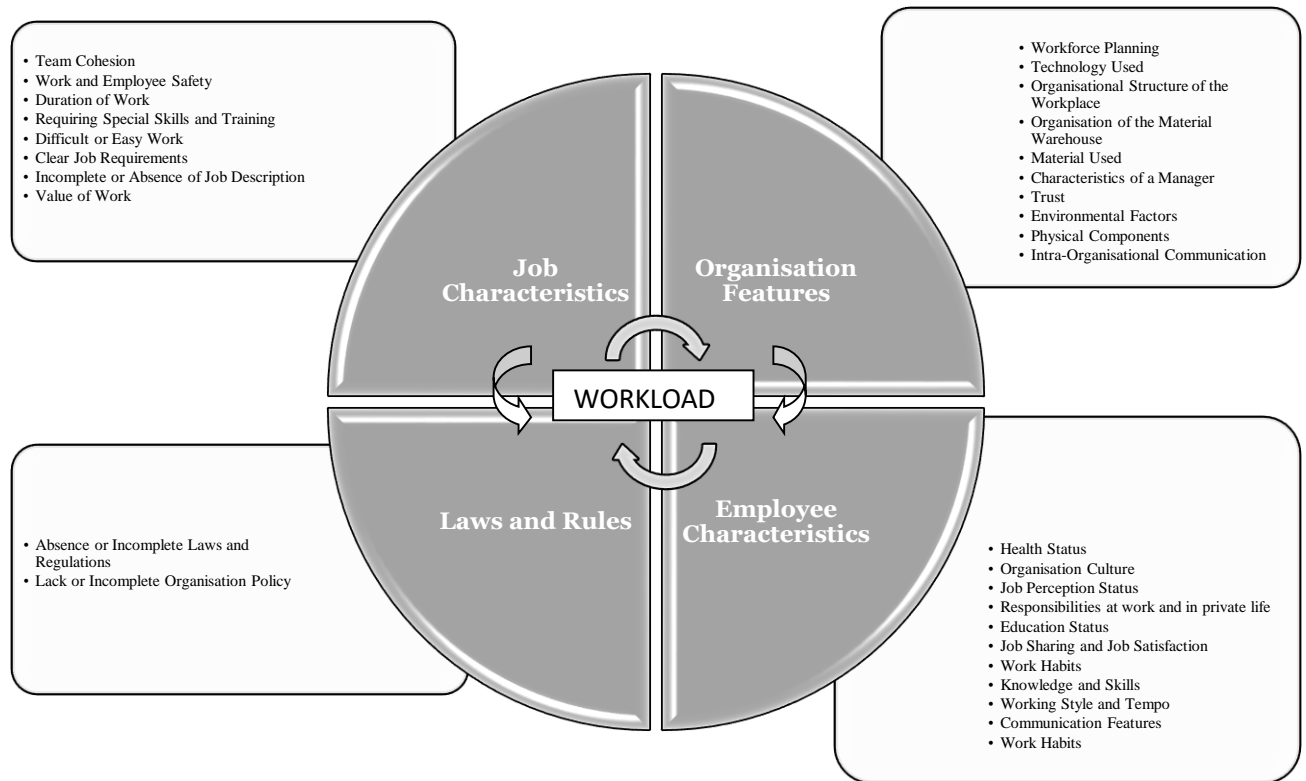


Figure 1. Factors Affecting Workload (Korkmaz, Z. (2012). *Newborn nurses' job analysis and workload*. (Unpublished Doctoral Dissertation), Erciyes University Health Sciences Institute, Kayseri.

In addition to the characteristics of the work, organization, employee and laws and rules, the factors affecting workload include the number of patients cared for, the occupancy rate of beds, seasonal or periodic changes (summer-winter, natural disasters, holidays or festivals), support services indirectly undertaken by nurses, work items such as eliminating material deficiencies, helping with food distribution, and secretarial procedures (Demirgöz Bal, 2014). In addition, the number of patients, demographic characteristics of the patient, the type and severity of the course of the disease, the care needs of the patient, and the duration of the patients' stay in intensive care can also be mentioned among the factors affecting the nurse workload (Chang et al, 2019; Cremasco et al, 2012; Demirgöz Bal, 2014).

WORKLOAD CONSEQUENCES

Workload is all the services produced in an organization. In order for the work outputs to be of high quality and efficient, it is necessary to create the necessary hardware, equipment, training level and environmental conditions. In addition to physical and mental workload, environmental workload and body posture at work are considered as factors that significantly affect the total workload. Correctly calculated workload level leads to many improvement activities in the organization. Carrying out activities with appropriate managers who can plan and execute within the scope of improvement activities is an extremely important issue in terms of regulating workload (Aksoy, 2014).

Due to the current shortage of nurses in health services and the increasing demand for health services, it is becoming an increasingly important issue to provide nurse employment to the extent

required by the workload (Aydın Berçin, 2019). In order to produce quality service in health care delivery, it is necessary to employ nurses in appropriate quality and quantity (Demirgöz Bal, 2014). It is known that nurse employment as a result of nurse workload analysis will have a positive effect on health care quality (Akatın et al., 2018; International Council of Nursing (ICN), 2006; Zencir & Eşer, 2015). Increasing the time allocated to nursing care has been found to reduce undesirable and negative patient outcomes (Aiken et al., 2003). On the contrary, the fact that individuals continue to work under intense workload negatively affects many organizational and individual outcomes (Ross et al., 2023).

Intense workload causes individuals to experience burnout, especially emotional burnout and depersonalization, and weaken their organizational commitment over time (Greenglass et al., 2001; Karacaoğlu & Çetin, 2015; Tayfur & Aslan, 2012). In addition, it brings along many negative consequences such as turnover, increased turnover, absenteeism and tardiness, decreased work performance, and work-family conflict (Aksoy, 2014; Tayfur & Aslan, 2012).

It is stated that workload that exceeds the capacity and endurance of individuals causes an increase in stress levels and turnover intentions, and a decrease in job satisfaction and performance (Çelik & Çıra, 2013; Greenglass et al., 2001). (Çelik & Çıra, 2013; Greenglass et al., 2001). In addition, it is also stated that excessive workload is an obstacle to behaviors such as job performance, individual resilience and self-efficacy (Brown et al., 2005).

In health care institutions, it is stated that as a result of the increase in the workload of nurses, fatigue and carelessness are experienced, thus increasing the risk of medical errors and decreasing patient safety (Balanuye, 2014; Güneş et al, 2016). It is stated that 74.4% of nurses intend to quit their jobs as a result of intense workload. In addition, the intense workload of nurses puts their individual health and the health of patients at risk (Traynor, 2017). It is emphasized that workload in nurses may cause stress, which will negatively affect patient and employee safety. It has been found that nurses' intention to quit and stress levels increase in institutions without an efficient working environment and workload planning (Al Hamdan et al, 2017; Basit & Duygulu, 2017).

Nurses need healthy and safe working environments in order to create efficient and effective outputs in health organizations. In order to improve and maintain the working environment, the Registered Nurses' Association of Ontario (RNAO) made some recommendations in 2017 in its Guidelines on "Promoting and Sustaining Safe and Effective Employment and Workload Practices" (Bonilla-Marciales et al., 2017; RNAO, 2017). These recommendations are stated below.

Suggestions for organization:

- Organizations should create a workforce plan for employees that facilitates safe, effective, culturally sensitive, appropriate and ethical patient care and beneficial healthcare outcomes.
- The nurse recruitment procedure should be managed by executive nurses with professional equipment, knowledge and skills in collaboration with clinician nurses.
- In order for an effective and efficient employment process to occur, the management unit, human resources unit, leader nurses and clinician nurses should be in cooperation.
- Organizations and institutions should have a financial program to employ the appropriate number of nurses in the appropriate specialty to ensure safe and quality patient care and positive health care outcomes.
- Institutions or organizations responsible for manpower recruitment should identify and use an effective communication strategy to address staffing needs in acute and unplanned situations.
- Organizations should develop a comprehensive program, such as the PatientCare Delivery Systems Model, to understand staffing needs and their impact on near and far health care outcomes.
- Organizations should use reliable and valid, evidence-based methods to measure workload in order to provide safe and effective patient care and to ensure the appropriate number and adequate number of nurses.
- Organizations should use effective, modern and secure Electronic Health Records and other integrated systems.

Recommendations for the individual:

- All nurses in the organization should know what to do to report and document underemployment in accordance with the requirements of laws and policies.
- Care-oriented nurses working in the organization should participate in daily, strategic and practical staffing decisions.
- Nurses in the organization should demonstrate a professional understanding of regular attendance, proper reporting of medical reports, proactive vacation planning, and knowledge of the roles of inter- and intra-professional members.
- Managing nurses should support the practice and development of all units, including clinician nurses and management units.

Suggestions about the System:

- Quality, accreditation and approval bodies should ensure nurse staffing with evidence-based practices that reflect ethical, safe and high quality of care.
- Policy makers should provide the necessary financial infrastructure and leadership to create productive work environments that reduce nurse turnover, support and promote retention, and develop and implement safe nursing employment programs.
- Funding agencies should support nurse researchers conducting studies on the outcomes of nurse recruitment policies on nurses, patients, organizations and the health care system.

Workload includes both physical and mental elements that affect the performance level of the individual in the work environment (Restuputri et al., 2019). Physical workload generally includes physical skills such as medication management, patient care, and discharge (Amin et al., 2014). Mental workload includes receiving, understanding, interpreting, concentrating, making decisions, and interacting with patients and their relatives (Amin et al., 2014 ; Restuputri et al., 2019). In the literature, the characteristics of physical and mental workload are affected by each other (Mehta & Agnew, 2012). Mental workload consists of subjective processes and may cause functional errors in individuals by affecting physical skills (Restuputri et al., 2019). The characteristics of physical workload and its effects on nurses can be observed, but mental workload is more difficult to observe and clearly define. The reasons for this are that mental workload has factors including emotions, thoughts, and mental demands of the job (Aprilia et al., 2019). In this direction, simultaneous

evaluation of physical and mental workload may provide more realistic results in order to better understand nursing workload (Koca et al., 2015).

In addition to physical workload, mental workload levels of nurses should also be measured and necessary improvement activities should be carried out according to the results obtained (Karadağ et al., 2015).

In a study conducted by Nasirizad Moghadam et al. in 2021, a significant positive relationship was found between all dimensions of both physical workload and mental workload and total mental workload in intensive care nurses (Nasirizad Moghadam et al., 2021).

MISSED NURSING CARE

In 2006, Kalisch added the concept of "Missed Nursing Care" in English and "Missed Nursing Care" in Turkish to the concepts proposed to be among the quality markers of health care services. The concept of missed nursing care is defined as partial or complete delay, postponement or neglect of the required patient care (Ergezen & Kol, 2021).

In the holistic care to be given to the patient, all spiritual, physical, mental and social needs of the patient are taken into consideration. In this sense, nurse manpower planning should be of appropriate number and quality (Cho et al., 2015; Friese et al., 2013). The insufficient number of manpower in nursing services and the increasing workload accordingly lead to incomplete and missed care needs of the patient.

Dimensions of Missed Nursing Care

When we look at what constitutes missed nursing care, similar nursing interventions are encountered in our country and in the world (Bragadóttir & Kalisch, 2018; Haftu et al, 2019; Henderson et al, 2017). When the literature is examined, the most common reasons for missed nursing care include talking to the patient, providing emotional support to the patient, educating the patient and his/her family, updating and implementing patient records and nursing care plans (Bragadóttir & Kalisch, 2018; Haftu et al., 2019; Jones et al., 2015; Papastavrou et al., 2016).

Reasons for Missed Nursing Care

There are reasons for missed nursing care include increased workload in nurses, insufficient number of nurses, high number of patients per nurse, long working hours, changes in patient care needs, emergency and sudden changes in patients, imbalance in patient distribution, inexperienced staff, insufficient technical and auxiliary staff, insufficient team support, insufficient materials and equipment, communication problems, etc. (dos Reis Dutra et al, 2019; Kalisch, 2009; Mantovan et al., 2020; Orique et al., 2016; Papastavrou et al., 2016; Palese et al., 2015; Recio-Saucedo et al., 2018).

Research on Missed Nursing Care

Studies on missed nursing care and the results of these studies are presented below.

Table 1. Results of Research on Missed Nursing Care

Country where the research is conducted	Research Result
In a study of 2917 nurses in the UK;	As a result of the increase in the number of patients cared for by a nurse from 6 to 12, it was found that the missed nursing care increased by 66% (Ball et al., 2014).
In a study of 31,627 nurses in twelve European countries (Belgium, England, Germany, Finland, Greece, Ireland, the Netherlands, Norway, Poland, Spain, Sweden and Switzerland);	It was found that when the number of patients cared for by a nurse increased from 6 to 11, the missed nursing care increased by 26% (Griffiths et al., 2014).
In a study of 232 nurses in South Korea;	It was determined that the number of patients cared for by a nurse decreased from 17 patients to 7 patients as a result of the intervention, resulting in a significant decrease in missed nursing care (Cho et al., 2015).
In a study of 125 nurses in the USA;	The mediating role between missed nursing care and nurse workload and patient outcomes was investigated and it was determined that missed nursing care had an effect on nurse workload and patient outcomes (Tubbs-Cooley et al., 2015).
A study of 10,174 nurses in Sweden;	As a result of the increase in the number of patients cared for by a nurse from 6 to 10, it was found that the missed nursing care increased by 53% (Ball et al., 2016).
In a study of 169 nurses in the USA;	In the relationship between nurses' workload and missed nursing care, a significant relationship was found between missed nursing care and staff adequacy in the unit, the number of patients cared for and satisfaction with the current position (Origue et al., 2016).
In a study conducted with 334 nurses in 4 different hospitals in Australia;	A significant negative relationship was found between teamwork and missed nursing care. In the regression model, it was determined that teamwork alone accounted for 9% of the variance of missed nursing care, women had significantly more missed nursing care than men, those with more than 10 years of experience had significantly more missed nursing care than those with 6 months of experience, and nurses who worked overtime had significantly more missed nursing care than those who did not work overtime. In addition, the highest missed nursing care was reported in emergency departments and the lowest in intensive care units (Chapman et al., 2017).
In a study of 295 nurses in Israel;	It has been determined that missed nursing care decreases significantly as nurses' sense of responsibility for individual and clinic develops (Srulovic and Drach-Zahavy, 2017).
In a study of 1542 nurses in China;	It was determined that the rate of missed care practices decreased as a result of nurses developing positive attitudes towards their work environment (Liu et al., 2018).
In a study of 233 nurses in the USA;	It was determined that the rate of missed care practices decreased as a result of nurses developing positive attitudes towards their work environment (Smith et al., 2018).

In a study of 31,650 nurses in the US;	The perception of the organizations as positive work environments was found to reduce missed care practices by 63.3% (Park et al, 2018).
In a study of 362 nurses in Jordan;	No significant relationship was found between missed nursing care in nurses and trust in delegation of authority, and the most common cause of missed nursing care was found to be labor resources (Saqer & AbuAIRub, 2018).
In a study of 5861 nurses in the USA;	When the relationship between nurses' workload, working environment and patients' dependency level and missed nursing care was examined, it was found that high workload, higher patient dependency level and poor working environment increased the likelihood that nurses could not meet the care (Lake et al., 2020).
In a study conducted with 205 nurses working in 4 tertiary care hospitals in India;	It has been stated that care activities such as medication management, discharge education, oral hygiene and emotional support of nurses are more frequently involved in missed nursing care activities compared to acute and life-threatening care needs. It was found that inadequate human resources was the most frequently cited reason for missed care during periods of increased workload. It has been stated that having sufficient number of staff to serve the variable workload will effectively reduce the missed nursing care (Mandal & Seethalakshmi, 2023).
In a study of 228 nurses in Sweden;	It was reported that the most missed nursing care in nurses was in the basic care and planning subscales. It was determined that nurses with higher levels of education and low levels of use of evidence-based practices experienced more missed nursing care. It was stated that high use of evidence-based practices caused less missed nursing care, while higher education level caused more missed nursing care (Falk et al., 2023).
In a study conducted with 477 nurses working in 7 public hospitals in Turkey;	Emotional support, ambulation and patient bathing were found to be the most frequently missed nursing care. It was determined that the main reasons for missed nursing care were the lack of auxiliary staff and the number of staff and unexpected increases in patient volume. Factors such as the characteristics of the ward, years of experience in the profession, working hours, the number of patients cared for during the shift and leaving the ward were found to be significant predictors of the seven missed nursing care activities (Dursun Ergezen et al., 2023).
In a study conducted with 155 nurses in Turkey;	In the data collected from nurses working in the pediatric emergency department, it was determined that gastrostomy, colostomy and tracheotomy care in the pediatric emergency department and teaching discharge were the most common missed nursing care practices. The condition of the emergency patient, the patient density, the insufficient number of nurses on duty, the high number of inexperienced nurses and the fact that nurses have duties outside the scope of their work were determined as the main factors causing missed care (Arikan & Esenay, 2023).

Missed Nursing Care Outcomes

The concept of missed nursing care is a concept that affects many processes and dynamics of health delivery organizations and is important for nursing management. It is seen that it is examined with concepts such as workload, average daily care time, and work intensity (Önal, 2019). According to the National Data Bank of the United States of America, daily bedside time, which is among the nursing quality indicators, is defined as the time that nursing caregivers are productive for direct patient care for 24 hours (Kalisch et al., 2012). In the study conducted by Schubert et al. in 2008, it was determined that a 0.5% increase in missed nursing care decreased patient satisfaction level by 37% (Schubert et al., 2008). In a study conducted by Kalisch et al. in 2011 with 4288 nurses, it was found that there was a negative relationship between the hours spent per patient and missed nursing care (Kalisch et al. 2011). On the other hand, they stated that if the number of nurses is low compared to the number of patients, not all of the care needed by the patient can be met (Kalisch et al. 2011). Similarly, in another study conducted by Kalish et al. in 2012, it was found that employing fewer nurses than needed increased missed nursing care (Kalisch et al. 2012). It is also stated that the intention to leave the job is higher in units with more missed nursing care and absenteeism in nurses (Tschannen et al., 2010). The effects of missed nursing care practices on patients include nosocomial infections, patient falls, incorrect drug or dose applications (Lucero et al., 2010; Schubert et al., 2009).

In a study conducted by Ausserhofer et al. in 2014, it was determined that missed nursing care was provided at a lower rate in hospitals with lower nurse-to-patient ratios and lower rates of nurses performing non-nursing tasks frequently (Ausserhofer et al., 2014). In a study conducted by Papastavrou et al. in 2014, the consequences of incomplete nursing care included patient falls, nasochemical infections, and low patient satisfaction and low job satisfaction in nurses (Papastavrou et al., 2014). Missed nursing care is less common in hospitals where nurses' working environments are more suitable, work less overtime and have more experienced nurses (Bruyneel et al., 2015).

CONCLUSION

When the national and international literature on nursing care in health organizations is examined, it is stated that care is frequently missed and this issue is an important problem (Duhalde et al., 2023; Dursun Ergezen et al., 2023; Kartal et al., 2022; Mandal & Seethalakshmi, 2023). It has been determined that missed nursing care exists at different rates in each country, and the number of nurses working, current workload, equipment and material resources, and communication skills have an effect on missed nursing care (Güleşen, 2022).

In order to reduce and completely prevent missed nursing care, it is necessary to reduce the physical and mental workload among the factors that cause missed nursing care. The factors that cause physical and mental workload should be identified and improvements should be made on these factors. It is recommended to make manpower planning based on scientific foundations and to improve the working environment and conditions.

REFERENCES

- Aiken, L. H., Clarke, S. P., Cheung, R. B., Sloane, D. M., & Silber, J. H. (2003). Educational levels of hospital nurses and surgical patient mortality. *JAMA*, 290(12), 1617-1623. <https://doi.org/10.1001/jama.290.12.1617>
- Akatın, Y., Ünlü, M., Bilir, M., Demir, L. E., Şentürk, S., Uzun, Ö., & Kaçar, F. (2019). Bir eğitim araştırma hastanesinde yatan hastaların bağımlılık düzeyinin belirlenmesi ve hemşire sayısının hesaplanması. *İzmir Kâtip Çelebi Üniversitesi Sağlık Bilimleri Fakültesi Dergisi*, 4(1), 1-6.

- Aksoy, M. (2014). Sağlık çalışanlarında iş yükünün örgütsel bağlılık ve iş tatmini üzerindeki etkisi: Diyarbakır hastanelerinde bir uygulama, (Yüksek Lisans Tezi), Çağ Üniversitesi Sosyal Bilimler Enstitüsü, Mersin.
- Al-Hamdan, Z., Manojlovich, M., Tanima, B. (2017). Jordanian nursing work environments, intenttostay, and job satisfaction, *Journal of Nursing Scholarship*, 49(1),103-110.
- Amin, S. G., Fredericks, T. K., Butt, S. E., & Kumar, A. R. (2014). Measuring mental workload in a hospital unit using EEG-A pilot study. *IIE Annual Conference*, 1411-1418.
- Aprilia, T. D., Somantri, I., & Mirwanti, R. (2019). Nurses' mental workload in critical care room sand emergency department. *Journal of Nursing Care*, 2(3), 159-166.
- Ardıç, K. & Polatçı, S. (2009). Tükenmişlik sendromu ve madalyonun öbür yüzü: İşle bütünleşme. *Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 32, 21-46.
- Atik, E., & Akoğlan Kozak, M.(2016). İş yükü algısı ve iş yükünün insan kaynakları yönetiminde kullanımı: Eskişehir’de otel işletmeleri örneği. *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, 16(Özel Sayı), 341-366.
- Aydın Berçin, D. (2019) *Sağlık hizmetlerinde iş yükünün hasta güvenliği üzerindeki etkisi: Fatih bölgesi üzerinde bir araştırma* (Yüksek Lisans Tezi), Sosyal Bilimler Enstitüsü, İstanbul.
- Aydın Sayılan, A, & Mert Boğa, S. (2018). Hemşirelerin iş stresi, iş yükü, iş kontrolü ve sosyal destek düzeyi ile tıbbi hataya eğilimleri arasındaki ilişkinin belirlenmesi. *Hemşirelikte Araştırma Geliştirme Dergisi*, 20(1), 11-22.
- Arikan, A., & Esenay, F. I. (2023). Missed nursing care in pediatric emergency departments in Turkey: A cross-sectional study. *Applied Nursing Research*, 72, 151699.
- Ausserhofer, D., Zander, B., Busse, R., Schubert, M., De Geest, S., Rafferty, A. M., ... & Schwendimann, R. (2014). Prevalence, patterns and predictors of nursing care left undone in European hospitals: results from the multicountry cross-sectional RN4CAST study. *BMJ Quality & Safety*, 23(2), 126-135.
- Balanuye, B. (2014). *The effect of workload of nurses working in surgical clinics on patient safety*. (Master's Thesis), Başkent University Institute of Health Sciences, Ankara.
- Ball, J. E., Griffiths, P., Rafferty, A. M., Lindqvist, R., Murrells, T., & Tishelman, C. (2016). A cross-sectional study of 'care left undone' on nursing shifts in hospitals. *Journal f Advanced Nursing*, 72(9), 2086-2097.
- Ball, J. E., Murrells, T., Rafferty, A. M., Morrow, E., & Griffiths, P. (2014). 'Care left undone' during nursing shifts: associations with workload and perceived quality of care. *BMJ Quality & Safety*, 23(2), 116-125.
- Basit, G., & Duygulu, S. (2018). Nurses' organizational trust and intention to continue working at hospitals in Turkey. *Collegian*, 25(2), 163-169.
- Bonilla-Marciales, A. P., Jaimes-Valencia, M. L., Serrano-Gómez, S. E., Arenas-Luna, G. I., Padilla-García, C. I., & Criado-Morales, M. L. (2017). Implementación de la guía de valoración y manejo del dolor, de la Registered Nurses' Association of Ontario (RNAO) en el programa de Enfermería de la Universidad Autónoma de Bucaramanga. *Med UNAB*, 20(2), 148-164.
- Bragadóttir, H., & Kalisch, B. J. (2018). Comparison of reports of missed nursing care: Registered Nurses vs. practical nurses in hospitals. *Scandinavian Journal of Caring Sciences*, 32(3), 1227-1236.
- Brown, S. P., Jones, E. & Leigh, T. W. (2005). The attenuating effect of role overload on relation ship slinking self-efficacy and goal level to work performance. *Journal of Applied Psychology*, 90(5), 972-979.
- Bruyneel, L., Li, B., Ausserhofer, D., Lesaffre, E., Dumitrescu, I., Smith, H. L., ... & Sermeus, W. (2015). Organization of hospital nursing, provision of nursing care, and patient experiences with care in Europe. *Medical Care Research and Review*, 72(6), 643-664.

- Carayon, P. & Gürses, A. (2016). *Nursing workload and patient safety-a human factors engineering perspective*. Agency for Healthcare Research and Quality U.S. Department of Health and Human Services. Rockville: AHRQ Publication.
- Chang, L. Y., & Hsiu-Hui, Y. U. (2019). The relationship between nursing workload, quality of care, and nursing payment in intensive care units. *Journal of Nursing Research*, 27(1), 1-9.
- Chapman, R., Rahman, A., Courtney, M., & Chalmers, C. (2017). Impact of team work on missed care in four Australian hospitals. *Journal of Clinical Nursing*, 26(1-2), 170-181.
- Cho, S.H., Kim, Y.S, Yeon, K.N. & You, S.J, (2015). Lee ID. Effects of increasing nurse staffing on missed nursing care. *International Nursing Review*. 62 (2):267-274.
- Cremasco, M. F., Wenzel, F., Zanei, S. S. V. V. & Whitaker, I.Y. (2012). Pressure Ulcers in the Intensive Care Unit: The Relation ship between Nursing Workload, Illness Severity and Pressure Ulcer Risk. *Journal of Clinical Nursing*, 22, 2183-2191.
- Çelik, M., & Çıra, A. (2013). Örgütsel vatandaşlık davranışının iş performansı ve işten ayrılma niyeti üzerine etkisinde aşırı iş yükünün aracılık rolü. *Ege Akademik Bakış*, 13(1), 11-20.
- Çiftçiöğlü, G., Tunç, G., Güneş, A., Değer, V., & Çifçi, S. (2018). Hastanelerde görevli sağlık çalışanlarının bireysel iş yükü algıları. *Sağlık ve Hemşirelik Yönetim Dergisi*, 5(1):1-8.
- Demirgöz Bal, M. (2014). Yataklı tedavi kurumlarında hemşire insan gücü planlama yaklaşımları. *Sağlık ve Hemşirelik Yönetimi Dergisi*, 3(1), 148-154.
- Dos Reis Dutra, C. K., Salles, B. G. & Guirardello, E. de B. (2019). Situations and reasons for missed nursing care in medical and surgical clinic units. *Revista Da Escola de Enfermagem*, 53, 1-7.
- Duhalde, H., Bjuresäter, K., Karlsson, I., & Bååth, C. (2023). Missed nursing care in emergency departments: A scoping review. *International Emergency Nursing*, 69, 101296.
- Dursun Ergezen, F., Çiftçi, B., Yalın, H., Geçkil, E., Korkmaz Doğdu, A., İltar, SM, ... & Ecevit Alpar, Ş. (2023). Kaçırılan hemşirelik bakımı: Türkiye'den kesitsel ve çok merkezli bir çalışma. *Uluslararası Hemşirelik Uygulamaları Dergisi*, 29 (5), e13187.
- Emeç, Ş., & Akkaya, G. (2018). Sağlık sektöründe zihinsel iş yükü değerlendirmesi ve bir uygulama. *Ergonomi*, 1(3), 156-162.
- Ergezen, F. D., & Kol, E. (2021). Karşılanamayan hemşirelik bakımı. *Journal of Education and Research in Nursing*, 18(4), 467-472.
- Falk, A. C., Boström, A. M., Nymark, C., & von Vogelsang, A. C. (2023). Missednursingcare in relation to registered nurses' level of education and self-reported evidence-based practice. *Worldviews on Evidence-Based Nursing*, 20(6), 550-558.
- Friese, C. R., Kalisch, B. J., & Lee, K. H. (2013). Patterns and correlates of missednursingcare in inpatient oncology units. *Cancer Nursing*, 36(6), E51-E57.
- Gawron, V. J. (2008). *Human performance, workload, and situationa lawareness measures handbook*. London: CRC Press.
- Greenglass, E. R., Burke, R. J., & Fiksenbaum, L. (2001). Workload and burn out in nurses. *Journal of Community & Applied Social Psychology*, 11(3), 211-215.
- Griffiths, P., Dall'Ora, C., Simon, M., Ball, J., Lindqvist, R., Rafferty, A. M., ... & (2014). Nurses' shift length and overtime working in 12 European countries: the association with perceived quality of care and patient safety. *Medical Care*, 52(11), 975-981.
- Güleşen, G. (2022). Hemşirelik bakımında önemli bir kavram: karşılanamayan hemşirelik bakımı ve nedenleri. *Türkiye Sağlık Bilimleri ve Araştırmaları Dergisi*, 5(1), 42-49.
- Güneş, Ü.Y, Gürlek, Ö. & Sönmez, M. (2016). A survey of the patients safety culture of hospital nurses in Turkey, *Collegian*, 23, 225-232.

- Haftu, M., Girmay, A., Gebremeskel, M., Aregawi, G., Gebregziabher, D., & Robles, C. (2019). Commonly missed nursing cares in the obstetrics and gynecologic wards of Tigray general hospitals; Northern Ethiopia. *PloSone*, *14*(12), e0225814.
- Henderson, J., Willis, E., Xiao, L., & Blackman, I. (2017). Missed care in residential aged care in Australia: An exploratory study. *Collegian*, *24*(5), 411-416.
- International Council of Nurses (ICN). (2006). Safe staffing saves lives. Information and Action Tool Kit. <http://www.icn.ch/images/stories/documents/publications/ind/indkit2006.pdf>. Accessed November 05, 2015.
- Jones, T. L., Hamilton, P., & Murry, N. (2015). Unfinished nursing care, missed care, and implicitly rationed care: State of the science review. *International Journal of Nursing Studies*, *52*(6), 1121-1137.
- Kalisch, B. J., Tschannen, D., & Lee, K. H. (2011). Do staffing level predict missed nursing care?. *International Journal for Quality in Health Care*, *23*(3), 302-308.
- Kalisch, B. J., Tschannen, D., & Lee, K. H. (2012). Missed nursing care, staffing, and patient falls. *Journal of Nursing Care Quality*, *27*(1), 6-12.
- Kalisch, B.J. (2009). Nurse and nurse assistant perceptions of missed nursing care: what does it tell us about team work?. *The Journal of Nursing Administration*. *39*(11), 485-493.
- Karacaoglu, K., & Çetin, İ. (2015). İş yükü ve rol belirsizliğinin çalışanların tükenmişlik düzeyleri üzerindeki etkisi: Afad örneği. *Nevşehir Hacı Bektaş Veli Üniversitesi SBE Dergisi*, *5*(1), 46-69.
- Karadağ, M. & Cankul, İ. H. (2015). Hemşirelerde zihinsel iş yükü değerlendirilmesi. *Anadolu Hemşirelik ve Sağlık Bilimleri Dergisi*, *18*(1), 26-34.
- Kartal, H., Çamlıca, T., & Özkan, A. (2022). Yoğun bakımlarda karşılanmayan hemşirelik bakımı ve etkileyen etmenlerin incelenmesi. *Sağlık ve Hemşirelik Yönetimi Dergisi*, *9*(2), 322-333.
- Kartal, H., Çamlıca, T., & Özkan, A. (2022). Missed nursing care in intensive care units and examination of the factors affecting it. *Journal of Health and Nursing Management*, *9*(2), 322-333.
- Kaynak, İ. (2021). İş güvencesizliğinin tükenmişliğe etkisinde iş yükü algısının rolü. *İşletme Araştırmaları Dergisi*, *13*(2), 1907-1922.
- Koca, D., Yildiz, S., Soyupek, F., Gunyeli, I., Erdemoglu, E., Soyupek, S., & Erdemoglu, E. (2015). Physical and mental workload in single incision laparoscopic surgery and conventional laparoscopy. *Surgical Innovation*, *22*(3), 294-302. <https://doi.org/10.1177/1553350614556363>.
- Korkmaz, Z. (2012). Yeni doğan hemşirelerinde iş analizi ve iş yükü. (Yayınlanmamış Doktora Tezi), Erciyes Üniversitesi Sağlık Bilimleri Enstitüsü, Kayseri.
- Lake, E. T., Staiger, D. O., Cramer, E., Hatfield, L. A., Smith, J. G., Kalisch, B. J., & Rogowski, J. A. (2020). Association of patient acuity and missed nursing care in US neonatal intensive care units. *Medical Care Research and Review*, *77*(5), 451-460.
- Liu, X., Zheng, J., Liu, K., Baggs, J. G., Liu, J., Wu, Y., & You, L. (2018). Hospital nursing organizational factors, nursing care left undone, and nurse burnout as predictors of patient safety: A structural equation modeling analysis. *International Journal of Nursing Studies*, *86*, 82-89.
- Lucero, R. J., Lake, E. T., & Aiken, L. H. (2010). Nursing care quality and adverse events in US hospitals. *Journal of Clinical Nursing*, *19*(15-16), 2185-2195.
- Mandal, L., & Seethalakshmi, A. (2023). Experience of missed nursing care: A mixed method study. *Worldviews on Evidence-Based Nursing*, *20*(3), 212-219.
- Mantovan, F., Muzzana, C., Schubert, M. & Ausserhofer, D. (2020). "It's about how we do it, not if we do it". Nurses' experiences with implicit rationing of nursing care in a acute care hospitals: A descriptive qualitative study. *International Journal of Nursing Studies*, 109.
- Mehta, R. K., & Agnew, M. J. (2012). Influence of mental workload on muscle endurance, fatigue, and recovery during intermittent static work. *European Journal of Applied Physiology*, *112*(8), 2891-2902. <https://doi.org/10.1007/s00421-011-2264-x>

Nasirizad Moghadam, K., Chehrzad, M. M., Reza Masouleh, S., Maleki, M., Mardani, A., Atharyan, S., & Harding, C. (2021). Nursing physical workload and mental workload in intensive care units: Are they related?. *Nursing Open*, 8(4), 1625-1633.

O'Brien-Pallas, L., Meyer, R., & Thomson, D. (2005). Workload and Quality Work Environments for Nurse and Patient Safety, 105-129

Registered Nurses' Association of Ontario (RNAO). (2017). (Nursing Best Practice Guideline, Developing and Sustaining Safe, Effective Staffing and Workload Practices;1-82.

Oriq, S. B., Patty, C. M. & Woods, E. (2016). Missed nursing care and unit-level nurse workload in the acute and post-Acutesettings. *Journal of Nursing Care Quality*, 31(1), 84-89.

Önal, M. (2019). İş yoğunlaştırmanın karşılanamayan hemşirelik bakımı ile ilişkisi, (Yüksek Lisans Tezi), İstanbul Üniversitesi-Cerrahpaşa Lisansüstü Eğitim Enstitüsü, İstanbul.

Palese, A., Ambrosi, E., Prosperi, L., Guarnier, A., Barelli, P., Zambiasi, P. (2015). Missed nursing care and predicting factors in the Italian medical care setting. *Internal and Emergency Medicine*. 10(6):693-702.

Papastavrou, E., Andreou, P., & Efstathiou, G. (2014). Rationing of nursing care and nurse-patient outcomes: a systematic review of quantitative studies. *The International Journal of Health Planning and Management*, 29(1), 3-25.

Papastavrou, E., Charalambous, A., Vryonides, S., Eleftheriou, C., & Merkouris, A. (2016). To what extent are patients' needs met oncology units? The phenomenon of care rationing. *European Journal of Oncology Nursing*, 21, 48-56.

Park, S. H., Hanchett, M., & Ma, C. (2018). Practice environment characteristics associated with missed nursing care. *Journal of Nursing Scholarship*, 50(6), 722-730.

Recio-Saucedo, A., Dall'Ora, C., Maruotti, A., Ball, J., Briggs, J., Meredith, P., ... & Griffiths, P. (2018). What impact does nursing care left undone have on patient outcomes? Review of the literature. *Journal of Clinical Nursing*, 27, 2248-2259.

Restuputri, D. P., Pangesti, A. K., & Garside, A. K. (2019). The measurement of physical workload and mental workload level of medical personnel. *Jurnal Teknik Industri*, 20(1), 34-44.

Ross, P., Howard, B., Ilic, D., Watterson, J., & Hodgson, C. L. (2023). Nursing workload and patient-focused outcomes in intensive care: A systematic review. *Nursing & Health Sciences*, 25(4), 497-515.

Saqer, T. J., & Abu AlRub, R. F. (2018). Missed nursing care and its relationship with confidence in delegation among hospital nurses. *Journal of Clinical Nursing*, 27(13-14), 2887-2895.

Schubert, M., Clarke, S. P., Glass, T. R., Schaffert-Witvliet, B., & De Geest, S. (2009). Identifying thresholds for relationships between impacts of rationing of nursing care and nurse-and patient-reported outcomes in Swiss hospitals: a correlational study. *International Journal of Nursing Studies*, 46(7), 884-893.

Schubert, M., Glass, T.R. & Clarke, S.P (2008). Rationing of nursing care and its relationship to patient outcomes: The Swiss extension of the International Hospital Outcomes Study. *Int J Qual Health Care*. 20(4):227-237.

Serra, N., Botti, S., Guillari, A., Simeone, S., Latina, R., Iacorossi, L., ... & Rea, T. (2023). Workload, job satisfaction and quality of nursing care in Italy: A systematic review of native language articles. *In Healthcare*, 11(18),2573.

Smith, J. G., Morin, K. H., Wallace, L. E., & Lake, E. T. (2018). Association of the nurse work environment, collective efficacy, and missed care. *Western Journal of Nursing Research*, 40(6), 779-798.

Srulovici, E., & Drach-Zahavy, A. (2017). Nurses' personal and ward account ability and missed nursing care: A cross-sectional study. *International Journal of Nursing Studies*, 75, 163-171.

Tayfur, Ö. & Arslan, M. (2012). Algılanan iş yükünün tükenmişlik üzerine etkisi: İş-aile çatışmasının aracılık rolü. *H.Ü. İktisadi ve İdari Bilimler Fakültesi Dergisi*, 30(1), 147-172.

Traynor, M. (2017). *Critical resilience for nurses: An evidence-based guide to survival and change in the modern NHS*. New York: Routledge.

Tschannen, D., Kalisch, B. J., & Lee, K. H. (2010). Missed nursing care: the impact on intention to leave and turnover. *Canadian Journal of Nursing Research Archive*, 22-39.

Tubbs-Cooley, H. L., Pickler, R. H., Mark, B. A., & Carle, A. C. (2015). A research protocol for testing relationships between nurse workload, missed nursing care and neonatal outcomes: the neonatal nursing care quality study. *Journal of Advanced Nursing*, 71(3), 632-641.

World Federation of Critical Care Nurses. (2019). WFCCN: Provision of Critical Care Nursing Workforce. Retrieved from http://wfccn.org/wp-content/uploads/2019/09/WFCCN-Workforce-PS_17.9.19.pdf

Zencir, G., & Eşer, İ. (2015). Hemşirelikte yeni bir kavram: Karşılanamayan hemşirelik bakımı. *Ege Üniversitesi Hemşirelik Fakültesi Dergisi*, 31(1), 83-94.

HIGH GRADE PRIMARY TESTICULAR CARCINOID TUMOR WITH A MULTIPLE METASTASIS: A CASE REPORT WITH SEVEN YEARS FOLLOW-UP**Serhat YENTÜR**

Health Sciences University, Bağcılar Education and Research Hospital, İstanbul, Turkey Urology

ORCID ID: <https://orcid.org/0000-0003-4196-2145>**Asilhan SABUNCU**

Health Sciences University, Bağcılar Education and Research Hospital, İstanbul, Turkey Urology

ORCID ID: <https://orcid.org/0009-0007-6005-9329>**Abstract**

Introduction and Purpose: A great majority of the carcinoid tumors exhibit low malignant potential and are localised in gastrointestinal tract. Testicular carcinoid tumor localisation is uncommon and the incidence of carcinoid tumors in the testicles is about 0.2%. Herein, we aimed to report a case of primary testicular carcinoid tumor with long-term follow-up.

Materials and Methods: A 17 years old male patient was admitted to our out-patient clinic with the complaints of right testicular pain, swelling and general condition deterioration. The physical examination revealed testicular tenderness on right testis with palpation and disseminated abdominal palpable masses. Another palpable lesion was detected on the left parietal bone localisation. Scrotal ultrasound imaging reported bilateral testicular microlithiasis finding. Contrast-enhanced abdomino-pelvic and cranial CT imagings revealed infrarenal disseminated abdominal lymphadenopathy and suspicious bone findings on L4 vertebra, pelvic bones and femur with left a parietal bone mass. Among the testicular tumor markers, only serum LDH levels were elevated. In October 2016, we performed right radical orchiectomy and pathological examination reported a non-differentiated testicular neuroendocrine (carcinoid) tumor localised in testicular parenchyma extending to epididymis and spermatic cord without tunica vaginalis invasion. The stage of the tumor was determined as pT3 N2 M1b S3. On immunohistochemical evaluation neuroendocrine markers such as synaptophysin and chromogranin were detected as positive. Moreover, KI-67 proliferation index was reported as 80% which is accepted as a high grade nature. The perioperative and postoperative period were uneventful. The patient was admitted to the oncology clinic in his postoperative second day. He treated with six cycles of etoposide 170 mg and cisplatin 50 mg adjuvant chemotherapy. At the end of the second cycle, the patient's general health condition improved and all metastatic lesions regressed fully on PET-CT imaging. He was discharged one week after second cycle chemotherapy treatment. During seven years long-term follow-up, the patient has not exhibited any metastatic lesion and follow-up period was uneventful.

Results: Primary testicular carcinoid tumor is a rarely seen tumor which commonly has low malignant potential. However, it can exhibit malignant potential with metastatic spreads. Standard radical orchiectomy following chemotherapy provides a successful treatment and good oncological outcomes even long-term follow-up.

Key Words: Testis, Carcinoid, Neuroendocrine Tumor

**HOW HYPERTENSION AFFECTS PHYSICAL ACTIVITY AND LIFE SATISFACTION
IN OLDER ADULTS?****Gökhan Can TÖRPÜ**

Bezmialem Vakıf University, Institute of Health Sciences, Department of Cardiopulmonary
Physiotherapy and Rehabilitation, Istanbul, Turkey

ORCID ID: <https://orcid.org/0009-0004-5400-272X>

Selva OTSAY

Bezmialem Vakıf University, Institute of Health Sciences, Department of Cardiopulmonary
Physiotherapy and Rehabilitation, Istanbul, Turkey

ORCID ID: <https://orcid.org/0009-0006-8326-255X>

Deniz TUNCER

Bezmialem Vakıf University, Faculty of Health Sciences, Department of Physiotherapy and
Rehabilitation, Istanbul, Turkey

ORCID ID: <https://orcid.org/0000-0003-4975-827X>

Abstract

Introduction and Purpose: Hypertension is a chronic medical condition where the blood pressure in the arteries is persistently elevated, often leading to heart disease, stroke, and other health issues. Hypertension can impact the physical activity and life satisfaction in older adults due to factors such as decreased cardiovascular efficiency, increased risk of related health complications, and the potential side effects of long-term medication use. The aim of this study is to investigate the effect of hypertension on physical activity and life satisfaction in older adults compared to healthy older adults.

Materials and Methods: Total of 36 older adults were included in this prospective study, divided into two groups according to the presence of hypertension. Group 1 (n=21); older adults with hypertension, Group 2 (n=15); older adults without chronic diseases. Physical activity was evaluated using the Physical Activity Scale for the Elderly in which higher scores indicate greater physical activity levels. Life satisfaction was assessed using The Satisfaction with Life Scale in which higher scores indicate greater satisfaction with life.

Results: The mean age of the participants was 70.64 ± 6.38 (group 1: 72.86 ± 1.52 years; group 2: 67.53 ± 0.99 years). Mean physical activity scores were 95.43 ± 13.48 for Group 1 and 157.73 ± 31.39 for Group 2. The life satisfaction scores were 15.60 ± 1.02 for Group 1 and 16.48 ± 1.08 for Group 2. While a significant difference was observed in terms of physical activity levels ($p < 0.05$), no significant difference was found in terms of life satisfaction ($p > 0.05$).

Discussion and Conclusion: We observed that the physical activity levels of older adults with hypertension were lower than those without hypertension, but there was no difference in terms of life satisfaction. Based on this result, we would like to emphasize that although it is important in all age groups, the approaches to increase physical activity are very important especially in elderly individuals with chronic diseases such as hypertension. To address this, it is recommended to structured physical activity programs for older adults with hypertension.

Key Words: Older Adults; Hypertension; Physical Activity; Life Satisfaction

**IMPACT OF TREATED WASTEWATER ON THE PROFILE NUTRITIONAL
PHYSICOCHEMICAL AND PHYTOCHEMICAL OLIVE OIL****Noureddine Djilali**

Laboratory of Applied Animal Physiology, Abedlhamib Ibnbadis University MOSTAGANEM

Amine Ghelamallah

Laboratory of Applied Animal Physiology, Abedlhamib Ibnbadis University MOSTAGANEM

Soltani Fatiha

Laboratory of Applied Animal Physiology, Abedlhamib Ibnbadis University MOSTAGANEM

Fodil Mustafa Kamel

Laboratory of Applied Animal Physiology, Abedlhamib Ibnbadis University MOSTAGANEM

Fayza Keddar

Laboratory of local natural bioresources (LBRN), Hassiba Ben bouali University CHLEF

Said Dahmani

Laboratory of Applied Animal Physiology, Abedlhamib Ibnbadis University MOSTAGANEM

Abstract

Water is essential to life and human activity. Given the scarcity of conventional water resources, the poor management of water resources and the pollution caused by wastewater discharges into the natural environment, wastewater treatment is essential to protect the natural environment and to create new water resources for reuse and reclamation for agricultural irrigation. The aim of our study is to evaluate and determine the physicochemical and microbiological quality of treated wastewater from the Hadjadj lagooning (Mostaganem) plant before and after treatment, and to determine the effect of irrigation with treated wastewater from this plant on the physicochemical quality of olive oil. According to our results, the physicochemical analyses of the treated wastewater were as follows : Purified volume= 1991,33 (m³) ; COD= 79,52 (mg/l) ; BOD5= 25,83 (mg/l) ; TSS= 26,66 (mg/l) ; DO= 3,49 (mg/l) ; pH= 7,76±0,25 ; CE= 1559.83 (µs/cm) show that the values obtained comply with the standards required by the WHO and Algerian regulations (JORA, 2012) and can be used for agricultural irrigation without any risk. The results of the microbiological parameters show that these waters are characterized by fecal contamination (presence of total and fecal coliforms <1000 CF/100ml), the total absence of pathogenic germs according to Algerian standards (JORA, 2012). According to our results, the samples show physico-chemical values within acceptable ranges, notably for acid value, acidity, peroxide value, iodine value, and other parameters. Levels of carotenoid pigments, chlorophyll, polyphenols, and

flavonoids vary but remain within reasonable limits. The oil samples also showed high fat levels and notable antioxidant activity. Our study highlights the importance of closely monitoring irrigation water quality, particularly when treated wastewater is used. The results indicate that irrigation with treated wastewater can have a significant impact on olive oil quality.

Keywords: Wastewater, well water, purified water, Hadjadj lagooning plant, irrigation, treatment, reuse, quality, olive oil.

**THE MEANING OF THE INSULIN PUMP FOR CHILDREN WITH TYPE 1 DIABETES:
A PHENOMENOLOGICAL STUDY****Gökşen POLAT**

Izmir Tınaztepe University, Vocational School of Health Services, First and Emergency Aid
Program, Izmir, Turkey

ORCID ID: <https://orcid.org/0000-0001-9575-2325>

Melike TEKİNDAL

Izmir Katip Çelebi University, Faculty of Health Sciences, Department of Social Services, Izmir,
Turkey

ORCID ID: <https://orcid.org/0000-0002-3453-3273>

Elif ÜNSAL AVDAL

Izmir Katip Çelebi University, Faculty of Health Sciences, Department of Nursing, Izmir, Turkey

ORCID ID: <https://orcid.org/0000-0001-6888-0882>

Abstract

Introduction and Purpose: Type 1 Diabetes is a chronic disease that often occurs from a young age. Children have to use pumps from a very young age. The purpose of this qualitative study; to reveal the insulin pump experiences of children with Type 1 Diabetes by examining them in depth.

Materials and Methods: Within qualitative research, using the technique of purposive sampling in 14 children with Type 1 Diabetes. Use an insulin pump at the age of 12-14 were included in the study. Semi-structured interview using the technique to determine their views and experiences. The obtained data thematic analysis method, computer-aided qualitative data analysis MAXQDA 2022 were analyzed by the program.

Results: Main themes are 'definition and meaning of the pump for children', 'children's experiences with thw insulin pump', 'how the pump makes children feel', 'changes in the lifes children after the pump' and 'expectations, dreams and suggestions with diabetes'. For children the life of the pump, comfort, and the children of normalcy means freedom, is to make sure you feel hope.

Discussion and Conclusion: Whereas the meaning of the insulin pump for the children was a device they had to carry with them all the time and depended on to perform organ functions. They stated that life without the pump was more difficult and irregular for them since it was a facilitator in the conduct of daily life. They also stated that they were independent in their daily lifes thanks to the pump, but that from time to time they had problems with the device such as the size and blockage problem, and that they were exposed to the stigma at school.

Key Words: Diabetes; Children, Qualitative Research, Insulin Pump

**APPLICATION OF CAISPR-CAS9 TECHNOLOGY IN THE ZOOONOTIC DISEASE
LEPTOSPIROSIS AND BIOSECURITY CHALLENGES****Irfan Ullah**

Master Program in Biotechnology, Graduate School, Universitas Padjadjaran, Bandung 40132,
Indonesia

Nita Susanti

Master Program in Biotechnology, Graduate School, Universitas Padjadjaran, Bandung 40132,
Indonesia

Roostita L. Balia

Faculty of Animal Husbandry, Universitas Padjadjaran, Jl. Raya Bandung-Sumedang Km.21
Jatinangor 45363, Indonesia

Saskia L Nasroen

Department of Oral and Maxillofacial Surgery, Faculty of Medicine, Jenderal Achmad Yani
University, Indonesia

Ani Melani Maskoen

Department of Oral Biology, Faculty of Dentistry, Universitas Jenderal Achmad Yani, Bandung,
Indonesia

Erli Sarilita

Department of Oral Biology, Faculty of Dentistry, Universitas Padjadjaran, Bandung, Indonesia

Abstract

CRISPR-Cas9 technology is the one of revolutionary technologies in genome editing and molecular biology field. Firstly, discovered in the E. coli Bacteria, the application of CRISPR-Cas9 is more significant than other GE technologies. The significant features of CRISPR-Cas9 are efficiency, specificity, versatility, flexibility, simplicity, and low cost. This technology is used in the therapy, and diagnosis of zoonotic diseases, and human chronic disease. Leptospirosis infection is one of the zoonotic diseases, the pathogen of leptospirosis is the Leptospira Bacterium. The article aims to evaluate CRISPR-Cas9 technology leptospirosis application and challenges. Millions of people are infected each year. The genome editing by CRISPR-Cas9 of the Leptospira proteins could control leptospirosis. The CRISPR-Cas9 technology provides genomic and proteomic data and identification and characterization of the Leptospira bacteria gene. this could be an effective approach to the control of leptospirosis infection. In summary, CRISPR-Cas9 is a beneficial tool for

controlling infective disease however the riskiest challenge is that the escape of modified bacterium high risk for human health.

Keywords: CRISPR-cas9, Genome editing, biosecurity, zoonotic, zoonosis, leptospirosis.

Introduction

Genome editing (GE) is a series of gene editing technologies which are used for living cells, plants, animals and human cells. These GE technologies are routinely used in many genetic laboratories. For some years the GE method are expanded, and do a fundamental role in the genetic field. And proving the versatility of genome-centric technology. (Mir et al., 2022). Since 2012 in the GE technology, the CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) Cas system is one of the revolutionary tools. CRISPR-Cas have a significant impact on genetic research and medical accuracy in diagnostics. For genome mapping, gene therapy, and gene editing the RNA-guided endonuclease (RGEN)-based CRISPR-Cas method is highly adaptable (Nishtha Chaturvedi & Chhaya Chaturvedi, 2021). The tool was first discovered in *Escherichia coli*, it's a breakthrough in molecular biology. It primarily consists of two components: the first is palindromic short DNA repeats with uniform spacing (20–40 bp in length). The second component is hypervariable spacer DNA, each segment of which is distinct and fully compatible with viral DNA, particularly that of bacteriophages. Numerous other genes known as Cas genes are linked to CRISPR. Both helicases and nucleases that break DNA are made by Cas proteins, which are made by Cas genes (PM Baliram et al., 2019). Class 1 and Class 2 systems are the two main kinds of CRISPR systems. Class 1 systems (types I, III, and IV) require a complex of multiple proteins for RNA-guided target cleavage, whereas class 2 systems (types II, V, and VI) only need one RNA-guided endonuclease (for example, Cas9 in type II) to mediate the cleavage of invasive genetic material (Nishtha Chaturvedi & Chhaya Chaturvedi, 2021).

This article aims to evaluate the CRISPR-cas9 genome editing tool in the zoonotic disease leptospirosis and biosecurity challenges. CRISPR-Cas9 is a significant and fundamental role in molecular biology and diagnostics, the CRISPR-Cas9 tool has accurate, effective, and simple. This tool makes possible genome alteration and in vivo viewing. And many disease therapy, production of the specific drugs, and cutting-edge diagnostic (Chávez-mejía et al., 2019). The CRISPR-Cas9 tools significantly using in the gene therapy of zoonotic disease (Karponi et al., 2019), (Wang et al., 2021), (Petersen, 2017).

According to Chinese research, the CRISPR-Cas9 tool is used to modify the duck enteritis virus (DEV) as a result produce recombinant DNA vaccines. These vaccines are usable for the influenza virus. (Chang et al., 2018). *T. gondii* non-selection knockouts by the RNA-guided cas9 endonuclease genome editing produce the more susceptible double-strand break repair. After the use of the genome-wide genetic assessment by CRISPR-Cas9 they identify every infection of human fibroblasts and completely identify the many novel and unique genes in the desired infection (Gupta et al., 2019). Perhaps genome editing has some consequences in mammalian cell editing. Genome editing in a specific area is suspectable causing mutagenesis in the other area of the target cell gene (Gupta et al., 2019). Concerns about the safety and ethical implications of genome editing (GE) have created debates and controversies within the scientific community. GE in reproductive cells, such as sperm or eggs, may result in genetic alterations that may be passed down to subsequent generations and may result in harmful mutations (Mir et al., 2022), (Watters et al., 2021).

The *Leptospira* bacteria are free-living organisms, that can be infected directly by the environment (L. G. V. Fernandes et al., 2019). The *Leptospira* bacteria cause leptospirosis disease, this is one of the zoonoses. Million people worldwide are affected by this leptospirosis zoonotic disease. The mortality rate of the world population due the leptospirosis round about 60,000 people deaths

annually. The leptospirosis infection involves the leptospiral proteins. The alteration of the leptospiral proteins with the help of the GE tools could be used for therapeutical procedures (L. G. V. Fernandes & Nascimento, 2022), (Picardeau, 2017).

Working Mechanism of CRISPR-cas9

The protein is activated when the gRNA binds to cas9 and causes a conformational shift. When Cas9 is activated, it binds with a sequence that matches its PAM sequence (NGG) and begins looking for the target DNA. The Cas9 protein will instantly melt the bases immediately upstream of PAM and coupled with the complementary region of gRNA when it identifies a target sequence. Ruv C and the HNH nuclease domain will cut the target DNA if the complementary region and the target region pair correctly. DSB are produced by Cas9 and are located in 3–4 nucleotides before the PAM sequence. Two different DNA repair pathways can be used to fix DSBs: NHEJ (non-homologous end joining), which is error-prone and results in inserts or deletions (Indels) at the DSB site, leading to premature stop codons or frameshifts, and HDR (homology-directed repair), which searches for the presence of a homologous DNA sequence and, upon finding one, causes homologous recombination. The only requirement is gRNA, which can be chemically produced, transcribed *in vitro*, or expressed in cells to provide specificity because Cas9 acts as a generic endonuclease (Gupta et al., 2019), (Chang et al., 2018), (Watters et al., 2021).

General application CRISPR-cas9 Genome Editing Technology

CRISPR-Cas9 technology has more influence tools than TALENs (transcription Activator-like Effector Nucleases) and ZFNs (Zinc Finger Nucleases) on the based of efficiency, specificity, versatility, flexibility, simplicity, and low cost. The use of the CRISPR-Cas9 viral mutants stops viral infections, removes proviral DNA and stops viral replication in infected cells (Okoli et al., 2018). CRISPR-Cas9 unique tool in the genome classifying, identifying, and prioritizing targets for follow-up interventions as well as overcoming various barriers to cancer therapy, cancer immunotherapy and checkpoint inhibitors (Azangou-Khyavy et al., 2020), (Chen et al., 2019), (Chávez-mejía et al., 2019), (Dawood & Jasim, 2021). The Double-standard breaks (DBSs) system in the CRISPR technology fundamental tool for the deletion of the bacterial gene, targeting the resistance gene finding in the plasmids. The multiplex system of CRISPR-Cas could target many resistance genes (Zohra et al., 2021). The cutting-edge method of CRISPR can control various infectious serious diseases (Kumar Mahto et al., 2023). Including the antiviral disease Human papillomavirus (HPV), hepatitis B virus (HBV), human immunodeficiency virus (HIV), and other pandemics disease (Dhanda, 2023). SARS-CoV2 could be diagnosed in the CRISPR-Cas9 method and give fast results than the RT-PCR (Shademan et al., 2022), (Nishtha Chaturvedi & Chhaya Chaturvedi, 2021).

General Biosecurity Challenges for CRISPR-cas9 Technology

The use of this molecule biology technology could be mistreated to increase the high risk to the environment and society. Terrorist access to this GE technology causes damage to society. The united nations need to make a standard regulatory framework for the future and be ready every time for the high risk of the misuse of GE technology (Mir et al., 2022). The CRISPR technology increases the ethical and concerns debates. Somatic cell editing is beneficial for medical therapy and diagnoses. However there have some consequences of somatic stem cell genome editing in the safety, risk-benefit analysis, protection of vulnerable people, informed permission and access equity are the ethical requirements for germline cell editing (Singh, 2021). The significant importance of

CRISPR-Cas9 targeted genome editing has a lot. However, the effective knock-out in cells in a mouse model is poor and prone to problems. And non-viral methods ex vivo technique for target cells separate the target cell and then modify and introduces to the host, this insertion of off-target gene and non-specific method creates some genotoxicity and causes cancer in several medicines (Gupta et al., 2019), (Zohra et al., 2021). In response to the known drawbacks of the Cas9-based CRISPR method, such as the potential for off-target lethality, the potential to interfere with transcripts wild-type, and heavy molecular weight, the alternative Cas-13 has been designed (Azangou-Khyavy et al., 2020). The use of CRISPR-Cas9 uses directly by weapons is a risk to world health. CRISPR-Cas9 can eliminate, suppress, or increase the expression of the specific gene that interferes with the physiological systems of the organism. They can create toxic biochemical or alter the raw availability of the elements which could damage plants, humans and animals' life (Watters et al., 2021).

CRISPR-Cas9 application in the leptospirosis

Gene knockout system in *Leptospira* spp.

The Brazilian studies discover in 2022, the gene knockout system for zoonotic disease leptospirosis pathogenic bacteria *Leptospira* spp. By combining CRISPR-Cas9 and non-homologous end-joining (NHEJ) systems. The researcher designed specific guide RNAs (gRNAs) targeting the genes of interest and delivered them into the *Leptospira* spp. Cells along with Cas9 nuclease. The gRNAs were designed to create double-strand breaks (DSBs) at the target site, and the NHEJ system was used to repair the DSBs, leading to the deletion of the target gene. The researchers successfully knocked out two genes, namely, lipL32 and lipB, which are known to be important virulence factors in *Leptospira* spp. The knockout strains showed a significant reduction in virulence compared to the wild-type strain in a hamster model of leptospirosis. They also demonstrated the specificity of the CRISPR-Cas9 system by showing that the off-target effects were minimal. Furthermore, they showed that the knockout strains were stable and could be propagated in culture without losing the knockout phenotype (L. G. V. Fernandes & Nascimento, 2022).

Genomic and proteomics resources of *Leptospira*:

The Indian researcher identifies the use of the CRISPR-Cas9 tools as a valuable resource for the study of the *Leptospira* and database and provides comprehensive data on the proteomic and genomic. The LeptoBD provide a comprehensive repository of genomic data for various *Leptospira* species. And including annotations and functional classification for the gene which could be useful for identifying potential targets for CRISPR-Cas9 gene editing. The LeptoDB transcriptomic and proteomic data could be useful for studying the expression and function of gene interest. This information could be useful to guide the design of CRISPR-Cas9 experiments and evaluate their efficacy. The data analysis, including genome browsers and search tools for gene and protein function, pathway analysis and orthologous group. These tools could aid in the identification and characterization of genes that are important for the pathogenesis of *Leptospira* and could guide the development of the CRISPR-Cas9 strategies for manipulating gene expression (Berawal et al., 2018).

The gene silencing in *Leptospira* bacterium use of CRISPR-Cas9

Researcher Fernandes and his research team demonstrate that the catalytically inactive form of the Cas9 protein (dCas9) can be efficiently delivered into *Leptospira* cells and guided to a specific genomic location using guide RNAs, resulting in significant gene silencing. This technology has the potential to be used for the manipulation of bacterial genomes and the development of new

approaches to the treatment and prevention of *Leptospira* infections. Chitosan-based transfection system used to deliver dCas9 into *Leptospira* cells. The researcher demonstrates the efficient delivery of dCas9 and its successful targeting of specific genomic locations using guide RNAs. The effectiveness of the approach is further demonstrated by the significant reduction in target gene expression achieved by dCas9-mediated gene silencing. They show the utility of this technology by using it to study the function of specific genes in *Leptospira*. This gives important evidence for the potential of CRISPR-Cas9 gene editing technology for the manipulation of bacterial genomes and specifically highlights the usefulness of dCas9 for gene silencing in *Leptospira*. This study also provides a platform for future research into the genetic manipulation of *Leptospira*, which may lead to the development of new approaches to the treatment and prevention of *Leptospira* infection. They have significant importance in genetic engineering to apply for basic research (L. G. V. Fernandes et al., 2019). In 2021 this researcher also uses the CRISPR interference (CRISPRi) tools for gene silencing for the pathogenic bacteria *Leptospira*, they design and construct CRISPRi vectors targeting the specific gene of genes of interest in pathogenic *Leptospira*. They also describe the method for delivering the CRISPRi vectors into the leptospira cells as well as the strategies for validating the gene silencing efficiency (L. G. V. Fernandes et al., 2021).

The challenges in the *Leptospira* in the CRISPR-cas9

1. One of the main challenges in using CRISPR-Cas9 to knockout genes in leptospira spp. Is the low efficiency of homologous recombination. Homology-directed repair, which is the preferred mechanism for gene editing, is rare in this bacterium. NHEJ, an alternative mechanism, is also inefficient in *Leptospira* spp. Therefore, there is a need to optimize gene editing tools to increase their efficiency. Another challenge is the delivery of foreign DNA into the bacterium challenging. Furthermore, the delivery of the CRISPR-Cas9 system requires the use of multiple plasmids, which increases the complexity of the system and reduces its efficiency (L. G. V. Fernandes & Nascimento, 2022).
2. The potential challenge is the diversity of *Leptospira* species and stains which can vary widely in their genetic makeup and pathogenicity. This could make it difficult to identify suitable target genes for CRISPR-Cas9 gene editing and generalize finding from one *Leptospira* species or strain to other. The development of new CRISPR-Cas9 strategies and tools specific to *Leptospira* could be a potential challenge (Beriwal et al., 2018).
3. Limited editing capabilities: CRISPR-Cas9 is not always effective in editing all types of DNA sequences, and certain types of mutation may be difficult or impossible to correct using this technology (L. G. V. Fernandes et al., 2019).
4. The potential for unintended consequences or the creation of genetically modified organisms (L. G. V. Fernandes et al., 2019).
5. Escape mutants, pathogenic bacteria such as *Leptospira* species can evolve to escape CRISPR-mediated gene silencing by acquiring a mutation in the target site. The authors suggest monitoring for the emergence of escape mutants and using multiple guide RNAs to minimize the risk of escape (L. G. V. Fernandes et al., 2021).

Result and dissuasion

Living cell genome editing is a revolutionary step in the molecular biology field (Mir et al., 2022). The GE editing technology increases the possibility the therapy of genetic diseases therapy (Chávez-mejía et al., 2019). CRISPR-Cas9 technology is one of the significant tools in GE technology. The fundamental benefits of CRISPR-Cas9 are efficiency, specificity, versatility, flexibility, simplicity, and low cost (Okoli et al., 2018). CRISPR-Cas9 has proven a fundamental role in the medical era in the to stop the viral infection, removing proviral DNA, (Okoli et al., 2018), in cancer therapy and

human genetic and viral disease identification and therapy and fast diagnostic procedures (Azangou-Khyavy et al., 2020), (Dhanda, 2023).

Leptospirosis is a zoonotic disease that infected millions of people each year. The *Leptospira* bacterium causes leptospirosis, however, the editing of the *Leptospira* protein could be used for the control of leptospirosis by CRISPR-cas9 genome editing. The Brazilian studies describe a new method for knocking out genes in *Leptospira* spp. Using CRISPR-Cas9 and the NHEJ system, which could facilitate further research into the pathogenesis of *Leptospira* spp. And the development of novel therapeutics and vaccines against leptospirosis (L. G. V. Fernandes & Nascimento, 2022). The Indian studies also proved proof that CRISPR-Cas9 technology could provide genomic and proteomic data and identification and characterization of the *Leptospira* gene. It is an influential tool for the control of the pathogenesis of *Leptospira* infection (Beriwal et al., 2018). The researcher also demonstrate the Cas9 proteins could be delivered by the *Leptospira* cell with help of the gRNAs as a result of the specific gene silencing. This method is an effective approach to genetic engineering to prevent *Leptospira* infection and treatment (L. G. V. Fernandes et al., 2021), (L. G. V. Fernandes et al., 2019).

Conclusion

Genome editing technology useful tool especially the CRISPR-Cas9 system. They have multiple applications in molecule biology however the misuse of this technology could be a high risk to world health. The zoonotic leptospirosis disease pathogen *Leptospira* bacteria can alter the *Leptospira* proteins by the CRISPR-Cas9 genome editing technique that could be treated the leptospirosis infection and create a vaccine against the leptospirosis. However, the modified *Leptospira* could escape from the laboratory it is a biosecurity risk for world health.

References

- Azangou-Khyavy, M., Ghasemi, M., Khanali, J., Boroomand-Saboor, M., Jamalkhah, M., Soleimani, M., & Kiani, J. (2020). CRISPR/Cas: From Tumor Gene Editing to T Cell-Based Immunotherapy of Cancer. *Frontiers in Immunology*, *11*(September), 1–19. <https://doi.org/10.3389/fimmu.2020.02062>
- Beriwal, S., Padhiyar, N., Bhatt, D., Pandit, P. D., Ansari, A., Lata, K. S., Saiyed, Z. M., Vaghasia, V., Sharma, P., Bhairappanavar, S. B., Soni, S., & Das, J. (2018). LeptoDB: An integrated database of genomics and proteomics resource of *Leptospira*. *Database*, *2018*(2018), 1–10. <https://doi.org/10.1093/database/bay057>
- Chang, P., Yao, Y., Tang, N., Sadeyen, J. R., Sealy, J., Clements, A., Bhat, S., Munir, M., Bryant, J. E., & Iqbal, M. (2018). The application of NHEJ-CRISPR/Cas9 and cre-lox system in the generation of bivalent duck enteritis virus vaccine against avian influenza virus. *Viruses*, *10*(2), 1–11. <https://doi.org/10.3390/v10020081>
- Chávez-mejía, A. C., Magaña-lópez, R., Durán-álvarez, J. C., & Jiménez-cisneros, B. E. (2019). *International Journal of Environment , Agriculture and Biotechnology (IJEAB)*. November, 143–152. <https://doi.org/10.22161/ijeab>
- Chen, K., Jiang, S., Hong, Y., Li, Z., Wu, Y. L., & Wu, C. (2019). Cationic polymeric nanoformulation: Recent advances in material design for CRISPR/Cas9 gene therapy. *Progress in Natural Science: Materials International*, *29*(6), 617–627. <https://doi.org/10.1016/j.pnsc.2019.10.003>
- Dawood, A. A., & Jasim, B. I. (2021). *The CRISPR Genome Editing Process is an Effective*

Advancement of Short-Term Cancer Treatment. 13(01), 54–56. <https://doi.org/10.5958/0975-4377.2021.00009.4>

Dhanda, S. (2023). *Applications of CRISPER / Cas9 as a Tool to study Human Diseases caused by Viruses : A review*. 12(1), 2472–2475.

Fernandes, L. G. V., Guaman, L. P., Vasconcellos, S. A., Heinemann, M. B., Picardeau, M., & Nascimento, A. L. T. O. (2019). Gene silencing based on RNA-guided catalytically inactive Cas9 (dCas9): a new tool for genetic engineering in *Leptospira*. *Scientific Reports*, 9(1), 1–14. <https://doi.org/10.1038/s41598-018-37949-x>

Fernandes, L. G. V., Hornsby, R. L., Nascimento, A. L. T. O., & Nally, J. E. (2021). Application of CRISPR interference (CRISPRi) for gene silencing in pathogenic species of *Leptospira*. *Journal of Visualized Experiments*, 2021(174), 1–14. <https://doi.org/10.3791/62631>

Fernandes, L. G. V., & Nascimento, A. L. T. O. (2022). A Novel Breakthrough in *Leptospira* spp. Mutagenesis: Knockout by Combination of CRISPR/Cas9 and Non-homologous End-Joining Systems. *Frontiers in Microbiology*, 13(May), 1–14. <https://doi.org/10.3389/fmicb.2022.915382>

Gupta, D., Bhattacharjee, O., Mandal, D., Sen, M. K., Dey, D., Dasgupta, A., Kazi, T. A., Gupta, R., Sinharoy, S., Acharya, K., Chattopadhyay, D., Ravichandiran, V., Roy, S., & Ghosh, D. (2019). CRISPR-Cas9 system: A new-fangled dawn in gene editing. *Life Sciences*, 232(April), 116636. <https://doi.org/10.1016/j.lfs.2019.116636>

Karponi, G., Kritas, S. K., Papadopoulou, G., Akrioti, E. K., Papanikolaou, E., & Petridou, E. (2019). Development of a CRISPR/Cas9 system against ruminant animal brucellosis. *BMC Veterinary Research*, 15(1), 1–10. <https://doi.org/10.1186/s12917-019-2179-z>

Kumar Mahto, K., Prasad, P., Kumar, M., Dubey, H., & Ranjan, A. (2023). Role of CRISPR Technology in Gene Editing of Emerging and Re-emerging Vector Borne Disease. *Mosquito Research - Recent Advances in Pathogen Interactions, Immunity, and Vector Control Strategies*, 1–16. <https://doi.org/10.5772/intechopen.104100>

Mir, T. ul G., Wani, A. K., Akhtar, N., & Shukla, S. (2022). CRISPR/Cas9: Regulations and challenges for law enforcement to combat its dual-use. *Forensic Science International*, 334, 111274. <https://doi.org/10.1016/j.forsciint.2022.111274>

Nishtha Chaturvedi, & Chhaya Chaturvedi. (2021). Role of Crisper CAS9 Technology in the Diagnosis of Covid19. *International Journal for Research in Applied Sciences and Biotechnology*, 8(5), 162–167. <https://doi.org/10.31033/ijrasb.8.5.23>

Okoli, A., Okeke, M. I., Tryland, M., & Moens, U. (2018). CRISPR/Cas9—Advancing orthopoxvirus genome editing for vaccine and vector development. *Viruses*, 10(1), 1–27. <https://doi.org/10.3390/v10010050>

Petersen, B. (2017). Basics of genome editing technology and its application in livestock species. *Reproduction in Domestic Animals*, 52, 4–13. <https://doi.org/10.1111/rda.13012>

Picardeau, M. (2017). Virulence of the zoonotic agent of leptospirosis: Still terra incognita? *Nature Reviews Microbiology*, 15(5), 297–307. <https://doi.org/10.1038/nrmicro.2017.5>

PM Baliram, M Sharma, & WS Ganpatrao. (2019). CRISPR/Cas9 Genome Editing and Its Medical Potential. *Advances in Biotechnology and Bioscience*, 3, 71–90.

Shademan, B., Nourazarian, A., Hajazimian, S., Isazadeh, A., Biray Avci, C., & Oskouee, M. A. (2022). CRISPR Technology in Gene-Editing-Based Detection and Treatment of SARS-CoV-2. *Frontiers in Molecular Biosciences*, 8(January), 1–11. <https://doi.org/10.3389/fmolb.2021.772788>

Singh, A. N. (2021). Ethical controversies and challenges in human genome editing. *International*

Medical Journal, 28(2), 134–137.

Wang, X., Lyu, Y., Wang, S., Zheng, Q., Feng, E., Zhu, L., Pan, C., Wang, S., Wang, D., Liu, X., & Wang, H. (2021). Application of CRISPR/Cas9 System for Plasmid Elimination and Bacterial Killing of *Bacillus cereus* Group Strains. *Frontiers in Microbiology*, 12(June), 1–17. <https://doi.org/10.3389/fmicb.2021.536357>

Watters, K. E., Kirkpatrick, J., Palmer, M. J., & Koblenz, G. D. (2021). The CRISPR revolution and its potential impact on global health security. *Pathogens and Global Health*, 115(2), 80–92. <https://doi.org/10.1080/20477724.2021.1880202>

Zohra, T., Numan, M., Ikram, A., Salman, M., Khan, T., Din, M., Salman, M., Farooq, A., Amir, A., & Ali, M. (2021). Cracking the Challenge of Antimicrobial Drug Resistance with CRISPR/Cas9, Nanotechnology and Other Strategies in ESKAPE Pathogens. *Microorganisms*, 9(5), 954. <https://doi.org/10.3390/microorganisms9050954>

ANTIMICROBIAL ACTIVITY EVALUATION OF Zn(II) AND Co(II) COMPLEXES WITH NAPHTHALENE DERIVATIVES SCHIFF BASE**Junaidu Na'aliya**

Department of Pure and Industrial Chemistry, Bayero University Kano, Nigeria

Ibrahim Kani Aminu

Department of Pure and Industrial Chemistry, Bayero University Kano, Nigeria

Abstract

The Schiff base derived from 2-hydroxy-1-naphthaldehyde and 1-naphthylamine and its Zn(II) and Co(II) complexes were synthesized and characterized using, solubility test, melting point/decomposition temperature, conductivity measurement, infrared spectral analysis, magnetic susceptibility, elemental analyses and UV- visible. The Schiff base and its corresponding metal complexes were screened for antimicrobial activity. The higher decomposition temperature range (237 – 264 °C) indicated good stability of the complexes. The molar conductance values range (7.29 – 8.12 $\Omega^{-1}\text{cm}^2\text{mol}^{-1}$) indicated the metal complexes as non-electrolytes. The magnetic susceptibility values; -Ve BM indicated Zn(II) complex as diamagnetic while 4.19 BM indicated Co(II) complexes as paramagnetic. The infrared spectra analysis results suggested that the Schiff base behave as bidentate ligand coordinates to metal ion through azomethine nitrogen and phenolic oxygen. The elemental analyses results revealed slight differences between calculated and observed percentage values of C, H, and N, which is in line with the proposed formulae of the synthesized compounds. The antimicrobial activity of the Schiff base and its corresponding metal complexes were carried out in DMSO using agar well diffusion method against two pathogenic bacterial stains (*Salmonella typhi* and *Streptococcus pneumoniae*) and two fungal isolates (*Aspergillus fumigatus* and *Rhizopus stolonifer*). The results revealed that the Schiff base and its corresponding metal complexes possessed moderate antimicrobial activity when compared with the standard drugs (Gentamycin and Nystatin). And also revealed that the activity increases with increase of concentration.

Keywords: Schiff base, Complexes, 2-hydroxy-1-naphthaldehyde, 1-naphthylamine, Antimicrobial activity.

INTRODUCTION

A Compounds containing an azomethine group (-CH=N-) are known as Schiff bases. These classes of compounds were discovered in 1864 by Hugo Schiff [10]. Schiff bases are neutral molecules with an electron pair and contain a carbon-nitrogen double bond.

The Schiff bases are also known as imines or azomethine. Aromatic aldehyde especially with an effective conjugation system, form stable Schiff bases, whereas those aliphatic aldehydes Schiff bases are unstable and readily polymerize. Schiff base ligands with aldehydes are formed more readily than with Ketones [2]. A wide range of Schiff base compounds and their metal complexes have been prepared, and their behavioral studied indicated their flexibility and diverse structures [13].

Schiff bases generally are bi-, tri- or tetra- dentate chelating agents and easily coordinate with almost all transition metal ions to form very stable complexes. Their chemical and physical properties in various fields, such as preparative uses, identification, or protection, and determination of aldehyde or ketones, purification of carbonyl or amino compounds, or protection of these compounds in complex or sensitive reactions have been studied by various workers [2]. Schiff base ligands may contain a variety of substituents with different electron-donating or electron-withdrawing groups, and therefore may have interesting chemical properties [3].

Schiff bases have been widely reviewed due to their various applications in different spheres, ranging from inorganic chemistry, physical analytical chemistry to biochemistry and biology. They were reported as effective corrosion inhibitors on mild steel such as copper and aluminium [2]. They have been reported to possess diverse biological activities such as antifungal, analgesic, anti-inflammatory, antibacterial, antioxidant, antitumor, cardiovascular, antitubercular and as local anesthetic [15]. Phenolic Schiff bases obtained from aromatic aldehyde and aromatic amines have shown a number of applications in many fields such as pharmaceutical, life sciences and chemical science, ability to reversibly bind oxygen, transfer of an amino group and complexing ability towards some toxic metals [12].

Schiff base metal complexes have been receiving considerable attention for many years, due to their interesting characteristics in the field of material science and biological systems. The metal complexes of Schiff bases derived from substituted aldehyde and heterocyclic compounds which usually contain nitrogen, sulphur or oxygen as ligand atoms are becoming increasingly important as biochemical, analytical homogenous and heterogenous catalysis and antimicrobial agents, in the design of molecular modeling and industrial fields [17].

Schiff base metal complexes have important application in medicinal chemistry. Medical science demands such types of compounds which are more potent, biologically active, easily absorbable and nontoxic, and show fast action for treatment of diseases [9]. Extensive studies revealed that chelation makes the complex more stable and biologically more active in the presence of bio-metal. Metal ions fixed the complexes at the specific active site of the proteins and enzymes of the host and show their potentiality [6].

MATERIALS AND METHOD

2.1. Material

2.1.1. Reagents

All chemicals were purchased from Sigma Aldrich and Loba Chemie PVT. LTD and used without further purification. The 2-hydroxy-1-naphthaldehyde and 1-naphthylamine were used for the synthesis of the Schiff bases. The hydrated metal salt; $ZnCl_2 \cdot XH_2O$ and $CoCl_2 \cdot 6H_2O$ were used for the synthesis of the metal complexes. The ethanol, methanol, acetone, chloroform, dimethylsulfoxide, dimethylformamide, diethyl-ether and conc. HNO_3 were used as a solvents, also anhydrous $CaCl_2$ was used as a drying agent.

2.1.2. Instruments

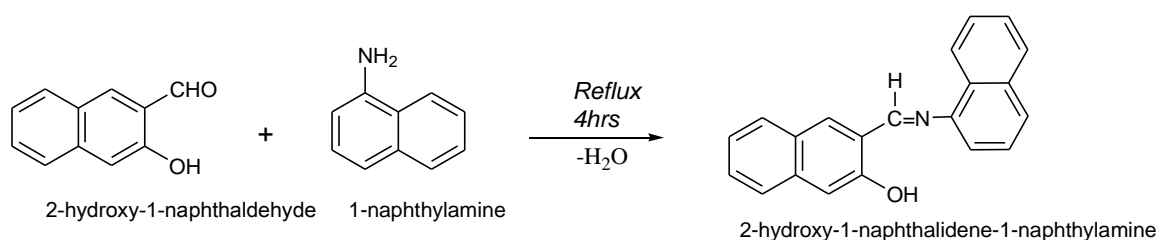
All glass wares used were washed with detergent after soaking in HNO_3 , rinsed with distilled water and dried in an oven. Weighing was conducted using electrical melter balance model AB54. Infrared spectral analysis was determined using Fourier transform infrared spectrophotometer (FTIR-8400S) in the range $4000 - 400 \text{ cm}^{-1}$. Electrical conductance was measured using Jenway conductivity meter model 4010 range $20 - 200 \mu\text{s}$. Melting points and decomposition temperature were determined

using microprocessor melting point apparatus (WRS-IB). Magnetic susceptibility was determined using magnetic susceptibility balance MKI Sherwood scientific ltd. Elemental analyses were determined using Series II CHNS/O Analyzer 2400 Perkin Elmer. The UV-Vis spectral analyses were determined using Perkin Elmer UV-Vis Spectrophotometer Lambda-35.

2.2. Methods

2.2.1. Synthesis of Schiff base

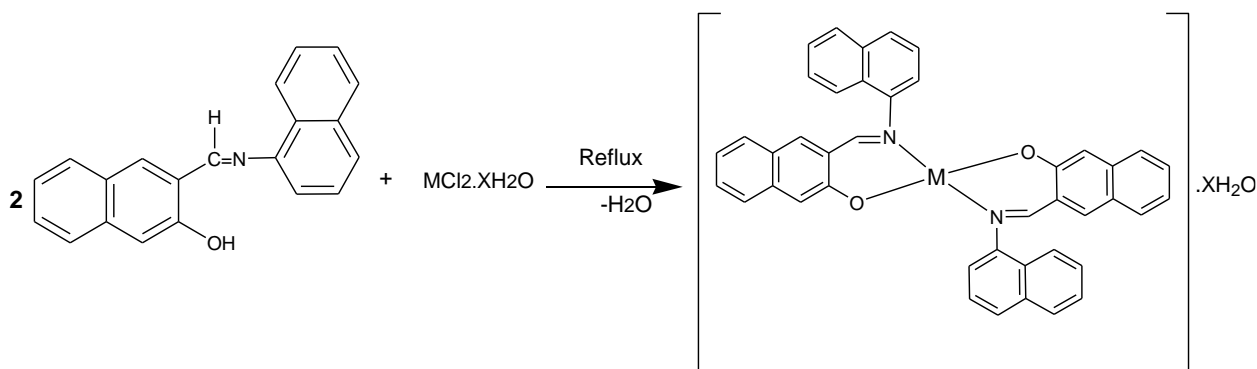
The Schiff base was synthesized by mixing 25 cm³ ethanolic solution of 2-hydroxy-1-naphthaldehyde (0.67 g, 0.004 mol) with 25 cm³ ethanolic solution of 1-naphthylamine (0.57 g, 0.004 mol). The resulting mixture was refluxed for 4 hrs. and then cooled to room temperature, and the corresponding precipitate formed on cooling was then filtered, washed with diethyl ether and recrystallized with ethanol and then dried in desiccators over anhydrous CaCl₂ to obtain Schiff base as shown in scheme 1 [1].



Scheme 1: Synthesis of Schiff base

2.2.2. Synthesis of Schiff base complexes

A metal complexes of Schiff base were synthesized by mixing 25 cm³ hot ethanolic solution of Schiff base (1.17 g, 0.004 mol) with 25 cm³ hot ethanolic solution of hydrated metal chloride salts (0.002 mol). The resulting mixture each was refluxed for 8 hrs. the complex obtained in each case was cooled to room temperature, filtered, washed with ethanol and recrystallized with diethyl ether several times to remove any unreacted ligand. Finally each of the complexes was dried over anhydrous CaCl₂ in desiccators to obtain the required product as shown in scheme 2 [7].



Where M = Zn(II), Co(II)

Scheme 2: Synthesis of Schiff base metal complexes

3.0. Antimicrobial studies

3.1. Preparation of Schiff base and metal complexes concentrations for antimicrobial activity.

The concentrations of the Schiff bases and their metal complexes were prepared according to the adopted procedure reported by Neelofar *et al.*, [15] by dissolving 0.006 mol of the samples each in 10 cm³ DMSO to obtain the concentration of 60 µg/mm, then followed by serial dilution to obtain the concentration of 30 µg/mm.

3.2. Preparation of nutrient agar and potatoes dextrose agar media

Nutrient agar medium was prepared by suspending 38 g of the medium in 1 liter of distilled water, then it was boiled and autoclaved at 121 °C for 15 min, and finally poured into sterile petri dishes and used for antibacterial evaluation [16].

Potato dextrose agar medium was prepared by mixing the potato infusion with dextrose agar and water which was boiled to dissolve and then autoclaved at 121°C for 15 min. It was also poured into sterile petri dishes and used for antifungal test [16].

3.3. Antibacterial assay

The synthesized Schiff bases and their metal complexes were screened *in vitro* for antibacterial activity against two pathogenic bacteria strains (*Salmonella typhi* and *Streptococcus pneumoniae*) by the agar well diffusion method. The wells were dug in the media with the help of a sterile metallic borer. The bacteria inocula were spread on the nutrient agar. The 60 µg/mm and 30 µg/mm concentration of the test samples in dimethylsulfoxide were introduced in the respective wells. Other two wells were supplemented with standard antibacterial drug (Gentamycin) which served as positive control and DMSO which served as negative control. The plates were incubated at 37 °C for 24 h. The activity was determined by measuring the diameter of zones showing complete inhibition in (mm) [15].

3.4. Antifungal assay

Antifungal activity of Schiff bases and their metal complexes was carried out against two fungal isolates (*Aspergillus fumigatus* and *Rhizopus stolonifer*) using agar well diffusion method. The wells were dug in the media with the help of a sterile metallic borer. Fungal strains were spread on the surface of the sabouroud dextrose agar with the help of a sterile cotton swab. The recommended concentrations of the test samples in dimethylsulfoxide were introduced in the respective wells. Other two wells were supplemented with standard antifungal drug (Nystatin) which served as positive control and DMSO which served as negative control. The plates were incubated at 37 °C for 48h. Activity was determined by measuring the diameter of zones showing complete inhibition (mm) [15].

4.0. RESULTS AND DISCUSSION

4.1. Results

Table 1: Physical and Analytical Data of Schiff base and its metal Complexes

Compound	Colour	Melt.pt/Dec. Temp.(°C)	%Yield	Elemental analysis Calculate (Found)		
				%C	%H	%N
Schiff base	Yellow	123	83.16	81.85 (80.96)	5.05 (4.60)	5.39 (4.67)
[ZnL ₂]	Cream	237	75.13	78.67 (78.93)	4.26 (3.92)	4.26 (3.57)
[CoL ₂].4H ₂ O	Brown	264	67.64	69.72 (68.69)	4.98 (4.01)	3.87 (3.41)

Key: L = C₂₁H₁₅NO, Zn = Zinc, Co = Cobalt

Table 2: Solubility of the Schiff base and its metal Complexes in some common Solvents

Compound	Water	Methanol	Ethanol	Chloroform	Acetone	DMF	DMSO
Schiff base	IS	SS	SS	S	S	S	S
[ZnL ₂]	IS	SS	SS	S	S	S	S
[CoL ₂].4H ₂ O	IS	SS	SS	S	S	S	S

L = C₂₁H₁₅NO, DMSO = Dimethylsulfoxide, IS = Insoluble, SS = slightly soluble, S = Soluble

Table 3: IR Spectral data of the Schiff base and metal Complexes

Compound	V(O-H) cm ⁻¹	V(C=N) cm ⁻¹	V(M-N) cm ⁻¹	V(M-O) cm ⁻¹	V(H ₂ O) cm ⁻¹
Schiff base	3335	1611	-	-	-
[ZnL ₂]	-	1607	589	489	-
[CoL ₂].4H ₂ O	-	1599	604	459	-

Key: L= C₂₁H₁₅NO, Zn = Zinc, Co = Cobalt

Table 4: Conductivity measurement of the metal Complexes in DMSO

Complex	Concentration Moldm ⁻³	Specific Conductance Ohm ⁻¹ cm ⁻¹	Molar Conductance Ohm ⁻¹ cm ² mol ⁻¹
[ZnL ₂]	1.0×10 ⁻³	8.12×10 ⁻⁶	8.12
[CoL ₂].4H ₂ O	1.0×10 ⁻³	7.29×10 ⁻⁶	7.29

Key: L= C₂₁H₁₅NO, Zn = Zinc, Co = Cobalt, DMSO= Dimethylsulfoxide

Table 5: Magnetic susceptibility of the metal Complexes

Compound	Xg(gmol ⁻¹)	Xm(gmol ⁻¹)	μ _{eff} (BM)	Property
[ZnL ₂]	-2.28×10 ⁻⁷	-1.49×10 ⁻⁴	-Ve	Diamagnetic
[CoL ₂].4H ₂ O	1.02×10 ⁻⁵	7.37×10 ⁻³	4.19	Paramagnetic

Key: L = C₂₁H₁₅NO, Zn = Zinc, Co = Cobalt

Table 6: Electronic spectral data of Schiff base and its metal Complexes

Compound	Solvent	π (nm)	π^* (nm)	π^* (nm)	MCT
Schiff bas	DMSO		214	328	-
[ZnL ₂]			219	323	381
[CoL ₂].4H ₂ O			222	321	381

Key: L = C₂₁H₁₅NO, Zn = Zinc, Co = Cobalt, DMSO = Dimethylsulfoxide

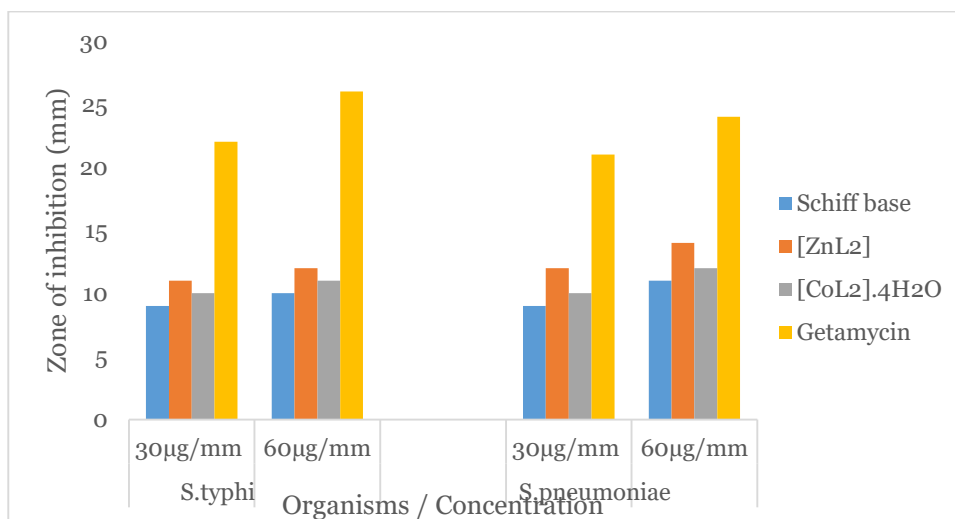


Figure 1: Antibacterial activity of the Schiff base and its metal complexes

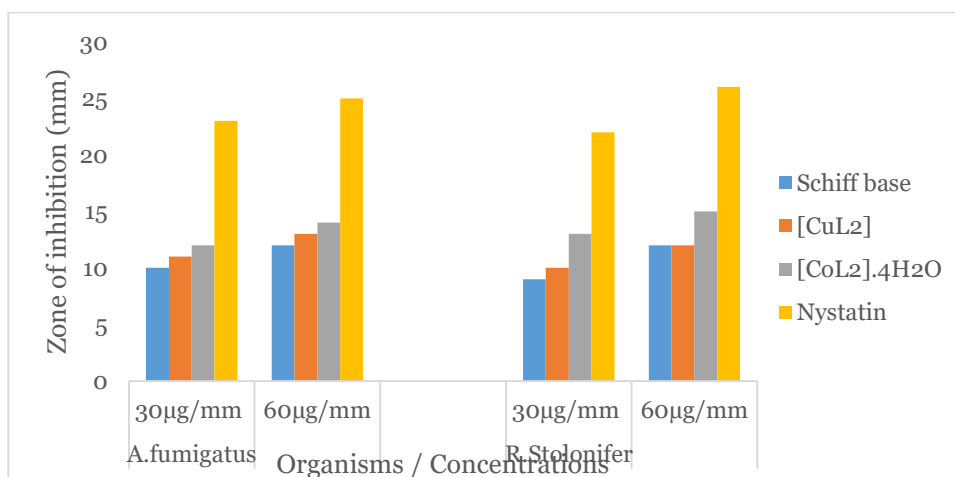


Figure 1: Antibacterial activity of the Schiff base and its metal complexes

4.2. Discussion

The reaction between 2-hydroxy-1-naphthaldehyde and 1-naphthylamine yielded Schiff base ligand which is yellow crystalline solid with the percentage yield of 83.16 % and melting point temperature of 123 °C. (Table. 1) this is in agreement with the colour and closer in melting point reported by Gomathi *et al.*, [8].

The reaction between synthesized Schiff base and hydrated metal chloride salt of Zn(II) and Co(II) formed complexes with different physical and chemical properties; such as colour, decomposition temperature and elemental compositions (Table. 1), the formation of colours may be due to d-d transition as well as charge transfer as reported by Nagesh and Mruthyunjayaswamy, (2014), while the difference in colour may be attributed to the nature of the ligand as reported by Akmal *et al.*, [1]. The decomposition temperature of the complexes fall in the range of 237 - 264 °C respectively (Table. 1), these high decomposition temperature indicated the good stability of the complexes due to coordination between the Schiff base and the metal ion and their high molecular weight as reported by Anu *et al.*, [4]. Also the elemental analysis data revealed slight differences between the calculated and observed percentage values of CHN respectively (Table. 1), these values are in good agreement with the proposed formulae of the prepared compound.

The synthesized Schiff base and its corresponding metal complexes are soluble in some common organic solvents such as acetone, chloroform, Dimethylsulfoxide, Dimethylformamide, slightly soluble in ethanol and methanol and insoluble in water and Diethyl-ether (Table 2), as reported in similar work by Ibrahim *et al.*, [9].

The values obtained in the spectrum of the Schiff base showed a band at 3335 cm^{-1} which may be assigned to the $\nu(\text{-OH})$ stretching vibration, which disappeared on complexation, indicating the coordination of the Schiff base with the metal ion through phenolic oxygen, another band appeared at 1611 cm^{-1} which is assigned to $\nu(>\text{C}=\text{N}-)$ stretching vibration and this band shifted to another regions in the range of (1599 – 1607 cm^{-1}) in the spectra of corresponding metal complexes respectively (Table. 3), also indicating the coordination of the Schiff base with the metal ion through azomethine nitrogen atom. The new bands appeared in the spectra of the complexes in the regions range (589 – 604 cm^{-1}) and (459 – 489 cm^{-1}), these bands are assigned to $\nu(\text{M-N})$ and $\nu(\text{M-O})$ stretching vibration respectively, (Table. 3) also indicating the coordination of the Schiff base to the metal(II) ion as in the similar work reported by Basim *et al.*, [5].

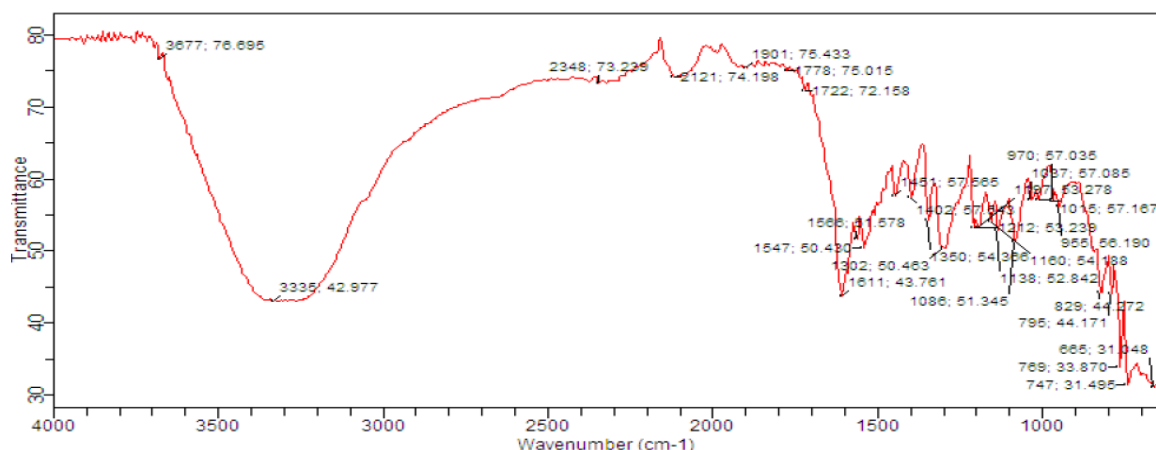


Figure 3: IR Spectrum of Schiff base

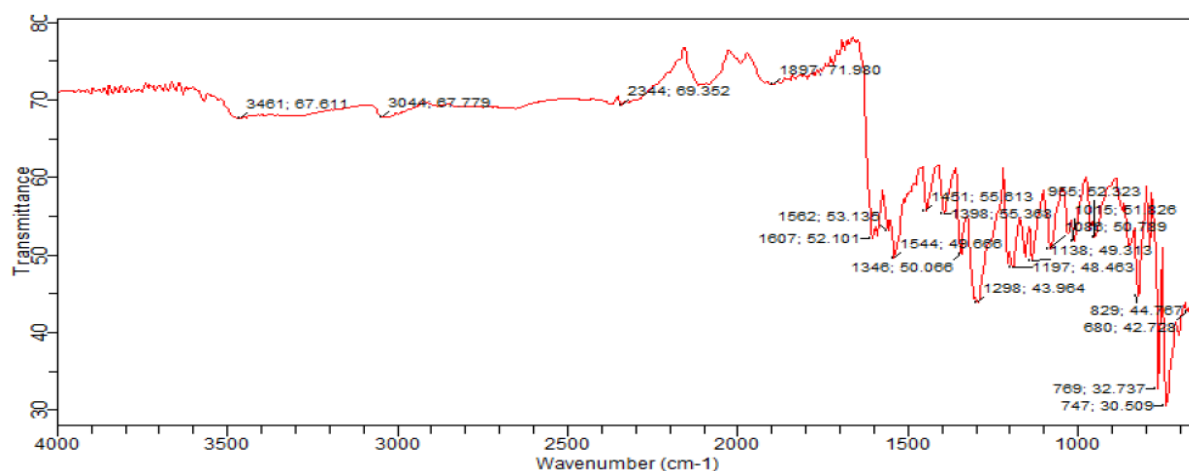


Figure 4: IR Spectrum of Zn(II) metal complex

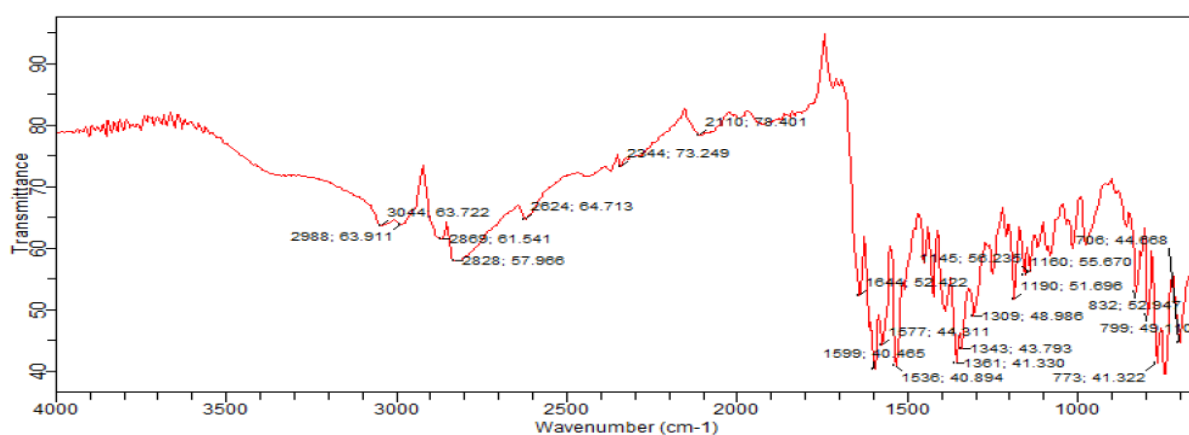


Figure 5: IR Spectrum of Co(II) metal complex

The molar conductance values range ($7.29 - 8.12 \Omega^{-1}\text{cm}^2\text{mol}^{-1}$) indicated non electrolytic nature of the synthesized complexes. (Table 4) the values obtained are in line with the values reported by Wasan et al., [18] in similar work.

The values obtained from magnetic susceptibility measurement of the complexes at room temperature indicated that the Zn(II) complex with magnetic moment (-Ve BM) as diamagnetic while Co(II) complex with (4.19 BM) as paramagnetic (Table 5)

The electronic spectra of the synthesized Schiff base and its corresponding metal complexes were carried out in DMSO using Perkin Elmer UV-Vis Spectrophotometer Lambda-35, and the result is shown in (Table 6), The electronic Spectrum of the Schiff base revealed an absorption bands at 214nm and 338nm which may be assigned to $\pi \rightarrow \pi^*$ and $n \rightarrow \pi^*$ transitions of benzene and azomethine group respectively. These absorption bands shifted to another bands in the spectra of the metal complexes in the ranges (219 – 222 nm) and (321 – 323 nm) which may be assigned to $\pi \rightarrow \pi^*$ and $n \rightarrow \pi^*$ indicating coordination of the metal ion to the Schiff base. Another absorption bands appeared in the spectra of the metal complexes at 381 nm which may be assigned to the ligand-metal charge transfer LMCT, also revealed the coordination of metal ion to Schiff base ligand.

The antimicrobial activity of the synthesized Schiff base and its corresponding metal complexes was conducted in DMSO using agar well diffusion method against two pathogenic bacterial strains (*Salmonella typhi* and *Streptococcus pneumoniae*) and two fungal isolates (*Aspergillus fumigatus*

and *Rhizopus stolonifer*). The diameter of the inhibition zones were measured and recorded as shown in Fig. 1 and 2. The results revealed that the Schiff base and its metal complexes possessed moderate antimicrobial activity against the tested organisms when compared with the standard drugs; (Gentamycin and Nystatin). The metal complexes showed higher activity than free ligand, which may be due to chelation processes, that shows the rises in the lipophilicity of the metal complexes by increasing the delocalization of π electron over full chelates ring. The improved lipophilicity help the metal complex to easily penetrate into the lipid membrane and block the metal binding sites of the enzymes of microorganism, and this may affect the protein synthesis and further growth of organisms by inhibiting the respiration process of the cell, as reported similarly by Matangi *et al.*, [18].

5.0. Conclusion

The Schiff base derived from 2-hydroxyl-1-naphthaldehyde and 1-naphthylamine and its corresponding Zn(II) and Co(II) complexes were synthesized and characterized successfully. The molar conductance values range ($7.29 - 8.12 \Omega^{-1}\text{cm}^2\text{mol}^{-1}$) indicated non electrolytic nature of the complexes. The Zn(II) complex was found to be diamagnetic while the Co(II) complex was found to be paramagnetic. The FTIR and elemental analyses results revealed 1:2 metal-ligand ratios in all the complexes. Both the Schiff base and its corresponding metal complexes were revealed to have moderate antimicrobial activity.

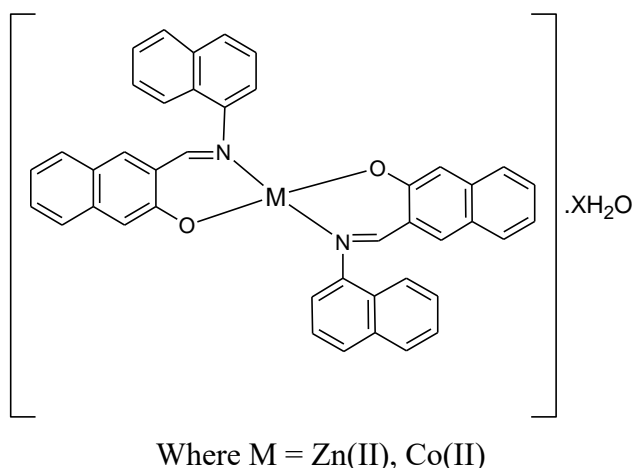


Figure 6. Proposed Structure of Metal Complexes

REFERENCES

- [1] Akmal, S. G., Mohsen, S. A., Atiat, S. B. and Said, M. T. (2007). Synthesis, characterization and biological activity of some platinum (II) complexes with Schiff bases derived from salicylaldehyde, 2-furaldehyde and phenylenediamine, *Spectrochimica Acta Part A* 67: 114 – 121.
- [2] Amir, A., Mohammad, H. and Hadi, K. (2012). Schiff base derivatives: A short review, *world applied programming journal*, 2 (11): 472 – 476. ISSN: 2222-2510. www.waprogramming.com
- [3] Anita, B., Dominick, C., Tomislav, F., Branko, K. and Vladimir, S. (2010). Schiff bases derived from hydroxyaryl aldehydes: molecular and crystal structure, tautomerism, quinoid effect, coordination compounds, *Macedonian journal of chemistry and chemical engineering*. vol. 29, (2): 117 – 138.

- [4] Anu, D., Naveen, P., Rath, N. P. and Kaveri, M. B. (2020). Palladium (II) complexes containing substituted thiosemicarbazones. Synthesis spectral characterization X-ray crystallography biomolecular interactions and *in vitro* cytotoxicity, *Journal of Molecular Structure* <https://doi.org/10.1016/j.molstruc.2020.127703>.
- [5] Basim, H. A., Mohammed, M. H. and Ahmad, H. I. (2019). New complexes of chelating Schiff base: Synthesis, spectral investigation, antimicrobial, and thermal behavior studies, *Journal of Applied Pharmaceutical Science*. 9, (04): 045 – 057.
- [6] Chaudhary, N. K. (2013). Synthesis and medicinal use of Metal Complexes of Schiff bases, *a Journal of Science, Technology and Mathematics*, 9 (1): 75 - 80..
- [7] Gomathi, V., Selvameena, R., Subbalakshmi, R. and Valak, M. (2013). Synthesis, spectral characterization and antimicrobial screening of Mn(II) and Zn(II) complexes derived from (E)-1-(P-tolylimino)methylnaphthalene-2-ol) *Oriental journal of chemistry and pharmaceutical sciences*, 29 (2): 533 – 538.
- [8] Gomathi, V. and Selvameena, R. (2014). Synthesis, spectral characterization and antimicrobial screening of novel Schiff bases from sulfa drugs, *International journal of pharmacy and pharmaceutical sciences*, 6(1): 3 – 12.
- [9] Ibrahim, A. K., Yusuf, B. A. and Hamisu, A. (2017). Synthesis, characterization and antimicrobial studies of Cu(II) and Zn(II) complexes with the schiff base N-salicylidene-4-chloroaniline, *Chemsearch journal*, 8(2): 68 – 74.
- [10] Iniama, G. E., Isaac, T. I. and Samson, O. O. (2015). Antimicrobial studies of synthesized Zn(II) schiff base complexes of L-arginine-2-hydroxy-1-naphthaldehyde and glycine-2-hydroxy-1-naphthaldehyde. *International journal of scientific and technology research*, 4 (8):
- [11] Matangi, S., Pragathi, J., Ushaiah and Gyanakumari, C. (2012). Synthesis, structural characterization, molecular modeling and antimicrobial studies of transition metal complexes of Schiff base ligand derived from 5-chlorosalicylaldehyde and 2-(2-aminophenyl) 1H-benzimidazole, *Journal of chemical and pharmaceutical research*, 2012, 4 (3): 1553 – 1561.
- [12] Muzammil, K., Trivedi, P. and Khetani, D. B. (2015). Synthesis and characterization of schiff base m-nitro aniline and their complexes, *Research journal of chemical sciences*, 5 (5): 52 – 55.
- [13] Nasira, N. S., Rashmi, S., Kabita, S., Rahul, G., Shankerdutt, P., Satu, T. C. and Chavan, R. P. (2016). Synthesis, characterization of some schiff bases derived from phenylhydrazine, *International journal of chemical studies*, 4 (1): 109 – 111.
- [14] Nagesh, G. Y. and Mruthyunjayaswamy, B. M. (2014). Synthesis characterization antimicrobial DNA cleavage and *in vitro* cytotoxic studies of some metal complexes of Schiff base ligand derived from thiazole and quinoline moiety, Hindawi publishing Corporation bioinorganic chemistry and applications Volume 2014, Article ID 314963, 17 pages <http://dx.doi.org/10.1155/2014/314963>.
- [15] Neelofar, N. A., Adnan K., Salma, A., Noureen, A. K. and Muhammad, B. (2017). Synthesis of schiff bases derived from 2-hydroxy-1-naphthaldehyde, and their Tin(II) complexes for antimicrobial and antioxidant activities, *Bull. chem. soc. ethiop.* 31 (3): 445 - 456.
- [16] Obonga, O., Philip, F.U., Emmanuel, O.E., Sampson, N.D. (2017). Comparative Phytochemical, Antioxidant and Antimicrobial Properties of Ficus capensis, Aristolochia ringens, Albizia zygia and Lannea welwitschii Wilfred. *Univ. J. Pharm.* 16(2): 147 - 15
- [17] Rajendra, A. P., Mishra, A. T and Gupta S. K. (2012). Microwave synthesis, spectral, thermal and antimicrobial activities of Co(II), Ni(II) and Cu(II) schiff base metal complexes, *Research Article-018*, 12 (2): 22 – 31.
- [18] Wasan, M. A. (2018), Synthesis characterization and corrosion inhibition study of two Schiff base ligands derived from urea and thiourea and their complexes with Cu(II) and Hg(II) ions, *J. phys. conf. ser.* 4 (2):15 -24. DIO: 1003 012017

EXAMINATION OF CERVICAL AND LUMBAR REGION PAIN SEVERITY, MUSCLE STRENGTH, RANGE OF MOTION AND QUALITY OF LIFE IN INDIVIDUALS WITH COVID-19**Betül KÖSE**

Antalya Bilim University, Institute of Postgraduate Education, Department of Physiotherapy and Rehabilitation, Antalya, Turkey

ORCID ID: <https://orcid.org/0009-0008-4514-6501>

Yıldız ERDOĞANOĞLU

Antalya Bilim University, Faculty of Health Science, Department of Physiotherapy and Rehabilitation, Antalya, Turkey

ORCID ID: <https://orcid.org/0000-0002-9909-6561>

Abstract

Purpose: This study was planned to determine the difference in cervical and lumbar pain severity, muscle strength, range of motion and quality of life between individuals who have and have not had Covid-19.

Method: In this cross-sectional study, a total of 48 individuals, 24 Covid-19 survivors and 24 non-survivors, aged 18-45 years, two years after the normalization process, were included. After obtaining the sociodemographic characteristics of the participants, pain severity was assessed by Visual Analog Scale, cervical and lumbar muscle strength was assessed by Microfet-2 digital hand dynamometer, cervical range of motion was assessed in six different positions (flexion, extension, right lateral flexion, left lateral flexion, right rotation, left rotation) and lumbar range of motion was assessed in four different positions (flexion, extension, right lateral flexion, left lateral flexion) by universal goniometer. The quality of life of the participants was evaluated with the Short Form-36 questionnaire.

Results: As a result of the study, there was a significant difference between the groups in terms of pain severity ($p: 0.013$) and range of motion ($p<0.05$) in individuals who had Covid-19 and those who did not have Covid-19, while there was no significant difference between the scores of muscle strength and quality of life ($p>0.05$).

Conclusion: When we examined the results of the study; it was seen that there was a difference in terms of pain severity and range of motion in individuals who had Covid-19 and those who did not have Covid-19, but there was no significant difference in terms of muscle strength and quality of life. It is thought that there may have been significant improvements in the physical capacity and quality of life of these individuals with the normalization process.

Keywords: Covid-19, Pain Severity, Muscle Strength, Range of Motion, Quality of Life.

REGULATION ON PHARMACISTS AND PHARMACIES IN TURKEY FROM PAST TO PRESENT**DÜNDEEN BÜGÜNE ECZACILAR VE ECZANELER HAKKINDA KANUN****Uzm. Ecz. Deniz Özler KIRAL**

Institute of Health Sciences, Ankara University, Ankara, Turkey

ORCID ID: <https://orcid.org/0009-0000-0771-5875>**Prof. Dr. Gülbin ÖZÇELİKAY**

Institute of Health Sciences, Ankara University, Ankara, Turkey

ORCID ID: <https://orcid.org/0000-0002-1580-5050>**Abstract**

Introduction: The legislation regarding pharmacists and pharmacies has evolved over the years, undergoing changes and improvements. In this study, regulations concerning pharmacy services will be examined chronologically, evaluating developments and shortcomings.

The first legal regulation concerning pharmacy services in Turkey was published under the name "Regulation on Pharmacists and Pharmacies" in the official gazette dated November 6, 1927, with number 964. The provisions of Law No. 5320, issued additionally to Law No. 964, were abolished with the enactment of Law No. 6197 on December 18, 1953, which was published in the official gazette numbered 8591 on December 24, 1953.

Law No. 6197 on Pharmacists and Pharmacies has been subject to updates through various provisions added or removed on January 23, 2008, May 17, 2012, January 2, 2014, November 6, 2014, and most recently on February 21, 2024.

Some notable points between Law No. 964 and its amendments and Law No. 6197 are as follows: While the definition of pharmacy was not provided in Law No. 964, Law No. 6197 introduced a definition of pharmacy, which was further expanded in the 2012 amendment. The population-based criteria for pharmacies changed from one pharmacy per 10,000 people in the 1927 Law to one pharmacy per 3,500 people in the 2012 amendment. The requirement for financial capability to open a pharmacy, present in Law No. 964, was removed in Law No. 6197. The distance requirement between pharmacies, present in Law No. 964, was eliminated in Law No. 6197. The requirement for pharmacy work experience to open a pharmacy decreased from 2 years in Law No. 964 to 1 year in the 2012 amendment of Law No. 6197. The concept of "muvazaa" (sham transaction) was not included in Law No. 964 but was introduced in Law No. 6197 with the 2012 amendment. The concepts of "second pharmacy" and "assistant pharmacist" were not present in Law No. 964 but were included in Law No. 6197 with the 2012 amendment.

Results: In conclusion, alongside positive aspects, there are also some shortcomings in the regulations made parallel to the development of pharmacy and pharmacies. For instance, while the inclusion of regulations regarding "muvazaa" in 2012 is a positive development, it is a delayed regulation. The delayed imposition of sanctions allowed pharmacies involved in sham transactions

to operate, becoming one of the significant problems in the pharmacy profession. Although regulations regarding the number of pharmacies per population were initially present but later removed, they were reintroduced in 2012 to curb the increasing number of pharmacies. However, this rule sometimes led to exorbitant prices for pharmacy transfers, creating inequality of opportunity for new graduate pharmacists to open pharmacies. It is considered appropriate to regulate prices for pharmacy transfers. The most positive development is the regulation regarding Second Pharmacist and Assistant Pharmacy, which facilitates pharmacist employment and allows for an increase in the number of pharmacists in pharmacies. This regulation also enables patients to receive pharmacist consultancy services in pharmacies.

Key Words: Regulation, Pharmacists, Pharmacies

Özet

Bu çalışmada, eczacılık ve eczaneler ile ilgili bu düzenlemeler, kronolojik olarak ele alınacak ve gelişmeler, eksiklikler değerlendirilecektir. Eczacılar ve eczanelerin uyması gereken mevzuat yıllar içinde değişikliklere uğrayarak geliştirilmiştir.

Türkiye’de eczacılık hizmetleri ile ilgili ilk kanuni düzenleme 06.11.1927 tarihli resmi gazetede 964 sayılı Eczacılar ve Eczahaneler Hakkında Kanun adı altında yayınlanmıştır. 964 sayılı Kanun’la buna ek olarak çıkarılan 5320 sayılı Kanun hükümleri 18.12.1953 Kabul tarihli 6197 No’lu Eczacılar ve Eczaneler hakkında Kanun’un yürürlüğe girmesiyle kaldırılmış olup, bahsi geçen Kanun, 24.12.1953 tarih ve 8591 sayılı Resmi Gazete’de yayınlanmıştır.

6197 Sayılı Eczacılar ve Eczaneler Hakkında Kanun, 23/01/2008, 17/05/2012, 02/01/2014, 06/11/2014 ve son olarak 21/02/2024 tarihlerinde çeşitli hükümler eklenmek ya da çıkarılmak suretiyle güncellemelere tabi tutularak son şeklini almıştır.

Yukarıda tarihsel gelişimi özetlenen 964 sayılı Kanun ve güncellemeleriyle 6197 sayılı Kanun arasında dikkat çeken bazı hususlar şu şekildedir. Eczacılığın tanımı 964 sayılı Kanun’da yapılmamışken, 6197 sayılı Kanun’da eczacılığın tanımı yapılmış, 2012 yılında yapılan güncellemeyle tanım genişletilmiştir. Nüfusa yönelik kriter, 1927 yılında çıkan 964 sayılı kanunda 10 bin kişiye 1 eczane olacak şekilde düzenlenmişken, 6197 sayılı Kanun’da 2012 yılında yapılan düzenlemeyle 3500 kişiye bir eczane olacak şekildedir. 1927 sayılı Kanunda eczane açmak için mali güce sahip olmak gerekirken, 6197 sayılı Kanunda böyle bir zorunluluk yoktur. Eczaneler arasında mesafe şartı 964 sayılı Kanun’da yer alırken, 6197 sayılı Kanun’da böyle bir şart yoktur. Eczane açmak için eczanede çalışma süre şartı 964 sayılı Kanunda 2 yılken, 2012 yılında yapılan güncelleme ile 6197 sayılı Kanunda bu süre 1 yıl olarak belirlenmiştir. Muvazaa hususuna 964 sayılı Kanunda yer verilmemişken, 2012 yılında yapılan güncelleme ile 6197 sayılı Kanunda yer verilmiştir. İkinci eczacılık ve yardımcı eczacılık kavramları 964 sayılı Kanun’da yer almıyorken, 2012 yılında yapılan güncelleme ile 6197 sayılı Kanunda yer almıştır. Bunların yanı sıra; reçete karşılığında verilmesi gereken ilaçların reçetesiz verilmesi ve toptan satışın yasak olması, eczanelerin yılda en az iki defa teftiş edilmesi, hastalık ve sair suretlerle eczanesinden ayrılan eczacının ayrılış süresinin on beş günü aşması halinde diplomalı bir eczacının mesul müdür olarak atanması gerektiği gibi hususlar her iki Kanun’da da yer almıştır.

Sonuç olarak, eczacılık ve eczanelerin gelişimine paralel olarak yapılan düzenlemelerin olumlu yanları yanında bazı eksiklikler de bulunmaktadır. Örneğin muvazaa ile ilgili düzenlemenin 2012 yılında yer alması olumlu bir gelişme olmakla birlikte gecikmiş bir düzenlemedir. Zira yaptırımın bu kadar gecikmiş olması muvazaalı eczanelerin açılıp, faaliyet göstermesine sebep olmuş, bu durum eczacılık mesleğinin en önemli sorunlarından biri haline gelmiştir. Nüfusa göre eczane sayısının düzenlenmesi ilk çıkan Kanunda yer almışken sonradan kaldırılmış, 2012 yılında yapılan düzenlemeyle yeniden getirilmiştir. Bu kural artan eczane sayısına bir önlem olarak getirilmiştir. Ancak bu durum, kimi zaman eczane devirlerinin fahiş fiyatlara gerçekleşiyor

olmasına sebep olmuş, yeni mezun eczacıların eczane açmasında fırsat eşitsizliğine sebep olmuştur. Eczane devirlerinde fiyat düzenlemesinin yapılmasının uygun olacağı düşünülmektedir. Olumlu gelişmelerden en önemlisi, İkinci eczacılık ve yardımcı eczacılık ile ilgili düzenlemedir. Bu düzenleme ile eczacı istihdamına olanak sağlanmış ayrıca eczanede eczacı sayısının artmasıyla hastanın eczacı danışmanlığı hizmeti almasına da olanak sağlanmıştır.

Anahtar Kelimeler: Eczane, Eczacı, Kanun

GİRİŞ VE GELİŞME

Bu çalışmada, Türkiye’de eczacılar ve eczaneler hakkında yayınlanan kanuni düzenlemelerin tarihsel gelişimine yer verilmiştir.

06.11.1927 Tarih ve 964 Sayılı Kanun

Türkiye’de eczacılık hizmetleri ile ilgili ilk kanuni düzenleme 06.11.1927 tarihli resmi gazetede 964 No’lu Eczacılar ve Eczahaneler Hakkında Kanun adı altında yayınlanmıştır. Bahsi geçen Kanun; Eczacılar, Eczaneler, Ecza ve Kimyevi Maddeler, Teftiş, Ceza ve Müteferrik maddeler olmak üzere altı bölümden oluşmuştur.

Eczacılar başlıklı ilk bölümde; kimlerin eczane açıp işletebileceği, eczane açmak için istenilen belgeler ve başvurulacak resmi makam, verilen izin ve ruhsatnamenin hangi hallerde geri alınacağı belirtilmiştir. Vefat eden eczacının eczanesinin mesul müdürle idare edilme şartları, eczanelerin satın alınması, devri ve nakli ile ilgili izlenecek yollar, eczanelerin ve ecza dolaplarının açılma şartları konularına değinilmiştir. Yine bu bölümde; eczane açmak için, eczacılık okulu bitirmek ve memleket dahilinde açılmasına izin verilmiş olan eczanelerden birinde iki sene müddetle çalışmış olmak mecburiyeti, ayrıca bir eczane açmak ve idare etmek için mali güce sahip bulunduğu dair bir belgenin de istenilen belgeler arasında yer aldığı konularına değinilmiştir.

Eczaneler başlıklı ikinci bölümde; eczanelerin adedinin mahallin nüfusuna göre tespit edileceği, on bin nüfusa bir eczane olacak şekilde eczanelerin açılabilmesi, bir mahallin ihtiyacı, nüfusu on binden aşağı mahalde bir ikinci eczane açılmasına lüzum gösterir ise mahallinin teklifi üzerine izin verilebileceği hususlarına değinilmiştir. Ayrıca eczaneler arasında uygun mesafe bulunması hususuna da söz konusu Kanun’un yirminci maddesinde değinilmiştir. Yirminci maddede; her şehir ve kasabada açılacak eczane adedinin ve açılacak bölgelerin, o şehir ve kasabanın coğrafi vaziyetine ve nüfus dağılımına göre projelendirileceği ve şimdiki adıyla Sağlık Bakanlığı tarafından onaylanacağı hükmüne yer verilmiştir. Her mahalde yapılacak bölümlendirmede nüfus adedine göre fazla miktarda olan eczane, belirlenen eczane adedine ininceye kadar, yeniden eczane açılmasına izin verilmeyeceği gibi devrine ve satılmasına veya sair suretlerle kapatılmış olanların tekrar açılmasına da izin verilmeyecek olduğu hükmedilmiştir. Kanunun yürürlüğe girmesinden itibaren bir sene içinde bir şehir veya kasaba dâhilinde mevcut eczane sayısı belirlenen sayıya inmezse, yirminci maddede tarif olunan kroki ve dağılıma nazaran fazla görülen eczanelerden açılma tarihi itibarıyla en eskisi bırakılıp, başkalarının diğer mahallere nakledileceği hükmü de bu bölüm altında ifade edilmiştir.

Ecza ve kimyevî maddeler başlıklı üçüncü bölümde; reçete karşılığında verilmesi gereken ilaçların reçetesiz satışının, zehirli ve etkili maddelerin toptan satışının yasak olduğu hususlarına yer verilmiştir. Ayrıca, eczanede hangi reçetelerin yapılacağı, reçetelerin hazırlanışı, eczacının reçete hazırlamadaki sorumlulukları ve reçete kayıtlarının onaylı deftere yapılması gerektiği, eczanelerde ecza ve kimyevi maddelerle, tuvalet eşyasından başka eşyanın bulunmaması gerektiği hususları hükme bağlanmıştır.

Teftiş başlıklı dördüncü bölümde; eczanelerin senede iki, lüzum görülürse daha fazla teftişe tabi olduğu, teftişin kimler tarafından yapılacağı, teftiş sırasında bozuk, mağşuş veya gayrisaf ecza ve kimyevî maddelerin tespiti durumunda izlenecek yol ifade edilmiştir.

Cezalar başlıklı beşinci bölümde; eczanelerde tespit edilen bozuk ve mağşuş veya gayrisaf ilaçlarla, ruhsatsız müstahzarlar hakkında yürütülecek işlem tarif edilmiştir. Eczanesinde iki defa bozuk, mağşuş veya gayrisaf ecza ve kimyevî maddeler bulundurduğu tespit edilen ve teftiş esnasında görülen noksanların tamamlanması için iki defa yapılan ihtara riayet etmeyen eczacının eczanesinin derhal kapatılmasına hükmedilmiştir.

Müsaadesiz eczane açan ve eczanesinden başka mahallerde ilaç yapan veya satan eczacıların eczanesinin kapatılacağı ve sanatını icradan men edilerek, ceza kanununa göre cezalandırılacağına yer verilmiştir. İlaçların ve zehirli ve kimyevî maddelerin müsaadesiz satılmasının yasak olduğu, bunları müsaadesiz satan ve satmak için olmasa bile eczanesinde bulunduran veya halkın girebileceği bir yerde bulunduran kimse eczacı değil ise bu eşyaya el konulacağı ve o kimse hakkında ceza kanununa göre işlem yapılacağı hükmedilmiştir.

Hangi hallerde para cezası uygulanacağı, eczanelerin hangi hallerde ne kadar süre ile kapalı kalacağı, kanunda bahsi geçen para cezaları ve hafif hapis cezaları ile bir seneye kadar hapis ve eczanelerin kapatılması ve eşyaya el konulması kararlarının verilmesinin sulh mahkemelerine ait olduğu bu bölümde ifade edilmiştir.

Müteferrik maddeler başlıklı son bölümde ise; Lozan barış anlaşmasına göre Türkiye’de eczacılık mesleğini yapma iznini almış yabancı eczane sahiplerinin bu kanunun hükümlerine uymak şartı ile sanatlarını icraya devam edeceği, yabancı ülke eczacılık okullarından diploma almış Türk uyruklu eczacıların Türkiye dahilinde açılmış eczanelerin birinde iki yıl süresince çalışmak şartı ile diplomalarının tasdik edileceğine hükmedilmiştir. Hastalık ve sair suretlerle eczanesinden ayrılan eczacının haber vermesi gereken yerler ve bu sürenin on beş günü aşması halinde diplomalı bir eczacının mesul müdür olarak atanması gerektiği de bu bölümde ifade edilmiştir.

Eczanelerin nöbet düzenlemeleri, bu kanunun yürürlüğe girmesinden üç ay sonra nüfusu on binden yüksek olan şehir ve kasabalarda tabiplerin eczane ve müstemilatlarında hasta kabul edemeyecekleri, eczacıların kendi mıntıklarında görev yapan tabiplerle ilgili bilgileri eczane içinde halkın görebileceği mahalle asması gerektiği belirtilmiştir. Bu kanunun yürürlüğe girmesinden itibaren iki sene içerisinde eczane sahip ve mesul müdürünün eczanesinin üstünde, bitişiğinde veya yakınında ikamet etmesi için gereken mahalli hazırlaması gerektiği, kalfa ve çıraklar için özel bir düzenleme yapılacağı, ilaç fiyatları hakkındaki düzenlemenin Sıhhiye vekâletince yapılacağı hususları hükme bağlanmış ve bu bölüm altında bahsedilmiştir.

1927 yılında düzenlenen ve yukarıda hükümleri özetlenen Kanun’un yürürlüğe girmesinden sonra 1949 yılında; eczanesi bulunmayan il, ilçe ve o dönemki Sağlık Bakanlığı’na belirlenen bucaklarda eczane açarak beş yıl süre ile çalışan ve yapılan teftişlerde iyi sicil almış eczacıların, Kanun’da belirtilen sınırlamalara uymaksızın istedikleri il ve ilçelerde eczane açmalarına müsaade edileceği hakkında hüküm, 07.02.1949 tarih ve 5320 sayılı Kanun ile yürürlüğe girmiştir. Bahsi geçen Kanun’da ifade edilen bucakların, bu kanunda görülen amaca uygun bir şekilde ve büyük şehirlerin belediye sınırları dışındaki ve bu şehirlerle kolayca münasebet temin edilemeyecek yerlerden olma şartı da ayrıca ifade edilmiştir.

18.12.1953 Tarih ve 6197 Sayılı Kanun

Yukarıda bahsi geçen 964 sayılı Kanun’la buna ek olarak çıkarılan 5320 sayılı Kanun hükümleri 18.12.1953 Kabul tarihli 6197 No’lu Eczacılar ve Eczaneler hakkında Kanun’un yürürlüğe girmesiyle kaldırılmış olup, bahsi geçen Kanun, 24.12.1953 tarih ve 8591 sayılı Resmi Gazete’de yayınlanmıştır.

6197 sayılı bu kanun altı bölümden oluşmuştur. Birinci bölümde; eczacılığın tanımı: “Eczacılık, eczane, ecza deposu, ecza dolabı, galenik, tıbbi ve ispençiyari mevat ve müstahzarat laboratuvarı veya imalâthanesi gibi müesseseler açmak ve işletmek veya tıbbi ve ispençiyari müstahzarat ihzar veya imal etmek veyahut bu kabil resmî veya hususi müesseselerde mesul müdürlük yapmaktır.” olarak yapılmıştır. Türkiye’de eczacılık yapabilmek için gereken vasıflar, yabancı ülkelerdeki eczacılık mektep veya fakültelerinden mezun eczacıların Türkiye’de eczacılık yapabilmeleri için ilmî hüviyetin ispatı veya imtihanın kazanılması şartı hükmü de bu bölümde ifade edilmiştir.

Eczacılar başlıklı bu bölümde eczacılık yapmaya mani haller sıralanmış, eczane açmak veya nakletmek için gereken belgelerin neler olduğu ve verilen ruhsatnamenin hangi hallerde geri alınacağı konularına yer verilmiştir. Ruhsatnamenin hangi hallerde geçersiz olacağı, vefat eden ya da hacredilen eczacının eczanesinin işletilmesi için gereken şartlar ve süreler, eczananın devri ile ilgili izlenecek yollar, mesul müdür atanmak şartıyla açılmasına izin verilecek hususi eczane ve ecza dolapların hangileri olduğu hususları bu bölümde açıklanmıştır.

Memur veya asker olan kimsenin eczane açamayacağı, bir eczananın mesul müdürlüğünü yapamayacağı, ancak tek eczanesi olan yerlerdeki eczanelere üç ayı aşmayan sürede nezaret edebileceği hususlarına yer verilmiştir. Bir eczane sahibi olup da askerlik hizmetini yapmak üzere silâh altına davet edilen veya milletvekili veya belediye başkanı seçilen eczacıların bu görevleri devam ettiği sürece eczanelerini bir mesul müdür marifetiyle idare edebileceği belirtilmiştir. Bir eczacının birden fazla eczane açması veya mesul müdürlüğünü üzerine almasının yasak olduğu, bir eczane sahibinin eczanesi dışında ilâç tertip edemeyeceği ve mesleki dışında bizzat ticaret yapamayacağı gibi öğretmenlikten ve seçimle elde edilen vazifelerden başka bir işi de kabul edemeyeceği de bu bölümde hükme bağlanmıştır.

Eczaneler başlıklı İkinci bölümde; eczanelerin kaç kısımdan oluşacağı, laboratuvarın vasıf ve şartları ve içerisinde bulunması gereken alet ve saire ve eczane hizmetlerinin Sağlık Bakanlığınca belirleneceği hususuna değinilmiştir.

Ecza ve Kimyevi maddeler başlıklı üçüncü bölümde; ecza ve kimyevi maddelerin Türk kodeksinde yazılı vasıf ve şartları taşıması gerektiği, ambalajları açılmış tıbbi ecza ve kimyevi maddelerin sâf olmamalarından ve iyi muhafaza edilmemelerinden eczane, ecza deposu ve laboratuvar sahipleri ve mesul müdürlerinin sorumlu olduğu belirtilmiştir. Reçeteye tabi ilaçların reçetesiz verilmesinin ve toptan satışının yasak olduğu, reçeteler hazırlanırken uyulacak kurallar ve eczacının sorumlulukları, eczanede satışına müsaade edilen eşyalar hususları hükme bağlanmıştır.

Teftiş başlıklı dördüncü bölümde; eczanelerin, ecza depolarının, ecza ticarethaneleri ve ecza imalathanelerinin ve laboratuvarlarının şimdiki adıyla Sağlık Bakanlığı’nın denetimine tabi olduğu en az iki defa teftişi mecburi olduğu gibi lüzum halinde sair zamanlarda da teftiş edilebileceği belirtilmiştir. Teftişin, sağlık müfettişleri veya sağlık müdürleri veya Sağlık ve Sosyal Yardım Vekâleti veya müdürlüğünce tensip edilecek resmi tabipler tarafından yapılacağı hususlarına değinilmiştir. Ayrıca, teftiş sırasında bozuk, mağşuş veya gayrisâf ecza ve kimyevi maddeler tespit edildiğinde izlenecek yol tarif edilmiştir.

Müteferrik hükümler başlıklı beşinci bölümde; hastalık ve sair mazeretlerle eczanesinden ayrılan bir eczacının bu ayrılış müddeti 24 saati aştığı takdirde izlenecek yol ifade edilmiştir. Ayrılış müddeti on beş günden fazla sürecekse eczane açık bırakılmak istenildiği takdirde bir mesul müdür tâyin etmenin mecburi olduğu hükme bağlanmıştır.

Eczanelerin nöbetlerinin, mahallin en yüksek sağlık âmirinin tensibiyle halkın ihtiyacını temin edecek surette tanzim olunacağı, tabiplerin eczaneye gelen veya getirilen kimselerin ilk tedavisinin yapılması haricinde eczanede hasta bakmasının yasak olduğu belirtilmiştir. Eczacıların eczaneleri mıntıkası içinde bulunan doktorların listesinin eczane içerisinde görünür bir mahale asmasının

mecbur olduğu, eczanede bulunan ilaçların fiyat tespitinin şimdiki adıyla Sağlık Bakanlığı tarafından yapılacağı hususlarına beşinci bölümde değinilmiştir.

Cezalar başlıklı altıncı bölümde; usule uygun olarak ruhsatname almaksızın faaliyet gösteren uygulanacak cezalar, yine bu kanunda bahsi geçen yerlerde ambalajsız veya ambalajı açılmış olarak bozuk veya zamanı geçmiş veya mağşuş veya gayrisafi ilaç ile ambalajlı olsa bile zamanı geçmiş ilaç bulunduğu takdirde uygulanacak cezalar tarif edilmiştir. Zehirli veya kimyevi maddelerle tıbbi ecza ve müstahzarların müsaadesiz satılmasının yasak olduğu belirtilmiş, bunları müsaadesiz satan veya satmak üzere dükkânında bulunduranlar hakkında uygulanacak işlem ifade edilmiştir. Yine bu kanundaki yasak ve mecburiyetlere muhalif hareket edenlere uygulanacak cezai işlem ve eczanesini işletmeye başladıktan sonra mazeretsiz olarak ve mücbir sebepler dışında eczanesini kapalı bırakanlara uygulanacak cezai işlem ifade edilmiştir.

964 sayılı kanunda bahsi geçen, eczanelerde hasta kabul ve muayene eden doktorların, bu kanunun yayım tarihinden itibaren bir ay içinde muayenehanelerini eczane dışına nakle mecbur olduğuna yer verilmiştir. Lozan Barış Anlaşmasına göre Türkiye'de eczacılık yapma izni almış olan eczane sahibi yabancı eczacıların bu kanun hükümlerine riayet etmek şartıyla sanatlarını icraya devam edeceği Kanunun geçici maddelerinde belirtilmiştir.

6197 Sayılı Kanun'daki Güncellemeler

6197 Sayılı Eczacılar ve Eczaneler Hakkında Kanun, 23/01/2008, 17/05/2012 ve 02/01/2014 tarihlerinde de çeşitli hükümler eklenmek ya da çıkarılmak suretiyle güncellemelere tabi tutulmuştur.

23/01/2008 tarihinde yapılan değişikliklerle; Kanun'un 4. maddesindeki eczacılık yapmaya mani haller güncellenmiş, yine Kanun'un 6. Bölümünde yer alan Cezalar başlığı altındaki 40., 41.,42.,43.,44., ve 45. maddelerinde yapılan değişikliklerle, ruhsatname almaksızın eczane açma halinde, ambalajsız veya ambalajı açılmış olarak bozuk veya zamanı geçmiş veya mağşuş veya gayrisaf ilaç ile ambalajlı olsa bile zamanı geçmiş ilaç bulundurma durumunda, eczanelerde ilaç halinde ihzar, imal veya tertip edilmemiş olan bozuk veya mağşuş ecza ve kimyevi maddeler bulunması halinde, zehirli veya kimyevi maddelerle tıbbî ecza ve müstahzarların müsaadesiz satılması halinde, Kanun'a aykırı hareket edildiği durumlarda, eczanesini mazeretsiz olarak ve mücbir sebepler dışında kapalı bırakan veya teftiş sırasında görülen noksanların tamamlanması için yapılmış ihtarlara riayet etmeyen eczacıların tespit edilmesi halinde uygulanacak ceza yaptırımlarının güncellenmesi sağlanmıştır.

17/05/2012 tarihinde yapılan değişikliklerle; Kanun'un 1. maddesindeki eczacılığın tanımı ayrıntılı olarak açıklanmış, Kanun'un 5. maddesi ile nüfusa göre eczane açma kriteri getirilmiş, üç bin beş yüz kişiye bir eczane olacak şekilde düzenleme yapılmıştır. Eczane açmak isteyen eczacıların yerleştirilirken tabi tutulacakları puanlama sistemi açıklanmış, eczane açılacak yerlerin duyurulması ve müracaatın nasıl olacağı belirtilmiştir. Ayrıca, ikinci eczacı çalıştırma zorunluluğu ile eczane açmak için bir yıl süre ile yardımcı eczacı olarak çalışma zorunluluğu ile ilgili hükümler ve ikinci eczacı ile yardımcı eczacı ücretlerinin ne olacağı bu maddede belirtilmiştir. Yine Kanun'un 6. maddesi ile muvazaa yaptığı tespit edilen eczacılara uygulanılacak ceza hususuna değinilmiş, 17. maddede yapılan değişikliklerle eczaneye hangi hallerde mesul müdür atanacağı hususlarına değinilmiştir. 26. maddede eczanede karşılanan reçetelerin kaydı ile ilgili husus, 28. maddede eczanelerden satılabilecek ürünler ayrıntılı olarak belirtilmiş, 35. maddede ise eczacıların görevi başında olma zorunluluğu ile mazerete binaen görevi başında olmama durumunda ise uygulanacak mesul müdür atama durumuna yer verilmiştir. Bunun yanı sıra, eczanelerin iki yıla kadar kapalı kalabileceği hususu da bu maddede yer almıştır. Geçici Madde 3 ile de eczane açma ile ilgili haklar konusuna değinilmiş. Kanun maddesinin yürürlüğe girdiği takvim yılında eczane açma hakkına

sahip eczacılar, eczacılık fakültesinde okumakta olan öğrenciler ile eczanesi var olan eczacılara eczane açma, nakletme ve devretme konularında tanınan haklar belirtilmiştir.

Son olarak 6197 Sayılı Kanun, 02/01/2014 tarihinde güncellenmiştir. Bu güncellenme ile de ilaçların eczanelerden toptan satılamayacağı, hangi hallerin toptan satış sayılmayacağı ve eczanelerin ihalelere giremeyeceği yer almıştır. İlaç Takip Sistemi (İTS) bildirim zorunluluğu, ilaçların internet ve elektronik ortamda satılamayacağı, eczane eczacıları ve eczaneler adına internet sitesi açılmayacağı belirtilmiştir. Eczacıların, reçete yönlendirmesi amacıyla kurumlar, hekimler, diğer sağlık kurum ve kuruluşları veya üçüncü şahıslar ile açık veya gizli iş birliği yapamayacağı, simsar, kurye elemanı ve benzeri yönlendirici personel bulunduramayacağı, reçete toplama veya yönlendirme yapamayacağı, bu yollarla gelen reçeteleri kabul edemeyeceği 24. maddede yer almıştır.

SONUÇ

Türkiye’de eczacılar ve eczaneler ile ilgili yasal düzenlemeler genel itibarıyla Eczacılar, Eczaneler, Eczacılar ve Kimyevi Maddeler, Teftiş, ve Ceza başlıkları altında yer almıştır. Mevzuata yönelik dikkat çeken bazı hususlar aşağıda özetlenmiştir.

Konu	06.11.1927 tarih ve 964 sayılı Kanun	18.12.1953 tarih ve 6197 sayılı Kanun
Nüfusa yönelik kriter	10.000 kişiye 1 eczane	(17.05.2012 tarihindeki güncelleme) 3.500 kişiye 1 eczane
Eczane açmak için mali güce sahip olmak	Yer almaktadır.	Yer verilmemiştir.
Eczaneler arası mesafe şartı	Asgari münasip bir mesafe	Yer verilmemiştir.
Eczane açmak için eczanede çalışma süre şartı	2 yıl	(17.05.2012 tarihindeki güncelleme) 1 yıl
İkinci eczacılık / Yardımcı eczacılık	Yer verilmemiştir.	(17.05.2012 tarihindeki güncelleme) Yer almaktadır.
Muvazaa	Yer verilmemiştir.	(17.05.2012 tarihindeki güncelleme) yer almaktadır.
Eczacılığın tanımı	Yer verilmemiştir.	Yer almaktadır (17.05.2012 tarihli güncelleme ile tanım genişletilmiştir.)
Reçete karşılığında verilmesi gereken ilaçların reçetesiz verilmesi ve toptan satışın yasak olması	Yer almaktadır.	Yer almaktadır.
Eczanelerin yılda en az iki defa teftiş edilmesi	Yer almaktadır.	Yer almaktadır.
Yapılan teftiş sonrasında iki ihtara rağmen noksanların giderilmemesi neticesinde uygulanılacak cezai müeyyide	Kapama cezası	İdari para cezası
Yabancı ülke eczacılık okullarından diploma almış Türk uyruklu eczacıların Türkiye'de eczacılık yapma şartı	Türkiye'de faaliyet gösteren bir eczanede iki yıl çalışma şartı ile diplomaları tasdik olunur.	İlmî hüviyetin ispatı veya imtihanın kazanılması şartı ile diplomaları tasdik olunur.
Hastalık ve sair suretlerle eczanesinden ayrılan eczacının ayrılış süresinin on beş günü aşması halinde diplomalı bir eczacının mesul müdür olarak atanması gerektiği	Yer almaktadır.	Yer almaktadır.
Eczacının eczanesinin üstünde, bitişiğinde veya yakınında ikamet etmesi	Yer almaktadır.	Yer verilmemiştir.

KAYNAKLAR

- https://www5.tbmm.gov.tr/tutanaklar/KANUNLAR_KARARLAR/kanuntbmmc005/kanuntbmmc005/kanuntbmmc00500964.pdf
- <https://www.resmigazete.gov.tr/arsiv/7129.pdf>
- <https://www.resmigazete.gov.tr/arsiv/8591.pdf>
- <https://www.resmigazete.gov.tr/arsiv/8660.pdf>
- <https://www.resmigazete.gov.tr/eskiler/2012/05/20120531-3.htm>
- <https://www.resmigazete.gov.tr/eskiler/2014/11/20141114-3.htm>

LOCAL SUCRALPHATE APPLICATION IN A CASE OF PERSISTENT ANORECTAL ABSCESS FISTULA**İNATÇI ANOREKTAL APSELİ FİSTÜL OLGUSUNDA LOKAL SUKRALFAT UYGULAMASI****Ali KARABULUT**

Siirt Eğitim ve Araştırma Hastanesi Genel Cerrahi Kliniği, Siirt, Türkiye

ORCID ID: <https://orcid.org/0000-0001-669-2152>**Betül GÜZELYÜZ**

Afşin Devlet Hastanesi Genel Cerrahi Kliniği, Kahramanmaraş, Türkiye

ORCID ID: <https://orcid.org/0000-0002-9092-1705>**Fikri ŞİRİN**

Afşin Devlet Hastanesi İç Hastalıkları Kliniği, Kahramanmaraş, Türkiye

ORCID ID: <https://orcid.org/0000-0003-0422-4450>**Abstract**

Introduction and Purpose: To emphasize that local sucralfate application is a promising treatment option in persistent anorectal abscesses and fistulas.

Case: A 45-year-old male with no chronic disease and a history of perianal abscess drainage 5 years ago. He presented with purulent anal discharge that had been going on for 5 years and anal pain that had been present for 2 days. On examination, there was no finding in the perineum, but there was a defect 1 cm inside the anal verge in the lithotomy position at 6 o'clock. In ultrasonography (USG), this defect was a fistula tract and a collection of approximately 2 cm was observed. When the patient's anamnesis was detailed, it was learned that the abscess drainage history 5 years ago was done transanally and that the internal pit of the fistula palpable on examination was the drainage area. In the pelvic MRI, a 33x18x25 mm abscess and a horseshoe fistula extending to the anal canal at 1-6-11 o'clock, 14 mm proximal from the anal inlet, were observed. The patient refused effective perineal drainage and multiple seton treatment for this abscessed fistula, which had no connection with the perineal skin and drained transanally spontaneously. Drainage of the painful abscess was performed through the internal pit of the transanal fistula. However, we explained that this isn't a permanent treatment and questioned whether there was anything that could accelerate the closure of the pouch, and the limited number of studies in the literature on local sucralfate application were shared. Upon the volunteering of the patient, irrigation was performed with sucralfate solution (we used 10 ml Antepsin oral suspension) after the drainage process in order to prevent the drainage tract from closing and the pouch remaining in the same shape, and to prevent the pouch from shrinking and spontaneous drainage of the accumulated fluid from the tract. The patient, whose

clinical complaints had resolved, was scheduled for irrigation once a week and follow-up USG after 2 months.

Results: Sucralfate, which is used as a common gastrointestinal ulcer medicine in oral form and as a topical preparation in the treatment of a wide variety of wounds, is supported by literature data that it is useful in ensuring faster wound healing by stimulating granulation tissue formation and mucus production.

Conclusion: Local application of sucralfate, which is known as a mucosa protective agent and has a place in the treatment of ulcerated lesions of the gastrointestinal system, can be tried before aggressive surgeries in persistent anorectal abscesses and fistulas.

Key words: Perianal abscess, Anal fistula, Local sucralfate, Wound healing, Chronic wound.

Özet

Giriş ve Amaç: İnatçı anorektal apse ve fistüllerde lokal sukralfat uygulamasının umut vadecici bir tedavi seçeneği olduğunu vurgulamak.

Olgu: Kronik hastalığı olmayan, 5 yıl önce perianal apse drenajı öyküsü olan 45 yaşında erkek olgu. 5 yıldır devam eden pürülan anal akıntı ve 2 gündür var olan anal ağrı ile başvurdu. Muayenede perinede bulgu olmayıp tuşede litotomi pozisyonunda saat 6 yönünde anal girimden 1 cm içeride defekt saptandı. Ultrasonografide (USG) bu defektin bir fistül traktı olup iştirakli olduğu yaklaşık 2 cm'lik bir koleksiyon izlendi. Olgunun anamnezi detaylandırıldığında 5 yıl önceki apse drenaj öyküsünün transanal yolla yapıldığı ve tuşede ele gelen fistül iç ağzının denaj alanı olduğu öğrenildi. Çekilen pelvik MR'da 33x18x25 mm'lik bir apse ile anal girimden 14 mm proksimalde saat 1-6-11 hizalarında anal kanala uzanan at nalı fistül izlendi. Olgu, perine cildi ile bağlantısı olmayıp transanal spontan drene olan bu apseli fistülünün perineden etkin drenajı ve multiple seton takılarak fistül tedavisini reddetti. Ağrılı olan apsesinin drenajı, transanal fistül iç ağzından gerçekleştirildi. Ancak bunun kalıcı tedavi olmadığı tarafımızca anlatılan ve poşun kapanması için hızlandırıcı bir şey olup olmadığını sorgulayan olgu ile literatürdeki sınırlı sayıdaki lokal sukralfat uygulaması ile ilgili çalışma paylaşıldı. Olgunun gönüllü olması üzerine drenaj traktının kapanıp poşun aynı şeklide kalmasını önleyip poşun küçülerek biriken mayinin spontan drenajının da traktan olabilmesi için drenaj işleminin ardından sukralfat solüsyonu ile (10 ml Antepsin oral süsp. kullandık) irrigasyon yapıldı. Klinik şikayetleri gerileyen olguya haftada bir irrigasyon ve 2 ay sonra kontrol USG planlandı.

Bulgular: Oral formda yaygın bir gastrointestinal ülser ilacı ve topikal bir preparat olarak çok çeşitli yaraların tedavisinde kullanılan sukralfat, granülasyon dokusu oluşumunu ve mukus üretimini uyararak yaranın daha hızlı iyileşmesini sağlamada faydalı olduğu literatür verileri ile desteklenmektedir.

Sonuç: Gastrointestinal sistem ülser lezyonların tedavisinde yeri olan ve mukoza koruyucu ajan olarak bilinen sukralfatın lokal uygulaması, inatçı anorektal apse ve fistüllerde agresif cerrahilerden önce denenebilir.

Anahtar sözcükler: Perianal apse, Anal fistül, Lokal sukralfat, Yara iyileşmesi, Kronik yara.

LITERATURE REVIEW ON LOTUS BIRTH AND HEALTH OUTCOMES

LOTUS DOĞUMU VE SAĞLIK SONUÇLARI ÜZERİNE LİTERATÜR İNCELEMESİ

Dr. Öğr. Üyesi Özlem AKIN

Recep Tayyip Erdoğan Üniversitesi Sağlık Bilimleri Fakültesi, Doğum ve Kadın Hastalıkları
Hemşireliği Anabilim Dalı, Rize, TÜRKİYE

ORCID: 0000-0001-7210-8756

Arş. Gör. Hilal Gül BOYRAZ YANIK

Ordu Üniversitesi Sağlık Bilimleri Fakültesi, Doğum ve Kadın Hastalıkları Hemşireliği Anabilim
Dalı, Ordu, TÜRKİYE

ORCID: 0000-0003-1177-4004

Prof. Dr. Nülüfer ERBİL

Ordu Üniversitesi Sağlık Bilimleri Fakültesi, Doğum ve Kadın Hastalıkları Hemşireliği Anabilim
Dalı, Ordu, TÜRKİYE

ORCID: 0000-0003-3586-6237

Abstract

Lotus birth is a holistic practice where the umbilical cord is not cut after birth. The reasons for choosing lotus birth vary, but typically include strengthening the mother-baby bond through uninterrupted skin-to-skin contact, respecting the placenta, and believing in a spiritual connection between the newborn and the placenta. During this type of birth, the third stage of labor is managed passively; no oxytocin medications are used, and the umbilical cord is not pulled. After birth, the placenta is washed, salted, and wrapped in an absorbent material.

Since the blood in the placenta is no longer circulating and the tissues are no longer viable, there is a potential risk of infection in the placenta, which theoretically could spread to the baby. However, the likelihood and severity of such an infection are unknown. The literature indicates that lotus birth carries risks for the newborn, including endocarditis, hyperbilirubinemia, staphylococcal infection, idiopathic hepatitis, neonatal omphalitis, and sepsis, which can be life-threatening. On the other hand, lotus birth includes the benefits of delayed cord clamping, which can increase the newborn's iron reserves and hemoglobin concentration. Mothers who choose lotus birth should be aware of the potential risks, and newborns should be closely monitored for signs of infection. More research is required to gain a better understanding of the health impacts of lotus birth and to minimize potential risks. This way, the safest and most effective care can be provided to patients who choose lotus birth.

Key Words: Lotus birth; Umbilical cord; placenta.

Özet

Lotus doğum, doğumdan sonra göbek bağıının kesilmediği bir uygulamadır. Lotus doğumu tercih etmenin nedenleri çeşitli olmakla birlikte, genellikle kesintisiz ten tene temas yoluyla anne-bebek bağıını güçlendirme, plasentaya saygı gösterme ve yeni doğan ile plasenta arasında ruhsal bir ilişki olduğuna inanma gibi sebepler öne sürülmektedir. Bu tür bir doğum sırasında, doğumun üçüncü evresi pasif bir şekilde yönetilir; oksitosin ilaçları kullanılmaz ve göbek kordonu çekilmez. Doğumdan sonra, plasenta yıkanır, tuzlanır ve emici bir malzemeye sarılır. Plasentada bulunan kan artık dolaşmadığı için ve dokular yaşamsız hale geldiği için, plasenta enfeksiyon riski altında olabilir, teorik olarak bu durum daha sonra bebeğe yayılabilir, ancak böyle bir enfeksiyonun olasılığı ve şiddeti bilinmemektedir. Literatürde lotus doğumun yenidoğan için endokardit, hiperbilirubinemi, idiyopatik hepatit, neonatal omfalit ve sepsis gibi hayati tehlike oluşturabilecek riskler barındırdığı belirtilmektedir. Diğer yandan lotus doğumun gecikmiş göbek kordonu klemplemenin faydalarını içerdiği ve bu sayede yenidoğanın demir rezervini ve hemoglobin konsantrasyonunu artırdığı da belirtilmektedir. Lotus doğumu tercih eden annelerin olabileceği ancak potansiyel risklerin bulunduğunu ve bebeklerin enfeksiyon açısından sıkı şekilde takip edilmesi gerektiği önem taşımaktadır. Lotus doğumunun sağlık üzerindeki etkilerini daha iyi anlamak ve potansiyel riskleri en aza indirmek için daha fazla araştırma yapılması gerekmektedir. Bu şekilde, lotus doğumunu tercih eden hastalara en güvenli ve etkili hizmetin sunulması sağlanabilir.

Anahtar kelimeler: Lotus doğum; Umbilikal kord; Plasenta.

GİRİŞ

Batı ülkelerinde, doğum sırasında göbek kordonunun kesilmesi, geleneksel ve bilimsel temellere dayanarak rutin bir uygulama haline gelmiştir. Ancak son yıllarda, bu uygulamaya karşı çıkan ve doğumu fetüs perspektifinden ele alan bir düşünce akımı ortaya çıkmıştır. Bu görüşe göre, kordonun hala atım yaparken kesilmesinin yenidoğana zararlı olabileceği savunulmaktadır. Bazı uzmanlar, kordonun damarlarının en az birkaç dakika boyunca kapanmamasını, böylece plasentadan geri akan kanın yenidoğana maksimum demir ve hemoglobinin rezervi sağlamasını önermektedir. Kordonun doğal işlevleri sona erene kadar beklenmesi gerektiği bu yaklaşım, "Lotus Doğum" teorisinin temelini oluşturmuştur (Levy ve Blickstein, 2006).

Lotus Doğum, doğumdan sonra göbek bağıının kesilmediği bütünsel bir uygulamadır (Buckley, 2003). Bu terim, göbek kordonunun kesilmemesi ve plasentanın atıldıktan sonra kendiliğinden ayrılıncaya kadar yenidoğana bağlı bırakılması ve uygulamasını tanımlamak için ortaya atılmıştır; bu da genellikle doğumdan 3-10 gün sonra gerçekleşir (Zinsser, 2018). Plasenta genellikle kumaşla veya bir torba ile sarılmakta (Buckley, 2003; Burns, 2014) ve kokuları azaltmak için tuzlar, lavanta yağı, biberiye veya diğer otlar ile işlenebilmektedir (Hanel ve Ahmed, 2009; Buckley, 2003; Westfall, 2003).

Bu prosedür, 1974 yılında yenidoğan ile plasentanın birliğini antropoid maymun modeli üzerinden aktaran Clair Lotus Day adında bir kadının adını taşır (Buckley, 2003; Crowther, 2006). Lotus doğumunu tercih etmenin çeşitli nedenleri bulunmaktadır; bu nedenler arasında genellikle kesintisiz ten tene temas yoluyla anne-bebek bağıını güçlendirme, plasentaya saygı gösterme ve yenidoğan ile plasenta arasında ruhsal bir bağ olduğuna inanma gibi sebepler öne çıkmaktadır (Monroe ve ark., 2019).

Bu yöntemin savunucularına göre, fetüs ve plasenta aynı hücrelerden oluştuğu için tek bir birimdir. Dolayısıyla, yenidoğan bu parçasından yapay olarak ayrılmazsa, plasentadaki tüm hayati kuvvet ve önemli miktarda kan, göbek kordonu aracılığıyla ona aktarılacak ve bu sayede yenidoğan, daha güçlü bir bağışıklık sistemi ile donatılacaktır. Sezaryen ile doğan bebeklerin bile bu yöntemden

fayda sağladığı söylenmektedir. Ayrıca, bu yöntemin destekçileri, eğer anne gebelik sırasında duygusal travma veya stres yaşamışsa, bebeğin kalan stres belirtileri göstermeyeceğini iddia ederler; bu şekilde doğan bebekler sakin ve dengeli olarak tanımlanır, kısacası plasenta ile doğmuş olurlar (Bonsignore ve ark., 2019).

Bu tür bir doğum sırasında, doğumun üçüncü evresi pasif bir şekilde yönetilir; oksitosin ilaçları kullanılmaz ve göbek kordonu çekilmez. Doğumdan sonra, plasenta yıkanır, tuzlanır ve emici bir malzemeye sarılır. Bazen kötü kokuyu önlemeye yardımcı olması için lavanta gibi bitkilerle de sarılır (Gönenç ve ark., 2019). Bildirilen ilk Lotus Doğum vakaları Avustralya'da 2004 yılına kadar uzanmaktadır (Burns, 2014). Lotus doğum, Avustralya, Yeni Zelanda, Tibet ve Hindistan gibi farklı ülkelerde uygulanmaktadır (Buckley, 2003). Lotus doğum az sayıda da olsa ülkemizde gebeler tarafından tercih edilmektedir (Gönenç ve ark., 2019). Bununla birlikte literatürde lotus doğumun faydalarını ve belirlenen risklere ilişkin vaka raporları sınırlıdır. Bu çalışmada, lotus doğum ile ilgili literatür incelenmiş, faydaları ve riskleri açısından çalışma bulgularının taranması amaçlanmıştır.

Lotus Doğumun Sağlık Sonuçları

Gecikmiş göbek bağı kesiminin faydalarını destekleyen kanıtlar mevcut olsa da göbek kordonunun kesilmemesiyle ilişkilendirilen neonatal sağlık sonuçlarını raporlayan çalışmaların sınırlı sayıda olduğu görülmektedir. Amerikan Kadın Doğum ve Jinekologlar Koleji ile Amerikan Pediatri Akademisi, lotus doğumu konusunda resmi bir karar sergilememektedir. Ancak, lotus doğumu tercih eden kadınların, bu yöntemin yeni doğan ve anneler üzerindeki potansiyel riskleri ve faydaları hakkında bilgilendirilmeleri gerektiğini ifade etmiştir (Whittington ve ark., 2023).

Batuhan Karasın ve Kızılkaya'nın (2022) literatür taramasında lotus doğumun yararları arasında ten tene temasın artırılması, bebeğin doğum sonrası yeni ortama uyumunun kolaylaştırılması, bebeğin sıkça hareket ettirilmesinin engellenmesi ve doğum sonu dönemin doğal ve müdahalesiz şekilde devam etmesi yer alırken; lotus doğumun bazı risklerinin de olduğu belirtilmektedir. Bunlar arasında endokardit, hiperbilirubinemi, stafilokok enfeksiyonu, idiyopatik hepatit, yenidoğan göbek bağı enfeksiyonu ve sepsis riskinin artması sayılabilir.

Lotus Doğum ve Faydaları

Umbilikal kordun klemplenmesi ve kesilmesi işlemi, anne ile bebeğin teknik olarak ayrılmasının ötesinde derin bir anlam taşımaktadır (Kluckow ve Hooper, 2015). Yenidoğanın dış dünyaya adaptasyonu, fizyolojik bir süreçle gerçekleşirken, bu süreçte kordon klemplenme zamanının yenidoğanın sağlığı üzerinde önemli etkileri olduğu anlaşılmıştır. Araştırmalar, umbilikal kordonun kesilmeden önce en az 30-60 saniye beklemenin bebek için faydalı olduğunu; kan hacmini artırarak kan transfüzyonu ihtiyacını ve prematüre bebeklerde intrakraniyal hemoraji riskini azalttığını göstermektedir (Tarnow-Mordi ve ark., 2014). Lotus doğumunun, gecikmiş göbek kordonu klemplenmenin faydalarını içerdiği ve bu sayede yenidoğanın demir rezervini ve hemoglobin konsantrasyonunu artırdığı belirtilmektedir (Batuhan Karasın ve Kızılkaya, 2022). Ancak, Endonezya'da yapılan bir araştırmada, lotus doğumla dünyaya gelen term yenidoğanlarda demir eksikliği anemisi insidansının kontrol grubuna kıyasla farklılık göstermediği bildirilmiştir (Hanum ve Nasution, 2019). Bir çalışmada, ev doğumları yapan veya yapmayı planlayan annelerle, aralarında lotus doğumu seçenlerin de bulunduğu bir gruba röportaj yapılmıştır (Burns, 2014). Anneler, plasantanın bir tıbbi yan ürün olmaktan ziyade bebeğe ait olduğunu, annelerden biri plasentasını bırakmanın bebeğinin kararı olacağını hissettiğini ifade etmiştir. Kadınlar uygulamayı manevi terimlerle ifade etmiş, temizlik ve tıbbi faydalar genellikle ikincil endişeleri olmuştur (Burns, 2014). Ayrıca kadınlarda plasenta üzerinde kontrol ve deneyimin manevi yönünü vurgulayan çalışmalar olmuştur (Buckley, 2003; Westfall, 2003). Gönenç ve arkadaşları (2019)

tarafından yapılan nitel bir çalışmada, Türkiye'de lotus doğumu yaşamış 9 kadının deneyimini tanımlamaktadır. Katılımcılar, lotus doğumunu seçme nedenlerinin en doğal doğum sürecini isteme ve kordonun kesilmesinin yenidoğan ile plasenta arasındaki manevi ilişkiyi kesintiye uğratarak plasentaya saygısızlık olduğunu bildirmişlerdir. Genel olarak, katılımcılar olumlu bir deneyim yaşadıklarını ve tekrar tercih edeceklerini ve başkalarına da önerdiklerini bildirmişlerdir. Diğer olumlu algılar arasında anne-bebek bağının güçlenmesi, emzirmenin teşvik edilmesi ve huzurlu, sakin bir yenidoğan yer almaktadır. Bildirilen olumsuz deneyimler arasında, aile, arkadaşlar ve sağlık profesyonellerinin lotus doğumuna yönelik olumsuz algıları ve bu kararı alırken kaynak eksikliği bulunmaktadır. En büyük endişeler, yeni doğanı ve plasentayı birlikte taşıırken kordonun çekilmesini engellemek ve enfeksiyon veya sarılık risklerinden korunmaktır. Katılımcıların çoğu plasentayı ayrıldıktan sonra gizlemiş veya gömmüştür. Bildirilen yeni doğan enfeksiyonları bulunmamıştır ve sarılıkla ilgili bir rapor olduğu saptanmıştır. Zinsser ve arkadaşları (2018) hastane dışında gerçekleşen üç lotus doğumunu incelemiş ve herhangi bir enfeksiyon görülmediğini bildirmiştir.

Lotus Doğum ve Riskleri

Göbek bağının nekrotik doku içermesi, yenidoğanlarda bakteriyel kolonizasyon riskini artırabilir. Bu durum, özellikle gelişmekte olan ve az gelişmiş ülkelerde, göbek bağı enfeksiyonlarına yol açarak yenidoğanlarda ölüm ve hastalık oranlarının yüksek olmasına neden olabilir. Bu süreçte, anne ve bebekte rahatsızlığa ve hijyen sorunlarına yol açan enfeksiyonlar, sıkça eleştirilmektedir (Kul ve ark., 2005).

Kraliyet Obstetrisyenler ve Jinekologlar Birliği (Royal College of Obstetricians and Gynaecologists) (RCOG) lotus doğumun güvenliğine ilişkin kanıt eksikliğinin altını çizmektedir. Lotus doğumu tercih eden annelerin olabileceğini ancak potansiyel risklerin bulunduğunu ve bebeklerin enfeksiyon açısından sıkı şekilde takip edilmesi gerektiğini ifade etmiştir (RCOG, 2008). Plasentada bulunan kan artık dolaşmadığı ve dokular yaşamsız hale geldiği için, plasenta enfeksiyon riski altında olabileceğini ve teorik olarak enfeksiyonun bebeğe yayılabileceğini belirtmektedir (RCOG, 2008). Diğer yandan 2015 yılında, Amerikan Kalp Derneği ve Amerikan Pediatri Akademisi, neonatal resüsitasyon kılavuzlarını göbek kordonunun klemplenmesini 30 ila 60 saniye geciktirme önerisiyle güncellemiştir. Bu uygulama, term bebeklerde hemoglobin ve demir seviyelerini artırırken, prematüre bebeklerde dolaşımı ve kırmızı kan hücresi hacmini iyileştirmektedir. Ancak, term bebeklerde sarılık vakalarının hafif bir artışına neden olabilir, bu yüzden neonatal sarılığı izlemek ve tedavi etmenin önemli olduğu belirtilmektedir (Committee Opinion, 2017; American Academy of Pediatrics, 2002).

Lotus doğumla en yakın karşılaştırılabilir veriler omfalitin görülme sıklığına dair olanlardır. Omfalitin görülme oranı, yüksek gelirli ülkelerde 1/1000 olarak tahmin edilmektedir (Stewart ve Benitz, 2016). Teorik olarak, lotus doğumunda olduğu gibi yenidoğanın doğumdan sonra plasentaya maruz kalması uzun sürdüğünde omfalit riski artar (Monroe ve ark., 2019). Omfalit, öncelikle yenidoğanları etkileyen, göbek kordonunun lokalize bir enfeksiyonudur. Omfalit komplikasyonları nadir olmasına rağmen, özellikle tedaviye erişimin her zaman kolay olmadığı gelişmekte olan ülkelerde yıkıcı olabilir (Stewart ve Benitz, 2016). Kyejo ve arkadaşlarının (2022) Tanzanya'da yaptıkları çalışmada lotus doğum yaygınlığı düşük olmasına rağmen yeni bir doğum şekli olup, daha iyi sonuçlar için anne doğumuyla ilgilenen tüm kadroların bilinçlenmesi gerektiğini belirtmiştir. Ayrıca bu uygulamayla yenidoğan enfeksiyonu riskinin arttığı kaydedilmiştir. Baker ve arkadaşları (2017) göbek kordonunun kesilmemesi sonrasında S. epidermidis sepsisi gelişen term yenidoğan bir rapor sunmuştur. Yenidoğan tarafından gösterilen belirtiler arasında letarji, kötü beslenme ve alt ekstremitelerin ritmik kasılması yer almıştır. Ittleman ve Szabo (2018) yaptıkları çalışmada, lotus doğumu yapılan term yenidoğanda, yaşamın birinci gününde Stafilokok lugdunensis sepsisi ve

endokardit geliştiğini saptamıştır. Tricarico ve arkadaşları (2017) lotus doğumunun ardından idiyopatik hepatitli bir yenidoğanın kısa bir raporu da yayımlanmıştır. Monroe ve arkadaşları (2019) hastane içinde gerçekleşen altı lotus doğumunu rapor etmiştir ve hiçbirinin neonatal enfeksiyon yaşamadığı saptanmış, iki bebeğin hiperbilirubinemi için fototerapi tedavisi aldığı saptanmıştır.

SONUÇ VE ÖNERİLER

Lotus doğumunun, gecikmiş göbek kordonu klemlemenin faydalarını içermesi ve bu sayede yenidoğanın demir rezervini artırması gibi potansiyel avantajlar sunduğu belirtilmekle birlikte, yenidoğan için endokardit, hiperbilirubinemi, stafilokok enfeksiyonu, idiyopatik hepatit, neonatal omfalit ve sepsis gibi hayati tehlike oluşturabilecek riskler de barındırdığı görülmektedir. Ancak, bu doğum yöntemiyle ilişkili sağlık sonuçlarına dair net kanıtlar bulunmamaktadır. Bu nedenle, lotus doğumunun fayda ve risk dengesi dikkatle değerlendirilmelidir. Lotus doğumunun sağlık üzerindeki etkilerini daha iyi anlamak ve potansiyel riskleri en aza indirmek için daha fazla araştırma yapılması gerekmektedir. Bu şekilde, lotus doğumunu tercih eden hastalara en güvenli ve etkili hizmetin sunulması sağlanabilir. Ayrıca, sağlık profesyonellerinin bu konuda farkındalıkları artırılarak lotus doğumu düşünen kadınlara bu yöntemin olası faydaları ve riskleri hakkında kapsamlı bilgi vermeleri ve bilinçli kararlar almalarına yardımcı olmaları gerekmektedir.

KAYNAKLAR

- American Academy of Pediatrics.** (2002). *Guidelines for perinatal care* (6th ed.). American Academy of Pediatrics.
- Baker, A. N., Rao, L. M., & Yeganeh, N. (2017). Case 3: Seizures in a 2-day-old infant. *Neo Reviews*, 18(7), e445-e447.
- Batuhan Karaşın, F., & Kızılkaya, T. (2022). Plasentaya Spiritüel Yaklaşım: Lotus Doğum. *İstanbul Gelişim Üniversitesi Sağlık Bilimleri Dergisi*, (16), 324-331.
- Buckley S. J. (2003). Lotus birth: A ritual for our times. *Midwifery Today with International Midwife*, (67), 36–38.
- Bonsignore, A., Buffelli, F., Ciliberti, R., Ventura, F., Molinelli, A., & Fulcheri, E. (2019). Medico-legal considerations on "Lotus Birth" in the Italian legislative framework. *Italian Journal of Pediatrics*, 45(1), 39. <https://doi.org/10.1186/s13052-019-0632-z>
- Burns, E. (2014). More than clinical waste? Placenta rituals among Australian home-birthing women. *The Journal of Perinatal Education*, 23(1), 41–49. <https://doi.org/10.1891/1058-1243.23.1.41>
- Committee Opinion No. 684: Delayed Umbilical Cord Clamping After Birth. (2017). *Obstetrics and Gynecology*, 129(1), 1. <https://doi.org/10.1097/AOG.0000000000001860>
- Crowther, S. (2006). Lotus birth: Leaving the cord alone. *The Practising Midwife*, 9(6), 12-14.
- Gönenç, İ. M., Aker, M. N., & Ay, E. (2019). Qualitative Study on the Experience of Lotus Birth. *Journal of Obstetric, Gynecologic, and Neonatal Nursing: JOGNN*, 48(6), 645–653. <https://doi.org/10.1016/j.jogn.2019.08.005>
- Hanel, E., & Ahmed, M. N. (2009). Is it "time to cut the cord?". *Clinical Pediatrics*, 48(8), 875–877. <https://doi.org/10.1177/000922809337404>
- Hanum, P., & Nasution, S. W. (2019). Efektifitas metode lotus birth terhadap kejadian anemia defisiensi zat besi pada bayi. *Jumantik*, 4(2), 213-219.

- Ittleman, B. R., & Szabo, J. S. (2018). Staphylococcus lugdunensis sepsis and endocarditis in a newborn following lotus birth. *Cardiology in the Young*, 15, (1–3).
- Kluckow, M., & Hooper, S. B. (2015). Using physiology to guide time to cord clamping. *Seminars in Fetal & Neonatal Medicine*, 20(4), 225–231. <https://doi.org/10.1016/j.siny.2015.03.002>
- Kul, M., Gürsel, O., Gülgün, M., Kesik, V., Sarıcı, S. Ü., & Alpay, F. (2005). Sağlıklı term yenidoğanlarda farklı göbek bakımı uygulamalarının göbek düşme zamanı ve diğer klinik sonuçlar üzerine etkilerinin değerlendirilmesi. *Türk Pediatri Arşivi*, 40(3), 227-231.
- Levy, T., & Blickstein, I. (2006). Timing of cord clamping revisited. *Journal of Perinatal Medicine*, 34, 293–297.
- Monroe, K. K., Rubin, A., Mychaliska, K. P., Skoczylas, M., & Burrows, H. L. (2019). Lotus Birth: A Case Series Report on Umbilical Nonseverance. *Clinical Pediatrics*, 58(1), 88–94. <https://doi.org/10.1177/0009922818806843>
- Royal College of Obstetricians and Gynaecologists (RCOG). (2008). *RCOG statement on umbilical non-severance or "lotus birth"*. Royal College of Obstetricians and Gynaecologists. Retrieved from <https://www.rcog.org.uk/en/news/rcog-statement-on-umbilical-nonseverance-or-lotus-birth/2008>
- Stewart, D., & Benitz, W. (2016). Umbilical cord care in the newborn infant. *Pediatrics*, 38(3), e20162149.
- Tarnow-Mordi, W. O., Duley, L., Field, D., Marlow, N., Morris, J., Newnham, J., Paneth, N., Soll, R. F., & Sweet, D. (2014). Timing of cord clamping in very preterm infants: more evidence is needed. *American Journal of Obstetrics and Gynecology*, 211(2), 118–123. <https://doi.org/10.1016/j.ajog.2014.03.055>
- Tricarico, A., Bianco, V., Di Biase, A. R., Iughetti, L., Ferrari, F., & Berardi, A. (2017). Lotus Birth Associated With Idiopathic Neonatal Hepatitis. *Pediatrics and Neonatology*, 58(3), 281–282. <https://doi.org/10.1016/j.pedneo.2015.11.010>
- Westfall, R. (2003). An ethnographic account of lotus birth. *Midwifery Today with International Midwife*, (66), 34–36.
- Whittington, J. R., Ghahremani, T., Whitham, M., Phillips, A. M., Spracher, B. N., & Magann, E. F. (2023). Alternate Birth Strategies. *International Journal of Women's Health*, 15, 1151–1159. <https://doi.org/10.2147/IJWH.S405533>
- Zinsser L. A. (2018). Lotus birth, a holistic approach on physiological cord clamping. *Women and Birth: Journal of the Australian College of Midwives*, 31(2), e73–e76. <https://doi.org/10.1016/j.wombi.2017.08.127>

BIOINFORMATIC ANALYSIS OF EXPRESSION AND METHYLATION STATUS OF MAPK15 IN KIDNEY RENAL CLEAR CELL CARCINOMA**Salih YABALAK**

Van Yuzuncu Yil University, Faculty of Medicine, Department of Medical Genetics, Van, Türkiye

ORCID ID: <https://orcid.org/0009-0000-5024-9128>**Gökhan GÖRGİŞEN**

Van Yuzuncu Yil University, Faculty of Medicine, Department of Medical Genetics, Van, Türkiye

ORCID ID: <https://orcid.org/0000-0001-6040-7863>**Abstract**

Introduction and Purpose: Mitogen activated protein kinases (MAPK) family is critical important signaling proteins that regulate various cellular functions such as growth, morphogenesis, differentiation, proliferation, survival and adaptation. MAPK15 is an atypic member of MAPK family and mainly responsible for cellular transformation and autophagy. It is activated by ionized radiation, starving and smoking and increased expression of MAPK15 is associated with gastric, colon, chronic myeloid leukemia and testicular germ cell tumors. These results have been shown that MAPK15 may have a crucial role in cancer development therefore, in this study, it was aimed to determine the effect of MAPK15 expression through bioinformatical approaches in kidney renal clear cell carcinoma.

Materials and Methods: Expression profile of MAPK15 was determined by GEPIA2 and TNMplot databases. CancerSEA databases was used to analyse the relationship between functional cancer status and MAPK15 expression. In addition to functional cancer status, promoter methylation profile of MAPK15 in kidney renal clear cell tumors were determined by OncoDB and MEXPRESS databases. Association between clinical and pathological features of tumors and MAPK15 was analyzed via UALCAN database. Lastly, Kaplan Meier plotter was used to determine survival analyses.

Results: Our results showed that MAPK15 expression significantly increased in tumor tissues compared to normal tissues. In the meantime, promoter methylation level of MAPK15 decreased in tumor tissues. We also observed that expression profile of MAPK15 is associated with the decreased survival rate in patients diagnosed with kidney renal clear cell carcinoma. As a summary, our results suggested that MAPK15 may be used as a prognostic factor in kidney renal clear cell carcinoma

Key Words: MAPK15; MAPK Family; Kidney Renal Clear Cell Carcinoma; AI and cancer

**COMPLEMENTARY ALTERNATIVE MEDICINE PRACTICES IN MENOPAUSE
SYMPTOMS: A LITERATURE REVIEW****MENOPOZ SEMPTOMLARINDA TAMAMLAYICI ALTERNATİF TIP
UYGULAMALARI: BİR LİTERATÜR İNCELEMESİ****Arş. Gör. Hilal Gül BOYRAZ YANIK**Ordu Üniversitesi Sağlık Bilimleri Fakültesi, Doğum ve Kadın Hastalıkları Hemşireliği Anabilim
Dalı, Ordu, TÜRKİYE

ORCID: 0000-0003-1177-4004

Dr. Öğr. Üyesi Özlem AKINRecep Tayyip Erdoğan Üniversitesi Sağlık Bilimleri Fakültesi, Doğum ve Kadın Hastalıkları
Hemşireliği Anabilim Dalı, Rize, TÜRKİYE

ORCID: 0000-0001-7210-8756,

Prof. Dr. Nülüfer ERBİLOrdu Üniversitesi Sağlık Bilimleri Fakültesi, Doğum ve Kadın Hastalıkları Hemşireliği Anabilim
Dalı, Ordu, TÜRKİYE

ORCID: 0000-0003-3586-6237

Abstract

Menopause is defined as the period when physical, emotional and hormonal changes occur and the menstrual cycle is permanently interrupted. It is stated that the main physiological change in menopause is due to the decrease in estrogen level and increase in FSH level. Various problems can be seen during the menopausal period, when women's lives are affected physiologically, psychologically, socially and culturally. While vasomotor problems such as hot flashes, sweating, palpitations, headaches, insomnia and depression, forgetfulness and urinary problems may occur in the early period, it is stated that there is an increase in the rates of osteoporosis, cardiovascular diseases and cancer in the late period. Women prefer complementary and alternative medicine for the symptoms they experience during this period. Complementary and alternative treatments used in the menopausal period are divided into two categories as body and mind practices, and can be classified as natural products such as plants, minerals, dietary supplements, and mind-body practices such as hypnosis, relaxation and meditation. It has been found that vitamin E, herbal estrogens, black cohosh, St. John's wort and primrose provide improvement in symptoms such as hot flashes and sweating, while primrose also reduces psychological symptoms. In mind-body practices, massage, reflexology and yoga have been found to reduce menopause symptoms, while hypnosis and aromatherapy have been found to reduce anxiety and improve sleep quality. There is a need for evidence-based studies examining the effects of complementary alternative treatments on symptoms that affect the well-being and quality of life of women during menopause.

Key Words: Menopause; woman; complementary and alternative

Özet

Menopoz, fiziksel, duygusal ve hormonal değişimlerin yaşandığı ve menstrual siklusun kalıcı olarak kesildiği dönem olarak tanımlanmaktadır. Menopozdaki temel fizyolojik değişim östrojen seviyesinin azalmasına ve FSH seviyesinin artmasına bağlı olduğu belirtilmektedir. Kadın yaşamının fizyolojik, psikolojik, sosyal ve kültürel anlamda etkilendiği menopozal dönemde çeşitli sorunlar görülebilmektedir. Erken dönemde sıcak basması, terleme, çarpıntı, baş ağrısı, uykusuzluk gibi vazomotor sorunlar ile depresyon, unutkanlık, üriner problemler görülebilirken, geç dönemde osteoporoz, kardiyovasküler hastalıklar ve kanser oranlarında artış görüldüğü belirtilmektedir. Kadınlar bu dönemde yaşadıkları semptomlar için tamamlayıcı ve alternatif tıpy tercih etmektedir. Menopozal dönemde kullanılan tamamlayıcı ve alternatif tedaviler beden ve zihin uygulamaları olarak iki kategoriye ayrılmakta, bitkiler, mineraller, diyet takviyeleri gibi doğal ürünler ve hipnoz, gevşeme, meditasyon gibi zihin beden uygulamaları şeklinde sınıflandırılabilir. E vitamini, bitkisel östrojenler, kara yılan otu, sarı kantaron ve çuha çiçeğinin sıcak basmaları, terleme gibi semptomlarda iyileşme sağladığı aynı zamanda çuha çiçeğinin psikolojik semptomlarda da azalma sağladığı bulunmuştur. Zihin beden uygulamalarında ise masaj refleksoloji ve yoganın menopoz semptomlarını azaltmada, hipnoz ve aromaterapinin anksiyeteyi azalttığı ve uyku kalitesini arttırdığı bulunmuştur. Menopoz döneminde yaşanan kadınların iyilik hallerini ve yaşam kalitelerini etkileyen semptomlarda tamamlayıcı alternatif tedavilerin etkilerini inceleyen kanıt temelli çalışmalara ihtiyaç bulunmaktadır.

Anahtar Sözcükler: Menopoz; kadın; tamamlayıcı ve alternative

GİRİŞ

Her kadının yaşamında kaçınılmaz bir durum olan menopoz, fiziksel, duygusal, zihinsel ve hormonal değişikliklerin yaşandığı ve menstrual siklusun kalıcı olarak kesildiği dönem olarak tanımlanmaktadır (Aksu ve Erenel, 2023). Dünya Sağlık Örgütüne göre menopoz, ovaryum aktivitesinin yitilmesi sonucunda menstruasyonun kalıcı olarak sonlanması şeklinde tanımlanmaktadır (WHO, 2022). Dünyada kadınların genellikle 45-55 yaşları arasında menopoza girdiği belirtilmektedir (WHO, 2022). Ülkemizde 2018 TNSA verilerine göre menopoza giren kadınların %45,1'i 48-49, %31,2'si 46-47 ve %15,9'u 44-45 yaş aralığında olduğu belirlenmiştir (TNSA, 2018).

Kadınların doğal üreme döngüsünün sona erdiğini gösteren menopozda temel fizyolojik değişimin, östrojen seviyesinin azalması ve folikül uyarıcı hormonun (FSH) seviyesinin artmasına bağlı olduğu belirtilmektedir (Bekmezci ve Altuntuğ, 2020; Santoro ve ark., 2015). Üreme döngüsünün bu aşaması, kadınların çoğu için fizyolojik, psikolojik, sosyal, kültürel ve etnik faktörlerden etkilenebilen biyopsikososyal süreçtir (O'Neill ve Eden, 2017). Menopozal dönemde erken ve geç sorunlar görülebilmektedir. Menopozun erken döneminde; sıcak basması, terleme, uykusuzluk, çarpıntı, baş ağrısı gibi vazomotor semptomlar ile kas-kemik ağrıları, halsizlik, depresyon, dikkat kaybı, unutkanlık, libido azalması gibi rahatsızlıklar, vajinal atrofi ve üriner problemler olarak sıralanmaktadır. Geç döneminde ise osteoporoz, kardiyovasküler hastalıklar ve kanserin görülme oranlarında artış gözlemlendiği belirtilmektedir (Velioğlu ve Gürkan, 2021).

Shukla ve ark. (2018) kadınların %47'sinde menopoz semptomlarının olduğunu, %21.3'ünde en az bir vazomotor, %91.5'inde fiziksel, %44.7'sinde psikososyal semptomların görüldüğü belirlemiştir. Arar ve Erbil (2023)'in çalışmasında menopoz semptomlarının "hafif", "orta", "şiddetli" ve "çok şiddetli" düzeyleri birlikte değerlendirildiğinde, kadınların %83.5'inde sıcak basması ve terleme, %63.2'sinde kalp rahatsızlığı hissetme, %86'sında uyku sorunu, %83.8'inde depresif duygu durumu, %75.6'sında sinirlilik, %65.7'sinde kaygı/endişe, %82.4'ünde fiziksel ve zihinsel yorgunluk, %70.1'inde cinsel sorun, %75.8'inde idrar sorunları, %66.3'ünde vajinal kuruluk, %55.4'ünde eklem

ve kas ağrıları yaşadıkları belirlenmiştir. Aynı çalışmada kadınların yaşadığı menopoz semptomlarının günlük yaşam aktivitelerine etkisi VAS'a göre 0-10 arası puanlama ile ifade edildiğinde günlük yaşam aktivitelerinin etkilenme durumunun sırasıyla; uyku (4.57 puan), fiziksel ve zihinsel yorgunluk (4.29 puan), ruhsal durum (4.26 puan), genel yaşam kalitesi (4.14 puan), hayattan keyif alma (4.09 puan) ve sosyal aktiviteler (3.97 puan) olduğu belirtilmiştir (Arar ve Erbil, 2023).

Menopoz tedavisinde, hormon seviyelerini dengelemek ve vazomotor semptomları hafifletmek amacıyla hormon replasman tedavileri (HRT), bilim insanları arasında tartışmalı olmasına rağmen, yaygın olarak kullanılmaktadır (Guo ve ark., 2019). Ancak, Kadın Sağlığı Girişimi çalışmasının 2002'de HRT'nin olumsuz etkilerini ilk kez bildirmesinden bu yana, HRT kullanımı önemli ölçüde azalmıştır (Rossouw ve ark., 2002). Bu durum, birçok kadının menopoz semptomlarından kurtulmak için tamamlayıcı ve alternatif tıp (TAT) yöntemlerine yönelmesine yol açmıştır (Posadzki ve ark., 2013).

MENOPOZDA TAMAMLAYICI VE ALTERNATİF TIP YÖNTEMLERİ

Modern tıp ile bazı hastalıkların tedavilerinin sınırlı olması veya tedavi yan etkilerinin fazla olması nedeniyle bazı inanışlar ve tamamlayıcı ve alternatif tedaviler ilgi çekmeye başlamıştır (Yurdakul ve Sarı, 2020). Eğitim, ekonomik durum, çalışma durumu, sağlık bakım hizmetlerinden memnun olma ve eşlik eden kronik hastalık tamamlayıcı ve alternatif tıp kullanımına yönlendirmiştir (Fjær ve ark., 2020).

Tamamlayıcı ve Alternatif Tıp Merkezi, tamamlayıcı ve alternatif tedavi (TAT) yöntemleri 5 başlıkta sınıflandırılmaktadır. Bu yöntemler; alternatif medikal sistemler, vücut-zihin tıbbi tedavileri, biyolojik temelli tedaviler, vücuda yönelik sistemler ve manyetik alan ve enerji terapileri şeklindedir (Yeşil ve ark., 2024).

Menopozal dönemde yaşanan vazomotor semptomlara yönelik uzun süreli kullanılan hormonal tedavi kullanımına bağlı birçok hastalık riski meydana gelmekte ve bireyleri tamamlayıcı tıp yöntemlerini kullanmaya yönlendirmektedir (Yetişmiş ve ark., 2023). Menopoz semptomlarına yönelik Tamamlayıcı ve Alternatif Tıp (TAT) yöntemleri, doğal ürünler ve zihin beden uygulamaları şeklinde iki geniş kategoriye ayrılmaktadır (Kaba ve Bozkurt, 2020).

Menopoz semptomlarında bitkiler, mineraller, diyet takviyeleri gibi *doğal ürünler* ve hipnoz, bilişsel davranışçı tedavi, gevşeme, meditasyon gibi *zihin beden uygulamaları* şeklinde sınıflandırılabilmektedir (Kaba ve Bozkurt, 2020; Yetişmiş ve ark., 2023).

Doğal Ürünler

E Vitamini

E vitaminin sıcak basmaları, ruhsal değişiklikler ve vajinal kuruluğu azaltmada etkili olduğu belirtilmektedir (Şen ve Sevil, 2008). Vücutta antioksidan işlevi gördüğü düşünülen E vitamini 1940'lı yıllardaki çeşitli klinik araştırmalarda günlük 50-400 IU E vitamini alımının plasebo ile karşılaştırılması sonucu sıcak basmaları ve diğer menopozal şikayetlerde etkili bir azaltma sağladığı belirtilmektedir (Kaba ve Bozkurt, 2020).

Lokal E vitamini uygulamasının rejenaratif etkilere sahip olduğu cinsel ilişkiyi iyileştirdiği ve atrofik yaraları iyileştirerek dispareniyi azaltabileceği ileri sürülmüştür (Ziaghani ve ark., 2012). E vitamininin cinsel yaşamın ve yaşam kalitesinin etkilendiği menopozal dönemde özellikle hormon tedavisi kullanamayan veya uyumu düşük olan kadınlarda vajinal atrofi semptomlarının hafifletilmesinde kullanılabileceği belirlenmiştir (Golmakani ve ark., 2019). Feduniw ve ark. (2022)

sistematiik incelemedesinde E vitamininin menopo2 sonrası kadınlarda sıcak basması ve vajinal atrofi de etkili olduėu belirlenmiřtir.

Bitkisel Östrojenler

Yapısal veya işlevsel olarak östradiol içeren veya benzer östrojenik aktiviteye sahip bitki bileşenlerine fito-östrojen adı verilmektedir (Veliöėlu ve Gürkan, 2021). Geleneksel tıpta kullanımı ve yaygınlığı en fazla olan fito-östrojenler izoflavonlar, prenil flavonoidler, kumestanlar, lignanlardır (Kaba ve Bozkurt, 2020). Menopoz semptomlarında alternatif tedavi kullanımının incelendiėi bir arařtırmada %79'unun bitkisel bir besin takviyesi ve %33'ünün soya kullandıėı belirlenmiřtir (Newton ve ark., 2002). Soya ve soya ürünleri yüksek konsantrasyonlarda fitoöstrojen içermesi nedeniyle menopoz semptomlarının azaltılmasında kullanılmaktadır (Veliöėlu ve Gürkan, 2021).

Menopoz semptomlarını hafifletmede fitoöstrojenlerin kullanımının incelendiėi sistematiik derleme ve meta-analiz çalışmasında, fito-östrojenlerin menopozdaki kadınlarda sıcak basması sıklığını ciddi yan etkiler olmaksızın azalttıėı belirlenmiřtir (Chen ve ark., 2015).

Lethaby ve arkadaşlarının (2013) yaptıėı sistematiik incelemede, fitoöstrojenlerin perimenopozal ve postmenopozal kadınlarda sıcak basmaları ve gece terlemelerinin sıklığı ve řiddeti üzerinde menopozal semptomları azaltmada etkili olmadığı tespit edilmiřtir. Menopoz sonrası kadınlara bir fito-östrojen ürünü verildiėinde, sıcak basması ve vajinal kuruluk gibi semptomları hafiflettiėi ancak endometrial hiperplazi, meme kanseri ve tromboz gibi östrojenik yan etkilerin görülme riski olduėu belirtilmektedir (Eden, 2012). Fito-östrojenlerin menopoz sonrası dönemde kullanımı ile yapılan bir çalışmada kadınların %79'u sıcak basmasını, %15'i uykusuzluėu, %14'ü duyu durum bozukluklarını azaltmak ve %15'i osteoporozu önlemek için fito-östrojenleri kullandıkları belirlenmiřtir (Girardi ve ark., 2014).

Kara Yılan Otu (Cimicifuga Racemosa L.)

Beyaz çiçekli uzun ömürlü bir bitki olan kara yılan otunun menopoz semptomlarını azaltmada etkili olduėu belirtilmektedir (Kilci ve Ertem, 2019). Menopoz semptomlarında en çok arařtırılan bitkisel ilaçlardan biri olan karayılan otundaki bileşenler östrojen reseptörüne bağlanarak seçici olarak LH salgılanmasını FSH üzerinde herhangi bir etkisi olmadan bastırmaktadır (Kaba ve Bozkurt, 2020).

Postmenopozal semptomların tedavisinde karayılan otu ve fluoksetinin incelendiėi randomize kontrollü bir çalışmada; 8 hafta boyunca günde bir kez akşam yemeėinden sonra 6,5 mg karayılan otu kuru kökü ekstraktının uygulanmasının, plaseboya kıyasla vazomotor semptomların řiddetini ve sıcak basması sayısını önemli ölçüde azalttıėını bulunmuřtur (Oktem ve ark., 2007). Sadahiro ve ark. (2023) sistematiik derleme ve meta analiz çalışmasında da kara yılan otu özlerinin menopoz semptomlarının yanı sıra sıcak basması ve somatik semptomları da önemli ölçüde iyileřtirdiėi belirlenmiřtir.

Literatürde, menopoz dönemindeki kadınlarda kara yılan otunun vazomotor semptomları hafifletmede etkili olduėu gösterilmiřtir (Mohapatra ve ark., 2022). Bařka bir çalışmada ise kara yılan otunun vazomotor semptomlar, uyku problemleri ve sinirlilikte azalma sağladıėı belirlenmiřtir (Guida ve ark., 2021). Kara yılan otu ile yapılan bazı çalışmalarda fayda sağladıėı görülürken bazı çalışmalarda plasebo grubuna göre hiçbir fark göstermediėi belirlenmiřtir (Frei-Kleiner ve ark., 2005; Osmers ve ark., 2005; Wuttke ve ark., 2003). Çalışma sonuçlarındaki bu farklılıkların kara yılan otu doz deėişimleri ve çalışma popülasyonlarının farklı gruplar olmasından kaynaklandıėı belirtilmektedir (Tanmahasamut ve ark., 2015). Hafif menopozal semptomları olan kadınlar iyileřme gösterirken, řiddetli menopoz semptomları yařayan kadınlar bu tedaviden sınırlı ölçüde fayda görmüřtür (Frei-Kleiner ve ark., 2005; Tanmahasamut, ve ark., 2015).

Çuha Çiçeği (Primrose Oil)

Çuha çiçeğinin içeriğinde yer alan gama-linoleik asit yağ asidi ve çuha çiçeği tohumları ezildiğinde ortaya çıkan yağın menopoz semptomlarını azaltmaya yardımcı olduğu belirtilmektedir (Kilci ve Ertem, 2019). Farzaneh ve ark. (2013) randomize kontrollü çalışmasında oral çuha çiçeği yağının uygulanması menopozal sıcak basmalarını iyileştirdiği belirlenmiştir.

Çuha çiçeğinin menopoz semptomları üzerine etkisinin incelendiği meta-analiz çalışmasında; çuha çiçeği yağının genel menopozal semptom şiddetlerini azalttığı ancak vazomotor semptomlar üzerinde etkili olmadığı belirlenmiştir (Kazemi ve ark., 2021). Öte yandan Safdari ve ark. (2021) çalışmasında, çuha çiçeğinin menopoz sonrası psikolojik semptomları azaltmada olumlu etkileri olduğu bulunmuştur. Çuha çiçeğinin menopozal semptomlara yönelik etkilerinin incelendiği çalışmalar literatürde sınırlıdır, bununla birlikte yapılan çalışmalarda genellikle vazomotor semptomlara odaklanıldığı görülmektedir (Safdari ve ark., 2021; Farzaneh ve ark., 2013; Kazemi ve ark., 2021).

Melek Otu (Dong Quai)

Çin'de yaygın olarak kullanılan kadın ginsengi olarak bilinen melek otunun vazodilatör ve antispazmotik etkisi bulunmaktadır (Velioglu ve Gürkan, 2021). Geleneksel Çin tıbbında 2000 yılından uzun süredir baharat, tonik ve ilaç olarak kullanılmakta, geleneksel olarak menopoz şikayetlerinde de tercih edilmektedir (Kaba ve Bozkurt, 2020). Melek otu ile yapılan araştırmalar çok sınırlı olmakla birlikte (Kaba ve Bozkurt, 2020), yapılan bir çalışmada melek otunun postmenopozal kadınlarda sıcak basması ve endometrial kalınlaşmasında belirgin azalma sağlamadığı belirlenmiştir (Fugh-Berman, 2003).

Sarı Kantaron (Hypericum Perforatum L.)

Dünyanın farklı yerinde kendiliğinden yetişen, uzun ömürlü ve altın sarısı renkte çiçekleri olan sarı kantaron tıpta birçok alanda kullanılmaktadır (Dündar ve ark., 2020). Sarı kantaron antidepresan ve analjezi benzeri etkisi olan bitkisel ürünlerden bir tanesidir (Eatamadnia ve ark., 2019). Fenolik asitler, naphthodianthrones ve phloroglucinols içeren sarı kantaronun, depresyon tedavisinde kullanıldığı gibi aynı zamanda menopozal semptomlarda özellikle de sıcak basmasında olumlu etkileri olduğu belirtilmektedir (Çakır ve ark., 2022).

Sarı kantaron ile ilgili yapılan çalışmalarda genellikle başka ürünler ile kombinasyon yapılarak plasebo ile karşılaştırmaya odaklanıldığı görülmektedir (Ghazanfarpour ve ark., 2016; Fahami ve ark., 2010). Liu ve ark. (2014) meta-analiz çalışmasında sarı kantaron ve herhangi bir bitkisel ürün ile kombinasyonu kullanımı sonucu menopoz semptomlarında özellikle de sıcak basmasında olumlu etkileri olduğu belirlenmiştir. Al-Akoum ve ark. (2009) sarı kantaronun perimenopozal dönemdeki kadınlarda semptomlarda azalma sağlayarak yaşam kalitelerini arttırdığını belirlemiştir.

ZİHİN VE BEDEN UYGULAMALARI

Masaj

Eski çağlardan itibaren kullanılan masaj terapisi, arteriyel ve venöz kan akışının, lenfatik sistemin, ödemin, konjektif doku ve kasların aktivasyonunu etkilediği bilinmekte, kas-doku uyarıları dokunma reseptörleri, basınç, ısı, titreşim ve ağrı üzerinde etki ederek periferik sinir sistemi yoluyla omurilikteki merkezi ve otonom sinir sistemine iletilerek nörokimyasal reaksiyonları tetiklediği belirtilmektedir (Oliveira ve ark., 2012). Doğu kültüründen köken alan ve vücudun yumuşak

dokularına sistematik olarak uygulanan bir yöntem olan masaj, kaslarda sağladığı rahatlama ile zihinsel olarak da rahatlama katkı sağlamaktadır (Karaduman ve Akköz Çevik, 2020). Taavoni ve ark. (2015) çalışmasında menopoz dönemindeki kadınlara uygulanan masaj terapisinin menopoz semptomlarını azaltmada etkili olduğu bulunmuştur. Listiana ve ark. (2022) sistematik derleme çalışmasında masajın menopoz semptomlarını azaltmada olumlu etkileri olduğu belirlenmiştir.

Refleksoloji

Stresin azaltılmasını sağlayan ve bedende fizyolojik değişikliklere neden olan refleksoloji, belirli noktalarına basınç uygulanarak gerçekleştirilen, tamamlayıcı ve enerji dengeleme tekniğidir (Amanak ve ark., 2013; Boyraz ve ark., 2023). Refleksolojinin vücudun rahatlmasına yardımcı olduğu, endokrin ve sinir sistemini dengeleyerek menopozal yakınmaların azalmasına ve bu döneme rahat bir geçişe katkı sağladığı belirtilmektedir (Çuvadar ve ark., 2022).

Refleksolojinin, menopoz dönemindeki kadınların uyku kalitesini iyileştirdiği (Asltoghiri ve Ghodsi, 2012), 40-60 yaş arasındaki kadınlarda ayak refleksolojisinin vazomotor sorunları azalttığı ve yaşam kalitesini artırdığı bulunmuştur (Gozuyesil ve Baser, 2016).

Menopoz dönemindeki kadınlara uygulanan ayak refleksolojisinin depresyonu azalttığı (Mahdavi-pour ve ark., 2019), çalışmasında uyku kalitesini artırdığı ve yorgunluğu azalttığı bulunmuştur (Aydın ve Yiğitalp, 2021).

Yoga

Son yıllarda iletişim araçları ile daha geniş popülasyonlara ulaşan yoga, birçok hasta grubunda sıklıkla tercih edilen bir yöntem haline gelmiştir (Velioğlu ve Gürkan, 2021). Fiziksel ve zihinsel bir egzersiz yöntemi olan yoga, mevcut farkındalığı artırmak amacıyla tercih edilmektedir. Çünkü yoga, bireyde rahatlama hissi yaratarak ve genel iyilik hissini artırarak menopoz semptomlarını hafifletmektedir. (Kaba ve Bozkurt, 2020).

Yapılan bir sistematik derleme ve meta-analiz çalışmasında yoganın menopoz semptomlarını azaltmada etkili ve güvenilir bir yöntem olduğu belirlenmiştir (Cramer ve ark., 2012). Jorge ve ark. (2016) randomize kontrollü çalışmasında yoganın menopoz semptomları, stres ve depresyon düzeylerini azalttığı ve yaşam kalitesini artırdığı belirlenmiştir. Susanti ve ark. (2022) çalışmasında da yoganın menopoz dönemindeki kadınlarda menopoz semptomlarını azalttığı ve genel sağlık durumlarını iyileştirdiği belirlenmiştir.

Yoganın, menopoz semptomlarından; sıcak basması ve uyku problemleri üzerine olumlu etkileri olduğu ve menopoz dönemindeki kadınların yaşam kalitelerini yükselttiği belirtilmektedir (Öz ve ark., 2021). Joshi ve ark. (2011) çalışmasında yoganın menopoz semptomlarını azalttığı bulunurken, Newton ve ark. (2014) çalışmasında vazomotor semptomlar sıklığı ve şiddeti üzerine etkisi olmadığı, bununla birlikte uykusuzluk semptomlarını azalttığı bulunmuştur. Abiç ve Vefikuluçay (2024) çalışmasında ise yoganın menopozda yaşanan psikolojik, somatik ve ürogenital semptomları azaltabileceği bulunmuştur.

Hipnoz

Hipnoz, odaklanmış bir dikkat, kişiselleştirilmiş zihinsel imgeleme ve telkinin derin bir rahatlama durumunu içeren bir zihin terapisi olarak tanımlanmaktadır (Johnson ve ark., 2019). Yogada, kas gücü ile fiziksel dengenin oluşması sağlanarak fiziksel ve mental iyilik halinin sağlanması amaçlanmaktadır (Velioğlu ve Gürkan, 2021).

Menopoz sonrası hipnozun sıcak basması şikayetlerinde azalma sağladığı belirlenmiştir (Elkins ve ark., 2013). Yapılan başka bir çalışmada da hipnozun uyku kalitesini arttırmada etkili olduğu bulunmuştur (Otte ve ark., 2020). Hipnozun, menopoz dönemindeki kadınlarda anksiyeteyi azalttığı (Roberts ve ark., 2021), uyku bozukluklarında iyileşme (Marizi ve ark., 2023) ve cinsel işlev sorunlarında azalma sağladığı (Jonhson ve ark., 2016) belirlenmiştir.

Aromaterapi

Güvenli bir terapi yöntemi olarak kabul edilen aromaterapi bitkilerden elde edilen esansiyel yağların tedavi amaçlı kullanılması olarak tanımlanmaktadır (Darsareh ve ark., 2012). Aromaterapi; fiziksel, emosyonel ve ruhsal sağlığı iyileştirmek ve çeşitli hastalıkları tedavi etmek amacıyla çeşitli otlardan, çiçeklerden ve bitkilerden elde edilen uçucu yağların inhalasyon, masaj ya da banyo şeklinde kullanılması olarak da tanımlanmaktadır (Teskereci ve Özerli, 2021).

Menopoz sonrası kadınlarda lavanta yağı ile fiziksel ve psikolojik belirtilerde iyileşme sağladığı belirlenmiştir (Darsareh ve ark., 2012). Babakhanian ve ark. (2018) yaptığı sistematik derleme ve meta analiz çalışmasında aromaterapinin menopoz sonrası kadınlarda anksiyete ve depresyon gibi psikolojik semptomları hafifletmede etkili olduğu ancak sinirlilik semptomlarını yönetmede etkili olmadığı belirlenmiştir.

Menopoz semptomlarının yaşam kalitesini etkilemesi nedeniyle basit, invaziv olmayan ve güvenli bir yöntem olan aromaterapi tercih edilmekte çeşitli semptomlar üzerinde rahatlıkla kullanılmaktadır (Teskereci ve Özerli, 2021). Yapılan çalışmalar incelendiğinde; lavanta aromaterapisinin menopoz semptomlarını azalttığı (Nikjou ve ark., 2018), yaşam kalitesini önemli ölçüde iyileştirdiği (Bakhtiari ve ark., 2019), uyku kalitesini artırdığı (Gürler ve ark., 2020) belirlenmiştir.

Diyet ve Yaşam Biçimi Değişiklikleri

Menopozal dönemdeki kadınlar için vazomotor semptomların azaltılmasında diyet ve yaşam biçimi değişiklikleri önerilmektedir (Yetişmiş ve ark., 2023). Sıcak basmaları için diyetlerinde; sıcak içecek ve baharatlı yiyecek tüketimini azaltmaları, çay, kahve, alkol ve kafeinden kaçınmaları tavsiye edilir. Ayrıca günlük yaşamlarında, aşırı stres, gergin ve heyecanlı ortamlardan kaçınmalarının sıcak basmasını azaltabileceği belirtilmektedir (Akarsu ve Kuş, 2017).

Menopoz sırasındaki sağlık davranışları ve deneyimlerinin niteliksel değerlendirilmesinin yapıldığı bir araştırmada; kadınların %80'inden fazlası menopoz semptomlarını hafifletmeye yönelik yapılandırılmış bir yaşam tarzı programıyla ilgilendiği ve bu kadınların %72'si kilo verme ve kiloyu korumaya yönelik stratejiler öğrenmek istediği belirlenmiştir (Marlatt ve ark., 2018). Kracht ve ark. (2022) nitel araştırmasında menopoz dönemindeki kadınların yaşadıkları semptomlara hazırlıksız yakalandıklarını ve kilo vermede veya kiloyu korumada başarısız olduklarını ifade etmişlerdir. Ayrıca farklı diyet ve egzersiz programları denemek istedikleri ve bu konularda bilgi eksikliği yaşadıkları belirlenmiştir.

Yapılan sistematik bir inceleme çalışmasında menopoz dönemindeki kadınların yaşadıkları semptomlar ile diyet arasında ilişki bulunmuştur. Kafein, yağ ve işlenmiş gıda tüketiminin menopoz semptomlarının yoğunluğunu artırdığı belirlenmiştir (Noll ve ark., 2021). Menopoz dönemindeki kadınlar her ne kadar sağlıklı yaşam tarzı hakkında bilgi sahibi olsa da davranışa geçmekte zorlanmakta veya yetersiz kalabilmektedir (Orhan ve Yağmur, 2020).

SONUÇ

Menopoz döneminde fizyolojik ve emosyonel değişimler yaşanmaktadır. Bu değişimler kadınların genel sağlığını ve iyilik hallerini ve yaşam kalitelerini olumsuz yönde etkilemektedir. Menopozda doğal bitkisel besinler ve beden zihin müdahalelerini içeren yöntemler bulunmaktadır. Bu yöntemlerin menopozdaki kullanımı ile kanıtlar sınırlı olmakla birlikte, literatürde menopoz semptomlarında tamamlayıcı tedavi yöntemlerinin etkilerini inceleyen kanıt temelli çalışmaların yapılması önerilmektedir.

KAYNAKLAR

- Abiç, A., & Vefikuluçay, D. Y. (2024). The effect of yoga on menopause symptoms: a randomized controlled trial. *Holistic Nursing Practice*, 38(3), 138-147.
- Akarsu, R. H., & Kuş, B. (2017). Menapozal sıcak basması kontrolünde kullanılan nonfarmakolojik yöntemler. *Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi*, 6(2), 104-112.
- Aksu, S. P., & Erenel, A. Ş. (2023). Menapozal dönem semptomları ve hemşirelik bakımı. *Gazi Sağlık Bilimleri Dergisi*, 8(1), 1-10.
- Al-Akoum, M., Maunsell, E., Verreault, R., Provencher, L., Otis, H., & Dodin, S. (2009). Effects of *Hypericum perforatum* (St. John's wort) on hot flashes and quality of life in perimenopausal women: a randomized pilot trial. *Menopause*, 16(2), 307-314.
- Amanak, K., Karaöz, B., & Sevil, Ü. (2013). Alternatif/Tamamlayıcı Tıp ve Kadın Sağlığı. *TAF Preventive Medicine Bulletin*, 12(4), 441-448
- Arar, M. A., & Erbil, N. (2022). Menapozal dönemde nonfarmakolojik yöntemlerin uyku kalitesine etkisi: Randomize kontrollü çalışmaların sistematik derlemesi. *Süleyman Demirel Üniversitesi Sağlık Bilimleri Dergisi*, 13(2), 334-347.
- Arar, M. A., & Erbil, N. (2023). The effect of menopausal symptoms on women's daily life activities. *Menopause Review/Przełąd Menopauzalny*, 22(1), 6-15.
- Asltoghiri, M., & Ghodsi, Z. (2012). The effects of Reflexology on sleep disorder in menopausal women. *Procedia-Social and Behavioral Sciences*, 31, 242-246.
- Aydın, L. Z., & Yiğitalp, G. (2021). The effect of reflexology on sleep quality and fatigue in postmenopausal women: A randomized control trial. *European Journal of Integrative Medicine*, 43, 101281.
- Babakhanian, M., Ghazanfarpour, M., Kargarfard, L., Roozbeh, N., Darvish, L., Khadivzadeh, T., & Dizavandi, F. R. (2018). Effect of aromatherapy on the treatment of psychological symptoms in postmenopausal and elderly women: a systematic review and meta-analysis. *Journal of Menopausal Medicine*, 24(2), 127-132.
- Bakhtiari, S., Paki, S., Baradaranfard, F., Mosleh, S., & Jekar, M. (2019). Effect of lavender aromatherapy through inhalation on quality of life among postmenopausal women covered by a governmental health center in Isfahan, Iran: A single-blind clinical trial. *Complementary Therapies in Clinical Practice*, 34, 46-50.
- Bekmezci, E., & Altuntuğ, K. (2020). Menopoz ile ilişkili semptomlara yönelik kanıt dayalı uygulamaların incelenmesi. *Genel Sağlık Bilimleri Dergisi*, 2(3), 167-174.
- Boyras, H. G., Erbil, N., Nefes, H. N., & Aydın, E. (2023). Türkiye'de Doğum ve Kadın Hastalıkları Hemşireliği Lisansüstü Tezlerinde Refleksoloji Kullanımı: Literatür Derlemesi. *Journal of Traditional Medical Complementary Therapies*, 6(3), 288-97

- Chen, M. N., Lin, C. C., & Liu, C. F. (2015). Efficacy of phytoestrogens for menopausal symptoms: a meta-analysis and systematic review. *Climacteric*, 18(2), 260-269.
- Cramer, H., Lauche, R., Langhorst, J., & Dobos, G. (2012). Effectiveness of yoga for menopausal symptoms: a systematic review and meta-analysis of randomized controlled trials. *Evidence-Based Complementary and Alternative Medicine*, 2012.
- Çakır, Ö., Balkaya, N. A., & Dönmez, S. (2022). Menopoz Döneminde Vazomotor Semptomlarda Fitoöstrojen Kullanımı. *Ordu Üniversitesi Hemşirelik Çalışmaları Dergisi*, 5(3), 476-484.
- Çuvadar, A. (2022). Menopozal Semptomlar ve Refleksoloji. *Sağlık Profesyonelleri Araştırma Dergisi*, 4(2), 116-120.
- Darsareh, F., Taavoni, S., Joolae, S., & Haghani, H. (2012). Effect of aromatherapy massage on menopausal symptoms: a randomized placebo-controlled clinical trial. *Menopause*, 19(9), 995-999.
- Dündar, T., Toptaş, B., & Karaçam, Z. (2020). Menopozal semptom yönetiminde sarı kantaron kullanımı: sistematik derleme. *Mersin Üniversitesi Tıp Fakültesi Lokman Hekim Tıp Tarihi ve Folklorik Tıp Dergisi*, 10(2), 258-268.
- Eatemadnia, A., Ansari, S., Abedi, P., & Najar, S. (2019). The effect of *Hypericum perforatum* on postmenopausal symptoms and depression: A randomized controlled trial. *Complementary Therapies in Medicine*, 45, 109-113.
- Elkins, G. R., Fisher, W. I., Johnson, A. K., Carpenter, J. S., & Keith, T. Z. (2013). Clinical hypnosis in the treatment of post-menopausal hot flashes: A randomized controlled trial. *Menopause (New York, NY)*, 20(3).
- Fjær, E. L., Landet, E. R., McNamara, C. L., & Eikemo, T. A. (2020). The use of complementary and alternative medicine (CAM) in Europe. *BMC Complementary Medicine and Therapies*, 20(1), 1-9.
- Fahami, F., Asali, Z., Aslani, A., & Fathizadeh, N. (2010). A comparative study on the effects of *Hypericum Perforatum* and passion flower on the menopausal symptoms of women referring to Isfahan city health care centers. *Iranian Journal of Nursing and Midwifery Research*, 15(4), 202.
- Farzaneh, F., Fatehi, S., Sohrabi, M. R., & Alizadeh, K. (2013). The effect of oral evening primrose oil on menopausal hot flashes: a randomized clinical trial. *Archives of Gynecology and Obstetrics*, 288(5), 1075-1079.
- Feduniw, S., Korczyńska, L., Górski, K., Zgliczyńska, M., Bączkowska, M., Byrczak, M., ... & Ciebiera, M. (2022). The Effect of Vitamin E Supplementation in Postmenopausal Women—A Systematic Review. *Nutrients*, 15(1), 160.
- Frei-Kleiner, S., Schaffner, W., Rahlfs, V. W., Bodmer, C. H., & Birkhäuser, M. (2005). *Cimicifuga racemosa* dried ethanolic extract in menopausal disorders: a double-blind placebo-controlled clinical trial. *Maturitas*, 51(4), 397-404.
- Fugh-Berman, A. (2003). "Bust enhancing" herbal products. *Obstetrics & Gynecology*, 101(6), 1345-1349.
- Ghazanfarpour, M., Sadeghi, R., Roudsari, R. L., Khadivzadeh, T., Afiat, M., & Esmaeilizadeh, M. (2016). Effects of flaxseed and *Hypericum perforatum* on hot flash, vaginal atrophy and estrogen-dependent cancers in menopausal women: a systematic review and meta-analysis. *Avicenna Journal of Phytomedicine*, 6(3), 273.
- Girardi, A., Piccinni, C., Raschi, E., Koci, A., Vitamia, B., Poluzzi, E., & De Ponti, F. (2014). Use of phytoestrogens and effects perceived by postmenopausal women: result of a questionnaire-based survey. *BMC Complementary and Alternative Medicine*, 14, 1-5.

- Golmakani, N., Parnan Emamverdikhan, A., Zarifian, A., Sajadi Tabassi, S. A., & Hassanzadeh, M. (2019). Vitamin E as alternative local treatment in genitourinary syndrome of menopause: a randomized controlled trial. *International Urogynecology Journal*, 30, 831-837.
- Gozuyesil, E., & Baser, M. (2016). The effect of foot reflexology applied to women aged between 40 and 60 on vasomotor complaints and quality of life. *Complementary Therapies in Clinical Practice*, 24, 78-85.
- Guida, M., Raffone, A., Travaglino, A., Neola, D., Reppuccia, S., Borgo, M., ... & Mollo, A. (2021). Cimicifuga racemosa isopropanolic extract for menopausal symptoms: an observational prospective case-control study. *Gynecological Endocrinology*, 37(12), 1132-1137.
- Guo, P. P., Li, P., Zhang, X. H., Liu, N., Wang, J., Chen, D. D., Sun, W. J., & Zhang, W. (2019). Complementary and alternative medicine for natural and treatment-induced vasomotor symptoms: An overview of systematic reviews and meta-analyses. *Complementary therapies in clinical practice*, 36, 181-194. <https://doi.org/10.1016/j.ctcp.2019.07.007>
- Gürler, M., Kızıllırmak, A., & Baser, M. (2020). The effect of aromatherapy on sleep and quality of life in menopausal women with sleeping problems: a non-randomized, placebo-controlled trial. *Complementary Medicine Research*, 27(6), 421-430.
- Hacettepe Üniversitesi Nüfus ve Sağlık Araştırmaları Enstitüsü (TNSA) (2018). Erişim Tarihi:07.12.2023, http://www.sck.gov.tr/wp-content/uploads/2020/08/TNSA2018_ana_Rapor.pdf
- Johnson, A., Roberts, L., & Elkins, G. (2019). Complementary and alternative medicine for menopause. *Journal of Evidence-Based Integrative Medicine*, 24, 2515690X19829380.
- Jorge, M. P., Santaella, D. F., Pontes, I. M., Shiramizu, V. K., Nascimento, E. B., Cabral, A., ... & Ribeiro, A. M. (2016). Hatha Yoga practice decreases menopause symptoms and improves quality of life: A randomized controlled trial. *Complementary Therapies in Medicine*, 26, 128-135.
- Johnson, A. K., Johnson, A. J., Barton, D., & Elkins, G. (2016). Hypnotic relaxation therapy and sexual function in postmenopausal women: Results of a randomized clinical trial. *International Journal of Clinical and Experimental Hypnosis*, 64(2), 213-224.
- Joshi, S., Khandwe, R., Bapat, D., & Deshmukh, U. (2011). Effect of yoga on menopausal symptoms. *Menopause International*, 17(3), 78-81.
- Kaba, F. & Bozkurt, Ö. D. (2020). Menopoz Semptomlarında Tamamlayıcı ve Alternatif Tedaviler. *Ebelik ve Sağlık Bilimleri Dergisi*, 3(2), 134-142.
- Karaduman, S., & Akköz Çevik, S. (2020). The effect of sacral massage on labor pain and anxiety: a randomized controlled trial. *Japan Journal of Nursing Science*, 17(1), e12272.
- Kazemi, F., Masoumi, S. Z., Shayan, A., & Oshvandi, K. (2021). The effect of evening primrose oil capsule on hot flashes and night sweats in postmenopausal women: a single-blind randomized controlled trial. *Journal of Menopausal Medicine*, 27(1), 8.
- Kilci, Ş., & Ertem, G. (2019). Menopozda Semptom Yönetiminde Kullanılan Kanıta Dayalı Uygulamalar. *Sakarya Üniversitesi Holistik Sağlık Dergisi*, 2(3), 36-54.
- Kracht, C. L., Romain, J. S., Hardee, J. C., Santoro, N., Redman, L. M., & Marlatt, K. L. (2022). "It just seems like people are talking about menopause, but nobody has a solution": A qualitative exploration of menopause experiences and preferences for weight management among Black women. *Maturitas*, 157, 16-26.
- Lethaby, A., Marjoribanks, J., Kronenberg, F., Roberts, H., Eden, J., & Brown, J. (2013). Phytoestrogens for menopausal vasomotor symptoms. *Cochrane Database of Systematic Reviews*, (12).

- Listiana, E., Anggorowati, A., & Susilawati, D. (2022). Massage Therapy to Relieve Menopausal Symptoms: A Systematic Review. *Jurnal Kebidanan*, 11(1), 9-20.
- Liu, Y. R., Jiang, Y. L., Huang, R. Q., Yang, J. Y., Xiao, B. K., & Dong, J. X. (2014). Hypericum perforatum L. preparations for menopause: a meta-analysis of efficacy and safety. *Climacteric*, 17(4), 325-335.
- Mahdavi-pour, F., Rahemi, Z., Sadat, Z., & Ajorpaz, N. M. (2019). The effects of foot reflexology on depression during menopause: A randomized controlled clinical trial. *Complementary Therapies in Medicine*, 47, 102195.
- Marizi, L., Emilia, O., Permatasari, A., Wahyuni, S., & Nurayuda, N. (2023). Effectiveness of self-hypnosis In Overcoming Sleep Disorders In Menopausal Women. *Journal of Maternal and Child Health Sciences (JMCHS)*, 3(1), 33-40.
- Marlatt, K. L., Beyl, R. A., & Redman, L. M. (2018). A qualitative assessment of health behaviors and experiences during menopause: a cross-sectional, observational study. *Maturitas*, 116, 36-42.
- Mohapatra, S., Iqbal, A., Ansari, M. J., Jan, B., Zahiruddin, S., Mirza, M. A., ... & Iqbal, Z. (2022). Benefits of black cohosh (*Cimicifuga racemosa*) for women health: an up-close and in-depth review. *Pharmaceuticals*, 15(3), 278
- Newton, K. M., Buist, D. S., Keenan, N. L., Anderson, L. A., & LaCroix, A. Z. (2002). Use of alternative therapies for menopause symptoms: results of a population-based survey. *Obstetrics & Gynecology*, 100(1), 18-25.
- Newton, K. M., Reed, S. D., Guthrie, K. A., Sherman, K. J., Booth-LaForce, C., Caan, B., ... & LaCroix, A. Z. (2014). Efficacy of yoga for vasomotor symptoms: a randomized controlled trial. *Menopause (New York, NY)*, 21(4), 339.
- Nikjou, R., Kazemzadeh, R., Asadzadeh, F., Fathi, R., & Mostafazadeh, F. (2018). The effect of lavender aromatherapy on the symptoms of menopause. *Journal of the National Medical Association*, 110(3), 265-269.
- Noll, P. R. E. S., Campos, C. A. S., Leone, C., Zangirolami-Raimundo, J., Noll, M., Baracat, E. C., ... & Sorpreso, I. C. E. (2021). Dietary intake and menopausal symptoms in postmenopausal women: a systematic review. *Climacteric*, 24(2), 128-138.
- Oktem, M., Eroglu, D., Karahan, H. B., Taskintuna, N., Kuscu, E., & Zeyneloglu, H. B. (2007). Black cohosh and fluoxetine in the treatment of postmenopausal symptoms: a prospective, randomized trial. *Advances in Therapy*, 24, 448-461.
- Oliveira, D. I., Hachul, H., Goto, V., Tufik, S., & Bittencourt, L. R. A. (2012). Effect of therapeutic massage on insomnia and climacteric symptoms in postmenopausal women. *Climacteric*, 15(1), 21-29.
- O'Neill, S., & Eden, J. (2017). The pathophysiology of menopausal symptoms. *Obstetrics, Gynaecology & Reproductive Medicine*, 27(10), 303-310.
- Orhan, İ., & Yağmur, Y. (2020). Menopozal Dönemde Sağlıklı Yaşam Biçimi Davranışları, Yaşam Kalitesi ve Motivasyonel Görüşmeler. *İnönü Üniversitesi Sağlık Hizmetleri Meslek Yüksek Okulu Dergisi*, 8(2), 496-505.
- Osmers, R., Friede, M., Liske, E., Schnitker, L., Freudenstein, J., & Henneicke-von Zepelin, H. H. (2005). Efficacy and safety of isopropanolic black Cohosh extract for climacteric symptoms (vol 105, pg 1074, 2005). *Obstetrics and Gynecology*, 106(3), 644-644.
- Otte, J. L., Carpenter, J. S., Roberts, L., & Elkins, G. R. (2020). Self-hypnosis for sleep disturbances in menopausal women. *Journal of Women's Health*, 29(3), 461-463

- Öz, T., Demirel, Ö. B., & Gürkan, Ö. C. (2021). Menopoz Semptomlarının Yönetiminde Yoganın Kanıt Temelli Kullanımı. *Mersin Üniversitesi Tıp Fakültesi Lokman Hekim Tıp Tarihi ve Folklorik Tıp Dergisi*, 11(3), 420-428.
- Posadzki, P., Lee, M. S., Moon, T. W., Choi, T. Y., Park, T. Y., & Ernst, E. (2013). Prevalence of complementary and alternative medicine (CAM) use by menopausal women: a systematic review of surveys. *Maturitas*, 75(1), 34–43. <https://doi.org/10.1016/j.maturitas.2013.02.005>
- Roberts, R. L., Rhodes, J. R., & Elkins, G. R. (2021). Effect of hypnosis on anxiety: results from a randomized controlled trial with women in postmenopause. *Journal of Clinical Psychology in Medical Settings*, 28(4), 868-881.
- Rossouw, J. E., Anderson, G. L., Prentice, R. L., LaCroix, A. Z., Kooperberg, C., Stefanick, M. L., Jackson, R. D., Beresford, S. A., Howard, B. V., Johnson, K. C., Kotchen, J. M., Ockene, J., & Writing Group for the Women's Health Initiative Investigators (2002). Risks and benefits of estrogen plus progestin in healthy postmenopausal women: principal results From the Women's Health Initiative randomized controlled trial. *JAMA*, 288(3), 321–333. <https://doi.org/10.1001/jama.288.3.321>
- Sadahiro, R., Matsuoka, L. N., Zeng, B. S., Chen, K. H., Zeng, B. Y., Wang, H. Y., ... & Tseng, P. T. (2023). Black cohosh extracts in women with menopausal symptoms: an updated pairwise meta-analysis. *Menopause*, 30(7), 766-773.
- Safdari, F., Dastanaei, B. M., Kheiri, S., & Karimiankakolaki, Z. (2021). Effect of Evening Primrose Oil on Postmenopausal Psychological Symptoms: A Triple-Blind Randomized Clinical Trial. *Journal of Menopausal Medicine*, 27(2), 58.
- Santoro, N., Epperson, C. N., & Mathews, S. B. (2015). Menopausal symptoms and their management. *Endocrinology and Metabolism Clinics*, 44(3), 497-515.
- Shukla, R., Ganjiwale, J., & Patel, R. (2018). Prevalence of postmenopausal symptoms, its effect on quality of life and coping in rural couple. *Journal of Mid-life Health*, 9(1), 14.
- Susanti, H. D., Sonko, I., Chang, P. C., Chuang, Y. H., & Chung, M. H. (2022). Effects of yoga on menopausal symptoms and sleep quality across menopause statuses: A randomized controlled trial. *Nursing & Health Sciences*, 24(2), 368-379.
- Şen, E., & Sevil, Ü. (2008). Menopoz semptomlarında tamamlayıcı tedaviler. *Florence Nightingale Journal of Nursing*, 16(62), 136-142.
- Taavoni, S., Darsareh, F., & Haghani, H. (2015). Effect of massage therapy on menopausal symptoms applied by midwife and trained clients: a randomized clinical therapy. *European Psychiatry*, 30, 1830.
- Tandon, V. R., Sharma, S., Mahajan, A., Mahajan, A., & Tandon, A. (2022). Menopause and sleep disorders. *Journal of Mid-life Health*, 13(1), 26.
- Tanmahasamut, P., Vichinsartvichai, P., Rattanachaiyanont, M., Techatraisak, K., Dangrat, C., & Sardod, P. (2015). Cimicifuga racemosa extract for relieving menopausal symptoms: a randomized controlled trial. *Climacteric*, 18(1), 79-85.
- Teskereci, G., & Özerli, A. (2021). Menopozda Semptom Yönetiminde Aromaterapi: Literatür Derleme. *Mersin Üniversitesi Tıp Fakültesi Lokman Hekim Tıp Tarihi ve Folklorik Tıp Dergisi*, 11(3), 411-419.
- Velioglu, E., & Gürkan, Ö. C. (2021). Menopoz Semptomlarının Yönetiminde Kanıt Temelli Tamamlayıcı ve Alternatif Tedaviler. *Geleneksel ve Tamamlayıcı Anadolu Tıbbi Dergisi*, 3(2), 20-27.

World Health Organizaion (2022). Menopause. Eriřim Tarihi:07.12.2023, <https://www.who.int/news-room/fact-sheets/detail/menopause>

[Wuttke, W., Seidlova-Wuttke, D., & Gorkow, C. \(2003\). The Cimicifuga preparation BNO 1055 vs. conjugated estrogens in a double-blind placebo-controlled study: effects on menopause symptoms and bone markers. Maturitas, 44, S67-S77.](#)

Yeřil, H., Eyigör, S., Eyvaz, N., & İnbat, M. (2024). Lenfödem Tanılı Hastalarda Geleneksel ve Tamamlayıcı ve Alternatif Tedavi Kullanımı. Kocatepe Tıp Dergisi, 25(1), 111-116.

Yetiřmiş, H. Y., Hadımlı, A., & Saydam, B. K. (2023). Menopozda Semptom Yönetimi ve Tamamlayıcı Tıp. Muř Alparslan Üniversitesi Saęlık Bilimleri Dergisi, 3(2), 41-53.

Yurdakul, E. S., & Sarı, O. (2020). Geleneksel ve Tamamlayıcı Tıp Uygulamalarının Etik Yönden İncelenmesi. Mersin Üniversitesi Tıp Fakültesi Lokman Hekim Tıp Tarihi ve Folklorik Tıp Dergisi, 10(3), 404-414.

Ziaghani, S., Abbaspour, Z., & Abbaspour, M. R. (2012). The comparison between the effects of hyaluronic acid vaginal suppository and vitamin E on the treatment of atrophic vaginitis in menopausal women. Journal of Arak University of Medical Sciences, 15(6), 57-64.

MORPHOLOGIC STUDY AND MOLECULAR CONFIRMATION OF *MYXOBOLUS SP.* (MYXOZOA: MYXOBOLIDAE) INFECTING GOLDFISH (*CARASSIUS AURATUS*)**Amin Marandi**

Department of Aquatic Animal Health, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

Hooman Rahmati-Holasoo

Department of Aquatic Animal Health, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

Hosseinali Ebrahimzadeh Mousavi

Department of Aquatic Animal Health, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

Fatemeh Arabkhazaeli

Department of Pathobiology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

Sara Shokrpour

Department of Pathobiology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

Zahra Ziafati Kafi

Department of Microbiology and Immunology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

Alireza Nassiri

Department of Aquatic Animal Health, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

Soroush Sarmadi

Department of Microbiology and Immunology, Faculty of Veterinary Medicine, University of Tehran, Tehran, Iran

Abstract

Aquaculture of ornamental fish is a highly profitable in numerous nations. There is a reported increase in the occurrence and spread of new diseases worldwide, affecting different organisms. Myxozoa is an important group of parasites that have significant economic and ecological importance. In the present investigation some of the fish population at commercial goldfish (*Carassius auratus*) farms exhibited the formation of cavitating muscular lesions resembling humps during. Fish exhibiting pathological abnormalities were transported to the Ornamental Fish Clinic and underwent a clinical examination. Wet smears were prepared and studied under light microscopy. Subsequently, light microscopy was employed to analyze wet smears of skin and gills, in addition to whitish exudate. Morphologic study confirmed presence of *Myxobolus sp.* wet smears. Furthermore, tissue homogenates were collected to achieve a higher level of accuracy in identification and to the molecular confirmation. Molecular study showed that individuals from the goldfish farms were infected with the pathogenic myxozoan *Myxobolus sp.*, resulting in substantial damage to the epaxial muscles.

Keywords: *Myxobolus sp.*, Goldfish, Myxosporidia, Bivalvulida, *Carassius auratus*.

**PHYTOCHEMICAL SCREENING OF COCONUT WATER AND BITTER LEAF EXTRACT
AND ANTIBIOGRAM OF THE MIXTURE (COCONUT WATER + BITTER LEAF) ON
Salmonella typhi and *Streptococcus Spp***

Emmanuel Oluwatimileyin Matthew

Department of Applied Biology, Kaduna Polytechnic Tundunwada, Kaduna State, Nigeria

Dr. Ibrahim Abdulkarim Ozigi

Department of Applied Biology, Kaduna Polytechnic Tundunwada, Kaduna State, Nigeria

Abdulgafar Ishola Uthman

Department of Applied Biology, Kaduna Polytechnic Tundunwada, Kaduna State, Nigeria

ORCID: 0009-0004-8107-7057

Adeleye Adeyeri David

Department of Applied Biology, Kaduna Polytechnic Tundunwada, Kaduna State, Nigeria

College of Science and Technology, Department of Applied Biology, Kaduna Polytechnic
Tundunwada, Kaduna State, Nigeria.

Abstract

Background: Nigeria, a significant player in the global economy, has a rich agricultural heritage that includes diverse crops with potential medicinal properties. Among these, coconut (*Cocos nucifera*) and bitter leaf (*Vernonia amygdalina*) are notable for their traditional medicinal uses. This study aimed to evaluate the phytochemical composition and antibacterial efficacy of extracts from these plants, individually and in combination, against *Salmonella typhi* and *Streptococcus pyogenes*, addressing the need for alternative antibacterial therapies in the face of rising antibiotic resistance.

Methods: Bitter leaf and coconut were collected from Bakindogo market, Kaduna, and authenticated by a botanist. The plants were prepared and macerated, with the extracts subjected to phytochemical screening using standard methods. The antibacterial activity was assessed through agar disk diffusion, determining the zones of inhibition at various extract concentrations. The minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were established for both pathogens.

Results: Phytochemical analysis revealed the presence of alkaloids, flavonoids, tannins, saponins, terpenoids, and carbohydrates in both extracts, with anthraquinones present only in *Vernonia amygdalina*. The extracts showed significant antibacterial activity, particularly the mixture of *Vernonia amygdalina* and *Cocos nucifera* water. The mixture exhibited higher efficacy against *Salmonella typhi*, with zones of inhibition ranging from 9.5mm to 17mm, compared to *Streptococcus pyogenes*, which showed inhibition zones from 9.0mm to 13mm. The MIC for *Salmonella typhi* was 25mg/ml, with an MBC of 100mg/ml, indicating bactericidal properties at higher concentrations. *Streptococcus pyogenes* showed an MIC of 100mg/ml, but the MBC was not applicable, suggesting bacteriostatic effects.

Conclusions: The study confirms the significant antibacterial potential of *Vernonia amygdalina* and *Cocos nucifera* water extracts, particularly against *Salmonella typhi*. These findings support their traditional use and highlight their potential as alternative antibacterial agents. Further research and pharmaceutical exploration are recommended to fully harness these plants' medicinal properties, particularly for developing new treatments for bacterial infections.

Keywords: *Vernonia amygdalina*, *Cocos nucifera*, Phytochemical screening, Antibacterial activity, *Salmonella typhi*, *Streptococcus pyogenes*, Herbal remedies and Antibiotic resistance

Background

Nigeria stands as a significant player in the global economy, recognized as the largest black nation. With a robust economic growth trajectory, Nigeria's gross domestic product (GDP) soared from \$170 billion in 2000 to \$451 billion in 2012, albeit unofficial estimations suggest figures closer to \$630 billion, inclusive of the informal sector [1][2]. The agricultural sector has consistently been a pivotal contributor to Nigeria's economy, with a noteworthy 26.15% contribution to the GDP in 2017 (NBS, 2019). This sector serves as the cornerstone for economic advancement, development, and poverty alleviation, as emphasized by Sertoglu, Ugural, and Bekun [3], positioning agriculture as the catalyst for sustained economic prosperity.

In Nigeria, agriculture encompasses a diverse array of staple and cash crops, with significant cultivation dedicated to crops such as cassava, yam, maize, sorghum, rice, palm kernel, and coconut, among others [2]. Notably, coconut, revered as the "tree of life," holds immense economic potential, albeit receiving limited attention within Nigeria's agricultural landscape [4]. Originating from Southeast Asia, coconut exhibits remarkable adaptability, thriving across various soil types and climates. Its utility extends beyond traditional consumption, offering a plethora of industrial applications that could bolster Nigeria's industrial development and elevate living standards.

The historical narratives surrounding the origin of coconut are diverse and often steeped in mythology. While Indian mythology attributes the creation of the coconut palm to the sage Vishwamitra, botanical evidence suggests its origin in Papua New Guinea or Malesia, with subsequent dispersal facilitated by natural phenomena and Polynesian voyagers. This dispersion underscores coconut's resilience and capacity for widespread proliferation across diverse geographical regions [5].

Alongside coconut, bitter leaf (*Vernonia amygdalina*) emerges as a botanical asset in Nigeria's agricultural bounty. This perennial shrub, renowned for its bitter-tasting leaves, harbors extensive medicinal properties, earning it recognition as a staple herb in traditional medicine across West Africa. Indigenous to various ecological zones, bitter leaf thrives in diverse environments, adapting to habitats ranging from forest margins to grasslands.

The morphological characteristics of bitter leaf underscore its resilience and adaptability, with features such as soft woodiness, lanceolate leaves, and bisexual flowers contributing to its ecological versatility. Beyond its ecological significance, bitter leaf holds immense socio-economic value, particularly within Nigerian communities, where it is revered for its medicinal prowess and nutritional benefits [6].

Amidst the backdrop of Nigeria's agricultural abundance, concerns surrounding food safety and security persist. Bacterial infections continue to pose significant challenges, necessitating innovative approaches to antimicrobial research. The emergence of multidrug-resistant pathogens underscores the urgency for alternative therapeutic interventions, including the exploration of traditional herbal remedies [7][8].

In light of these considerations, this study aims to conduct phytochemical screening of coconut water and bitter leaf extract, evaluating their antibacterial efficacy against *Salmonella typhi* and *Streptococcus* spp. By elucidating the phytochemical composition and antibiogram of this botanical mixture, we seek to contribute valuable insights into the potential therapeutic applications of traditional herbal remedies in combating bacterial infections.

In summary, this research endeavors to bridge the gap between traditional botanical knowledge and contemporary biomedical research, offering a pathway towards sustainable healthcare solutions within the context of Nigeria's rich agricultural heritage.

METHODS

Collection, Identification, and Authentication of the Plants

Bitter leaf and coconut were procured from Bakindogo market in Kaduna. Their identification and authentication were carried out by a botanist from the Department of Biological Science at Kaduna State University. The plants were washed using sterile water and dried at room temperature in the Department of Applied Biology at Kaduna Polytechnic.

Preparation of the Plant

The bitter leaf was washed and then squeezed into coconut water. The mixture was left to soak for three days to allow maceration.

Extraction of the Plant Crude Extract

After soaking for three days, the mixture of bitter leaf and coconut water was periodically shaken to ensure thorough extraction. The macerated mixture was then filtered to separate the micelle from the marc. The micelle was subsequently separated from the menstruum by evaporation using a water bath.

Crude Extract Concentration

Various concentrations of the crude extract were prepared. A stock solution of 100 mg/ml was made by dissolving 1g of the crude extract in 10 ml of sterile distilled water. From this stock solution, different concentrations (100 mg/ml, 50 mg/ml, 25 mg/ml, and 12.5 mg/ml) were prepared accordingly.

Phytochemical Screening of Crude Extracts

The presence of bioactive compounds in the methanol extracts was determined by phytochemical tests using standard methods described by [9] and [10].

Test for Carbohydrates (Molisch's Test)

A few drops of Molisch's reagent were added to 2 ml of the extract solution, followed by the addition of 1 ml of concentrated sulfuric acid down the side of the test tube. Changes in coloration at the interface of the two liquids were noted.

Test for Tannins

1 A few drops of 0.1% ferric chloride solution were added to the extract solutions, and changes were observed.

2 Additionally, a few drops of lead acetate solution were added to the extract solutions, and changes were observed.

Test for Alkaloids

- 1 Two drops of dilute sulfuric acid and Meyer's reagent were added to 1 ml of the extract solution, and observed changes were noted.
- 2 Another 1 ml portion of the extract was reacted with Dragendorff's reagent, and changes in the product formed were observed and recorded.
- 3 An affirmation test for the presence of alkaloids was performed by adding two drops of Wagner's reagent, and observed changes were recorded.

Test for Saponins

A frothing test was performed by adding 5 ml of de-ionized water to the filtrate of the extracts and shaking vigorously to observe the formation of stable persistent frothing. This frothing was observed for up to 45 minutes.

Test for Flavonoids

- 1 Shinoda Test: Filtrates of the extracts (3 ml) were obtained, and four pieces of magnesium fillings were added, followed by a few drops of concentrated hydrochloric acid. Observed color changes were noted.
- 2 Sodium Hydroxide Test: 5 ml of 10% sodium hydroxide was added to an equal volume of the extracts. Observed color changes were noted accordingly.

Test for Terpenoids

Liebermann-Burchard Test: Chloroform was added to the extract, mixed with 1 ml of acetic anhydride, and followed by the addition of 1 ml of concentrated sulfuric acid down the wall of the test tube. Observed changes were noted.

Test for Anthraquinones

Bornträger's Test: 0.5 g of crude extracts was added to 10 ml of chloroform, shaken, and then filtered. Ten ml of the filtrate was reacted with an equal volume of ammonia (10 ml) and shaken gently. Observed changes were recorded.

Characterization and Authentication of Test Organisms

Clinical isolates of *Salmonella typhi* and *Streptococcus* spp. were obtained from 44 Army Reference Hospital in Kaduna State, Nigeria.

Storage and Maintenance of Cultures

The cultures were streaked onto Nutrient Agar slants and incubated at 37°C for 48 hours. These cultures were stored in a refrigerator at 4°C for subsequent use. Stock cultures were prepared and kept until needed. Broth cultures were prepared from these organisms.

Preparation and Standardization of Inocula

Nutrient broth was prepared according to the manufacturer's specifications. The bacterial isolates were tested for sterility on Nutrient Agar, then re-grown in Nutrient broth at 37°C for 24 hours. McFarland's standard method was used to standardize the organisms to 1×10^4 cfu/ml by preparing four sets of dilution tubes with 9 ml of normal saline and one tube with 4 ml of normal saline, labeled 10^{-1} to 10^{-4} . 1 ml of the overnight culture was added to the 10^{-1} dilution tube, and serial dilutions

were prepared to arrive at a dilution of 10^{-4} cfu/ml. Dilution with sterile Nutrient broth was done until the optical density matched that of McFarland's standard.

Antimicrobial Susceptibility Test

Nutrient agar was prepared according to the manufacturer's specifications, and the molten agar was poured into sterile disposable plates and allowed to cool to about 45°C. The plates were swabbed with diluted standardized overnight cultures. Six mm Whatmann No. 1 paper discs, each soaked in the extract concentrations (100 mg/ml, 50 mg/ml, 25 mg/ml, and 12.5 mg/ml), coconut water, and bitter leaf juice, were placed on the agar plates. A standard antibiotic (200 mg/10 ml) was used as a positive control, and sterile distilled water was used as a negative control on a separate plate. Diameters of zones of inhibition were measured after incubating the plates at 25°C for 48 hours. The plates were replicated in triplicate, and the mean zones of inhibition for each organism at each extract concentration were measured using a ruler and recorded.

Determination of Minimum Inhibitory Concentration (MIC)

2 ml of all the four-fold serial dilutions were used to impregnate sterile disks with a diameter of 5 mm. These impregnated disks were used to determine the MIC by placing them on the already streaked isolates of *Salmonella typhi* and *Streptococcus pyogenes* and incubated at 37°C for 24 hours. The zone of inhibition was measured using a ruler and recorded according to the concentration incorporated on the disk.

Determination of Minimum Bactericidal Concentration (MBC)

The MBC was determined by sub-culturing the prepared dilutions onto fresh Nutrient agar and further incubating for 24 hours at 37°C. These plates were observed for growth. The plates with the least concentration showing no growth were considered the MBC.

RESULTS

Phytochemical Constituents of Vernonia amygdalina, Cocos nucifera Water, and Their Mixture

Comparative phytochemical screening of Vernonia amygdalina, Cocos nucifera water, and their mixture revealed the presence of alkaloids, flavonoids, tannins, saponins, terpenoids, and carbohydrates in all samples. Anthraquinones were present only in Vernonia amygdalina.

Table 1: Phytochemical Composition of Bioactive Compounds

Phytochemical Components	Cocos nucifera Water	Vernonia amygdalina	Vernonia amygdalina and Cocos nucifera Water Mixture
Alkaloids	Present	Present	Present
Saponins	Present	Present	Present
Tannins	Present	Present	Present
Flavonoids	Present	Present	Present
Terpenoids	Present	Absent	Present
Anthraquinones	Absent	Present	Present
Carbohydrates	Present	Present	Present

Bacterial Susceptibility Standard of Amoxil**Table 2: Susceptibility Standard of Amoxil**

R	I	S
≤13	14-16	≥17

R: Resistant **I:** Intermediate **S:** Susceptible

≤: less than or equal to ≥: greater than or equal to

Antimicrobial Activity of the Mixture of Vernonia amygdalina and Cocos nucifera Water on Salmonella typhi and Streptococcus pyogenes

The antibiogram of the mixture of Vernonia amygdalina and Cocos nucifera water was found to be effective against Salmonella typhi and Streptococcus pyogenes, showing zones of inhibition as summarized in Table 3.

Table 3: Antimicrobial Activity of the Mixture of Vernonia amygdalina and Cocos nucifera Water on Salmonella typhi and Streptococcus pyogenes

Test Organisms	Concentration (mg/ml) Zone of Inhibition (mm)				Positive control (500mg/ml) Amoxicillin	Reaction
	100	50	25	12.5		
1st isolate of S. typhi	17±0.1	12.5±0.5	12±0.1	9.5±0.5	18	S
2nd isolate of S. typhi	17±0.1	12.5±0.5	12±0.1	9.5±0.5	18	S
3rd isolate of S. typhi	17±0.1	12.5±0.5	12±0.1	9.5±0.5	18	S
4th isolate of S. typhi	17±0.1	12.5±0.5	12±0.1	9.5±0.5	18	S
1st isolate of S. pyogenes	13±0.1	13±0.1	11±0.5	9±0.1	17	S
2nd isolate of S. pyogenes	13±0.1	13±0.1	11±0.5	9±0.1	17	S
3rd isolate of S. pyogenes	13±0.1	13±0.1	11±0.5	9±0.1	17	S
4th isolate of S. pyogenes	13±0.1	13±0.1	11±0.5	9±0.1	17	S

- **S:** Susceptible

Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) of the Mixture on Salmonella typhi and Streptococcus pyogenes

The MIC was determined using the agar disk diffusion and macro tube dilution methods, while the MBC was determined by sub-culturing the prepared dilutions into fresh media. The results in Table 4 show that the mixture of *Vernonia amygdalina* and *Cocos nucifera* water has significant antibacterial effects on *Salmonella typhi* at various concentrations. *Streptococcus pyogenes* showed partial sensitivity at 100 mg/ml.

Table 4: Minimum Inhibitory Concentration (MIC) and Minimum Bactericidal Concentration (MBC) of the Mixture of *Vernonia amygdalina* and *Cocos nucifera* Water on *Salmonella typhi* and *Streptococcus pyogenes*

Test Organisms	MIC (mg/ml)	MBC (mg/ml)
1st isolate of <i>S. typhi</i>	25	100
2nd isolate of <i>S. typhi</i>	25	100
3rd isolate of <i>S. typhi</i>	25	100
4th isolate of <i>S. typhi</i>	25	100
1st isolate of <i>S. pyogenes</i>	100	NA
2nd isolate of <i>S. pyogenes</i>	100	NA
3rd isolate of <i>S. pyogenes</i>	100	NA
4th isolate of <i>S. pyogenes</i>	100	NA

- NA: Not applicable

Discussion

Phytochemical screening of *Vernonia amygdalina* leaf extract and *Cocos nucifera* water (Table 1) revealed the presence of alkaloids, flavonoids, tannins, anthraquinones, saponins, terpenoids, and carbohydrates, while anthraquinones were present only in *Vernonia amygdalina*. Studies have shown that alkaloids and flavonoids are key compounds responsible for the antibacterial activities in higher plants [11]. Saponins, tannins, and alkaloids are well-documented plant metabolites known for their antimicrobial properties [12]. The presence of these phytochemicals in the mixture may contribute to its antibacterial activity, supporting their traditional use in treating various bacterial and fungal infections.

The antibacterial susceptibility test showed that all strains of the two clinical isolates, *Salmonella typhi* and *Streptococcus pyogenes* (Table 2), were highly susceptible to Amoxicillin (control). This observation aligns with the findings of Kassim et al. [13]. *Salmonella typhi* exhibited higher sensitivity to Amoxicillin with a zone of inhibition ranging from 18mm to 23mm, compared to *Streptococcus pyogenes*, which showed a range of 18mm to 20mm.

Comparing the antibacterial activity of the individual agents, *Cocos nucifera* water demonstrated a higher efficacy against the tested organisms than *Vernonia amygdalina*. *Cocos nucifera* water exhibited a zone of inhibition ranging from 17.5mm to 20.5mm on *S. pyogenes* and 19.0mm to 22.0mm on *S. typhi* at a 100mg/ml concentration. In contrast, *Vernonia amygdalina* ethanol extract showed a zone of inhibition from 16.0mm to 19.0mm on *S. typhi* and 16.0mm to 18.0mm on *S. pyogenes* at the same concentration. This higher antibacterial activity of *Cocos nucifera* water can be attributed to its high content of lactic acid, primarily in the form of free fatty acids and monoglycerides [14]. Nonetheless, *Vernonia amygdalina* also demonstrated good antibacterial activity.

The mixture of *Vernonia amygdalina* and *Cocos nucifera* water showed a broad-spectrum antibacterial activity, with efficacy increasing with higher concentrations. *Salmonella typhi* strains were highly sensitive to the mixture, with zones of inhibition ranging from 9.5mm to 17mm at

concentrations of 12.5mg/ml to 100mg/ml. *Streptococcus pyogenes* strains were less sensitive, showing zones of inhibition from 9.0mm to 13mm at the same concentrations.

The MIC and MBC tests revealed that the mixture had a good antibacterial effect on *Salmonella typhi*, with MIC and MBC values of 25mg/ml and 100mg/ml, respectively. For *Streptococcus pyogenes*, the MIC was 100mg/ml, but the MBC was not applicable. These results suggest that the mixture is bacteriostatic at lower concentrations and bactericidal at higher concentrations. This supports the traditional use of large quantities of extracts by traditional practitioners for treating infections [15].

Conclusion

The study investigated the antibacterial activity and minimum inhibitory concentration of the antibiogram mixture of *Vernonia amygdalina* and *Cocos nucifera* water. Phytochemical analysis confirmed the presence of alkaloids, flavonoids, tannins, anthraquinones, saponins, terpenoids, and carbohydrates in both plants, with anthraquinones found only in *Vernonia amygdalina*. The mixture exhibited a high potential to inhibit *Salmonella typhi* but was less effective against *Streptococcus pyogenes*, supporting its traditional use in therapy. This study highlights the potential application of these plants as alternative antibacterial agents.

Recommendations

Based on the findings of this research, the following recommendations are made for the development of new antibacterial drugs:

1. Exploration by Pharmaceutical Companies: Pharmaceutical companies should investigate the antibacterial properties of the mixture of *Vernonia amygdalina* and *Cocos nucifera* water as a potential source of new antibacterial drugs.
2. Further Studies: Additional research should be conducted on these plants to uncover more of their potential in addressing gastrointestinal infections and other bacterial diseases.

DECLARATION

ETHICS APPROVAL AND CONSENT TO PARTICIPATE: In compliance with local guidelines, the collection of *Vernonia amygdalina* (Bitter leaf) and *Cocos nucifera* (Coconut) used in this study followed ethical standards and regulations. The plant material was collected from Bakindogo market in Kaduna, Nigeria. The identification and authentication of the plant were performed by a botanist in the Department of Biological Sciences, Kaduna State University.

Furthermore, it's important to note that the plant material used in this study was cultivated rather than wild. No endangered or protected species were involved in this research.

CONSENT FOR PUBLICATION: Not applicable

AVAILABILITY OF DATA AND MATERIALS: As for the data availability statement, I confirm that all data generated or analyzed during this study are included in the published article. This consists of the phytochemical composition of the *Curcuma longa* methanol extract, antibacterial activity results, minimum inhibitory concentration (MIC), and minimum bactericidal concentration (MBC) values.

COMPETING INTERESTS: The authors declare that they have no competing interests

FUNDING: This research was funded by the first author; no any organization or society fund the research.

AUTHORS' CONTRIBUTIONS: EOM carry out the experimental aspect of the research and also contributed to the write up, IAO supervised the experimental aspect and also contribute to the data presentation and the write up, AIU designed the study and also the major contributor in writing the manuscript data presentation and AAD also contributed by supervising the experimental aspect, analyzing the data and the write up.

ACKNOWLEDGEMENTS: Not applicable

REFERENCES

1. National Bureau of Statistics (NBS). (2019). Nigerian Gross Domestic Product Report. Retrieved from <https://www.nigerianstat.gov.ng/>
2. Aragon, C. M. (2000). Informal economy, informal sector, and legal rights. UNU/WIDER, Working Paper No. 2000/127.
3. Sertoglu, K., Ugural, S., & Bekun, F. V. (2017). The causal nexus between economic growth and agricultural development: Evidence from BRICS and MINT countries. *Eurasian Economic Review*, 7(3), 437-450.
4. Lopes, H. (2010). Adoption of Improved Maize and Common Bean Varieties in Mozambique. Dissertation for Award of MARD degree at Sokoine University of Agriculture, Morogoro.
5. Gandhi, M., & Singh, Y. (1989). *On the Mythology of Indian Plants*. Rupa & Co., New Delhi, India.
6. Oseni, K., & Babatunde, O. (2016). Vernonia amygdalina: An Underutilized Vegetable with Nutraceutical Potentials – A Review. *Turkish Journal of Agriculture – Food Science and Technology*, 4(9), 763-768. <https://doi.org/10.24925/turjaf.v4i9.763-768.570>
7. Nascimento, G. G. F., Locatelli, J., Freitas, P. C., & Silva, G. L. (2000). Antibacterial activity of plant extracts and phytochemicals on antibiotic-resistant bacteria. *Brazilian Journal of Microbiology*, 31, 247-256.
8. Tongson, C. P. M., Davidson, P. M., Mahakarnchanakul, W., & Vibulsresth, P. (2005). Antimicrobial Effect of Thai Spices against *Listeria monocytogenes* and *Salmonella typhimurium* DTTO4. *Journal of Food Protection*, 68, 2054-2058.
9. Trease, G. E., & Evans, W. C. (1989). *Pharmacognosy* (11th ed.). Bailliere Tindall, London, 45-50.
10. Harborne, J. B. (1984). *Phytochemical Methods: A Guide to Modern Techniques of Plant Analysis*. Chapman and Hall.
11. Cordell, G. A., Quinn-Beattie, M. L., & Farnsworth, N. R. (2001). The potential of alkaloids in drug discovery. *Phytotherapy Research*, 15, 183-205.
12. Tschesche, R. (1971). Advances in the Chemistry of Antibiotic Substances from Higher Plants. *Journal of Pharmacognosy and Phytochemistry* (pp. 274-289). Springer, Berlin, Heidelberg.

13. Kassim, A., Omuse, G., Premji, Z., & Revathi, G. (2016). Comparison of Clinical Laboratory Standards Institute and European Committee on Antimicrobial Susceptibility Testing guidelines for the interpretation of antibiotic susceptibility at a University teaching hospital in Nairobi, Kenya: A cross-sectional study. *African Journal of Laboratory Medicine*, 5(1), 15-21.
14. Sihombing, D., Purba, R. H., & Sirait, R. S. (2012). The diversity of coconut in Indonesia: Collection, characterization, and utilization. *Journal of Plantation Crops*, 40(3), 213-220.
15. Akinyemi, K. O., Oluwa, O. K., & Omomigbehin, E. O. (2006). Antimicrobial Activity of Crude Extracts of Three Medicinal Plants Used in South-West Nigerian Folk Medicine on Some Food Borne Bacterial Pathogens. *African Journal of Traditional, Complementary and Alternative Medicines*, 3(4), 13-22.

MYCOLOGICAL ANALYSIS OF SPOILT *Colocassia esculenta* OBTAINED FROM SELECTED MARKETS (KAWO AND BAKINDOGO) WITHIN KADUNA METROPOLIS**Muhammed Rashidat**

Department of Applied Biology, Kaduna Polytechnic Tundunwada, Kaduna State, Nigeria

Ocheme Juliana

Department of Applied Biology, Kaduna Polytechnic Tundunwada, Kaduna State, Nigeria

Abdulgafar Ishola Uthman

Department of Applied Biology, Kaduna Polytechnic Tundunwada, Kaduna State, Nigeria

ORCID: 0009-0004-8107-7057

Abstract

Background: Cocoyam (*Colocasia esculenta*) is a staple food crop in many regions, but it is highly susceptible to spoilage caused by fungal pathogens. This study aimed to identify the fungal organisms associated with rot in cocoyam corms purchased from Kawo and Bakindogo markets in Kaduna State, Nigeria. Understanding the fungal species involved and their impact on cocoyam can help develop better storage and handling practices to improve food safety.

Results: Spoiled cocoyam corms were examined, and tissues were aseptically cultured on Sabouraud Dextrose Agar. The isolated fungi were purified and identified through macroscopic and microscopic analyses using the slide culture technique. The fungi identified included *Aspergillus* spp., *Rhizopus* spp., *Mucor* spp., *Penicillium* spp., and *Fusarium* spp. Notably, *Rhizopus*, *Mucor*, and *Fusarium* species caused extensive tissue maceration. These pathogens likely infiltrated the cocoyam corms via air, wounds, harvesting tools, and pests.

Conclusions: The study identified several fungal pathogens responsible for cocoyam spoilage, with *Rhizopus*, *Mucor*, and *Fusarium* species causing significant damage. Proper handling and storage of cocoyam corms are crucial to prevent contamination and subsequent spoilage. Additionally, some of these fungi produce mycotoxins, posing health risks to humans and animals. Implementing better agricultural and storage practices can mitigate these risks and enhance cocoyam shelf life and safety.

Keywords: Cocoyam, *Colocasia esculenta*, spoilage, fungal pathogens, food safety

BACKGROUND

Cocoyam is a staple food crop of significant economic value in Nigeria, ranking third in importance after cassava and yam among root and tuber crops cultivated and consumed in the country [1]. Nutritionally, cocoyam surpasses both yam and cassava, offering higher protein, mineral, and vitamin content, with its starch being more easily digestible [2]. Nigeria is the world's top producer of cocoyam, yielding approximately 3.27 million metric tonnes annually, which constitutes about 36 percent of the global production [3].

The yield and quality of cocoyam are adversely affected by various abiotic and biotic factors, with diseases caused by fungi [4][5] and bacteria [6][7] being significant threats. Fungal and bacterial diseases pose serious challenges to the cultivation of *Colocasia esculenta* in Nigeria. In recent years, cocoyam production has been declining, with 2012 figures showing an annual yield of about 15,993 qq, meeting only 19 percent of local consumption needs [8]. This decline is largely due to prevalent diseases, the most impactful being "mal seco," which has significant agricultural and economic consequences. However, the development of a new cultivar named Nazareno in Puerto Rico has mitigated some of the issues associated with mal seco.

Bacterial leaf blight (BLB), first identified as a major disease affecting cocoyam in Nigeria, is caused by *Xanthomonas axonopodis* pv. *dieffenbachiae*, identified through pathogenicity and biochemical tests [9]. The disease's status in Northern Nigeria, another key cocoyam-growing region, remains undocumented. Polymerase chain reaction (PCR)-based molecular characterization has proven to be an effective, sensitive, and rapid method for assessing genetic relationships among pathogenic organisms [10].

Fungal pathogens associated with the storage rot of cocoyam include *Aspergillus niger*, *Fusarium solani*, *Botryodiplodia theobromae*, *Fusarium oxysporum*, *Corticium rolfsii*, *Geotrichum candidum*, and *Sclerotium rolfsii* [11]. The initial stages of leaf blight disease manifest as small, often circular brown to olive-green spots. According to Graham, the fungus thrives in wet conditions, with spores produced on the leaves spreading through wind and rain to nearby plants or new locations. The fungus kills leaf cells, resulting in brown spots that rapidly expand, producing yellow margins and red-brown droplets on the undersides, which dry into dark pellets [12]. Infections typically start at the leaf edges where moisture accumulates. A white ring can form near the spot margins within a few days, indicating spore production, which quickly dries out in the sun unless it remains cloudy or rainy. Besides wind, the disease can also spread through infected suckers or planting material with cut ends exposed to wet conditions.

Statement of the Problem

While numerous microorganisms, particularly molds, are associated with cocoyam decay, few are identified as primary pathogens. Pathogenicity varies depending on storage conditions, with fungi predominantly responsible for spoilage. Factors such as high respiratory activity and storage conditions influence spoilage, with fungi like *Fusarium solani* and *Aspergillus niger* being common culprits [13].

Significance of the Study

This study aims to enhance farmers' understanding of fungal infections and cocoyam spoilage, aiding researchers and academicians in related research endeavors. Additionally, it seeks to improve indigenous storage practices to increase on-farm storage life for certain cocoyam varieties.

Hence, the aim of this study is to conduct a mycological analysis of spoiled *Colocasia esculenta* obtained from Bakindogo and Kawo markets.

METHODS

Sample Collection

Twenty (20) tubers of *Colocasia esculenta* were sourced from Bakindogo and Kawo Market, Kaduna. These were then transported to the Department of Applied Biology, Kaduna Polytechnic.

Glassware Sterilization

Glassware underwent thorough cleaning with tap water and detergent solution, followed by rinsing with distilled water to remove any residual detergent. Subsequently, they were sterilized in a steam oven at 160°C for 15 minutes and allowed to cool to room temperature before use. The working surface was disinfected with ethanol to minimize contamination.

Media Preparation

Sabouraud Dextrose Agar (SDA) was prepared according to manufacturer's instructions and sterilized at 121°C for 15 minutes using an autoclave. The prepared media was dispensed into petri dishes for further analysis.

Fungi Isolation

Spoiled tissues from the *Colocasia esculenta* tubers were obtained using sterile knife and forceps. A section of the spoiled part was excised with the sterile knife and inoculated onto the agar plate by inserting the rotten portions into the center of the plate. The plates were then incubated at room temperature, and the growth was monitored and recorded daily.

3.5 Pure Culture Isolation

Isolated fungi were sub-cultured onto fresh medium in new petri dishes to obtain pure single cultures.

Macroscopic Identification of Isolates

Identification of isolates was based on the gross morphological appearance of fungal colonies on Sabouraud Dextrose Agar (SDA) culture medium, along with microscopic evaluation using the slide culture technique. Reference was made to the Fungal Atlas manual.

Microscopic Identification of Isolates

Portions of the growth culture on the plate were taken with a sterile inoculation needle and placed onto clean glass slides. Lactophenol stain was applied to the sample, traced gently, and covered with a cover slip. The prepared smear was then viewed under x10 and x40 objectives of the microscope.

RESULTS

The results detailing the colonial morphology and microscopic characteristics of fungi responsible for cocoyam spoilage sourced from Kawo and Bakindogo markets are summarized in Table 1. A total of five fungal isolates were identified from decayed cocoyams. These isolates include *Mucor* spp., *Fusarium* spp., *Rhizopus* spp. responsible for soft rots, while *Penicillium* spp. and *Aspergillus* spp. were associated with dry rot.

Macroscopic and Microscopic Characteristics of Fungal Isolates from Rotten *C. esculenta*

Table 1 presents the macroscopic and microscopic observations of fungal isolates from *Colocassia esculenta*. The findings reveal the presence of five fungal species (*Mucor* spp., *Aspergillus* spp., *Penicillium* spp., *Fusarium* spp., and *Rhizopus* spp.) isolated from both Bakindogo and Kawo markets.

Table 1: Macroscopic and Microscopic Characteristics of Fungal Isolates from Rotten *C. esculenta*

Fungi Species	Macroscopic Observation	Microscopic Observation
<i>Mucor</i> spp.	Colonies appeared pale grayish-brown at room temperature	Sporangiophores were single and non-septate with an absence of rhizoids
<i>Fusarium</i> spp.	Colonies exhibited fluffy to cottony-like appearance with colors ranging from yellow, green, to pink	Large, single, septated macroconidia were observed
<i>Aspergillus</i> spp.	Colonies displayed colors ranging from white to brownish on the reverse side	Conidiophores with hyphae appeared hyaline brown to black, septated
<i>Penicillium</i> spp.	Colonies were filamentous with rapid growth, showing a powdery texture and white to gray-green color	Conidia appeared as unbranching chains at the tips of phialides, with smooth, short conidiophores
<i>Rhizopus</i> spp.	Colonies had a deeply cottony texture, transitioning from white to gray-brown on the surface	Broad, non-septate hyphae with presence of rhizoids and stolons; brown sporangiophores

Percentage Occurrence of Fungal Isolates from Bakindogo and Kawo Markets

The dominant fungal contaminants in each market sample were identified, with *Rhizopus* spp. being the most prevalent in Kawo market (30%), followed by *Mucor* spp., *Fusarium* spp., and *Aspergillus* spp. (all at 20%), while *Penicillium* spp. had the lowest occurrence (10%). In Bakindogo market, *Mucor* spp. and *Fusarium* spp. were equally prevalent at 30%, followed by *Penicillium* spp. (20%), and *Aspergillus* spp. and *Rhizopus* spp. (both at 10%).

Table 2: Percentage Occurrence of Fungal Isolates from Bakindogo and Kawo Markets

Market	Fungal Isolates	Frequency	Percentage
Kawo	<i>Mucor</i> spp.	2	20%
	<i>Rhizopus</i> spp.	3	30%
	<i>Fusarium</i> spp.	2	20%
	<i>Aspergillus</i> spp.	2	20%
	<i>Penicillium</i> spp.	1	10%
Bakindogo	<i>Mucor</i> spp.	3	30%
	<i>Rhizopus</i> spp.	2	10%
	<i>Fusarium</i> spp.	1	30%
	<i>Aspergillus</i> spp.	2	10%
	<i>Penicillium</i> spp.	2	20%

DISCUSSION, CONCLUSION, AND RECOMMENDATION

Discussion

The fungal species identified in spoiled cocoyam included *Fusarium* spp, *Penicillium* spp, *Aspergillus* spp, *Mucor* spp, and *Rhizopus* spp. Similar findings were reported by Ugwuanyi [14],

who identified *Aspergillus niger*, *Botryodiplodia* spp., *Corticium rolfsii*, *Geotrichum candidum*, and *Fusarium* spp. as rot-causing pathogens in cocoyam. Frank and Kingsley [15][16], further corroborated these findings, establishing these organisms as pathogens of root and tuber crops. [17] isolated *Rhizopus* and *Mucor* species, fast-growing fungi known to cause rot in cocoyam. Additionally, Onuegbu (1999) [18] isolated *Aspergillus* and *Fusarium* species from spoiled cocoyams.

Improper storage and harvesting practices, along with post-harvest injuries, likely contribute to severe rot occurrence in cocoyam. These fungi constitute a significant threat to cocoyam production, infecting the crop through factors such as temperature and relative humidity. Injuries sustained after harvest, whether from careless handling, insect damage, or direct penetration by pathogens, exacerbate the problem. Proper packaging, handling, and the use of clean planting equipment and healthy planting materials are crucial to mitigate these risks.

Conclusion

Mucor spp, *Aspergillus* spp, *Rhizopus* spp, *Fusarium* spp, and *Penicillium* were identified as the fungal species responsible for post-harvest rot in *C. esculenta*.

Recommendations

Based on these findings, the following recommendations are proposed to prevent spoilage of *C. esculenta*:

1. Application of Shavit F72 WP and Metalaxyl Mancozeb at manufacturer's recommended rates to protect cocoyam seeds against tuber rot disease.
2. Conduct further experiments post-treatment and storage to assess the presence or absence of chemical residues in the tubers.
3. Explore the anti-fungal activities of botanical extracts from *Z. officinale* rhizomes and *P. nigrum* seeds against rot-causing organisms, and conduct additional studies to determine their suitability in protecting cocoyam tubers.

DECLARATION

ETHICS APPROVAL AND CONSENT TO PARTICIPATE: In compliance with local guidelines, the collection of *Colocassia esculenta* (Cocoyam) used in this study followed ethical standards and regulations. The plant material was collected from Bakindogo and Kawo market in Kaduna, Nigeria. The identification and authentication of the plant were performed by a botanist in the Department of Biological Sciences, Kaduna State University.

Furthermore, it's important to note that the plant material used in this study was cultivated rather than wild. No endangered or protected species were involved in this research.

CONSENT FOR PUBLICATION: Not applicable

AVAILABILITY OF DATA AND MATERIALS: As for the data availability statement, I confirm that all data generated or analyzed during this study are included in the published article. This consists of the macroscopic and microscopic of fungal characteristics isolated from spoilt *Colocassia esculenta* (Cocoyam) and percentage occurrence values.

COMPETING INTERESTS: The authors declare that they have no competing interests

FUNDING: This research was funded by the first and second author; no any organization or society fund the research.

AUTHORS' CONTRIBUTIONS: AIU carry out the experimental aspect of the research, designed the study and also the major contributor in writing the manuscript and MR also carryout the experimental aspect and also contribute to the data presentation and the write up.

ACKNOWLEDGEMENTS: Not applicable

REFERNCES

1. Baruwa, O.I. and Oke, J.T.O. (2012). Analysis of the technical efficiency of small-holder Cocoyam farms in Ondo State, Nigeria. *Tropicultura*. 30(1):36-40.
2. Odebunmi, E.O., Oluwaniyi, O.O., Sanda, A.M. and Kolade, B.O. (2007). Nutritional composition of selected tubers and root crops used in Nigeria food preparations. *International Journal of Chemistry*, 17(1):37-43.
3. Zarafi, A.B., Chindo, P.S., Shenge, K.C. and Alao, S.E.L. (2012). Investigations on Cocoyam diseases in north western Nigeria. In: Progress Report of Research Projects, Institute for Agricultural Research, Samaru, Zaria, Nigeria, 211-212.
4. Ugwuoke, K.I., Onyeye, C.C. and Tsopmbeng, N.G. (2008). The efficacy of botanical protectants in the storage of Cocoyam. *Journal of Tropical Agriculture, Food, Environment and Extension*. 7:93-98.
5. Bandyopadhyay, R., Sharma, K., Onyeka, T.J., Aregbesola, A. and Lava-Kumar, P. (2011). First report of taro (Cocoyam (*Colocasia esculenta*) leaf blight caused by *Phytophthora colocasiae* in Nigeria. *American Phytopathological Society Journal*. 95(5):918.
6. Amodu, U.S. and Akpa, A.D. (2012). Determination of the relative susceptibility of roots and tubers to the soft rot bacteria (*Pectobacterium* spp.). *New Clues in Sciences*. 2:97-103.
7. Opara, E., Njoku, C.T. and Isaiah, C. (2013). Potency of some plant extracts and pesticides on bacterial leaf blight diseases of Cocoyam (*Colocasia esculenta*) in Umudike, South Eastern Nigeria. *Greener Journal of Agricultural Sciences*. 3(5):312-319.
8. Cortés, M., and Gayol, L. (2009). Descriptive analysis of consumer preferences on tubers in Puerto Rico. *The Journal of Agriculture of the University of Puerto Rico*. 93(3/4):273-276.
9. Chartered Management Institute. Commonwealth Mycology Institute, Distribution Maps of Plant Diseases, Map No. 466, Edition 3. *Phytophthora colocasiae*. 2007. Commonwealth Agricultural Bureau, Wallingford, Oxfordshire, UK.
10. Diane, F., Santos, M., Boix, A., De Cara, M., Trillas, I., Aviles, M. and Tello, J.C. (2016). Grape Marc compost tea suppressiveness to plant pathogenic fungi: role of siderophores. *Compost Science Utilization*. 14: 48-53.
11. Ohazurike, N.C., Arinze, A.E., Onuh, M.O. and Ozurumba, C.I. (2003). *The Nature of Plant Pests and Disease*. Supreme Publishers, 47 Okigwe Road Owerri, Nigeria. 33-38.
12. Graham, J. (2000). Improved plant protection in Solomon Islands. Extension factsheet. 14: taro leaf blight 1-2.
13. Nwifo, M. I., & Atu, U. G. (1987). Diseases of Cocoyam in Nigeria. *Tropical Root Crops Journal*, 5(2), 50-55.
14. Ugwuanyi, J.O., & Obeta, A.N. (1996). Fungi associated with storage of Cocoyam (*Colocasia* spp.) in Nsukka, Nigeria.

15. Frank, J., & Kingsley, R. (2014a). Isolation, Identification and Pathogenicity of Fungi Associated with Cocoyam (*Colocasia esculenta*) Spoilage. *Journal of Plant Pathology*, 96(2), 245-256.
16. Frank, J., & Kingsley, R. (2014b). Pathogenicity of Fungi Associated with the Post-Harvest Rot of Cocoyam Corms in Anambra State. *International Journal of Agriculture and Biology*, 16(3), 312-319.
17. Okigbo, R.N. (2003). Fungi associated with peels of post-harvest yams (*Dioscorea* spp.) in storage. *Global Journal of Pure and Applied Sciences*, 9(1), 19-24.
18. Onwueme, I.C., & Charles, W.B. (1994). Cultivation of cocoyam tropical root and tuber crops: production, perspectives and future prospect. *FAO Plant Production and Protection*, 26, 139-161.
19. Onuegbu, B.A. Composition of four cocoyam cultivars and their tolerance to corm rot. *Tropical Science*. 1999; 39:136-139 (EScience Press).

ARE THE INDIVIDUALS WITH MENTAL ILLNESS HAPPY?**Tülay YILDIRIM ÜŞENMEZ**

Assistant Professor Doctor, Dicle University, Atatürk Health Science Faculty, Department of Nursing, Diyarbakir, Turkey, PhD, RN

<https://orcid.org/0000-0002-9979-9654>

Aslan DİKMEN

Master Student, Dicle University, Health Sciences Institute, Department of Psychiatric and Mental Health Nursing, Diyarbakir, Turkey

<https://orcid.org/0009 0002 6815 2273>

Abstract

Aim: The present study aimed to evaluate the happiness level of individuals with mental illness and the effect of descriptive characteristics on happiness.

Methods: The present study was a descriptive design. Sixty-five (65) individuals with mental illness were included in the study. The present study was carried out in psychiatry outpatient clinics between April and May 2024. Descriptive Characteristics Form and Subjective Happiness Scale (SHS) were utilized to gather data.

Results: The total mean score of the individuals with mental illness were 14.38 ± 2.71 on the SHS. There was a statistically significant difference between education level, working status, presence of a history of mental illness in the family, diagnosis of the illness, and duration of the illness the total mean score of the SHS ($p < 0.05$).

Conclusion: In the current study, it can be stated that the happiness of these individuals were at a moderate level. It can also be stated that the level of educational level, working status, presence of a history of mental illness in the family, diagnosis of the illness, and duration of the illness of individuals with mental illness may affect their happiness level.

Keywords: Happiness, Mental Illness, Mental Health Nursing, Psychiatric Nursing

INTRODUCTION

Mental illnesses manifest through cognitive, social, and managerial impairments, leading to disability. Consequently, individuals, as social beings, may experience deficiencies in communication, productivity, and cognitive functions (Yıldız, 2011). Following the onset of mental illness, there can be disruptions in an individual's occupational productivity, social interaction, thinking, planning, problem-solving, adaptation, and self-care capabilities (Çam & Yalçiner, 2018; Polat & Kutlu, 2019).

According to the World Health Organization, health is defined as a state of complete physical, social, and mental well-being. Mental health, therefore, involves an individual's harmony with themselves, their environment, and other individuals. This harmony varies and demonstrates flexibility to certain

extents in each person. It is indicated that an individual who is functional, productive, creative, capable of love, and able to enjoy themselves within their society has good mental health (Budak & Korkmaz, 2020; Yıldız, 2011).

Given the positive impact of happiness on mental health, it can be considered one of the most critical concepts in the field of mental health. Happiness is a multifaceted concept with various definitions and dimensions specific to different domains. Generally, the concept of happiness is defined as the state of mind characterized by pleasure and satisfaction, reflecting an individual's positive evaluation of their own life and subjective well-being (Şahin & Altun, 2022; Tozoğlu, 2023; Veenhoven, 2000; Şahin & Şahin Altun, 2020; Zhang & Chen, 2019). Former studies have indicated that individuals diagnosed with schizophrenia and similar conditions can experience happiness (Fervaha, 2016; Saperia et al., 2018; Şahin & Şahin Altun, 2020).

It has been noted that the frequency and severity of negative symptoms observed in individuals with mental illness, functional impairments, perceived stress levels, uncertainty, and hopelessness significantly impact their levels of happiness and the course of their illness (Saperia et al., 2018). Former studies have reported that the concept of happiness in individuals with schizophrenia and other mental disorders is influenced by numerous adverse factors such as stigma, social isolation, loneliness, depression, and anxiety. Similarly, it has been stated that high levels of happiness in individuals diagnosed with schizophrenia, etc., increase treatment compliance, coping, and hope levels, and reduce the recurrence rate of the illness and hospitalizations (Buckland et al., 2013; Fervaha et al., 2016; Olçun & Altun, 2017; Saperia et al., 2018). Other studies conducted with individuals with mental disorders have also highlighted that factors such as lower levels of depressive symptoms, appropriate physical and environmental conditions, positive interactions with family members, education level, and frequency of communication with family positively influence individuals' levels of happiness (Olçun & Altun, 2017; Saperia, 2018). It has been suggested that happiness is an essential concept for individuals with mental disorders to comply with and participate in treatment, take responsibility, improve their quality of life, and reintegrate into society (Buckland et al., 2013; Eglit et al., 2018; Şahin & Şahin Altun, 2020). Seedhouse's study emphasizes that happiness positively affects individuals' physical and mental health (Seedhouse, 2004). Additionally, it has been reported that happiness provides the strength to cope with mental issues (Helliwell et al., 2012). It has been indicated that having emotions such as hope and happiness provides individuals with mental disorders the advantage of coping with their illness and maintaining treatment motivation (Olçun & Altun, 2017).

A review of the literature reveals that studies on the levels of happiness in individuals with mental illness are limited. Nurses can lend positively to the quality of nursing care by implementing various psychotherapeutic interventions to enhance the happiness levels of individuals with mental disorders. In light of this information, this study aims to investigate the happiness levels of individuals with mental disorders and contribute to the literature.

The study seeks answers to the following questions:

- What is the happiness level of individuals with mental illness?
- Do sociodemographic characteristics affect the levels of happiness of individuals with mental illness?

METHOD

Design and Sample of the Study

This descriptive design study was completed with sixty-five individuals diagnosed with mental illness (based on the DSM-V, they were diagnosed with anxiety disorders, mood disorders,

psychosis, and related disorders, obsessive-compulsive disorder, substance use disorder) who met the inclusion criteria and applied to psychiatric outpatient clinics between April and May 2024. This study included individuals with mental illness who volunteered to participate in the study, able to communicate, 18 years of age and above, had in remission, had their drug use, drug side effects, and illness symptoms followed regularly by the psychiatrists.

Data Collection Tools

Descriptive Characteristics Form: This form include of nine questions (i.e., age, marital status, gender, employment status, education status, presence of a history of mental illness in the family, duration of the illness, diagnosis of illness, and individuals with whom the patient lives).

-Subjective Happiness Scale: The scale was designed by Lyubomirsky and Lepper (1999) to assess universal subjective happiness. The scale is a 7-point Likert-type scale consisting of four items. It has been demonstrated that the Subjective Happiness Scale possesses internal consistency (Lyubomirsky & Lepper, 1999). The Turkish adaptation of the scale was conducted by Doğan and Totan (2013), and the Cronbach's Alpha coefficient was determined to be 0.65 among university students. In the present study, the Cronbach's Alpha coefficient of the scale was calculated to be 0.84.

Data Analysis

IBM SPSS 25.0 program was utilized in the analysis of the data. $p < 0.05$ was considered significant for the study. In the data analysis; percentage distribution and arithmetic mean were used for evaluating the descriptive characteristics. In the comparison of descriptive characteristics and scale; Kruskal Wallis test, and Mann Whitney-U for examining the difference between the groups were utilized.

Ethical Consideration

Before starting the study, approval from the Ethics Committee of a University (Approv. No: 668597/2024) and legal permission from the hospital where the study was conducted were obtained. Individuals with mental illness and their primary caregiver were notified about the aim of the study and that their information would be kept confidential and that they could withdraw from the study at any time. Additionally, the study was conducted in accordance with the Principles of the Declaration of Helsinki and by obtaining written consent from the individuals with an 'Informed Voluntary Consent Form'.

RESULTS**Table 1.** Comparison of SHS Total Mean Scores of the Participants in Terms of Their Descriptive Characteristics (N=65)

Descriptive Characteristics		N	%	SHS
	18-28	20	30.8	15.20±3.10
Age Groups (Years)	29-39	19	29.2	14.84±2.63
	40 and above	26	40.0	13.42±2.21
			Test Value Significance	KW=4.645 p=0.098
Gender	Male	20	30.8	14.17±2.69
	Female	45	69.2	14.85±2.77
			Test Value Significance	MNU=397.000 p=0.447
Education Level	Primary School	33	50.8	13.42±2.13
	High School	22	33.8	14.81±2.77
	University	10	15.4	16.60±2.98
			Test Value Significance	KW=10.466 p=0.005
Marital Status	Married	29	44.6	14.24±2.83
	Single	36	55.4	14.50±2.64
			Test Value Significance	MN-U=513.000 p=0.905
Working Status	Employed	23	35.4	15.56±2.77
	Unemployed	42	64.6	13.73±2.47
			Test Value Significance	MN-U=284.000 p=0.006
History of Mental Illness in Family	Yes	22	33.8	13.22±2.87
	No	43	66.2	14.97±2.45
			Test Value Significance	MN-U=285.000 p=0.009
Diagnosis of the Illness	Psychosis and Related Disorders	17	26.2	13.11±2.62
	Mood Disorders	18	27.7	13.35±2.21
	Anxiety Disorders	15	23.1	15.93±2.25
	Other (Obsessive-Compulsive Disorders)	15	23.1	15.53±2.72
	Substance Use Disorder)			Test Value Significance
Duration of the Illness (Years)	0-5	25	38.5	15.68±2.92
	6-10	14	21.5	14.21±2.11
	11-15	11	16.9	13.54±2.06
	16 and above	15	23.1	13.00±2.47
			Test Value Significance	KW=9.107 p=0.028
Whom you live with	Parents	28	43.1	14.32±2.53
	Spouse or/and children	27	41.5	14.55±2.66
	Other (Alone, sibling, relative, friend etc)	10	15.4	14.10±3.51
			Test Value Significance	KW=0.400 p=0.819
TOTAL		65	100.0	
SHS Total Mean Score	Mean±SD			(14.38±2.71)

Abbreviation: SHS, Subjective Happiness Scale

It was determined that 40.0% of the individuals with mental illness were between the ages of 40 and above, 69.2% were female, 50.8% were primary school graduate, 44.6% were married, 44.6% were unemployed, 66.2% had no history of mental illness in the family, 27.7% were diagnosed with mood disorders, 38.5% had had the illness for 0–5 years, and 43.1% lived with their parents (Table 1).

Comparison of the individuals' mean SHS total score according to descriptive characteristics revealed statistically significant differences associated with educational level, working status, presence of a history of mental illness in the family, diagnosis of the illness, and duration of the illness ($p < 0.05$). However, there were no statistically significant differences with respect to the individuals' age groups, gender, marital status, and individuals with whom they lived in terms of the SHS ($p > 0.05$) (Table 1).

The total mean score of the individuals with panic disorder were 14.38 ± 2.71 on the SHS (Table 1).

DISCUSSION

The result of the study was that, according to the total mean scores of the scale, it can be said that the happiness of individuals with mental illness were at a moderate level. Previous studies have found that the subjective happiness level of individuals diagnosed with schizophrenia is low or moderate (Buckland et al., 2013; Kayaoğlu & Ay, 2024, Şahin & Şahin Altun, 2020). Fervaha et al. (2016) found in their study that individuals with psychotic disorders had lower subjective well-being than normal healthy individuals. In another study, it was reported that individuals diagnosed with schizophrenia showed lower levels of subjective happiness, well-being and life satisfaction than healthy individuals, and it was determined that cognitive impairments in these individuals were an important factor in lower life satisfaction (Gutiérrez-Rojas et al., 2021). According to a study, it was stated that as the level of depression increases in individuals with depressive disorder, the level of happiness decreases. This finding shows that depression negatively affects individuals' general perception of life satisfaction and happiness. It is a common finding in the mental health field that as depression increases, individuals feel more unhappy and less satisfied with life (Spinoven, et al., 2021). Bergsma and Veenhoven (2011) study shows that individuals with substance abuse and anxiety disorders generally have higher levels of happiness, but individuals with mood disorders are rarely happy. This emphasizes that the effects of different psychiatric disorders on individuals' happiness levels are variable and that individuals with mood disorders need special interventions to improve their quality of life (Bergsma and Veenhoven, 2011). Mankiewicz et al. (2013) stated in their study that psychosis alone does not reduce the happiness level of individuals, but when it is comorbid with depression, it reduces the happiness level. This shows that depression increases the individual's symptoms of depression, negatively increases the effects of psychosis, and reduces the level of happiness (Mankiewicz et al., 2013).

There was a statistically significant difference between education level, working status, presence of a history of mental illness in the family, diagnosis of the illness, and duration of the illness the total mean score of the SHS. The highest SHS total mean score was in the university graduate group. The total mean score of the SHS of employed individuals were higher than that of unemployed ones. Individuals with a history of mental illness in the family had a lower total mean score on the SHS than those who did not. The lowest SHS total mean score was in the individuals diagnosed with psychosis and related disorders and in the 16 year and above group. In the study of Kayaoğlu and Ay (2024), found a significant relationship between living with family, education level, marital status, and employment status and subjective happiness. The fact that university graduates have the highest happiness score emphasizes the positive effect of education on life satisfaction, while the fact that employed individuals have higher happiness scores than the unemployed shows that employment contributes to psychological and social well-being. According to the study of Jeste et al. (2015), it was stated that family dynamics have positive effects on the happiness levels of individuals with mental illness (Jeste et al., 2015). According to a study, it was stated that the working status of individuals with severe mental illness is a very important factor on the subjective happiness levels of these individuals. It was stated that many individuals with severe mental illness have a desire to work, but their happiness levels are low due to insufficient work rates (Gühne et al., 2021). In

another study, the effect of the educational status of individuals with mental illness on the happiness levels of these individuals was examined in detail. According to this study, it was stated that individuals with a higher level of education with mental illness have better coping skills with the symptoms of mental illness, and this is an important factor in increasing their level of happiness. Educated individuals can combat the symptoms of mental illness more effectively because they have higher awareness and more effective coping mechanisms compared to uneducated individuals. These competencies are considered as potential factors that increase happiness levels in individuals with mental illness (Halpern-Manners et al., 2016). The happiness levels of individuals with mental illness can be increased by providing appropriate personalized treatment and support. Individualized pharmacological treatments, psychoeducation and psychosocial supports applied to these individuals can positively affect the quality of life and level of happiness. Individuals with mental disorders can accept their current situation and adapt to it. The severity of symptoms seen in mental disorders can affect the level of happiness; Individuals with mild and controllable symptoms may experience higher levels of happiness. The happiness levels of individuals with mental illness can be increased by providing appropriate family support and employment opportunities. In addition, the short duration of the disease and the mild disease symptoms and prognosis can increase the level of happiness. The happiness levels of individuals with mental disorders can be increased when the necessary support is provided. However, stigma and discrimination can negatively affect happiness levels. Increased awareness and acceptance in society can help these individuals become happier. These factors are why individuals with mental disorders generally have moderate levels of happiness.

CONCLUSION and RECOMMENDATION

It was stated that the happiness of individuals with mental illness were at a moderate level. It can be said that the level of educational level, working status, presence of a history of mental illness in the family, diagnosis of the illness, and duration of the illness of individuals with mental illness may affect their happiness level. It can also be recommended that many psychotherapeutic interventions to increase the happiness level of individuals with mental illness. In addition, multicenter, randomized controlled studies with larger samples can be recommended.

REFERENCES

- Bekirođlu, S., & Özden, S. A. (2021). Türkiye’de ağır ruhsal hastalığa sahip bireylere ve ailelerine yönelik psikososyal müdahaleler: sistematik bir inceleme. *Psikiyatride Güncel Yaklaşımlar*, 13(1), 52-76.
- Bergsma, A., & Veenhoven, R. (2011). The happiness of people with a mental disorder in modern society. *Psychology of Well-Being: Theory, research and practice*, 1, 1-6.
- Buckland, H. T., Schepp, K. G., & Crusoe, K. (2013). Defining happiness for young adults with schizophrenia: A building block for recovery. *Archives of Psychiatric Nursing*, 27(5), 235-240.
- Budak, F., & Korkmaz, Ş. (2020). Covid-19 pandemi sürecine yönelik genel bir değerlendirme: Türkiye örneđi. *Sosyal Araştırmalar ve Yönetim Dergisi*, (1), 62-79.
- Çam, O., & Yalçın, N. (2018). Ruhsal hastalık ve iyileşme. *Psikiyatri Hemşireliği Dergisi*, 9(1), 55-60.
- Dođan, T., & Totan, T. (2013). Psychometric properties of Turkish version of the Subjective Happiness Scale. *The Journal of Happiness & Well-Being*, 1, 1, 21-28.

- Eglit, G. M., Palmer, B. W., Martin, A. V. S., Tu, X., & Jeste, D. V. (2018). Loneliness in schizophrenia: construct clarification, measurement, and clinical relevance. *PLoS One*, 13(3), e0194021.
- Fervaha, G., Agid, O., Takeuchi, H., Foussias, G., & Remington, G. (2016). Life satisfaction and happiness among young adults with schizophrenia. *Psychiatry Res*, 242, 174-179.
- Gutiérrez-Rojas, L., González-Domenech, P. J., Junquera, G., Halverson, T. F., & Lahera, G. (2021). Functioning and happiness in people with schizophrenia: analyzing the role of cognitive impairment. *International Journal of Environmental Research and Public Health*, 18(14), 7706.
- Gühne, U., Pabst, A., Löbner, M., Breilmann, J., Hasan, A., Falkai, P., ... & Riedel-Heller, S. G. (2021). Employment status and desire for work in severe mental illness: results from an observational, cross-sectional study. *Social Psychiatry and Psychiatric Epidemiology*, 56, 1657-1667.
- Halpern-Manners, A., Schnabel, L., Hernandez, E. M., Silberg, J. L., & Eaves, L. J. (2016). The relationship between education and mental health: new evidence from a discordant twin study. *Social Forces*, 95(1), 107-131.
- Helliwell, J. F., & Wang, S. (2012). The state of world happiness, The Earth Institute. *New York, Columbia University*.
- Jeste, D. V., Palmer, B. W., Rettew, D. C., & Boardman, S. (2015). Positive psychiatry: Its time has come. *The Journal of Clinical Psychiatry*, 76(6), 675–683. doi: 10.4088/JCP.14NR09599.
- Kayaoğlu, K., & Ay, E. (2024). Examination of internalized stigma, quality of life, and happiness in patients with schizophrenia. *Journal of Mental Health*, 33(1), 101-109.
- Mankiewicz, P. D., Gresswell, D. M., & Turner, C. (2013). Happiness in severe mental illness: Exploring subjective wellbeing of individuals with psychosis and encouraging socially inclusive multidisciplinary practice. *Mental Health and Social Inclusion*, 17(1), 27-34.
- Olçun, Z., & Altun, Ö.Ş. (2017). The correlation between schizophrenic patients' level of internalized stigma and their level of hope. *Arch Psychiatr Nurs*, 31, 332-337.
- Polat, S., & Kutlu, F. Y. (2019). Ruhsal bozukluklarda hastalık yönetimi ve iyileşme programı. *İzmir Kâtip Çelebi Üniversitesi Sağlık Bilimleri Fakültesi Dergisi*, 4(3), 111-115.
- Saperia, S., Da Silva, S., Siddiqui, I., McDonald, K., Agid, O., Remington, G., & Foussias, G. (2018). Investigating the predictors of happiness, life satisfaction and success in schizophrenia. *Comprehensive Psychiatry*, 81, 42-47.
- Seedhouse, D. (2004). *Health Promotion: Philosophy, Prejudice and Practice*, 2nd Ed. London, Wiley
- Spinoven, P., Elzinga, B. M., Penninx, B. W., & Giltay, E. J. (2021). Temporal relationships between happiness and psychiatric disorders and their symptom severity in a large cohort study: the Netherlands Study of Depression and Anxiety (NESDA). *BMC psychiatry*, 21, 1-11.
- Şahin, F., & Altun, Ö. Ş. (2022). Şizofreni hastalığında mutluluk kavramı. *Psikiyatride Güncel Yaklaşımlar*, 14(3), 291-298.
- Şahin, F., & Şahin Altun, Ö. (2020). The relationship between perceived family support and happiness level of patients with schizophrenia. *Journal of Psychiatric Nursing*, 11(3), 181–187. doi: 10.14744/phd.2020.09821.
- Tozoğlu, E. Ö. (2023). Are the patients with schizophrenia who have case managers in community mental health centers happier?. *Psikiyatride Güncel Yaklaşımlar*, 15(Ek 1), 14-23.

Veenhoven, R. (2000). Freedom and Happiness: A Comparative Study in Forty-Four Nations in The Early 1990s. In E. Diener, & E. Suh (Eds.), *Subjective Well-Being across Cultures* (Pp. 257-288). Cambridge, Ma: Mit Press.

Yıldız, M. (2011). Koruyucu psikiyatri açısından psikiyatrik iyileştirim. *Türkiye Klinikleri J Psychiatry-Special Topics*, 4(4), 82-85.

Zhang, Z., & Chen, W. (2019). A systematic review of the relationship between physical activity and happiness. *Journal of Happiness Studies*, 20(4), 1305-1322. <https://doi.org/10.1007/s10902-018-9976-0>

ORGANIC FOOD CONSUMPTION AND ATTENTION PERFORMANCE IN 10-13 MOROCCAN PRIMARY STUDENTS FROM KHEMISSSET**Mohcin Elkhatir**

Biology and Health Laboratory, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco.

Miloud Chakit

Biology and Health Laboratory, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco.

Abdechahid Loukili

Biology and Health Laboratory, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco.

Youssef Aboussaleh

Biology and Health Laboratory, Faculty of Sciences, Ibn Tofail University, Kenitra, Morocco.

Abstract

In last decades, as in other countries, Moroccan diet have known great changes involving foods artificial foods and fast food. This study aims to systematically assess associations between organic food consumption and cognition in sample of school children.

The study sample included data of 210 school students aging 10–13 years-old, from three elementary school cohorts. We measured all consumed foods including main meals, biscuits, , chemicals and life styles. The measured cognitive domains were attention memory (d2R test) and working (N-Back task). We used two statistical approaches to assess associations between organic foods and child cognition: the exposome-wide association study (ExWAS) considering each consumed food independently, and the deletion-substitution-addition algorithm (DSA) considering all exposures simultaneously to build a general model. The results show that child organic food intake was associated with higher fluid intelligence (attention) scores (beta = 1.18; 95% CI = 0.50, 1.87) and higher working memory (N-Back) scores (0.23; 0.05, 0.41), and child fast food intake (-1.25; -2.10, -0.40) was associated with lower attention and memory scores. However, the rural origin that reflect high physical activity.

This first comprehensive study of childhood nutrition risk factors suggests that unfavourable child diet, including low organic food consumption adversely and cross-sectionally associate with cognitive function. Unexpected associations were also observed and maybe due to confounding and reverse causality.

Key words: organic food, cognitive function, d2R test, adolescents, Morocco.

**TREATMENT OF EARLY CHILDHOOD CARIES IN ANTERIOR TEETH WITH
PEDIATRIC ZIRCONIA CROWNS: 2 CASE REPORT****ÖN DİŞLERDEKİ ERKEN ÇOCUKLUK ÇAĞI ÇÜRÜKLERİNİN PEDIATRİK ZİRKON
KURONLAR İLE TEDAVİSİ: 2 OLGU SUNUMU****Şükriye TÜRKOĞLU KAYACI**

Dr. Öğr. Üyesi, Sağlık Bilimleri Üniveristesi Çocuk DişHekimliği Anabilim Dalı

ORCID No: 0000-000201477-5283

Zeynep SOLMAZGÜL YAZICI

Dt., Sağlık Bilimleri Üniveristesi Çocuk DişHekimliği Anabilim Dalı

ORCID No: 0000-0001-7505-2962

Abstract

Early childhood caries is a common condition in the population and requires treatment. In recent years, zirconia crowns routinely used in dentistry have been introduced to pediatric dentistry. Prefabricated pediatric zirconia crowns have been developed as an aesthetic alternative to stainless steel crowns, which are frequently used in full coronal restorations of deciduous teeth. Prefabricated pediatric zirconia crowns have superior aesthetic and physical qualities and are biologically compatible. The surface structure prevents plaque adhesion and the satisfaction of the pediatric patient and parents is high due to its aesthetic appearance. In this case report, pediatric zirconia crowns were applied to the upper central and lateral teeth of 24-month-old and 17-month-old patients under general anesthesia. After the treatment in both patients, functional and durable restoration was provided while restoring the natural appearance of the teeth. Preventive dentistry practices, including oral hygiene and dietary habits education, remain the most important element in preventing early childhood caries and improving oral health in pediatric patients.

Keywords: early childhood caries, aesthetics, general anesthesia, pediatric zirconia crown**Özet**

Erken çocukluk çağı çürükleri, toplumda sıklıkla görülen ve tedavi gerektiren bir durumdur. Son yıllarda, diş hekimliğinde rutin olarak kullanılan zirkon kuronlar çocuk diş hekimliğine de kullanılmaya başlanmıştır. Prefabrike pediatrik zirkon kuronlar, süt dişlerinin tam koronal restorasyonlarında sıklıkla kullanılan paslanmaz çelik kuronlara estetik bir alternatif olarak geliştirilmiştir. Prefabrike pediatrik zirkon kuronlar üstün estetik ve fiziksel niteliklere sahip olmanın yanı sıra biyolojik olarak uyumlulardır. Yüzey yapısı plak yapışmasını önler ve estetik olması sebebiyle çocuk hasta ve ebeveynin memnuniyeti yüksektir. Bu vaka raporunda 24 aylık ve 17 aylık iki hastaya, genel anestezi altında üst santral ve lateral dişlerine pediatrik zirkon kuron uygulaması yapılmıştır. İki hastada da uygulanan tedavi sonrasında dişlerin doğal görünümünü geri kazandırırken işlevsel ve dayanıklı restorasyon sağlanmıştır. Ağız hijyeni ve beslenme alışkanlıkları eğitimi de dahil olmak üzere koruyucu diş hekimliği uygulamaları, erken çocukluk çağı çürüklerinin önlenmesinde ve çocuk hastalarda ağız sağlığının geliştirilmesinde en önemli unsur olmaya devam etmektedir.

Anahtar kelimeler: erken çocukluk çağı çürüğü, estetik, genel anestezi, pediatrik zirkon kuron

Giriş

Erken çocukluk çağı çürükleri (EÇÇ), hem gelişmekte olan hem de sanayileşmiş ülkelerde bir halk sağlığı sorunu teşkil eden çok yaygın ve çok faktörlü bir hastalıktır (Çolak et al., 2013). Amerikan Pediatrik Diş Hekimliği Derneği'ne (AAPD) göre EÇÇ, 6 yaşın altındaki çocuklarda bir veya daha fazla çürük diş yüzeyinin varlığı (çürüklü veya çürüksüz), bir veya daha fazla süt dişinin olmaması ve/veya bir veya daha fazla süt dişinde çürük nedeniyle dolgu bulunması ile tanımlanmaktadır. Dünya çapında çocukların %60 ila %90'ını etkileyen en yaygın çocukluk hastalıklarından biridir (Casamassimo et al., 2009). Erken çocukluk çağı çürükleri okul öncesi çocukları etkiler ve yüksek oranda tedavi edilmemiş çürük lezyonları ile karakterize dünya çapında bir pandemidir (Edelstein, 2009). Bu hastalık genel sağlığı ve çocuk gelişimini olumsuz etkilemektedir (Plutzer & Spencer, 2008). EÇÇ'nin fiziksel semptomları arasında rahatsızlık, ağrı, enfeksiyon, apse, gastrointestinal rahatsızlıklar, yetersiz beslenme, ağrı nedeniyle büyüme geriliği ve yeme isteksizliği yer almaktadır (Sheiham & James, 2015)EÇÇ'li çocuklar, olmayanlara göre daha düşük ağız sağlığı ile ilgili yaşam kalitesine sahiptir (Alkarimi et al., 2012).

Birincil dental müdahaleler, florlu diş macunu kullanımı ve çeşitli şekillerde florür kullanmaya devam etmek diş çürümesini önleyebilse de, EÇÇ hem gelişmiş hem de gelişmekte olan ülkelerdeki yoksul mahallelerdeki çocuklar arasında hala yaygındır (Lagerweij & van Loveren, 2015; Marthaler, 2004). Birincil dental müdahale, diş çürüğünün başlamasını önlemeye yönelik tedbirlerin uygulanmasını içerir; ikincil müdahale, çürüğün erken teşhisi ve tedavisine odaklanır; üçüncül müdahale ise ilerlemiş çürüklerden etkilenen dişlerin yönetimi ve restorasyonunu içerir. Tedavi edilmeyen diş çürükleri çocukların büyüme ve gelişimini etkiler, yemek yemelerini ve uyumalarını zorlaştırır. Uluslararası Diş Hekimliği Federasyonu'na (FDI) göre, EÇÇ birçok ülkede okula devamsızlığın önde gelen nedenlerinden biridir (*Oral Health Atlas | FDI*, n.d.). Ağız sağlığı sorunları olan çocuklar için yaşam kalitesini düşürmenin yanı sıra rahatsızlık ve enfeksiyona neden olarak hızla ilerleyebilir. Bu sorunlar ciddi, belki de ölümcül bir duruma dönüşebilir (Finucane, 2012). Yetişkinlerde diş çürüklerinin azalmasına rağmen, birçok ülkede küçük çocuklarda çürük prevalansında artış görülmüştür (Bagramian et al., 2009).

Şiddetli EÇÇ için müdahalelerin planlanması diş hekimleri için birçok zorluk teşkil etmektedir:

- Süt dişleri daimi dişlerden farklı bir morfolojiye sahiptir çünkü daha büyük bir pulpa odasına ve daha ince bir mine-dentin tabakasına sahiptirler, bu da çürüğün pulpaya ulaşması için gereken süreyi azaltır ve ağrı ve pulpa komplikasyonları riskini artırır.
- Çocuğun gelecekteki ağız sağlığıyla ilgili yaşam kalitesi, acil diş bakımında ECC'nin neden olduğu ağrı ve dehşet nedeniyle tehlikeye girebilir.
- Süt dişlerinin çok erken kaybedilmesi konuşma bozukluklarına, beslenme ve ısırma sorunlarına ve daimî dişlerin sürmesinin gecikmesine yol açabilir.
- Küçük çocuklar olgunlaşmamıştır, tipik olarak iş birliği yapmazlar (sedasyon veya GA gerekli olabilir) ve ebeveynler onlardan sorumlu olduğu için daha karmaşık bir karar verme sürecine sahiptirler (Kanareli et al., 2023).

Çocukların çoğu küçük yaşlarından dolayı tedavi ile iş birliği yapamazlar. Çalışmalar, 4-6 yaş arası çocukların yaklaşık %20,1'inin oral tanı ve tedavide iş birliği yapmadığını göstermiştir. Kısıtlama koşullarında terapötik etkinlik garanti edilemez ve çocukların fiziksel ve zihinsel gelişimi üzerinde etkisi vardır. Çürük tedavisi için iş birliği yapamayan genç hastalarla etkili bir şekilde nasıl başa çıkılacağı, çocuk diş hekimlerinin karşılaştığı bir zorluktur (XIA et al., 2011).

Dental genel anestezi, tedavi sırasında ağlama ve mücadele etme gibi kooperatif olmayan davranışların müdahalesini ortadan kaldırabilir, güvenli bir ortamda yüksek kaliteli diş tedavisi sağlayabilir, takip ziyaretleri sırasında anksiyeteyi azaltabilir ve iş birliğini geliştirebilir. Çok sayıda

çürük dişi veya dental anksiyetesi olan küçük çocuklar için güvenli ve etkili bir davranışsal yönetim yöntemi sağlar (Mallineni & Yiu, 2014).

Amerikan Pediatrik Diş Hekimliği Derneği (AAPD) ve İngiliz Pediatrik Diş Hekimliği Derneği (BSPD) kılavuzları, bir veya iki yüzey çürüğü yaygın olduğunda süt azı dişlerinin prefabrike bir pediatrik kuron ile tedavi edilmesini önermektedir (Kindelan et al., 2008).

Paslanmaz çelik kuron (PÇK), çürük tedavisi için çocuk diş hekimliğinde altın standarttır ve bu tedavi seçeneği, pulpotomi/pulpektomi sonrası süt dişleri, gelişimsel kusurları olan dişler veya amalgam dolgunun başarısız olma olasılığının yüksek olduğu birden fazla yüzeyi içeren büyük çürük lezyonları ve kırılmış dişler için çeşitli endikasyonlarla zaman içinde uzun ömürlülük de dahil olmak üzere iyi klinik ve radyolojik sonuçlara sahiptir. Bununla birlikte, paslanmaz çelik kuron (PÇK) genellikle ebeveynler tarafından estetik nedenlerle reddedilmektedir. Günümüzde, pediatrik zirkon kuronlar gibi daha estetik alternatifler mevcuttur (Alrashdi et al., 2022).

Zirkon kuronlar çocuk diş hekimliğinde nispeten güncel bir konudur. Zirkon kuronlar sadece anterior değil posterior bölgelerde de hastaların estetik isteklerini karşılayan alternatif bir tedavidir. Zirkonyum, bazen "seramik çelik" olarak da adlandırılan kristal bir zirkonyum dioksittir. Zirkon kuronlar, yoğun bir şekilde sinterlenmiş tek bir kristal bloğundan oluşur, bu da onları porselenle kaynaşmış metal kuronlardan neredeyse üç kat daha güçlü kılar ve onlara daha yarı saydam bir görünüm verir (Daou, 2014). Geniş çürüklü süt ön dişlerinin estetik yönetimi genellikle tam koronal kaplama restorasyonu gerektirir ve bu da genellikle çocuk diş hekimleri için bir zorluktur (Ashima et al., 2014). Zirkon kuronların estetik dışında çeşitli avantajları vardır. Yüksek derecede cilalanmış yüzeyleri nedeniyle, zirkon kuronlar diğer malzemelerden yapılanlara göre daha az plak birikimi gösterir. Diş hekimleri zirkon kuronlara uyması için dişleri hazırlamalıdır çünkü ayarlama için manipüle edilemezler. Sonuç olarak, bu kuronların takılacağı süt dişleri, paslanmaz çelik kuronların takılacağı dişlere göre daha fazla hazırlığa ihtiyaç duyar. Bu nedenle, zirkon kuronların potansiyel dezavantajları arasında ek diş redüksiyonu gerekliliği, kuronun ayarlanamaması/konturlanamaması ve maliyet yer almaktadır (Clark et al., 2016).

Bu vaka raporu, yüksek bireysel çürük riski, şiddetli dental anksiyete ve fobisi ve estetik talebi olan 24-aylık ve 17-aylık iki çocuğun genel anestezi altında zirkon diş kuronları kullanılarak başarılı bir şekilde tedavi edildiğini bildirmektedir.

Vaka Raporu

17-aylık kız hasta, yaygın çürük ve ağrı şikayetiyle kliniğe başvurdu (Resim 1). Ayrıntılı bir anamnez sonrasında sistemik bir hastalığı olmadığı öğrenildi. Hastanın yaşı ve anksiyetesi göz önüne alındığında, en iyi tedavinin hastanın genel anestezi altında tedavi etmek olacağına karar verildi. Bu durum, çocuğun diş hekimliği tedavisini sakin bir şekilde atlatmasını sağlarken gerekli tedavinin uygulanmasına olanak tanıdı. Hastanın üst santral ve lateral dişlerine süt kanal tedavisi uygulanmasını takiben pediatrik zirkon kuron (NuSmile, ABD) uygulandı (Resim 2). Genel anestezi sonrası hastanın ailesine uygun oral alışkanlıklar ve beslenme eğitimi verildi, düzenli olarak takip için çağırıldı.



Resim 1: 17 aylık hastanın operasyon öncesi ağız içi görüntüsü



Resim 2: 17 aylık hastanın operasyon sonrası ağız içi görüntüsü

24-aylık erkek hasta, yaygın çürük ve ağrı şikayetiyle kliniğe başvurdu (Resim 3). Ayrıntılı bir anamnez sonrasında sistemik bir hastalığı olmadığı öğrenildi. Hastanın yaşı ve şiddetli diş hekimi fobisi göz önüne alındığında, en iyi tedavinin hastanın genel anestezi altında tedavi etmek olacağına karar verildi. Bu durum, çocuğun diş hekimliği tedavisini sakin bir şekilde atlatmasını sağlarken gerekli tedavinin uygulanmasına olanak tanıdı. Hastanın üst santral ve lateral dişlerine süt kanal tedavisi uygulanmasını takiben pediatrik zirkon kuron (NuSmile, ABD) uygulanmıştır (Resim 4). Genel anestezi sonrası hastanın ailesine uygun oral alışkanlıklar ve beslenme eğitimi verildi ve düzenli olarak takip için çağırıldı.



Resim 3: 24 aylık hastanın operasyon öncesi ağız içi görüntüsü



Resim 4: 24 aylık hastanın operasyon sonrası ağız içi görüntüsü

Sonuç

Genel anestezi altında diş müdahalesinin, genel anestezi kullanımıyla ilişkili potansiyel riskler nedeniyle yalnızca diğer tüm seçenekler tükendikten sonra son çare olarak düşünülmesi gerektiğini unutmamak önemlidir. Bu nedenle, genel anesteziye devam etme kararı vermeden önce hastanın bireysel koşullarını ve tıbbi geçmişini dikkatlice değerlendirmek önemlidir. Yüksek çürük riski olan 17-aylık ve 24-aylık vakalarda, işlem sırasında çocuğun konforunu ve güvenliğini sağlamak için genel anestezi kullanımının en iyi seçenek olduğu düşünülmüştür. Pediyatrik zirkon kuronlar, paslanmaz çelik kuronlara (PÇK) estetik bir alternatif olarak görünmektedir. Üst santral ve laterallere uygulanan pediyatrik zirkon kuronların hem klinik hem de radyolojik olarak çok iyi bir şekilde bütünleştiği görülmüştür. Bununla birlikte, uygun ağız hijyeni uygulamaları ve beslenme alışkanlıklarını kapsayan birincil dental müdahalelerin diş çürüğünün önlenmesinde son derece önemli olduğu unutulmamalıdır. Süt dişlerinin dökülmesine kadar daha uzun ve düzenli bir takip dönemi oluşturulmalıdır.

Kaynakça

- Alkarimi, H. A., Watt, R. G., Pikhart, H., Jawadi, A. H., Sheiham, A., & Tsakos, G. (2012). Impact of treating dental caries on schoolchildren's anthropometric, dental, satisfaction and appetite outcomes: a randomized controlled trial. *BMC Public Health*, 12(1), 706. <https://doi.org/10.1186/1471-2458-12-706>
- Alrashdi, M., Ardoin, J., & Liu, J. A. (2022). Zirconia crowns for children: A systematic review. *International Journal of Paediatric Dentistry*, 32(1), 66–81. <https://doi.org/10.1111/IPD.12793>
- Ashima, G., Bhatia, S. K., Gauba, K., & Mittal, H. C. (2014). Zirconia crowns for rehabilitation of decayed primary incisors: an esthetic alternative. *The Journal of Clinical Pediatric Dentistry*, 39(1), 18–22. <https://doi.org/10.17796/JCPD.39.1.T6725R5566U4330G>
- Bagramian, R. A., Garcia-Godoy, F., & Volpe, A. R. (2009). The global increase in dental caries. A pending public health crisis. *American Journal of Dentistry*, 22(1), 3–8.
- Casamassimo, P. S., Thikkurissy, S., Edelstein, B. L., & Maiorini, E. (2009). Beyond the dmft: the human and economic cost of early childhood caries. *Journal of the American Dental Association (1939)*, 140(6), 650–657. <https://doi.org/10.14219/JADA.ARCHIVE.2009.0250>
- Clark, L., Wells, M. H., Harris, E. F., & Lou, J. (2016). Comparison of Amount of Primary Tooth Reduction Required for Anterior and Posterior Zirconia and Stainless Steel Crowns. *Pediatric Dentistry*, 38(1), 42–46.
- Çolak, H., Dülgergil, Ç., Dalli, M., & Hamidi, M. (2013). Early childhood caries update: A review of causes, diagnoses, and treatments. *Journal of Natural Science, Biology, and Medicine*, 4(1), 29. <https://doi.org/10.4103/0976-9668.107257>

- Daou, E. E. (2014). The Zirconia Ceramic: Strengths and Weaknesses. *The Open Dentistry Journal*, 8(1), 33–42. <https://doi.org/10.2174/1874210601408010033>
- Edelstein, B. L. (2009). Solving the Problem of Early Childhood Caries. *Archives of Pediatrics & Adolescent Medicine*, 163(7), 667. <https://doi.org/10.1001/archpediatrics.2009.107>
- Finucane, D. (2012). Rationale for restoration of carious primary teeth: A review. *European Archives of Paediatric Dentistry*, 13(6), 281–292. <https://doi.org/10.1007/BF03320828/METRICS>
- Kanareli, C., Balazuc-Armbruster, M., Tsolakis, I. A., Kanarelis, T., & Tsolakis, A. I. (2023). Full Mouth Treatment of Early Childhood Caries with Zirconia Dental Crowns: A Case Report. *Children*, 10(3), 488. <https://doi.org/10.3390/children10030488>
- Kindelan, S. A., Day, P., Nichol, R., Willmott, N., & Fayle, S. A. (2008). UK National Clinical Guidelines in Paediatric Dentistry: stainless steel preformed crowns for primary molars. *International Journal of Paediatric Dentistry*, 18 Suppl 1(SUPPL. 1), 20–28. <https://doi.org/10.1111/J.1365-263X.2008.00935.X>
- Lagerweij, M. D., & van Loveren, C. (2015). Declining Caries Trends: Are We Satisfied? *Current Oral Health Reports*, 2(4), 212–217. <https://doi.org/10.1007/S40496-015-0064-9/TABLES/1>
- Mallineni, S. K., & Yiu, C. K. Y. (2014). A Retrospective Review of Outcomes of Dental Treatment Performed for Special Needs Patients under General Anaesthesia: 2-Year Follow-Up. *The Scientific World Journal*, 2014, 1–6. <https://doi.org/10.1155/2014/748353>
- Marthaler, T. M. (2004). Changes in dental caries 1953-2003. *Caries Research*, 38(3), 173–181. <https://doi.org/10.1159/000077752>
- Oral Health Atlas | FDI*. (n.d.). Retrieved July 5, 2024, from <https://www.fdiworldddental.org/oral-health-atlas>
- Plutzer, K., & Spencer, A. J. (2008). Efficacy of an oral health promotion intervention in the prevention of early childhood caries. *Community Dentistry and Oral Epidemiology*, 36(4), 335–346. <https://doi.org/10.1111/j.1600-0528.2007.00414.x>
- Sheiham, A., & James, W. P. T. (2015). Diet and Dental Caries. *Journal of Dental Research*, 94(10), 1341–1347. <https://doi.org/10.1177/0022034515590377>
- XIA, B., WANG, C.-L., & GE, L.-H. (2011). Factors associated with dental behaviour management problems in children aged 2-8 years in Beijing, China. *International Journal of Paediatric Dentistry*, 21(3), 200–209. <https://doi.org/10.1111/j.1365-263X.2011.01111.x>

INVESTIGATION OF THE RELATIONSHIP BETWEEN FEAR OF FALLING AND TRUNK CONTROL IN PATIENTS WITH MULTIPLE SCLEROSIS**MULTIPL SKLEROZ HASTALARINDA DÜŞME KORKUSU VE GÖVDE KONTROLÜ ARASINDAKİ İLİŞKİNİN İNCELENMESİ****Taşkın Özkan**

Giresun Üniversitesi, Sağlık Hizmetleri Meslek Yüksekokulu, Terapi ve Rehabilitasyon Bölümü,
Fizyoterapi Programı, Giresun, Türkiye

ORCID ID: 0000-0001-9448-0516

Yasemin Ateş Sarı

Ankara Yıldırım Beyazıt Üniversitesi, Sağlık Bilimleri Fakültesi, Fizyoterapi ve Rehabilitasyon
Bölümü, Ankara, Türkiye

ORCID ID: 0000-0001-7046-5477

Nezhat Özgül Ünlüer

Sağlık Bilimleri Üniversitesi, Fizyoterapi ve Rehabilitasyon Fakültesi, Ankara, Türkiye

ORCID ID: 0000-0003-2314-0738

Abstract

Introduction: Trunk control is one of the most important factors that enable an individual to balance and walk in different environments and conditions during functional activities and is known to be reduced in patients with Multiple Sclerosis (MS). In addition, MS patients experience fear of falling and these patients avoid and restrict their activities due to fear of falling.

Objective: The aim of this study was to examine the relationship between fear of falling and trunk control in patients with MS.

Method: The study included 25 MS patients (17 women and 8 men). Disability level was assessed using the Expanded Disability Status Scale, fear of falling was assessed using the International Falls Efficacy Scale (FES-I), and trunk control was assessed using the Trunk Impairment Scale (TIS).

Results: The disability level of MS patients was 2.5 (2-3). FES-I scores were correlated with the static sitting, dynamic sitting, and total scores of TIS ($r=-0.416, -0.592, -0.587$ respectively; $p<0.05$), but not with the coordination score of TIS ($p>0.05$).

Conclusion: It is observed that fear of falling increases as trunk control decreases in patients with MS. These results show the importance of including practices to improve trunk control in rehabilitation protocols to reduce the fear of falling in patients with MS.

Key words: Multiple Sclerosis, fear of falling, trunk control

ÖZET

Giriş: Gövde kontrolü fonksiyonel aktiviteler sırasında bireyin farklı ortam ve koşullarda dengesini ve yürümesini sağlayan en önemli faktörler arasında gösterilmektedir ve Multipl Skleroz (MS) hastalarında azaldığı bilinmektedir. Ayrıca MS hastalarında düşme korkusu yaşanmakta ve bu hastalar düşme korkusu nedeniyle aktivitelerden kaçınmakta ve aktivitelerini kısıtlamaktadır.

Amaç: Bu araştırmanın amacı MS hastalarında düşme korkusu ve gövde kontrolü arasındaki ilişkiyi incelemektir.

Yöntem: Çalışmaya 25 MS hastası (17 kadın ve 8 erkek) dahil edildi. Hastaların özür düzeyi Genişletilmiş Özürülük Durum Ölçeği ile, düşme korkusu Uluslararası Düşme Etkinlik Ölçeği (UDEÖ) ile, gövde kontrolü Gövde Bozukluk Ölçeği (GBÖ) ile değerlendirildi.

Bulgular: MS hastalarının özür düzeyi 2.5 (2-3) idi. UDEÖ skorları GBÖ statik oturma, dinamik oturma ve total puanları ile ilişkili bulunmuşken ($r=-0.416$, -0.592 , -0.587 sırasıyla; $p<0.05$), GBÖ koordinasyon puanı ile ilişkili bulunmamıştır ($p>0.05$).

Sonuç: MS hastalarında gövde kontrolü azaldıkça düşme korkularının arttığı görülmektedir. Bu sonuçlar MS hastalarında düşme korkusunu azaltmak amacıyla gövde kontrolünü geliştirmeye yönelik uygulamaların rehabilitasyon protokolleri içerisine eklenmesinin öneminin göstermektedir.

Anahtar kelimeler: Multipl Skleroz, düşme korkusu, gövde kontrolü

Tablo 1. Multipl Skleroz hastalarının demografik özellikleri

		Multipl Skleroz Hastaları (n= 25)
Yaş, yıl Median (IQR25-75)		43 (32-50)
Vücut kütle indeksi, kg/m ² Median (IQR25-75)		22.86 (20.76-26.51)
Cinsiyet, Kadın/erkek, n (%)		17 (68) / 8 (32)
EDSS, total Median (IQR25-75)		2.5 (2-3)
Uluslararası Düşme Etkinlik Ölçeği Median (IQR25-75)		30 (24-38)
Gövde Bozukluk Ölçeği Median (IQR25-75)	Statik Oturma	7 (6-7)
	Dinamik Oturma	6 (6-6)
	Koordinasyon	4 (4-6)
	Total	17 (15-19)

EDSS: Genişletilmiş Özürülük Durum Ölçeği, IQR: Çeyrekler arası aralık

Tablo 2. Multipl Skleroz hastalarının düşme korkusu ve gövde kontrolü arasındaki ilişki

		Düşme Etkinlik Ölçeği	
		r	p
Gövde Bozukluk Ölçeği	Statik Oturma	-0.416	0.038
	Dinamik Oturma	-0.592	0.002
	Koordinasyon	-0.232	0.265
	Total	-0.587	0.002

PERCEPTIONS OF PALLIATIVE CARE NURSES ON DEATH WITH DIGNITY: A QUALITATIVE RESEARCH**Gönül DÜZGÜN**

Izmir Tınaztepe University, Vocational School of Health Services, First and Emergency Aid Program, Izmir, Turkey

ORCID ID: <https://orcid.org/0000-0003-3584-8354>

Kadriye TURAN

Health Sciences University Tepecik Training and Research Hospital, Palliative service, Izmir, Türkiye

ORCID ID: <https://orcid.org/0000-0003-3504-9229>

Gökşen POLAT

Izmir Tınaztepe University, Vocational School of Health Services, First and Emergency Aid Program, Izmir, Turkey

ORCID ID: <https://orcid.org/0000-0001-9575-2325>

Elif KELEKÇİBAŞI

Izmir Tınaztepe University, Faculty of Health Sciences, Department of Nursing, Izmir, Turkey

ORCID ID: <https://orcid.org/0009-0001-0715-9626>

Elif ÜNSAL AVDAL

Izmir Katip Çelebi University, Faculty of Health Sciences, Department of Nursing, Izmir, Turkey

ORCID ID: <https://orcid.org/0000-0001-6888-0882>

Fisun ŞENUZUN AYKAR

Izmir Tınaztepe University Faculty of Health Sciences, Department of Nursing, İzmir, Turkey

ORCID ID: <https://orcid.org/0000-0002-3466-4943>

Abstract

Introduction and Purpose: The aim of this study was defined as to reveal the palliative care nurses' perceptions on death with dignity from their experiences and to contribute to the quality of nursing care provided to patients at the end of life.

Materials and Methods: The study was carried out in a phenomenological design. The population of the research comprised of the patients hospitalized in the Palliative Care Service for Oncology

Patients and Anesthesiology Palliative Care Service. There are 7 semi-structured open-ended main questions. Coding qualitative data, creating themes, interpreting, and reporting were carried out by examining the texts. SPSS 25 was used for the analysis of socio-demographic characteristics and the program MAXQDA20 was used for the analysis of qualitative data. I confirm that we have adhered to relevant EQUATOR guidelines.

Results: In line with the findings obtained from the research, 7 main themes were obtained. Main themes; 'Components of the Death with Dignity Concept', 'Patients' and their Companions' Claims from the Nurse in the Terminal Period', 'Effectiveness of an End-of life Physiological Care: Quality of Life Focused Care', 'Rights of the Dying Patient', 'The Impact of Palliative Sedation on the Concept of Death with Dignity', 'Discussing the Concept of Death with Terminal Cancer Patients', 'Posthumous Approach to the Patient/Patient's Companions and the Environment'.

Discussion and Conclusion: It is concluded in this study that health care professionals need to be further supported in areas such as patient rights, the bereavement support and talking over the concept of death. It has been understood that it is not in the best interest of the patient for healthcare professionals who do not receive professional information about the death process to act according to their emotions and past experiences, and that these deficiencies should be completed with in-service training.

Key Words: Death; Dignity; Palliative Care; Patients

**POST-TRAUMATIC GROWTH AND PSYCHOLOGICAL RESILIENCE IN
INDIVIDUALS WHO EXPERIENCED AN EARTHQUAKE****DEPREM YAŞAMIŞ BİREYLERDE TRAVMA SONRASI BÜYÜME VE PSİKOLOJİK
SAĞLAMLIK****Yüksek Lisan Öğrencisi Aslıhan Demir**

Gaziantep Üniversitesi, Göç Enstitüsü, Göç Çalışmaları Anabilim Dalı

Doç. Dr. Safiye Özgünç

Gaziantep Üniversitesi, Sağlık Bilimleri Fakültesi

Abstract

Trauma is characterized by intense feelings of fear and anxiety that individuals have not experienced before. Post-traumatic stress disorder (PTSD) occurs when individuals are directly or indirectly exposed to a traumatic event. This traumatic event can occur in many ways, and the effects of PTSD can also be seen after natural disasters that occur around the world. Earthquakes are one of the most common and destructive disasters in the world and in our country. The fact that natural disasters such as earthquakes happen unexpectedly, are defenseless and unavoidable are among the factors that support the trauma. In addition to many negative physical and psychological effects that can be seen in individuals after trauma, some positive effects can also occur. The concept of post-traumatic growth can be considered among the positive effects. Individuals' psychological resilience levels are their ability to manage the effects after trauma, and this is called psychological robustness. The concepts of psychological robustness and post-traumatic growth can change depending on factors such as the duration of exposure to trauma after the earthquake and the physical and material losses that occur as a result. Based on this situation, it is aimed to evaluate to what extent the post-traumatic growth and robustness that occurs after the earthquake reduces the traumatic effects seen after the earthquake and provides a positive effect such as growth, in the light of other studies that have been done. In this context, it is thought that the studies to be carried out on post-traumatic growth and psychological robustness will pave the way for the evaluation of this issue.

Key Words: Trauma, Post-traumatic growth, Psychological resilience, Earthquake**ÖZET**

Travma anı bireylerin daha önce deneyimlemedikleri bir şekilde yoğun korku ve kaygı duygusuyla karakterize olarak tanımlanmaktadır. Travma Sonrası Stres Bozukluğu bireylerin doğrudan veya dolaylı yoldan travma anına maruz kalmasıyla ortaya çıkmaktadır. Maruz kalınan bu travma anı birçok şekilde ortaya çıkabileceği gibi, dünya genelinde yaşanan doğal afetler sonrası da TSSB etkileri görülebilmektedir. Deprem dünyada ve ülkemizde en çok karşı karşıya kalınan ve yıkıcı etkisi olan bir afet olarak nitelendirilmektedir. Deprem gibi doğal afetlerin bireyler için beklenmedik anda gerçekleşmesi, savunulmaz ve kaçınılmaz olması travmayı destekleyen etmenler arasında yer almaktadır. Travma sonrasında bireylerde birçok fiziksel ve psikolojik olumsuz etki görülebileceği gibi bazı olumlu etkiler de oluşabilmektedir. Travma sonrası büyüme kavramı olumlu etkiler

arasında değerlendirilebilmektedir. Kişilerin travma sonrası psikolojik dayanıklılık düzeyleri travma sonrası etkileri yönetebilme durumları ise psikolojik sağlamlılık olarak adlandırılmaktadır. Psikolojik sağlamlılık ve travma sonrası büyüme kavramları, deprem sonrası travma üzerinde anın maruz kalınma süresi, sonucunda oluşan fiziksel ve maddi kayıplar gibi etkenler doğrultusunda değişim gösterebilmektedir. Bu durumdan hareketle depremin ardından gerçekleşen travma sonrası büyüme ve sağlamlılığın depremin ardından görülen travma sonrası etkileri ne derece azalttığı ve büyüme gibi olumlu yönde etkiyi ne derece sağladığı yapılan diğer araştırmalar ışığında değerlendirilmesi amaçlanmaktadır. Bu doğrultuda mevcut çalışma deprem yaşamış bireylerde travma sonrası büyüme ve psikolojik sağlamlılık konusu ele almaktadır.

Anahtar Kelimeler: Travma, Travma Sonrası Büyüme, Psikolojik Sağlamlılık, Deprem

GİRİŞ

Doğal ve insan kaynaklı afetler her yıl binlerce insanı etkilemektedir (SAMSHA, 2024). Doğal afetlerden sağ kurtulanların bu deneyime nasıl tepki vereceği genellikle yıkımın derecesine, bireysel ve toplumsal kayıpların boyutuna ve günlük rutinleri, etkinlikleri ve hizmetleri yeniden oluşturmak için gereken süreye bağlıdır. Yardım hizmetlerinin miktarı, erişilebilirliği ve süresi, travmatik stres tepkilerinin süresini ve iyileşme sürecini önemli ölçüde etkileyebilir. Ayrıca afet sonrası günlük rutinlerin bozulmasının yanı sıra, topluluk üyelerinin veya etkilenen bölgelerdeki yabancıların varlığı, önemli düzeyde strese veya travmatik deneyimlere neden olabilir. Örneğin hırsızlık tehdidi, seyahat veya mülke veya yaşam alanlarına erişime ilişkin kısıtlamalar, barınaklarda mahremiyetin bozulması, medyanın ilgisi ve ardından yıkımı yansıtan tekrarlayan görüntülere maruz kalma bunların arasında sayılmaktadır. Dolayısıyla bir bireyi veya toplumu zora sokan sadece doğal afet veya olay değildir; Çoğunlukla olayın sonuçları ve topluluk içindeki ve dışındaki diğer kişilerin davranışsal tepkileri, hayatta kalanları etkili başa çıkmadan uzaklaştırmada veya dirençlilik ve iyileşmeye doğru itmede rol oynamaktadır (Rockville, 2014).

Tüm afetler arasında depremler farklı özelliklere sahiptir. Ne kontrol edilebilir ne de tamamen öngörülebilirler (Tunçel, 2023). Depremler ölüm ve yaralanmalar yoluyla halk sağlığını önemli ölçüde etkileme potansiyeli çok yüksek olan doğa olayları arasında yer almaktadır (Mavrouli ve ark., 2023). Çoğunlukla beklenmedik bir şekilde meydana gelen bu afet birçok insanı olumsuz yönde etkilemektedir (Zhang ve ark., 2011). Deprem gibi bir felaketle dünyanın güvenli ve kontrol edilebilir olduğuna dair inançlar yerle bir olabilir. Dolayısıyla travma sonrası stres ve anksiyete belirtilerinin deprem sonrasında daha yaygın olduğu ve daha uzun süreli olduğu saptanmıştır (Newnham ve ark., 2022). Travma sonrası stres bozukluğu (TSSB) felaketle sonuçlanan travmalardan sonra en sık görülen ruhsal hastalıklardan biridir. Depremden sağ kurtulanlar arasında TSSB görülme sıklığı %1,2 ila %82,64 arasında değişmektedir (Genco Görgü ve Gökdemir, 2023). TSSB, APA (American Psychological Association) tarafından 1980'li yıllarda "alışılmış insan deneyimi sınırları dışında" olarak tanımlandı. Süreç içerisinde TSSB'nin yaygınlığının artmasıyla birlikte travmatik durumların olağan dışılığı nadir meydana gelmelerinden değil bireyin yaşama olan uyumunu altüst etmesinden kaynaklandığı belirlendi. Comprehensive Textbook of Psychiatry'ye göre travma anının ortak noktası "yoğun korku, çaresizlik, kontrol kaybı ve yok olma tehdidi" dir (Herman, 2016). DSM (The Diagnostic and Statistical Manual of Mental Disorders) V Tanı el kitabına göre TSSB bireylerin travmatik durumla doğrudan veya dolaylı bir şekilde maruz kalmasıyla meydana gelebilecek olan psikiyatrik bir rahatsızlık olarak tanımlanmaktadır (APA, 2013).

Travma karşısında kişilerin gösterdiği tepkilerde önemli farklılıklar olabilir. Bu etkiler arasında; anksiyete hissi, sürekli endişe, uyku sorunları ve depresyon benzeri travma sonrası semptomlar, olay öncesinde, sırasında ve sonrasında felaketlere verilen yaygın tepkilerdir. Pek çok kişi, aile ve

toplumun yardımıyla afetlerden "kendini toparlayabilir", ancak diğerlerinin başa çıkmak ve iyileşme yolunda ilerlemek için ek desteğe ihtiyacı olabilir (SAMSHA, 2024). Bazılarında travmatik olay anksiyete, depresyon ve posttravmatik stres bozukluğu gibi ciddi bozulmalara yol açarken (Shakespeare-Finch, ve ark. 2003; Tedeschi ve Calhoun, 1996), bazılarında travma sonrası büyüme yaşanabilmektedir (Tedeschi ve Calhoun, 2004). "İnsanın Anlam Arayışı" kitabında "trajik iyimserlik" olarak tanımladığı acının başarı ve kazanım elde etmeye evrilmesi noktasında pozitif psikolojinin oluşumuna katkı sağladığı düşünülmektedir. Değiştirilmesi mümkün olmayan bir durumla karşı karşıya kaldığımızda kendimiz için potansiyelimizin en iyisi yapmak durumundayız. Bu durum trajik üçlü olarak adlandırdığımız acı, ölüm ve suçluluk için de gereklidir. Acılarımız başarıya evrilebilir, suçluluk noktasından daha iyiye evrilme fırsatı yakalayabiliriz (Frankl, 2006). Bu bağlamda travma sonrası büyüme kavramı önem kazanmaktadır. Travma sonrası büyüme, bireyin zorlu yaşam deneyimi ile çabalarken olumlu psikolojik değişimi deneyimlemesi (Tedeschi ve Calhoun, 2004) olarak tanımlanmaktadır.

Ortaya konan yaşam krizleri ve büyümenin kavramsal modeline göre travma sonrası büyümede etkili olan faktörler şu şekilde belirtilmektedir. Bunlar; maddi kaynaklar, sosyal yardım ve toplum yapısı, kişisel faktörler, psikolojik sağlamlılık, sosyo-demografik etkenler, fiziksel ve ruh sağlığı, olayla bağlantılı sistemler, yaşanan olayın şiddeti, zamanı bireyin yaşam akışında hangi noktada gerçekleştiği gibi faktörlerdir (Schaefer ve Moos, 1998). APA psikolojik sağlamlılığı ailevi ve ilişkisel problemleri kritik sağlık problemleri veya iş ve ekonomik stres etkenlerine, travmalara, tehditler gibi olumsuz süreçlere karşı adaptasyon sağlama olarak açıklamaktadır (APA, 2013). Psikolojik sağlamlılık sosyal destek, etkinlik, aidiyet, benlik saygısı, gibi etkenlerle karakterizedir (Ewert ve Tessner, 2019). Travma sonrası büyüme travmatik olaylardan sonra bireylerin olumlu yönde gelişim gösterebileceğinin üzerinde durmaktadır. Bu süreç bireyin anlamlı ilişkiler geliştirme, öncelik verdiği değer yargıların değişime uğraması ve manevi yönden daha zengin yaşam tarzı gibi etkenleri içermektedir. Psikolojik sağlamlılık kavramı depreme maruz kişiler de dahil olmak üzere bir travmatik olaylarla karşı karşıya kalanlar üzerinde dünya genelinde araştırılmıştır (Kararımak, 2010; Wang ve ark., 2010).

Psikolojik sağlamlılık sıklıkla stres sonucunda meydana gelen etkilerden "toparlanma" veya iyileşme sürecinin hızla gerçekleşmesiyle açıklanabilmektedir. Bu bağlamda sağlamlılık düzeyi gelişmiş bireyler süreç içerisinde kararlı ve dengeli bir psikolojik denge oluşturabilirler (Rutter, 2006). Psikolojik sağlamlılık üç farklı modla karşımıza çıkmaktadır. Bunlar; karşılaşılan zorluk veya problemler esnasında baş etme noktasında işlevsellikte artış, problemle karşı karşıya kalmanın ardından daha hızlı toparlanma, zorlukla baş etme noktasında artan uyum becerisi olarak açıklanabilmektedir (Joseph ve ark., 2012).

Literatür incelendiğinde travma sonrası büyüme ile ilgili çalışma sonuçları dikkati çekmektedir. Jung ve Han (2023) tarafından deprem yaşamış kişilerin travma sonrası gelişimlerinin incelendiği çalışma sonucunda, deprem yaşayan kişilerde TSB'nin üç kategoride sınıflandırılabilirliğini göstermektedir: "Benlik algısındaki değişim", "Kişilerarası ilişkilerdeki değişim" ve "Manevi değişim". Bunlar ayrıca sekiz alt kategoriye ayrılabilir: "Kişinin varlığını gözden geçirmesi", "Kabullenme", "Zorlukların üstesinden gelerek güçlü yönleri keşfetme", "Hayata şükran", "Kişisel ilişkilerdeki değişiklikler", "Sosyal ilişkilerdeki değişiklikler", "Kabullenme" Tanrı'nın varlığı" ve "Zorlukların üstesinden gelmek için bir atılım". Bir diğer çalışma travma sonrası büyümeyi etkileyen etmenler arama kurtarma ekibinde yapılmıştır. Çalışma sonucunda daha önce bir travma öyküsünün bulunması, travmaya maruz kalınma düzeyi, cinsiyet faktörü, sosyal anlamda destek ve baş etme stratejileri etkili olduğu görülmektedir (Yılmaz ve Şahin, 2007). Deprem sonrası hemşirelik bölümü öğrencileri üzerine yapılan başka bir çalışmada travma sonrası psikolojik sağlamlılığın cinsiyet, depremin ardından yaşanan yer/kşi, depremde kişinin evinin yıkılması veya ağır hasar alması gibi etkenlerce farklılaştığı görülmektedir (Ökten, 2024). Chen ve ark. Tarafından 2015 yılında yapılan TSSB ve TSB (Travma Sonrası Büyüme) üzerine yürütülen çalışmada iki yönlü

ilişki incelenmeye çalışılmıştır. Çalışma neticesinde on iki ay sonra görülen ilk travma sonrası büyümenin on sekiz ay sonraki TSSB azaltabileceği ortaya konulmuştur. Yapılan çalışma doğrultusunda bulgular travma sonrası büyümeyle süreç içerisinde TSSB'nin negatif yönde ilişkisi olduğu söylenebilmektedir. Travma sonrasında ilerleyen süreçte bireyler olayın olumlu yanlarını veya yararlarını düşünerek anlam, benlik saygısı, öz kontrolü destekleyip güçlendirebilirler. Bu durum da travmayla baş etmede ve bunun doğrultusunda ortaya çıkabilecek travma sonrası etkileri azaltmakta destek olabileceği düşünülmektedir (Chen ve ark. 2015).

Dayanıklılık insanların sahip olduğu ya da olmadığı bir özellik değildir. Herkesin öğrenip geliştirebileceği davranışları, düşünceleri ve eylemleri içerir. Dayanıklılığınızı geliştirmek kişisel bir yolculuktur. Dayanıklılık oluşturma konusunda bir kişi için iyi sonuç veren bir yaklaşım, bir başkası için işe yaramayabilir. Bireyler farklı stratejiler kullanırlar. Bu noktada dayanıklılık oluşturmak için bireyler kendi dayanıklılık stratejilerini geliştirme konusunda çalışmalıdırlar (APA, 2011).

SONUÇ

Depremden etkilenen insan sayısının milyonlarla ifade edilmesi, ne kadar büyük bir sorun olduğunu gözler önüne sermektedir. Hem bireysel hem de toplum ruh sağlığı açısından depremin olumsuz etkileri ile etkin bir şekilde baş etme oldukça önemlidir. Bu kapsamda deprem yaşayan bireylerin psikolojik sağlımlıklarını arttırmaya yönelik girişimler ileriye dönük koruyucu faktör olarak değerlendirilebilmektedir. Özellikle kırılgan gruplara yönelik destekleyici müdahaleler önem arz etmektedir. Bu bağlamda yapılacak olan çalışmalar ve desteklerin travma sonrası büyümeyi artıracak yönde eğitimler ve seminerlerle geliştirilmesi önceliklendirilmelidir.

KAYNAKÇA

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5. baskı). American Psychiatric Publishing.

APA., (2011). *Building Your Resilience. A Publication of the American Psychological Association.*

Chen, J., Zhou, X., Zeng, M., & Wu, X. (2015). Post-traumatic stress symptoms and post-traumatic growth: Evidence from a longitudinal study following an earthquake disaster. *PLoS One*, 10(6), e0127241.

Ewert, A., & Tessen, S. (2019). Psychological resilience and posttraumatic growth: An exploratory analysis. *Journal of Experiential Education*, 42(3), 280-296.

Frankl, V. (2006). *Man's search for meaning*. Boston: *Beacon Press*.

Genco Görgü, G., Gökdemir Ö. (2023). Posttravmatik Stres Bozukluğu: Depremden sonra. *Jour Turk Fam Phy*, 14 (4): 242-251. Doi: 10.15511/tjtfp.23.00442.

Herman, J. L. (2016). *Travma ve iyileşme: Şiddetin sonuçları, ev içi istismardan siyasi teröre* (Dördüncü Baskı). (T. Tosun, Çev.) İstanbul: Literatür Yayınları (2007).

Joseph, S., Murphy, D. ve Regel, S. (2012). An affective–cognitive processing model of post-traumatic growth. *Clinical Psychology & Psychotherapy*, 19(4), 316-325. doi.org/10.1002/cpp.1798

Jung HO, Han SW. (2023). Post-traumatic growth of people who have experienced earthquakes: Qualitative research systematic literature review. *Front Psychiatry*. doi: 10.3389/fpsy.2022.1070681. PMID: 36937000; PMCID: PMC10017470.

Kararırmak, Ö., 2010. Establishing the psychometric qualities of the Connor–Davidson Resilience Scale (CD-RISC) using exploratory and confirmatory factor analysis in a trauma survivor sample. *Psychiatry Res.* 179, 350–356.

Mavrouli, M., Mavroulis, S., Lekkas, E., & Tsakris, A. (2023). The impact of earthquakes on public health: A narrative review of infectious diseases in the post-disaster period aiming to disaster risk reduction. *Microorganisms*, 11(2), 419.

Newnham EA, Mergelsberg ELP, Chen Y, Kim Y, Gibbs L, Dzidic PL, (2022). Long term mental health trajectories after disasters and pandemics: A multilingual systematic review of prevalence, risk and protective factors. *Clin Psychol Rev.*

Ökten, Ç. (2024). Türkiye’de Kahramanmaraş Depremi’nden Sonra Hemşirelik Öğrencilerinde Yaşanan Travmatik Stres Belirtileri, Fiziksel Belirtiler ve Psikolojik Sağlamlık. *Uluslararası Sosyal Hizmet Araştırmaları Dergisi*, 4(1), 3-11

Rockville, M. D. (2014). Trauma-Informed Care in Behavioral Health Services. *Treatment Improvement Protocol (TIP) Series*

Rutter, M. (2006). Dayanıklılık kavramlarının bilimsel anlayışa etkileri. *New York Bilimler Akademisi Yıllıkları*, 1094 (1), 1-12.

Schaefer, JA ve Moos, RH (1998). Travma sonrası büyümenin bağlamı: Yaşam krizleri, bireysel ve toplumsal kaynaklar ve başa çıkma. *Travma sonrası büyüme: Kriz sonrasındaki olumlu değişiklikler*, 99 (126), 9781410603401-9.

Substance Abuse and Mental Health Services Administration (SAMSHA) (2024). Evidenced- based resource guide series: Use of medication-assisted treatment in emergency departments.

Tedeschi, R. G., & Calhoun, L. G. (1996). The Posttraumatic Growth Inventory: Measuring the positive legacy of trauma. *Journal of Traumatic Stress*, 9(3), 455–472. <https://doi.org/10.1002/jts.2490090305>

Tedeschi, R. G., & Calhoun, L. G. (2004). Target Article: "Posttraumatic Growth: Conceptual Foundations and Empirical Evidence". *Psychological Inquiry*, 15(1), 1–18. https://doi.org/10.1207/s15327965pli1501_01

Tunçel, Ö. K. (2023). Earthquake, collective trauma, and consequences. *Archives of Neuropsychiatry*, 60(2), 97.

Yılmaz, B., & Sahin, N. H. (2007). Arama-kurtarma çalışanlarında travma sonrası stres belirtileri ve travma sonrası büyüme. *Türk Psikoloji Dergisi*, 22(59), 119.

Zhang W, Liu H, Jiang X, Wu D, Tian Y. A longitudinal study of post-traumatic stress disorder symptoms and its relationship with coping skill and locus of control in adolescents after an earthquake in China. *PLoS One*. 2014;9(2):e88263. Doi:10.1371/journal.pone.0088263.

NOVEL ECO-FRIENDLY MATERIALS USED FOR REUSABLE MENSTRUAL PADS: A SCOPING REVIEW**Rajah, A. S.**

Department of Nursing Science, Bayero University, Kano, Nigeria

ORCID: <https://orcid.org/0000-0002-3506-2098>**Yunusa, U.**

Department of Nursing Science, Bayero University, Kano, Nigeria

Tashi, F. T.

College of Nursing and Midwifery, Kano, Nigeria.

Abdullahi, S. O.

College of Nursing and Midwifery, Kano, Nigeria.

Tukuntawa, A. S.

National Orthopaedic Hospital, Dala-Kano, Nigeria

Abstract**Introduction**

The increasing demand for sustainable menstrual products has led to a growing interest in innovative materials that reduce environmental impact. Disposable menstrual pads generate significant plastic waste, raising environmental concerns. Reusable menstrual pads (RMPs) offer a sustainable alternative, but the effectiveness and properties of novel eco-friendly materials for RMPs remain unclear. This review aims to identify and evaluate promising materials to support the development of eco-friendly menstrual health solutions.

Objective

The objective of this scoping review is to identify novel eco-friendly materials used for reusable menstrual pads, with a particular focus on their properties and environmental impact.

Inclusion Criteria: Studies investigating novel eco-friendly materials for RMPs, published in English, focusing on women and girls of reproductive age, comparing eco-friendly materials with conventional pads, or reporting on properties and environmental impact of these plant-based fibres. Studies of any design and conducted globally were considered.

Methods: A comprehensive three-step search strategy was employed to locate both published and unpublished studies. The initial search was conducted across databases such as PubMed, MEDLINE, Cochrane Library, Scopus, AJOL, Google Scholar, Web of Science, Worldwide Science, Science. gov, and the Global Health database. Two reviewers independently screened titles

and abstracts using the software Covidence. Data were extracted and charted using a standardized form. This search was conducted in February, 2024. The search yielded 431 studies, reduced to 429 after removing duplicates. After title and abstract screening, 363 articles were excluded. Full-text review of 29 studies led to the exclusion of 17, leaving 12 studies for final inclusion. Additionally, 48 studies were identified through citation searching, organizational websites and grey literature sources, with 8 assessed for eligibility and 4 included. In total, 16 research articles were included in the final synthesis, comprising 6 experimental studies, 2 mixed-method studies, 1 quantitative descriptive study and 7 review article.

Results: A diverse array of eco-friendly materials for reusable menstrual pads were identified. The top layer, comprises of bamboo, banana, organic cotton fibres, cotton flannel, jute, non-woven bamboo, bamboo pulp, water hyacinth, 100% knitted cotton fabric, flax fibre, kenaf, TENCEL®Biosoft (lyocell fibre), papaya fibres and papyrus. The core layer which focused on absorbency, include cotton terry cloth, bamboo wadding, linen, hemp cloth, cotton fleece, polywadding, bamboo kun, jute, *Sansevieria trifasciata* plant fibre, kenaf, chitosan, bamboo, banana fibres, flax and wool. The bottom layer comprised of water-repellent materials like polyester, nylon, polyurethane laminate, polyethylene, polypropylene, cornstarch-based bio-plastic sheets and Poly Lactic Acid.

Conclusion: This review highlights the potential of plant-based fibres as eco-friendly materials for RMPs. However, the scarcity of high-quality evidence, particularly on user experience, life cycle assessments and randomized controlled trials necessitates further research.

Keywords: Biodegradable materials; Menstrual hygiene; Plant-based fibers; Reusable menstrual pads; Sustainable products.

EVALUATION OF MICROBIAL LOAD OF REUSABLE MENSTRUAL PADS AND THE ASSOCIATED RISKS OF INFECTION**Rajah, A. S.**

Department of Nursing Science, Bayero University, Kano, Nigeria

ORCID: <https://orcid.org/0000-0002-3506-2098>**Yunusa, U.**

Department of Nursing Science, Bayero University, Kano, Nigeria

Tashi, F. T.

College of Nursing and Midwifery, Kano, Nigeria.

Abdullahi, S. O.

College of Nursing and Midwifery, Kano, Nigeria.

Tukuntawa, A. S.

National Orthopaedic Hospital, Dala-Kano, Nigeria

Abstract

Background: Menstruation is a natural and healthy part of life for women and girls worldwide, with approximately 1.8 billion women globally experiencing it monthly.

Aim: This study aimed to evaluate the microbial composition and infection risks associated with reusable menstrual pads (RMPs).

Methodology: A total of 26 samples were collected from RMP users. The participants used the pads, and the researchers retrieved them. The participants were directed on how to wash the pads using different methods: water only, detergent only, bar soap only, detergent and disinfectant, and detergent, disinfectant, and ironing. Microbiological analysis was conducted to assess microbial growth on nutrient agar, chocolate agar, and Sabouraud dextrose agar.

Results: Findings showed low microbial concentration in 53.8% of the positive specimens. The predominant isolates being Staphylococcus species (isolated in 26.9% of samples), Lactobacillus species (isolated in 26.9% of samples), Candida species (isolated in 19.2% of samples), and Fusobacterium nucleatum (isolated in 23% of samples). All RMPs washed with water only were positive for bacterial culture with count of > 100cfu/ml. Those washed with detergent and bar soap revealed microbial count of 50-100cfu/ml. RMPs washed with detergent and disinfectant, dried and then ironed, showed no significant growth or very low microbial counts compared to other cleaning methods.

Conclusion: The combination of detergent, disinfectant, and ironing is the most effective cleaning method for reducing microbial load on reusable menstrual pads.

Keywords: Reusable menstrual pads, Cleaning methods, Bacterial burden, Disinfection, Menstrual hygiene

PREDICTIVE MODELING OF HEART DISEASE USING RANDOM FOREST CLASSIFICATION: A COMPARATIVE STUDY WITH LOGISTIC REGRESSION AND SVC

Pinmanee Vajrapatkul

Computer Engineering, Srinakharinwirot University, Thailand

Adirek Vajrapatkul

School of Economics, Sukhothai Thammathirat Open University, Thailand

ABSTRACT

Heart disease remains a leading cause of mortality worldwide, necessitating the development of advanced predictive models to enhance early detection and intervention. This research focuses on the application of machine learning techniques, particularly Random Forest (RF) classification, for predicting heart disease. The study compares the performance of RF with Logistic Regression (LR) and Support Vector Classifier (SVC) using a dataset that includes key variables. The RF model demonstrated superior performance, significantly outperforming both LR and SVC. Feature importance analysis identified cholesterol levels and age as the most critical predictors of heart disease, along with chest pain type, resting blood pressure, exercise-induced angina, and fasting blood sugar levels. This research contributes to the analysis of feature importance, which can guide healthcare practitioners in tailoring preventive measures and treatment plans. By focusing on the most impactful factors, healthcare providers can implement more effective strategies to reduce the global burden of heart disease.

Keywords: Heart Disease, Random Forest Classification, Logistic Regression, Support Vector Classifier, Machine Learning

INTRODUCTION

Heart disease is a significant health concern globally, impacting individuals, families, and societies. The prevalence of heart disease, including conditions such as valvular heart disease, ischemic heart disease, and congenital heart defects, underscores the importance of early detection and treatment to improve long-term outcomes (Marciniak et al., 2017). Moreover, heart disease is a leading cause of death worldwide, emphasizing the urgent need to address this complex and life-threatening condition (Muhammed et al., 2023).

Heart disease significantly impacts various aspects of life, including physical, psychological, social, and emotional dimensions. The effects of heart disease extend beyond the individual and affect families, caregivers, and communities. Studies have highlighted the detrimental consequences of heart disease on quality of life, emphasizing the need for comprehensive care and support to address the multifaceted challenges posed by this condition (Algurén et al., 2020; Abdolahi et al., 2020; Gomes et al., 2022). Furthermore, heart disease impacts maternal and perinatal health, with conditions like valvular heart disease and cardiomyopathy presenting challenges during pregnancy (Ngowa et al., 2022).

Physically, heart disease can lead to a progressive decline in health, reduced physical capacity, and increased symptom burden, thereby affecting individuals' ability to engage in daily activities and

maintain independence (Susin, 2019; Rippe, 2018). The presence of heart disease often results in fatigue, decreased ability to perform routine tasks, and limitations in mobility, which contribute to a diminished quality of life (Todorova, 2018). These physical limitations can significantly impact individuals' overall well-being and sense of autonomy. Psychologically, heart disease can give rise to anxiety, depression, and treatment-related anxiety, further exacerbating the emotional toll on individuals living with this condition (Gomes et al., 2022; Heidari, 2022). The psychological distress associated with heart disease can affect mental health, social interactions, and overall quality of life, underscoring the importance of addressing the emotional well-being of patients alongside medical management (Abdolahi et al., 2020; Fischer et al., 2022). The emotional burden of heart disease can lead to feelings of isolation, stress, and challenges in daily life, highlighting the need for holistic care approaches that consider mental health alongside physical health.

Socially, heart disease can impact relationships, work, and daily activities, leading to social isolation, changes in roles, and challenges in maintaining social connections. The limitations imposed by heart disease can restrict individuals' participation in social events, work-related activities, and leisure pursuits, affecting their overall quality of life and sense of fulfillment. Therefore, the social implications of heart disease underscore the importance of fostering supportive environments and promoting social engagement to enhance well-being. Economically, heart disease can impose financial burdens on individuals and healthcare systems, necessitating costly treatments, medications, and lifestyle modifications (Algurén et al., 2020). Heart disease is a critical global health concern, with significant implications for individuals, healthcare systems, and societies worldwide. Cardiovascular diseases (CVDs) currently have the highest morbidity and mortality rates globally, affecting populations in both developed and developing countries (Guan et al., 2019).

The burden of heart disease is substantial, with the number of lives lost to CVDs increasing each year. This highlights the urgent need for effective prevention, early detection, and management strategies to address this pervasive health issue. The ongoing COVID-19 pandemic has further underscored the impact of heart disease, particularly in patients with pre-existing cardiovascular conditions. Studies have shown a significant association between case fatality rates in COVID-19 patients and underlying cardiovascular diseases, thereby emphasizing the heightened risk faced by individuals with heart conditions during the current health crisis (Dan et al., 2020). Consequently, the pandemic has posed unprecedented challenges in managing cardiovascular health, necessitating innovative approaches to ensure optimal care for patients with heart disease.

Ischemic heart disease, a leading cause of mortality worldwide, continues to pose a significant health threat, with an estimated prevalence of 197 million cases globally (Akhmerov & Parimon, 2022). The prevalence of ischemic heart disease highlights the pervasive nature of this condition and the need for targeted interventions to reduce the burden of cardiovascular events and improve outcomes for individuals at risk. Cardiovascular diseases, including ischemic heart disease, remain the leading cause of death worldwide, underscoring the importance of understanding the molecular mechanisms underlying heart conditions (Florek, 2024).

The impact of heart disease extends beyond mortality rates, affecting quality of life, economic productivity, and social well-being. Heart valve disease, for instance, is a significant cause of morbidity and mortality among cardiac patients globally, highlighting the need for comprehensive care and management strategies (Yang, 2023). Investigating the relationship between heart disease and various aspects of life, including anxiety, depression, and health-related quality of life, can guide healthcare providers in delivering comprehensive and patient-centered care (Abed & Sachet, 2022).

This research aims to address the pressing issue of heart disease by leveraging advanced machine learning techniques to enhance early detection and prediction capabilities. Specifically, the study focuses on the application of Random Forest classification and compares its performance with Logistic Regression (LR) and Support Vector Classifier (SVC). The primary objective is to develop

and evaluate a predictive model that can accurately identify individuals at risk of heart disease, thereby facilitating timely intervention and personalized care plans. This research contributes to the literature by demonstrating the performance of the Random Forest classifier in predicting heart disease for the particular studied dataset, compared to LR and SVC. Additionally, it provides critical insights into the most significant predictors of heart disease, aligning with established medical knowledge. To achieve these objectives, the research is systematically organized into several sections. The next section explores existing theories and previous studies related to heart disease, thus setting the context for the current research. The Methodology section details the model utilized in this research. The Results and Discussion section presents key findings and points of concern. Thereafter, the policy implications will be presented.

LITERATURE REVIEW

This section explores the multifaceted nature of heart disease by synthesizing key insights from previous studies. Heart disease, a prevalent and complex medical condition, includes various disorders affecting the heart and blood vessels, thus posing significant health risks globally.

The developmental origins of health and disease (DOHaD) theory in cardiology highlight the impact of early-life factors on adult health outcomes. Arima and Fukuoka (2020) link conditions like ischemic heart disease, diabetes, and chronic kidney disease to prenatal nutritional status. Therefore, this theory underscores the necessity of addressing cardiovascular health holistically, considering both present lifestyle choices and early developmental influences. Moreover, nutritional interventions are pivotal in preventing and managing cardiovascular disease, particularly in childhood. Establishing healthy habits early can have long-term implications. Capra et al. (2021) emphasize the importance of risk stratification for coronary heart disease (CHD) in children to tailor preventive measures and therapeutic approaches. By focusing on nutrition and lifestyle factors in childhood, healthcare providers can lay a foundation for lifelong cardiovascular well-being. The theory of fetal programming of adult diseases, initially proposed by David J.P. Barker, elucidates how early-life experiences and exposures can influence susceptibility to conditions like ischemic heart disease later in life (Faa, 2024). Hence, this theory highlights the importance of prenatal care and maternal health in shaping future cardiovascular health.

Self-care behaviors also play a crucial role in managing chronic conditions like heart failure. The Theory of Self-care of Chronic Illness provides frameworks for understanding and promoting effective self-management strategies (Kamath et al., 2021). By empowering patients with the knowledge and skills for self-care practices, healthcare providers can enhance outcomes and quality of life for individuals living with cardiovascular conditions. In addition, placental vascular pathology can have long-term consequences on both maternal and offspring cardiovascular systems. Conditions like pregnancy-induced hypertension may lead to endothelial dysfunction and increased cardiovascular risk postpartum (Benagiano et al., 2021). Therefore, understanding the impact of pregnancy-related vascular changes on future cardiovascular health underscores the need for comprehensive care for pregnant individuals to mitigate potential long-term cardiovascular consequences. The inflammation and heart disease theory posits a link between inflammatory processes and cardiovascular health, recognizing inflammation as a key player in the pathogenesis of heart disease (Fleming et al., 2019). Thus, by elucidating the role of inflammation in cardiovascular conditions, researchers and healthcare providers can explore targeted interventions addressing inflammatory pathways to improve outcomes for individuals at risk of or living with heart disease.

Graph theory applications in congenital heart disease offer innovative ways to represent complex cardiac conditions, thereby providing insights into the structural and functional aspects of congenital

heart defects (Lee & Chen, 2023). By leveraging graph theory to visualize and analyze congenital heart anomalies, healthcare professionals can enhance understanding and treatment strategies tailored to individual patients. Moreover, psychometric testing of self-care inventories for coronary heart disease reflects advancements in measuring and assessing self-care behaviors in individuals with cardiovascular conditions (Dickson et al., 2022). Developing robust tools to evaluate self-care practices provides valuable insights into patient behaviors and helps tailor interventions to promote effective self-management strategies. The institutionalization and deinstitutionalization of the cholesterol theory in coronary heart disease underscore the evolving landscape of cardiovascular research and the impact of shifting paradigms on disease management (Neculita & McKay, 2020). As new theories and concepts emerge in cardiovascular science, it is essential to critically evaluate and adapt existing frameworks to ensure optimal care and outcomes for individuals with heart disease.

An understanding of heart disease encompasses a myriad of factors, from early developmental influences to lifestyle choices and disease management strategies. By integrating theories from various disciplines, including developmental origins of health and disease, self-care frameworks, and inflammatory pathways, healthcare providers can offer holistic and personalized care to individuals with heart disease.

METHODOLOGY

Random Forest is an ensemble learning method for classification that operates by constructing multiple decision trees during training time and outputting the mode of the classes (classification) of the individual trees. The concept of this model is as follows:

Let $X = \{\text{AGE, CPT, BPS, CHL, FBS, EIA}\}$ $X = \{\text{AGE, CPT, BPS, CHL, FBS, EIA}\}$

represent the feature vector, and let y be the target variable, where $y=1$ indicates the presence of heart disease and $y=0$ indicates its absence. The Random Forest classifier is composed of T decision trees (Breiman, L. (2001)). For each tree t in the forest, a bootstrap sample is drawn from the training data. A decision tree \mathcal{T}_t is then grown by selecting the best split from a random subset of features at each node. For an input feature vector x , the prediction of the tree \mathcal{T}_t is $\hat{y}_t(x)$.

The Random Forest classifier aggregates the predictions of all individual trees. The final prediction \hat{y} is obtained by majority voting:

$$\hat{y} = \text{mode}(\{\hat{y}_1(x), \hat{y}_2(x), \dots, \hat{y}_T(x)\}). \quad (1)$$

To evaluate the model, the following metrics (Krstinić, D., et al., 2020) are utilized:

$$\text{Accuracy rate} = \frac{TP+TN}{TP+TN+FP+FN}, \quad (2)$$

$$\text{Precision rate} = \frac{TP}{TP+FP}, \quad (3)$$

$$\text{Recall} = \frac{TP}{TP+FN}, \quad (4)$$

$$F1 = 2 \times \frac{\text{Precision} \times \text{Recall}}{\text{Precision} + \text{Recall}}, \quad (5)$$

To predict heart disease, this research utilizes the dataset provided by Manu Siddhartha (2020). The dataset consists of the following features: Age of the patient (AGE), Chest pain type (CPT), Resting blood pressure (BPS), Cholesterol level (CHL), Fasting blood sugar level (FBS), and Exercise-induced angina (EIA). The target variable is Heart disease (HDS), which indicates the presence or absence of heart disease.

RESULTS AND DISCUSSION

This section presents the performance evaluation of the Random Forest (RF) classifier compared to Logistic Regression (LR) and Support Vector Classifier (SVC). It includes metrics, namely, accuracy, precision, recall, and the ROC curve, along with a detailed feature importance analysis to identify critical predictors of heart disease.

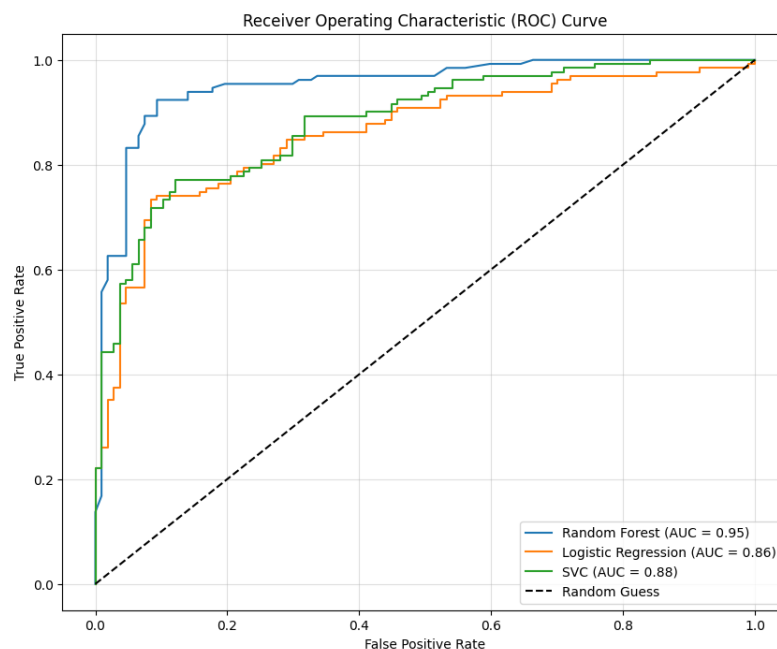


Figure 1 ROC curve

The ROC (Receiver Operating Characteristic) curve in Figure 1 is a graphical representation of the performance of three different classification models, i.e., Random Forest, Logistic Regression, and Support Vector Classifier (SVC) in distinguishing between the positive class (presence of heart disease) and the negative class (absence of heart disease). The curve plots the Recall (TPR) against the False Positive Rate (FPR) at various threshold settings.

The ROC curve for the Random Forest classifier is represented by the blue line (B). It has the highest Area Under the Curve (AUC) of 0.95, indicating that this model has the best performance among the three models in distinguishing between patients with and without heart disease. The curve is closest to the top-left corner, which means it has the highest TPR and the lowest FPR. The ROC curve for Logistic Regression is shown in orange (O). It has an AUC of 0.86, which is lower than

July 1-3, 2024 -PARIS

the Random Forest but still indicates good performance. The curve demonstrates that Logistic Regression has a decent balance between sensitivity and specificity but is outperformed by the Random Forest classifier. The ROC curve for SVC is depicted by the green line (G). It has an AUC of 0.88, which is slightly better than Logistic Regression but not as high as the Random Forest. The curve suggests that SVC is effective in distinguishing between the classes but again, not as effective as the Random Forest. The black dashed line represents a model that makes random guesses. The AUC for a random guess is 0.50, which serves as a baseline for comparison. All three models perform significantly better than this baseline.

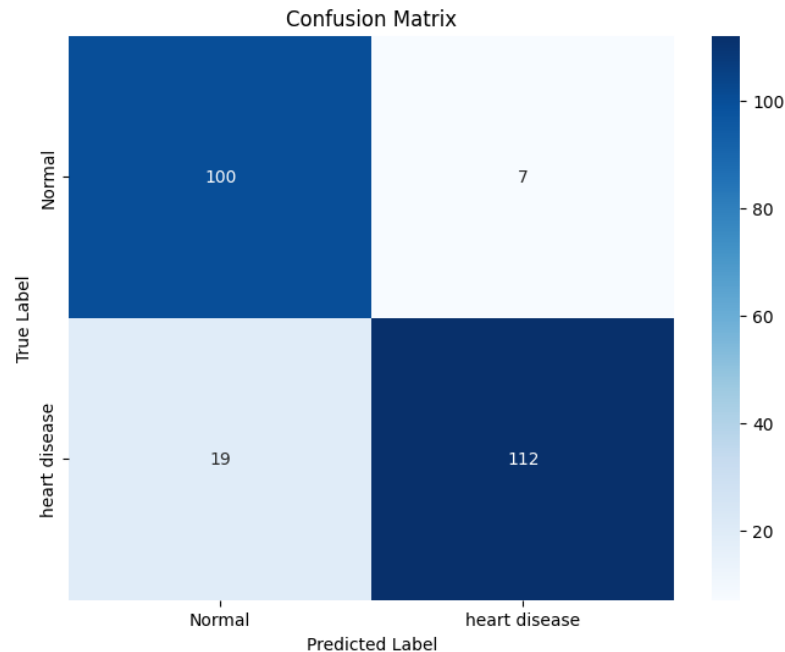


Figure 2 Confusion Matrix

The confusion matrix in Figure 2 provides a summary of the performance of the Random Forest classification model in predicting heart disease. This 2x2 table illustrates the actual versus predicted classifications made by the model, with rows representing the true labels and columns representing the predicted labels. The labels are divided into two classes, i.e., Normal and Heart Disease.

The matrix shows that the model correctly predicted 112 instances of heart disease, indicated as true positives (TP) in the bottom-right cell. It accurately identified 100 instances as normal, shown as true negatives (TN) in the top-left cell. However, the model incorrectly predicted heart disease in 7 normal instances, represented as false positives (FP) in the top-right cell. Additionally, it failed to identify 19 instances of heart disease, predicting them as normal, shown as false negatives (FN) in the bottom-left cell.

From this confusion matrix, several performance metrics are derived. The accuracy of the model is approximately 89 percent, indicating its overall correctness. The precision for the heart disease class is about 94 percent, reflecting the proportion of true positive predictions among all positive predictions. The Recall, or sensitivity, for the heart disease class is about 85 percent, representing the model's ability to correctly identify patients with heart disease. The false positive rate is around 15 percent, indicating the proportion of normal instances incorrectly classified as heart disease. The F1 score is approximately 89 percent, providing a balance between precision and true positive. These metrics suggest that the Random Forest model performs well, with high accuracy, precision, and true positive. However, the presence of 19 false negatives highlights the need for further

optimization to reduce the risk of missing actual cases of heart disease, which is critical in medical diagnostic

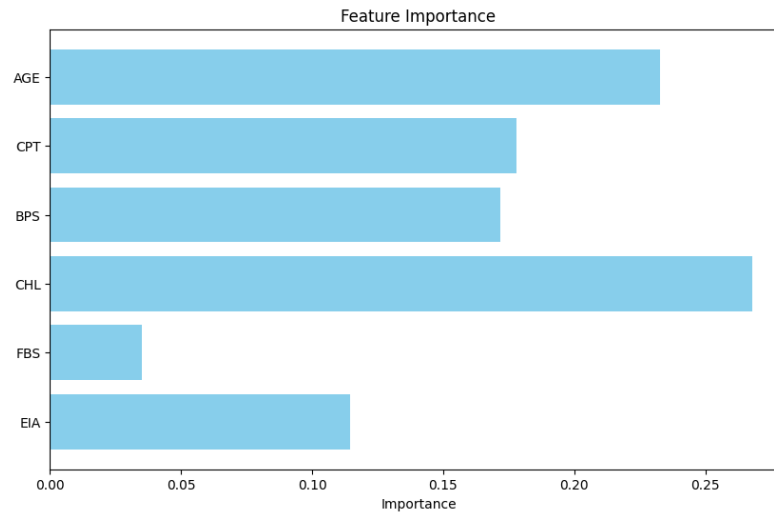


Figure 3 Feature Importance

Figure 3 illustrates the feature importance of various factors in the Random Forest model used for predicting heart disease. Cholesterol levels have the highest importance score, indicating it is the most critical factor in predicting heart disease. This aligns with medical knowledge, as high cholesterol levels are a well-known risk factor for cardiovascular diseases. The importance score for cholesterol is around 0.25, suggesting it has a substantial influence on the model's predictions. Age is the second most important feature, with an importance score slightly below that of cholesterol. This high importance reflects the fact that the risk of heart disease increases with age, making it a crucial predictor in the model. Chest pain type is another significant feature, with a notable importance score. Different types of chest pain can indicate varying levels of heart disease risk, thus making this feature important for accurate predictions. Resting blood pressure also shows considerable importance. Elevated blood pressure is a known risk factor for heart disease, explaining its relevance in the model. Exercise-induced angina has a moderate importance score. This feature provides information about how the heart responds to physical stress, contributing to the overall prediction accuracy. Fasting blood sugar has the lowest importance among the features but still contributes to the model. While it is less critical than the other features, it can still provide valuable insights, especially in patients with diabetes or prediabetes.

The feature importance analysis revealed that cholesterol and age are the top predictors of heart disease, followed by chest pain type (CPT), resting blood pressure (BPS), exercise-induced angina (EIA), and fasting blood sugar (FBS). These findings not only validate established medical knowledge but also provide actionable insights for healthcare professionals focusing on the most impactful factors in heart disease risk assessment. The findings highlight the interplay between theoretical frameworks and empirical data in understanding and predicting heart disease. The Developmental Origins of Health and Disease (DOHaD) theory underlines the profound impact of early-life factors on adult cardiovascular health (Arima & Fukuoka, 2020). This theory aligns with the empirical findings that age can influence heart disease risk. Furthermore, the literature emphasizes the role of nutrition in preventing cardiovascular disease from childhood (Capra et al., 2021). This perspective is supported by the RF model's incorporation of cholesterol and fasting blood sugar (FBS) levels as important features. Since these factors are influenced by diet, they underscore the importance of early and ongoing nutritional interventions in reducing heart disease risk.

IMPLICATIONS

The findings have significant policy implications for public health and healthcare management. The feature importance analysis from the RF model underlines the need for targeted public health campaigns. Cholesterol levels and age emerged as significant predictors of heart disease, suggesting that public health initiatives should focus on promoting healthy lifestyles and regular screenings, especially among older populations. Policymakers should design programs that encourage regular cholesterol checks and lifestyle modifications, such as healthy eating and physical activity, to mitigate these risk factors. Additionally, the economic implications of heart disease, including high treatment costs and lost productivity, necessitate policy measures that support preventive care. By investing in preventive measures informed by predictive models, governments can potentially reduce healthcare expenditures associated with advanced heart disease treatments. Policies that incentivize preventive care, such as insurance coverage for regular screenings and wellness programs, could be effective in encouraging individuals to take proactive steps in managing their heart health.

FUTURE RESEARCH

One key recommendation for future research is to enhance the sensitivity of these models to reduce false negatives, ensuring that fewer cases of heart disease go undetected. Researchers should explore hybrid models that combine the strengths of multiple algorithms to improve prediction accuracy and reliability. Additionally, future research should investigate the integration of genetic and environmental factors into predictive models. Incorporating data on genetic predispositions and lifestyle factors such as diet, exercise, and stress levels could provide a more comprehensive risk assessment. This approach would allow for more personalized and precise interventions, aligning with the trend toward precision medicine. Moreover, longitudinal studies are recommended to assess the long-term effectiveness of predictive models in clinical practice. These studies could track patient outcomes over time to validate the predictive power of the models and refine them based on real-world data.

CONCLUSION

This research aimed to enhance the early detection and prediction of heart disease by utilizing machine learning techniques, specifically focusing on Random Forest (RF) classification. The study involved a comparative analysis with Logistic Regression (LR) and Support Vector Classifier (SVC), leveraging a comprehensive dataset encompassing variables, for instance, age, chest pain type, blood pressure, and cholesterol levels. The dataset was then split into training and testing sets using an 80-20 split. The RF model was trained on the training set, followed by model evaluation using metrics, including accuracy, precision, recall, F1-score, and the Receiver Operating Characteristic (ROC) curve. The results of the analysis demonstrated that the RF classifier significantly outperformed both LR and SVC, achieving the highest accuracy and area under the ROC curve (AUC). The RF model's AUC of 0.95 indicated excellent discriminatory power in distinguishing between patients with and without heart disease. Furthermore, the confusion matrix analysis revealed high precision and recall, though it also highlighted the need for optimization to reduce false negatives. Feature importance analysis within the RF model identified cholesterol levels and age as the most influential predictors of heart disease, aligning with established medical knowledge. Other significant predictors included chest pain type, resting blood pressure, exercise-induced angina, and fasting blood sugar levels. These findings provide actionable insights for healthcare professionals, emphasizing the critical risk factors to focus on during heart disease

assessments. These insights can help tailor preventive measures and treatment plans, ultimately improving patient outcomes.

ACKNOWLEDGE

This research is supported by the School of Economics, Sukhothai Thammathirat Open University, Thailand. This research is also supported by Computer Engineering, Srinakharinwirot University, Thailand.

REFERENCES

- Abed, H., & Sachet, K. (2022). Influence of anxiety on health-related quality of life among patients with heart diseases. *International Journal of Health Sciences*, 6(s2), 10471-10479. <https://doi.org/10.53730/ijhs.v6ns2.7515>
- Abdolahi, M., Doustmohamadi, M., & Sheikhbardsiri, H. (2020). The effect of an educational plan based on the roy adaptation model for fatigue and activities of daily living of patients with heart failure disease. *Ethiopian Journal of Health Sciences*, 30(4). <https://doi.org/10.4314/ejhs.v30i4.11>
- Akhmerov, A., & Parimon, T. (2022). Extracellular vesicles, inflammation, and cardiovascular disease. *Cells*, 11(14), 2229. <https://doi.org/10.3390/cells11142229>
- Algurén, B., Coenen, M., Malm, D., Fridlund, B., Mårtensson, J., & Årestedt, K. (2020). A scoping review and mapping exercise comparing the content of patient-reported outcome measures (proms) across heart disease-specific scales. *Journal of Patient-Reported Outcomes*, 4(1). <https://doi.org/10.1186/s41687-019-0165-7>
- Arima, Y., & Fukuoka, H. (2020). Developmental origins of health and disease theory in cardiology. *Journal of Cardiology*, 76(1), 14-17. <https://doi.org/10.1016/j.jjcc.2020.02.003>
- Benagiano, M., Mancuso, S., Brosens, J., & Benagiano, G. (2021). Long-term consequences of placental vascular pathology on the maternal and offspring cardiovascular systems. *Biomolecules*, 11(11), 1625. <https://doi.org/10.3390/biom11111625>
- Breiman, L. (2001). Random Forests. *Machine Learning*, 45(1), 5-32. <https://doi.org/10.1023/A:1010933404324>
- Capra, M., Pederiva, C., Viggiano, C., Santis, R., Banderali, G., & Biasucci, G. (2021). Nutritional approach to prevention and treatment of cardiovascular disease in childhood. *Nutrients*, 13(7), 2359. <https://doi.org/10.3390/nu13072359>
- Dan, S., Pant, M., & Upadhyay, S. (2020). The case fatality rate in covid-19 patients with cardiovascular disease: global health challenge and paradigm in the current pandemic. *Current Pharmacology Reports*, 6(6), 315-324. <https://doi.org/10.1007/s40495-020-00239-0>
- Dickson, V., Iovino, P., Vellone, E., Alvaro, R., Matteo, R., Molin, A., ... & Riegel, B. (2022). Psychometric testing of the self-care of coronary heart disease inventory version 3.0. *The Journal of Cardiovascular Nursing*, 38(4), E131-E140. <https://doi.org/10.1097/jcn.0000000000000952>
- Faa, G. (2024). The fascinating theory of fetal programming of adult diseases: a review of the fundamentals of the barker hypothesis. *Journal of Public Health Research*, 13(1). <https://doi.org/10.1177/22799036241226817>
- Fischer, A., Grundlach, C., Helm, P., Bauer, U., Baumgartner, H., & Diller, G. (2022). Erectile dysfunction in men with adult congenital heart disease: a prevalent but neglected issue. *Korean Circulation Journal*, 52(3), 233. <https://doi.org/10.4070/kcj.2021.0184>

Fleming, R., Fleming, M., McKusick, A., & Chaudhuri, T. (2019). "The diet wars challenge study": insulin resistance, cholesterol and inflammation. *Acta Scientific Pharmaceutical Sciences*, 3(6), 133-144. <https://doi.org/10.31080/asps.2019.03.0287>

Florek, K. (2024). Vascular endothelial growth factor (vegf) and its role in the cardiovascular system. *Biomedicines*, 12(5), 1055. <https://doi.org/10.3390/biomedicines12051055>

Gomes, R., Gomes, L., Celinski, V., Martins, C., Sayed, O., Fillos, L., ... & Chaicoski, A. (2022). Factors that impact on quality of life of people with disease with tremor: systematic review. *International Journal of Innovative Research in Medical Science*, 7(09), 496-503. <https://doi.org/10.23958/ijirms/vol07-i09/1504>

Guan, Y., Song, X., Sun, W., Wang, Y., & Liu, B. (2019). Effect of hypoxia-induced microRNA-210 expression on cardiovascular disease and the underlying mechanism. *Oxidative Medicine and Cellular Longevity*, 2019, 1-12. <https://doi.org/10.1155/2019/4727283>

Heidari, N. (2022). The effect of acute high-intensity interval exercise on post-exercise blood pressure in post coronary artery bypass graft surgery patients: a pilot study. *Turkish Journal of Kinesiology*, 8(2), 30-36. <https://doi.org/10.31459/turkjin.1092119>

Kamath, D., Bhuvana, K., Salazar, L., Varghese, K., Kamath, A., Idiculla, J., ... & Xavier, D. (2021). A qualitative, grounded theory exploration of the determinants of self-care behavior among indian patients with a lived experience of chronic heart failure. *Plos One*, 16(1), e0245659. <https://doi.org/10.1371/journal.pone.0245659>

Krstinić, D., Braović, M., Šerić, L., & Božić-Štulić, D. (2020). Multi-label classifier performance evaluation with confusion matrix. *Computer Science & Information Technology*, 1, 1-14.

Lee, Y., & Chen, S. (2023). Graph theory applications in congenital heart disease. *Scientific Reports*, 13(1). <https://doi.org/10.1038/s41598-023-38233-3>

Marciniak, A., Glover, K., & Sharma, R. (2017). Cohort profile: prevalence of valvular heart disease in community patients with suspected heart failure in uk. *BMJ Open*, 7(1), e012240. <https://doi.org/10.1136/bmjopen-2016-012240>

Manu, S. (2020, November 5). Heart Disease Dataset (Comprehensive). *IEEE Dataport*. <https://doi.org/10.21227/dz4t-cm36>

Muhammed, S., Abdul-Majeed, G., & Mahmoud, M. (2023). Prediction of heart diseases by using supervised machine learning algorithms. *Wasit Journal of Pure Sciences*, 2(1), 231-243. <https://doi.org/10.31185/wjps.125>

Neculita, C., & McKay, R. (2020). The institutionalisation and deinstitutionalisation of the cholesterol theory. *Transnational Corporation Review*, 12(2), 173-192. <https://doi.org/10.1080/19186444.2020.1761177>

Ngowa, J., Kengne, C., Nsahlai, C., Jérôme, B., Essiben, F., Tatsipie, W., ... & Foumane, P. (2022). Maternal and perinatal outcomes of pregnant women with heart disease in three yaoundé referral hospitals. *Open Journal of Obstetrics and Gynecology*, 12(01), 93-103. <https://doi.org/10.4236/ojog.2022.121009>

Rippe, J. (2018). Lifestyle strategies for risk factor reduction, prevention, and treatment of cardiovascular disease. *American Journal of Lifestyle Medicine*, 13(2), 204-212. <https://doi.org/10.1177/1559827618812395>

Susin, F. (2019). Growing up with congenital heart disease: impact on the daily life quality from the perspective of a mother. *Medical Research Archives*, 7(5). <https://doi.org/10.18103/mra.v7i5.1937>

Todorova, M. (2018). Study of the quality of life with regard to the health of patients with chronic ischemic heart disease. *Knowledge International Journal*, 28(2), 515-518. <https://doi.org/10.35120/kij2802515t>

Yang, X. (2023). Lineage tracing identifies dynamic contribution of endothelial cells to cardiac valve mesenchyme during development. *Journal of Histochemistry & Cytochemistry*, 71(12), 675-687. <https://doi.org/10.1369/00221554231207434>

ENHANCED CNN MODEL FOR ACCURATE CLASSIFICATION OF BRAIN TUMORS FROM MRI SCANS

Pinmanee Vajrapatkul

Computer Engineering, Srinakharinwirot University, Thailand

Boonta Wayupab

Central Food Retail Company Limited, Replenishment and Demand Forecasting Department,
Nonthaburi, Thailand

Adirek Vajrapatkul

School of Economics, Sukhothai Thammathirat Open University, Thailand

ABSTRACT

This study presents an enhanced Convolutional Neural Network (CNN) model designed for the accurate classification of brain tumors from MRI scans. The primary goal is to improve diagnostic precision, which is critical for timely and effective treatment. The research focuses on developing a robust CNN architecture that effectively processes MRI images to distinguish between gliomas, meningiomas, pituitary tumors, and non-tumor cases. Utilizing a comprehensive dataset, the CNN model is trained, tested, and refined to achieve higher accuracy rates. The initial phase of the study involved evaluating the performance of the preliminary CNN model, which revealed considerable room for improvement. Subsequent refinements to the model led to enhanced performance. The refined CNN model demonstrated notable improvements in accuracy. These enhancements highlight the model's potential to support clinicians in making more accurate diagnoses. By leveraging deep learning, this research contributes to the precision in brain tumor diagnosis.

Keywords: Brain Tumors, MRI, Convolutional Neural Network, Glioma, Meningioma, Pituitary Tumor, Deep Learning

INTRODUCTION

Brain tumors have a significant impact on individuals' lives due to their potential to cause life-changing effects. These tumors can affect people of all ages and lead to a variety of symptoms and complications that greatly affect the quality of life. Early detection, effective treatment, and ongoing management are crucial for improving patient outcomes and overall survival rates (Asiri, 2024). Early diagnosis of brain tumors is essential for timely intervention and improved prognosis. Detecting brain tumors at an early stage allows for the prompt initiation of treatment, which can help prevent disease progression and reduce the risk of complications. Advances in imaging techniques, such as magnetic resonance imaging (MRI) enhancement and tumor classification, have improved the accuracy of early detection, enabling healthcare providers to intervene sooner and provide patients with optimal care (Asiri, 2024).

Patients with brain tumors often experience a range of neurological symptoms that can significantly impact their daily lives (Riazi, 2024). These symptoms can include impaired cognitive function, memory loss, and changes in behavior, which can profoundly affect daily functioning and overall

quality of life (Martin et al., 2018; Bunevičius, 2017). The physical effects of brain tumors can be debilitating, with symptoms such as headaches, seizures, motor deficits, and sensory disturbances. These impairments can limit mobility, independence, and overall quality of life. Additionally, the presence of a brain tumor can lead to fatigue, weakness, and decreased stamina, further impacting daily activities and overall well-being (Martin et al., 2018; Bunevičius, 2017).

The psychological impact of brain tumors should not be overlooked, as individuals may experience anxiety, depression, fear, and emotional distress related to their diagnosis and treatment. Coping with the uncertainty of the disease, undergoing invasive procedures, and facing potential changes in cognitive function can take a toll on mental health and emotional well-being. Support services, counseling, and psychological interventions are essential for addressing the emotional impact of brain tumors and promoting mental health (Martin et al., 2018; Bunevičius, 2017). The cognitive effects of brain tumors can lead to difficulties with memory, attention, concentration, and executive function, impacting work, social interactions, and daily tasks, thus affecting overall quality of life and independence.

The impact of brain tumors on relationships and social interactions is also significant. Individuals with brain tumors may experience changes in personality, communication difficulties, and challenges in social interactions. These changes can strain relationships with family, friends, and caregivers, leading to feelings of isolation and loneliness (Martin et al., 2018; Bunevičius, 2017). Additionally, the financial burden of brain tumors can have a significant impact on individuals and families. The costs associated with diagnosis, treatment, medications, rehabilitation, and supportive care can be substantial, leading to financial stress and hardship (Martin et al., 2018; Bunevičius, 2017).

Brain tumors pose a significant global health challenge, impacting individuals, healthcare systems, and society. According to Global Cancer Statistics, approximately 310,000 new cases of brain and nervous system tumors were reported worldwide, resulting in 250,000 deaths (Ma, 2024). Medical imaging advancements, particularly MRI, have significantly contributed to the detection, diagnosis, and treatment of brain tumors. MRI offers detailed visualization of brain structures, enhancing the accuracy of tumor identification and characterization. The integration of deep learning models in MRI-based brain tumor classification has shown promise in enhancing diagnostic precision and treatment planning (Li, 2024). The utilization of artificial intelligence and machine learning algorithms in classifying brain tumors based on MRI imaging has become increasingly crucial in the era of precision medicine. These technologies enable researchers to analyze complex imaging data, differentiate between tumor types, evaluate tumor characteristics, and predict patient outcomes. This personalized approach facilitates tailored treatment strategies, leading to more effective interventions (Li, 2024).

Studying the effects of brain tumors on life is crucial for several reasons. Identifying effective interventions and support strategies can help healthcare professionals assist patients in coping with the challenges posed by brain tumors and improve their overall quality of life. Research in this area highlights the importance of early detection, timely intervention, and ongoing support for individuals affected by brain tumors (Cammarata, 2024).

This research focuses on enhancing the accuracy of brain tumor classification using Convolutional Neural Networks (CNNs) applied to MRI scans. The primary contribution of this study is the development and refinement of a CNN model capable of accurately distinguishing between different types of brain tumors—specifically gliomas, meningiomas, and pituitary tumors—as well as identifying cases with no tumors. By leveraging advanced deep learning techniques, this research aims to address the critical need for precise diagnostic tools that can assist clinicians in making timely and accurate decisions, thereby improving patient outcomes. To achieve these objectives, the research is organized into several key sections. The methodology section details the CNN

architecture and the processes involved in training and refining the model. The results section presents the classification probabilities and performance metrics of the CNN model before and after refinement, highlighting significant improvements. Finally, the implications are discussed.

LITERATURE REVIEW

Brain tumors, also known as intracranial tumors, are abnormal growths of tissue in the brain or central spinal cord. These tumors can be benign (non-cancerous) or malignant (cancerous) and can arise from various cell types within the brain. The study of brain tumors encompasses a wide range of disciplines, including neurology, oncology, radiology, and neurosurgery, due to the complex nature of these conditions and their impact on neurological function (Pinkiewicz, 2024).

One key concept in understanding brain tumors is the blood-brain barrier (BBB) and its counterpart, the blood-tumor barrier (BTB). The BBB is a highly selective semipermeable membrane that separates circulating blood from the brain's extracellular fluid, regulating the passage of substances into the brain. In the context of brain tumors, alterations in the BBB can lead to the formation of the BTB, which is characterized by increased permeability and changes in the microenvironment that can affect tumor growth and response to treatment (Pinkiewicz, 2024). The concept of the BTB has gained prominence in neuro-oncology research, particularly regarding brain metastases and primary brain tumors such as gliomas. Studies have shown that specific types of brain tumors can induce alterations in the BBB, leading to a more permeable structure that facilitates the entry of therapeutic agents into the tumor microenvironment. Understanding the dynamics of the BTB is crucial for developing targeted treatment strategies that can effectively penetrate the tumor and improve patient outcomes (Pinkiewicz, 2024). Furthermore, the concept of long-term epilepsy-associated tumors (LEATs) highlights the intricate relationship between certain types of brain tumors and chronic drug-resistant epilepsy. Patients with low-grade brain tumors, such as gangliogliomas, often experience seizures that can be challenging to manage. The concept of LEATs underscores the need for comprehensive evaluation and management of epilepsy in patients with brain tumors to optimize treatment outcomes and quality of life (Kim, 2019).

Advances in imaging techniques, such as infrared spectroscopy, have provided new insights into the molecular signatures of brain tumors. By exploiting the unique spectroscopic profiles of different tumor types, researchers have developed methods for general brain tumor recognition based on distinct spectral patterns. This approach holds promise for improving the accuracy of tumor diagnosis and classification, paving the way for more personalized and effective treatment strategies (Steiner et al., 2022). Advances in imaging technology have also contributed to developing innovative approaches for brain tumor segmentation and detection. By combining complex wavelet transform and deep reinforcement learning algorithms, researchers have improved the accuracy and efficiency of tumor segmentation in multimodal brain images. These computational techniques play a crucial role in enhancing the diagnostic capabilities of clinicians and guiding treatment decisions for patients with brain tumors (Liu et al., 2022).

Several studies have explored brain tumor classification using CNN models. For example, Zhu et al. (2023) focused on developing a new CNN-based model to classify different types of brain tumors from MRI images. Almalki et al. (2022) used transfer learning to extract deep features for brain tumor classification using a shallow classifier. Additionally, Tiwari et al. (2022) employed CNN for multiclass brain tumor detection using medical imaging, showcasing advancements in image classification technology. Albalawi (2024) proposed an integrated approach of federated learning with transfer learning for brain tumor classification, aiming to address challenges such as manual intervention and limited generalizability to diverse tumor types. Kutlu and Avcı (2019) introduced a novel method for classifying liver and brain tumors using CNNs, discrete wavelet transform, and

long short-term memory networks, showcasing the integration of different techniques for classification. Haq et al. (2022) developed a deep learning approach for brain tumor classification using MRI data in an IoT healthcare environment, emphasizing the utilization of improved CNNs for classification.

Research on brain tumor classification using CNN models is diverse, focusing on enhancing classification accuracy, reducing misclassifications, and improving overall model performance. These studies collectively contribute to advancing medical diagnosis and treatment planning in the context of brain tumors, demonstrating the potential of CNN models in improving healthcare outcomes.

METHODOLOGY

Convolutional Neural Network (CNN) architecture is employed for image classification tasks, such as detecting and classifying brain tumors from MRI scans. The key components of the CNN architecture, as outlined by LeCun, Bengio, and Hinton (2015), include several layers, each with a specific function. The input layer receives the MRI images, serving as the initial point of data entry. Convolutional layers apply filters to the input image, creating feature maps that capture various image attributes. To introduce non-linearity, the activation function, typically the Rectified Linear Unit (ReLU), is applied. Pooling layers then downsample the feature maps, reducing dimensionality and computational load, which helps in managing the complexity of the data. Fully connected layers perform classification based on the features extracted by the convolutional and pooling layers. Finally, the output layer produces the final classification probabilities, determining the likelihood of the MRI image belonging to different categories of brain tumors.

Regarding each MRI image I is represented as a matrix of pixel intensities. For example, if an MRI image has dimensions $m \times n$, it can be represented as:

$$I \in \mathbb{R}^{m \times n}. \quad (1)$$

A convolution operation involves a filter F (or kernel) that is applied to the input image to extract features. For a single layer, the convolution can be expressed as:

$$(I * F)(x, y) = \sum_{i=0}^{k-1} \sum_{j=0}^{k-1} I(x+i, y+j) \cdot F(i, j), \quad (2)$$

where k is the size of the filter.

The ReLU activation function is applied element-wise to the feature maps obtained from the convolution operation:

$$f(x) = \max(0, x). \quad (3)$$

Pooling layers reduce the spatial dimensions of the feature maps. The most common type is max pooling:

$$P(x, y) = \max_{i, j \in W} F(x+i, y+j), \quad (4)$$

where W is the pooling window size.

The fully connected layer combines all the features to perform classification. If \mathbf{v} is the vector of features from the last convolutional/pooling layer, the output \mathbf{O} of the fully connected layer is:

$$\mathbf{o} = \mathbf{W}\mathbf{v} + \mathbf{b}, \quad (5)$$

where \mathbf{W} is the weight matrix and \mathbf{b} is the bias vector.

The output layer applies a softmax function to produce probabilities for each class (e.g., types of tumors). For an output vector \mathbf{O} , the softmax function is:

$$\text{softmax}(o_i) = \frac{e^{o_i}}{\sum_j e^{o_j}}. \quad (6)$$

The loss function used in training the model is the categorical cross-entropy loss. The goal is to minimize this loss function, which is defined as:

$$L = -\sum_{i=1}^C y_i \log(\hat{y}_i), \quad (7)$$

where C is the number of classes, y_i is the true label, and \hat{y}_i is the predicted probability for class i .

CNN is trained using backpropagation and gradient descent. The weights are updated as follows:

$$W_{t+1} = W_t - \eta \frac{\partial L}{\partial W_t}, \quad (8)$$

where η is the learning rate.

To train the model, this research utilizes the dataset provided by Sartaj, et.al, (2020).

RESULTS AND DISCUSSION

The analysis of brain tumor classification using a Convolutional Neural Network (CNN) model is divided into two phases, i.e., before and after process refinements. Each phase presents classification probabilities for various tumor types, including glioma, meningioma, pituitary tumors, and cases with no tumor. The probabilities highlight the model's ability to differentiate between these categories and the impact of the refinements on classification accuracy.

Phase 1 before process refinements:

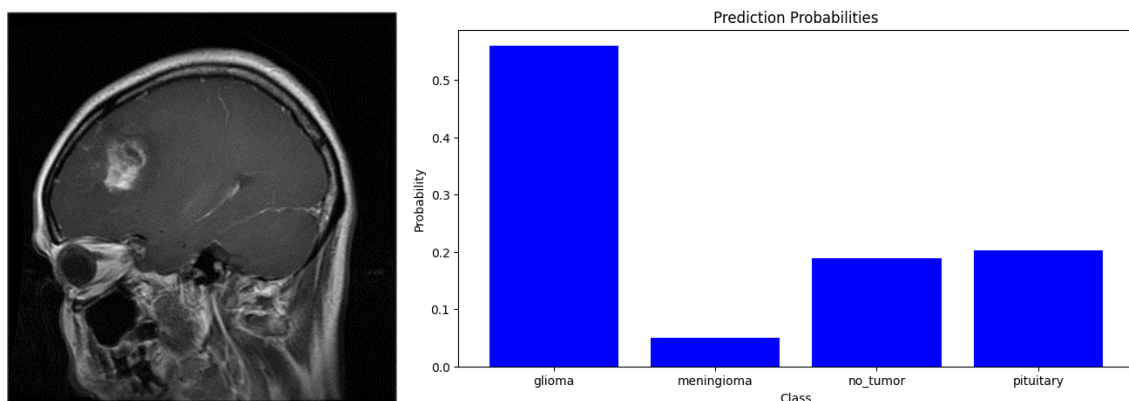


Figure 4 Glioma tumor

Figure 1 the classification probabilities for a glioma tumor

Figure 1 illustrates the classification probabilities for a glioma tumor using an initial Convolutional Neural Network (CNN) model. The model provided the following classification probabilities for an MRI scan identified as a glioma tumor with the probability vector [0.5596831, 0.04938127, 0.18826927, 0.20266642]. This probability vector indicates the likelihood that the given MRI image

belongs to various categories of tumors. Specifically, the probability of the MRI being classified as a glioma tumor is approximately 55.97 percent. The probability of it being classified as another type of tumor or condition is significantly lower, with the second highest probability being roughly 20.27 percent..

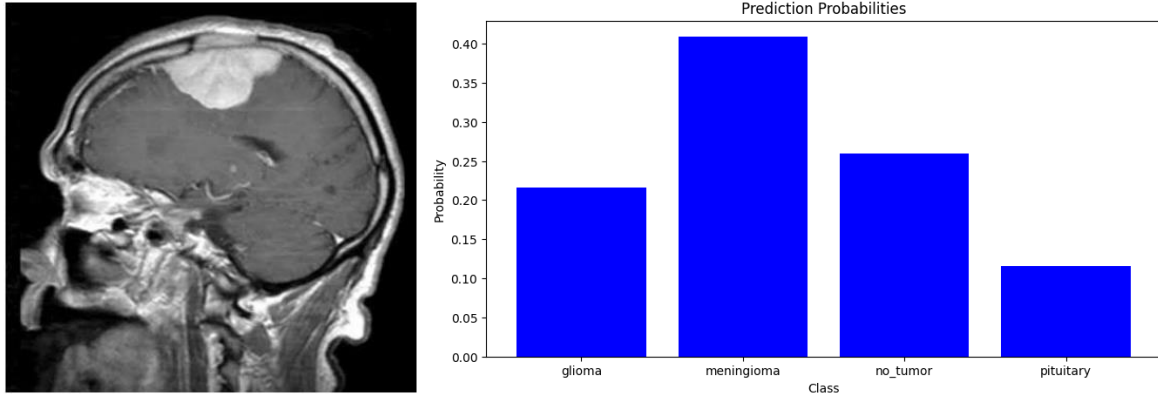


Figure 5 Meningioma tumor

Figure 2 the classification probabilities for a meningioma tumor

Figure 2 presents the classification probabilities for a meningioma tumor. The initial CNN model assigned the following classification probabilities for an MRI scan identified as a meningioma tumor with the probability vector [0.21617427, 0.40883997, 0.25938362, 0.11560217]. This probability vector indicates that the likelihood of the MRI being classified as a meningioma tumor is approximately 40.88 percent. The next highest probability, 25.94 percent, suggests a reasonable level of uncertainty in the initial model's classification, as the difference between the top probabilities is not substantial. The remaining probabilities are 21.62 percent and 11.56 percent, indicating some confusion in the model's ability to distinctly classify the tumor type.

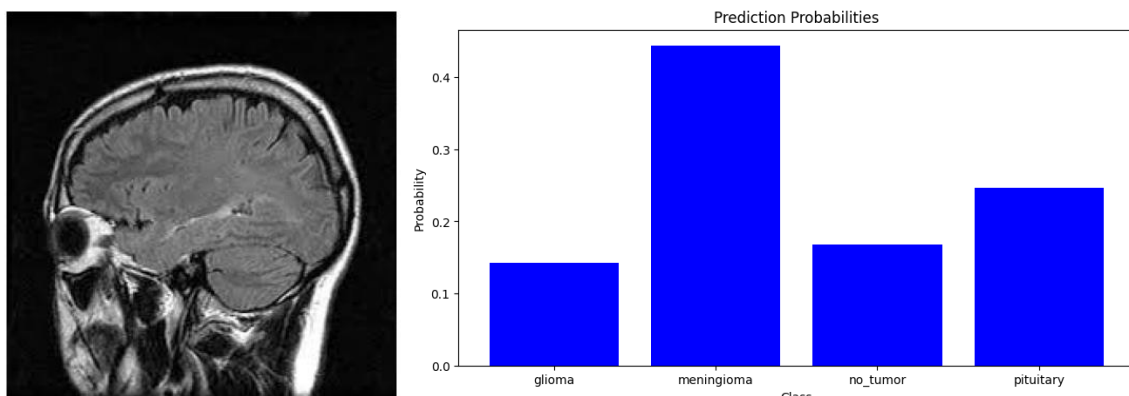


Figure 6 No tumor

Figure 3 the classification probabilities for a case where no tumor

Figure 3 presents the classification probabilities for a case where no tumor is present. The initial CNN model provided the following classification probabilities for an MRI scan identified as having no tumor with the probability vector [0.14267576, 0.4437205, 0.16761707, 0.24598667]. This

probability vector indicates that the highest probability is 44.37 percent, which incorrectly suggests that the model is most likely to classify the MRI as having a meningioma tumor rather than no tumor. The probability for no tumor is approximately 16.76 percent, showing that the model is significantly uncertain and prone to misclassification. Other probabilities are 14.27 percent for glioma and 24.60 percent for pituitary tumor, indicating considerable confusion in the initial model's classification.

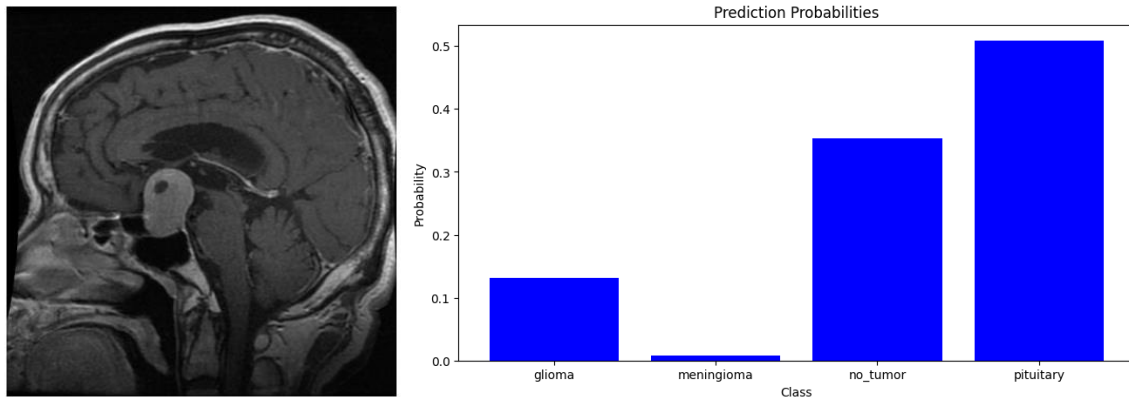


Figure 7 the classification probabilities for Pituitary tumor

Figure 4 presents the classification probabilities for a pituitary tumor. The initial CNN model provided the following classification probabilities for an MRI scan identified as a pituitary tumor with the probability vector [0.13070413, 0.00794651, 0.3528075, 0.5085419]. This probability vector indicates that the highest probability is 50.85 percent, suggesting that the model is most likely to classify the MRI as a pituitary tumor. The second highest probability is 35.28 percent, indicating a considerable chance of the model misclassifying the pituitary tumor as "no tumor." The probabilities for other categories are 13.07 percent for glioma and 0.79 percent for meningioma, indicating some degree of confusion in the model's classification.

Phase 2 after process refinements:

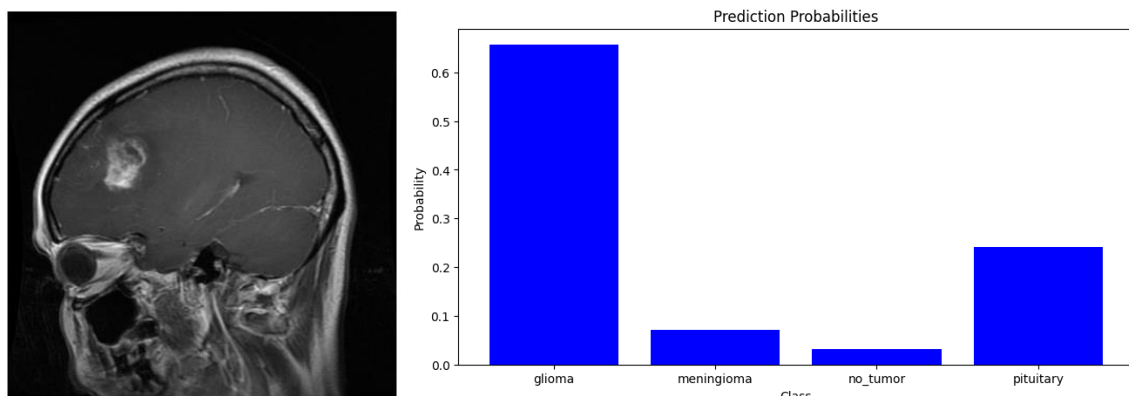


Figure 8 the classification probabilities for Glioma tumor

Figure 5 presents the classification probabilities for a glioma tumor following improvements to the CNN model. The refined classification probabilities for the same glioma tumor are represented by

the probability vector [0.6569667, 0.07069332, 0.03116407, 0.24117589]. This refined vector indicates that the probability of correctly identifying the MRI as a glioma tumor increased to approximately 65.70 percent. Other classifications received significantly lower probabilities, with the next highest probability (24.12 percent) still indicating a clear distinction that the MRI is most likely a glioma tumor.

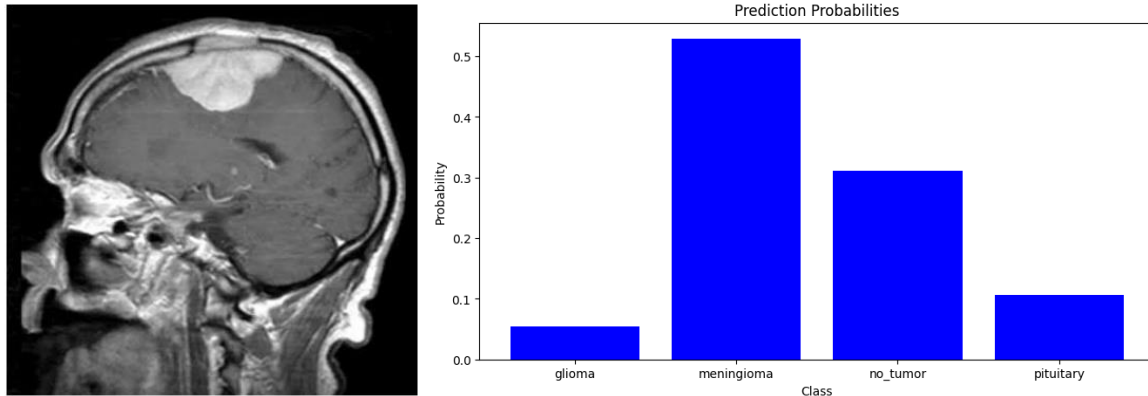


Figure 9 the classification probabilities for Meningioma tumor

Figure 6 presents the classification probabilities for a meningioma tumor following improvements to the CNN model. The classification probabilities for the meningioma tumor were updated to the probability vector [0.05382125, 0.5288506, 0.31113195, 0.10619617]. This refined vector shows that the probability of correctly identifying the MRI as a meningioma tumor increased to approximately 52.89 percent. The second highest probability is 31.11 percent, showing a clearer distinction but still indicating some residual uncertainty. The remaining probabilities, 5.38 percent and 10.62 percent, show a significant reduction, illustrating the model's enhanced capacity to differentiate a meningioma tumor from other types.

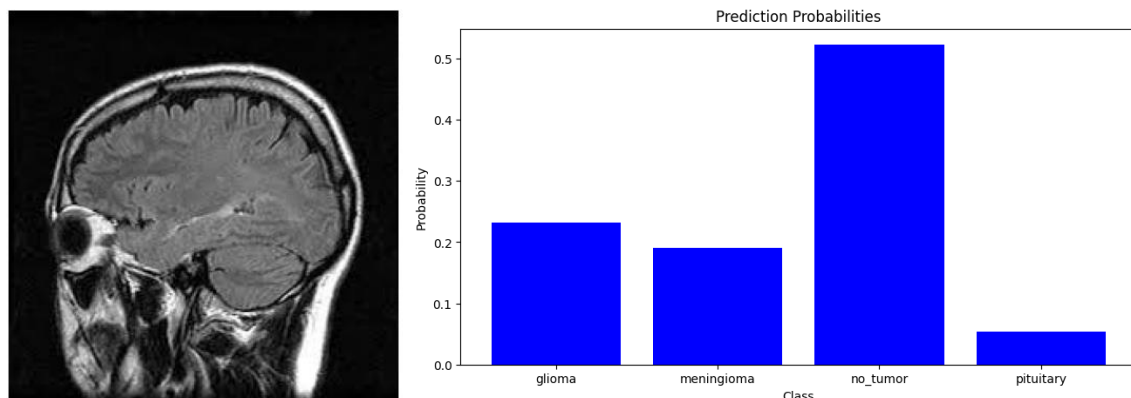


Figure 10 the classification probabilities for No tumor

Figure 7 presents the classification probabilities for a case with no tumor following improvements to the CNN model. The classification probabilities for the no tumor case were refined to the probability vector [0.23244074, 0.1905125, 0.5226297, 0.05441706]. This refined vector shows that the probability of correctly identifying the MRI as having no tumor increased significantly to approximately 52.26 percent. The second highest probability, 23.24 percent, still reflects some level

of residual uncertainty, but the model is now more confident in identifying cases with no tumor. The remaining probabilities, 19.05 percent and 5.44 percent, are considerably lower, illustrating the model's enhanced ability to differentiate between no tumor and other conditions.

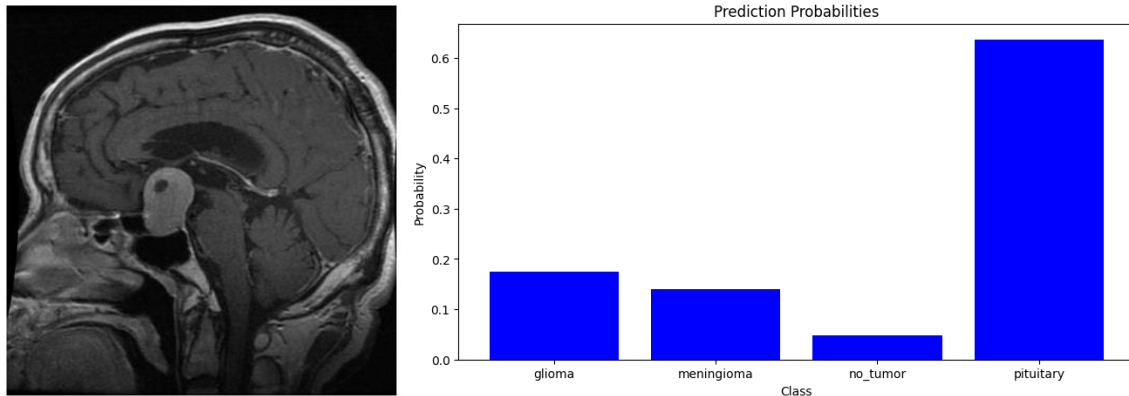


Figure 11 the classification probabilities for Pituitary tumor

Figure 8 presents the classification probabilities for a pituitary tumor following improvements to the CNN model. The classification probabilities for the pituitary tumor were refined to the probability vector [0.17467101, 0.1403469, 0.0488427, 0.6361394]. This refined vector shows that the probability of correctly identifying the MRI as a pituitary tumor increased to approximately 63.61 percent. The probabilities for other classifications (glioma at 17.47 percent, meningioma at 14.03 percent, and no tumor at 4.88 percent) are significantly lower, indicating a clearer distinction made by the model. This reflects the model's enhanced capacity to accurately identify pituitary tumors with higher confidence and reduced ambiguity.

The research presented two phases of CNN model development, highlighting an initial phase with notable misclassifications and a refined phase showing significant improvements. Initially, the CNN model exhibited considerable uncertainties and misclassifications, with probabilities for tumor types like glioma, meningioma, and pituitary tumors being incorrectly assigned. For example, glioma tumors were initially classified with a 55.97 percent probability, with significant misclassifications in other tumor types. After refinement, the model demonstrated enhanced accuracy and reduced misclassification rates. The probability of correctly identifying glioma tumors increased to 65.70 percent, meningioma tumors to 52.89 percent, no tumor cases to 52.26 percent, and pituitary tumors to 63.61 percent. These improvements indicate the model's increased precision in distinguishing between different types of brain tumors and cases with no tumors, showcasing its potential to provide more accurate and reliable diagnostic support in clinical settings.

IMPLICATIONS

The research findings presented in this study have significant policy implications for the healthcare sector, particularly in the realm of brain tumor identification. The enhanced accuracy and reliability of the refined CNN model underscore the need for policies that promote the integration of artificial intelligence (AI) and machine learning (ML) technologies into clinical practice. Policymakers should consider incentivizing the development and adoption of AI-powered diagnostic tools like the CNN model, as they have the potential to significantly improve the accuracy and speed of brain tumor diagnosis. This could lead to earlier interventions, more effective treatment plans, and ultimately, better patient outcomes. Additionally, the study emphasizes the need for policies that

support the training and education of healthcare professionals in the use of AI and ML technologies. As these technologies become increasingly integrated into clinical practice, it is crucial for healthcare providers to be equipped with the knowledge and skills to effectively utilize them. This includes understanding the capabilities and limitations of AI-powered diagnostic tools, interpreting their results accurately, and integrating them into clinical decision-making processes. By investing in training and education, policymakers can ensure that healthcare professionals are prepared to leverage the full potential of AI and ML technologies to improve patient care and outcomes in the field of neuro-oncology.

FUTURE RESEARCH

Future research should focus on expanding the dataset to include a wider range of brain tumor types and variations, ensuring a more comprehensive representation of real-world scenarios. Additionally, incorporating multi-modal imaging data, such as PET scans or CT scans, alongside MRI data could enhance the model's diagnostic capabilities by providing complementary information. Investigating the integration of other AI techniques, such as explainable AI, could improve the interpretability of the model's decisions, making it more transparent and trustworthy for clinical use. This approach would help clinicians understand the rationale behind the model's predictions, thereby increasing their confidence in using AI-assisted tools for diagnosis and treatment planning.

CONCLUSION

This research aimed to enhance the accuracy of brain tumor classification from MRI scans using a Convolutional Neural Network (CNN) model. The study employed a dataset provided by Sartaj et al. (2020) to train and refine the model. The initial CNN model exhibited limitations in accurately classifying different types of tumors, particularly in distinguishing between glioma, meningioma, pituitary tumors, and cases with no tumor. However, through a refinement process, the model's performance was significantly improved. The refined CNN model demonstrated enhanced capabilities in accurately classifying various brain tumor types, with increased probabilities for correct classifications and reduced uncertainties and misclassifications. This improvement was evident in the refined classification probabilities for glioma, meningioma, pituitary tumors, and cases with no tumor, showcasing the model's potential to aid clinicians in making more precise diagnoses. The refined model's enhanced accuracy and ability to distinguish between different tumor types highlight its potential to revolutionize medical diagnosis and treatment planning in neuro-oncology.

ACKNOWLEDGE

This research is supported by the School of Economics, Sukhothai Thammathirat Open University, Thailand. This research is also supported by Computer Engineering, Srinakharinwirot University, Thailand. This research is supported by Central Food Retail Company Limited, Replenishment and Demand Forecasting Department, Nonthaburi, Thailand

REFERENCES

Albalawi, E. (2024). Integrated approach of federated learning with transfer learning for classification and diagnosis of brain tumor. *BMC Medical Imaging*, 24(1). <https://doi.org/10.1186/s12880-024-01261-0>

- Almalki, Y., Ali, M., Kallu, K., Masud, M., Zafar, A., Alduraibi, S., ... & Aboualkheir, M. (2022). Isolated convolutional-neural-network-based deep-feature extraction for brain tumor classification using shallow classifier. *Diagnostics*, 12(8), 1793. <https://doi.org/10.3390/diagnostics12081793>
- Asiri, A. (2024). Optimized brain tumor detection: A dual-module approach for MRI image enhancement and tumor classification. *IEEE Access*, 12, 42868-42887. <https://doi.org/10.1109/access.2024.3379136>
- Bunevičius, A. (2017). Reliability and validity of the SF-36 health survey questionnaire in patients with brain tumors: A cross-sectional study. *Health and Quality of Life Outcomes*, 15(1). <https://doi.org/10.1186/s12955-017-0665-1>
- Cammarata, F. (2024). A novel boron-conjugated SRC inhibitor for proton boron capture therapy in glioblastoma treatment. *Journal of Instrumentation*, 19(04), C04051. <https://doi.org/10.1088/1748-0221/19/04/c04051>
- Haq, A., Li, J., Khan, S., Alshara, M., Alotaibi, R., & Mawuli, C. (2022). DACBT: Deep learning approach for classification of brain tumors using MRI data in IoT healthcare environment. *Scientific Reports*, 12(1). <https://doi.org/10.1038/s41598-022-19465-1>
- Kim, S. (2019). Clinical pearls and advances in molecular researches of epilepsy-associated tumors. *Journal of Korean Neurosurgical Society*, 62(3), 313-320. <https://doi.org/10.3340/jkns.2019.0033>
- Kutlu, H., & Avcı, E. (2019). A novel method for classifying liver and brain tumors using convolutional neural networks, discrete wavelet transform and long short-term memory networks. *Sensors*, 19(9), 1992. <https://doi.org/10.3390/s19091992>
- LeCun, Y., Bengio, Y., & Hinton, G. (2015). Deep learning. *Nature*, 521(7553), 436-444. <https://doi.org/10.1038/nature14539>
- Li, S. (2024). Classification of brain tumors based on magnetic resonance imaging (MRI) using deep learning models. *Applied and Computational Engineering*, 40(1), 247-254. <https://doi.org/10.54254/2755-2721/40/20230660>
- Liu, G., Li, X., & Cai, Y. (2022). Segmentation for multimodal brain tumor images using dual-tree complex wavelet transform and deep reinforcement learning. *Computational Intelligence and Neuroscience*, 2022, 1-11. <https://doi.org/10.1155/2022/5369516>
- Martin, A., Cagney, D., Catalano, P., Alexander, B., Redig, A., Schoenfeld, J., ... & Aizer, A. (2018). Immunotherapy and symptomatic radiation necrosis in patients with brain metastases treated with stereotactic radiation. *JAMA Oncology*, 4(8), 1123. <https://doi.org/10.1001/jamaoncol.2017.3993>
- Pinkiewicz, M. (2024). Breaking barriers in neuro-oncology: A scoping literature review on invasive and non-invasive techniques for blood-brain barrier disruption. *Cancers*, 16(1), 236. <https://doi.org/10.3390/cancers16010236>
- Riazi, A. (2024). Patients with hemangioblastoma: Mood disorders and sleep quality. *Brain Tumor Research and Treatment*, 12(2), 87. <https://doi.org/10.14791/btrt.2023.0040>
- Sartaj Bhuvaji, S., Kadam, A., Bhumkar, P., Dedge, S., & Kanchan, S. (2020). Brain Tumor Classification (MRI) [Data set]. Kaggle. <https://doi.org/10.34740/KAGGLE/DSV/1183165>
- Steiner, G., Galli, R., Preusse, G., Michen, S., Meinhardt, M., Temme, A., ... & Uckermann, O. (2022). A new approach for clinical translation of infrared spectroscopy: Exploitation of the signature of glioblastoma for general brain tumor recognition. *Journal of Neuro-Oncology*, 161(1), 57-66. <https://doi.org/10.1007/s11060-022-04204-3>

Tiwari, P., Pant, B., Elarabawy, M., Abd-Elnaby, M., Mohd, N., Dhiman, G., ... & Sharma, S. (2022). CNN based multiclass brain tumor detection using medical imaging. *Computational Intelligence and Neuroscience*, 2022, 1-8. <https://doi.org/10.1155/2022/1830010>

Zhu, Z., Khan, M., Wang, S., & Zhang, Y. (2023). RBEBT: A ResNet-based BA-ELM for brain tumor classification. *Computers, Materials & Continua*, 74(1), 101-111. <https://doi.org/10.32604/cmc.2023.030790>

PREVALENCE OF TOXASCARIS LEONINA IN PETS DOGS IN BELGRADE AREA**Academician Prof. Dr. Ivan PAVLOVIC**

Scientific Institute of Veterinary Medicine of Serbia, Belgrade, Serbia

ORCID ID: <https://orcid.org/0000-0003-4751-6760>**Abstract**

Introduction and Purpose: In the aim of evaluating the intestinal parasites fauna of pet dogs from Belgrade area, in period 2020-2021 we examined fecal samples of 367 pet animals.

Materials and Methods: All animals had clinical symptoms that indicated parasitic infections (weight loss, stunted growth, foul-smelling diarrhea; feces with blood, with findings of swallowing, etc.). Fecal samples we examined with flotation methods by McMaster and Richardson-Kendell. Determination of parasite eggs was made on the basis of their morphological characteristics

Results: During our examination we found presence of *Toxascaris leonina* in 8.98% of examined dogs. The life cycle of *T. leonina* is fairly simple. Eggs are ingested and hatch in the small intestine. The juveniles then penetrate the mucosal lining of the small intestine. After growth and molt, they return to the intestinal lumen and mature. The adult female worm lays eggs which are passed in the feces of the animal. The eggs become infective after 3–6 days in the environment. Dogs or cats can become infected by ingesting either the egg or rodents that contain the larvae. Rodents are usually the intermediate hosts of *T. leonina*. The rodent ingests the eggs and, once the eggs are hatched, the larvae migrate through the tissues of the rodent. The definitive host is then infected with this parasite when it eats an infected rodent. Infection symptoms are a common cause of diarrhea in young animals and can cause vomiting as well. The worms consume the host's food and can lead to lethargy and a classical pot-bellied appearance. Unlike *T. canis* and *T. cati*, *T. leonina* is nonmigratory with its life cycle affecting only one organ. Humans are usually not infected with *T. leonina*; however, this parasite has been found in humans in a few instances and is a cause of visceral larva migrans in children.

Key Words: Dogs, Epidemiology, *Toxascaris leonina*

**DESIGN OF NEW AROMATIC TERTIARY AMINE-BASED AS
BUTYRYLCHOLINESTERASE INHIBITORS RELYING ON MOLECULAR DOCKING,
ADME-TOX AND MOLECULAR DYNAMICS**

Abdelhamid QARA

Molecular Chemistry and Natural Substances Laboratory, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco

Mohamed OUABANE

Molecular Chemistry and Natural Substances Laboratory, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco

Chemistry-Biology Applied to the Environment URL CNRT 13, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco

Chakib SEKKATE

Chemistry-Biology Applied to the Environment URL CNRT 13, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco

Samir CHTITA

Laboratory of Analytical and Molecular Chemistry, Faculty of Sciences Ben M'Sik, Hassan II University of Casablanca, Sidi Othman, Box 7955, Casablanca, Morocco

Tahar LAKHLIFI

Molecular Chemistry and Natural Substances Laboratory, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco

Mohammed BOUACHRINE

Molecular Chemistry and Natural Substances Laboratory, department of chemistry, Faculty of Science, My Ismail University, Meknes, Morocco

Bio Laboratory, Higher School of Technology-Khenifra (EST-Khenifra), University of Sultan My Slimane, PB 170, Khenifra 54000 Morocco

Abstract

Butyrylcholinesterase (BChE) plays a pivotal role in the progression of The Alzheimer disease. Empirical research demonstrated a fundamental alteration in the role of BChE concerning the reduction of cholinergic neurotransmission within the brains of individuals at advanced stages of Alzheimer. This study focuses on developing potent inhibitors for Butyrylcholinesterase (BChE) in the context of Alzheimer's disease (AD) treatment. Building upon previous research, a series of 44 aromatic tertiary amine-based compounds was investigated. Starting with ADME-Tox studies, the

pharmacokinetic and pharmacodynamic properties of the compounds were analyzed to select promising candidates for BChE inhibition, which is a crucial factor in AD pathology.

Molecular docking analyses identified compound M18 as the most promising candidate, and further compounds (X9 and X10) were proposed based on M18's chemical structure. These compounds displayed superior properties in terms of binding energies and hydrogen bonds in comparison to M18.

The Molecular Dynamics (MD) simulations which are over a 500 ns timeframe confirmed the conformational stability of compounds X9 and X10, compared to M18. Overall, the stated results suggest that the proposed compounds including X9 and X10 specifically, have a significant potential as candidates for BChE inhibition. This presents a promising avenue for therapeutic intervention in Alzheimer disease.

Keywords: BChE inhibitors, AD pathology, aromatic tertiary amine, Docking, ADME-Tox, MD simulation.

RELATIONSHIP BETWEEN THE STRENGTH AND ENDURANCE OF CORE STABILITY MUSCLES WITH PAIN AND FUNCTIONALITY IN PATIENTS WITH SUBACROMIAL IMPINGEMENT SYNDROME

Eren ÖZEN

Bandırma Onyedi Eylül University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Balıkesir, Turkey

ORCID ID: <https://orcid.org/0000-0002-9261-9649>

Melike Sümeyye ÖZEN

Bandırma Onyedi Eylül University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Balıkesir, Turkey

ORCID ID: <https://orcid.org/0000-0001-6915-3185>

Ebru KAYA MUTLU

Bandırma Onyedi Eylül University, Faculty of Health Sciences, Department of Physiotherapy and Rehabilitation, Balıkesir, Turkey

ORCID ID: <https://orcid.org/0000-0002-8595-5513>

Abstract

Introduction and Purpose: Subacromial Impingement Syndrome (SIS) is a common musculoskeletal disorder characterized by compression and pain in the shoulder joint. In patients with SIS, factors such as pain and restricted joint movement negatively impact functional movements. Core stability is crucial for extremity mobility and functional activities. Therefore, the aim of our study is to examine the relationship between the strength and endurance of core stability muscles with pain and functionality in patients with SIS.

Materials and Methods: A total of 44 patients with SIS were included in the study. The endurance of core stability muscles was assessed using the lateral bridge test (left-right), the Modified Biering-Sorensen trunk extension test, the trunk flexion test, and the prone bridge test. Core muscle strength was evaluated using the Sit-ups test and the Modified Push-ups test. Shoulder pain was assessed using the Visual Analog Scale (VAS) (at rest, during activity, and at night). Functional status was evaluated using the Quick Disability of the Arm, Shoulder, and Hand (Q-DASH) questionnaire. Correlation analysis was performed using Spearman's correlation analysis.

Results: The mean age of the patients included in the study was 48.80 ± 4.86 years. A significant negative correlation was found between the score of the right lateral bridge test and the VAS score (at night) ($r = -0.309$). Also the right lateral bridge test time showed negative correlation with Q-DASH score ($r = -0.357$). There was a significant negative correlation between the trunk flexor endurance test score and all VAS scores (at rest, during activity, and at night) as well as the Q-DASH score ($r = -0.303$; $r = -0.394$; $r = -0.479$; $r = -0.608$, respectively). A significant negative correlation was also found between the Sit-ups test score and all VAS scores (at rest, during activity, and at night) and the Q-DASH score ($r = -0.388$; $r = -0.327$; $r = -0.431$; $r = -0.629$, respectively).

Additionally, a significant negative correlation was observed between the Modified Push-ups score and the Q-DASH score ($r = -0.418$). No significant correlations were found between the other parameters.

Discussion and Conclusion: In patients with SIS, it is observed that as the endurance and strength of core stability muscles increase, pain decreases, and functional status improves. Therefore, it is concluded that rehabilitation programs for SIS patients should include approaches aimed at enhancing core stability.

Key Words: Core Stability; Pain; Functionality; Subacromial Impingement Syndrome

INTRODUCTION

Subacromial Impingement Syndrome (SIS) is a prevalent musculoskeletal disorder that occurs due to the compression and inflammation of the subacromial bursa and the rotator cuff tendons. This condition is often caused by repetitive overhead activities, trauma, or anatomical variations that reduce the subacromial space (Neer, 1983). SIS is characterized by pain, weakness, and reduced range of motion in the shoulder, significantly impairing daily activities and overall quality of life (Ludewig & Braman, 2011). The pathophysiology of SIS involves the entrapment of soft tissues between the humeral head and the acromion, leading to inflammation, microtrauma, and subsequent pain (Michener et al., 2003).

Core stability is a crucial component of overall musculoskeletal health, providing a stable base for extremity movements and contributing to efficient biomechanical function (Kibler, Press, & Sciascia, 2006). Core stability involves the coordinated activation of deep and superficial muscles of the trunk, pelvis, and hips, which are essential for maintaining posture and generating powerful movements (Hodges & Richardson, 1996). Core stability is not only vital for athletic performance but also for everyday functional activities, including lifting, bending, and walking (Akuthota & Nadler, 2004).

Previous research has demonstrated that deficits in core stability can lead to compensatory movements and increased risk of injury, particularly in the shoulder region (Leetun et al., 2004). For instance, inadequate core stability can result in altered scapular kinematics and increased stress on the shoulder joint during arm movements (Page et al., 2010). Despite the established importance of core stability, the specific relationship between core stability muscles and SIS has not been thoroughly investigated. Given that core stability is fundamental to extremity function, it is hypothesized that enhancing core stability may reduce pain and improve functionality in patients with SIS. This study aims to fill this gap by examining the relationship between the strength and endurance of core stability muscles with pain and functionality in patients with SIS.

MATERIALS AND METHODS

Participants

This study included 44 patients diagnosed with SIS, recruited from outpatient clinics specializing in musculoskeletal disorders. Inclusion criteria were having been diagnosed with SIS by a specialist physician, being between the ages of 18-65, not having received a shoulder-related physiotherapy program in the last year, and not having undergone any shoulder-related surgery. Exclusion criteria were recent shoulder surgery, systemic inflammatory diseases (e.g., rheumatoid arthritis), other shoulder pathologies, and neurological disorders affecting shoulder function. Participants provided informed consent prior to participation, and the study was approved by the local ethics committee.

Assessment Tools

Core Stability Endurance Tests:

- **Lateral Bridge Test:** Participants performed a side plank on both the left and right sides, holding the position for as long as possible. This test assesses the endurance of the lateral abdominal muscles. Proper form was ensured by having participants align their bodies in a straight line from head to toe.
- **Modified Biering-Sorensen Trunk Extension Test:** Participants lay prone with their upper bodies unsupported and their lower bodies secured. They extended their trunks and held the position as long as possible to assess back extensor endurance. The time held in this position was recorded in seconds.
- **Trunk Flexion Test:** Participants performed a sit-up and held the trunk flexion position at 45 degrees. This test measures the endurance of the anterior core muscles. The duration for which participants could hold the position was recorded.
- **Prone Bridge Test:** Participants maintained a plank position with their forearms and toes on the ground, assessing the endurance of the entire core musculature. The duration of the hold was recorded (McGill, Childs, & Liebenson, 1999).

Core Muscle Strength Tests:

- **Sit-ups Test:** Participants performed as many sit-ups as possible within one minute to evaluate abdominal muscle strength. Proper form, including full range of motion, was required for each repetition to be counted (Bianco, Antonino, et al., 2015).
- **Modified Push-ups Test:** Participants performed as many push-ups as possible from their knees, assessing upper body and core muscle strength (Juker et al., 1998). Each push-up had to be performed with proper form, touching the chest to the floor and fully extending the arms.

Pain Assessment:

- **Visual Analog Scale (VAS):** Pain intensity was measured at rest, during activity, and at night using a 10 cm visual analog scale, where 0 indicates no pain and 10 indicates the worst possible pain (Price et al., 1983). Participants marked their pain level on the scale, and the distance from the start of the scale to the mark was measured in centimeters to quantify pain intensity.

Functional Status Assessment:

- **Quick Disability of the Arm, Shoulder, and Hand (Q-DASH):** Functional status was evaluated using the Q-DASH questionnaire, which measures the degree of disability and symptoms in the upper extremities (Beaton et al., 2001). The Q-DASH consists of 11 items, each scored on a 5-point Likert scale, with higher scores indicating greater disability.

Procedure

The assessments of the patients were made at Bandırma Onyedi Eylül University. Participants attended a single session where all assessments were conducted. Each test was explained and demonstrated before participants performed the tests. Adequate rest periods were provided between tests to prevent fatigue from influencing the results. The order of tests was randomized to control for order effects. Data collection was performed by trained researchers to ensure consistency and reliability.

Statistical Analysis

Statistical analyses were performed using SPSS version 25.0. Descriptive statistics were calculated for all variables, including means, standard deviations, and ranges. Spearman's correlation analysis

was used to explore the relationships between core muscle strength/endurance and pain/functionality outcomes. The significance level was set at $p < 0.05$. Correlation coefficients were interpreted as follows: small (0.10-0.29), medium (0.30-0.49), and large (0.50-1.0) (Cohen, 1988).

RESULTS

Demographic Data

A total of 44 patients with SIS, 37 female and 7 male, were included in our study and their demographic characteristics are shown in Table 1. The age of the SIS individuals was 48.80 ± 4.85 years, their height was 164.18 ± 6.96 cm, their body weight was 75.91 ± 12.73 kg and their BMI was 28.20 ± 4.69 kg/m².

Table 1. Demographic characteristics of patients with SIS

Features	$\bar{X} \pm SS$	Min-max
Age (years)	48.80 ± 4.85	37-58
Height (cm)	164.18 ± 6.96	150-180
Body weight (kg)	75.91 ± 12.73	58-106
BMI (kg/m ²)	28.20 ± 4.69	20.90-39.26

X \pm SS: Mean \pm standard deviation, **BMI:** Body Mass Index, **cm:** centimeter, **kg:** kilogram

Core Endurance with Pain Correlation and Functionality Correlation

A significant negative correlation was found between the right lateral bridge test time and the VAS score at night ($r = -0.309$, $p < 0.05$), indicating that greater lateral core endurance was associated with lower pain levels at night. Also the right lateral bridge test time showed negative correlation with Q-DASH score ($r = -0.357$, $p < 0.05$). The trunk flexor endurance test score showed significant negative correlations with all VAS scores (at rest, during activity, and at night) and the Q-DASH score ($r = -0.303$; $r = -0.394$; $r = -0.479$; $r = -0.608$, respectively, $p < 0.05$). No significant correlations were found between the other parameters (Table 2).

Core Strength with Pain Correlation and Functionality Correlation

The Sit-ups test score demonstrated significant negative correlations with all VAS scores and the Q-DASH score ($r = -0.388$; $r = -0.327$; $r = -0.431$; $r = -0.629$, respectively, $p < 0.05$). Additionally, the Modified Push-ups test score was significantly negatively correlated with the Q-DASH score ($r = -0.418$, $p < 0.05$) (Table 2).

Table 2. Relationship between the strength and endurance of core stability muscles with pain and functionality in patients with SIS

	VASrest		VASactivity		VASnight		Q-DASH	
	r	p	r	p	r	p	r	p
Core Muscles Endurance Tests								
Lateral Bridge Test (Right)	-0.203	0.186	-0.195	0.204	-0.309*	0.041	-0.357*	0.017
Lateral Bridge Test (Left)	-0.177	0.250	-0.090	0.562	-0.055	0.722	-0.182	0.236
The Modified "Biering-Sorensen" Test	-0.021	0.894	-0.249	0.103	-0.103	0.504	-0.239	0.117
Trunk Flexors Endurance Test	-0.303*	0.046	-0.394**	0.008	-0.479**	<0.001	-0.608**	<0.001
"Prone bridge" Test	-0.256	0.093	-0.262	0.085	-0.269	0.078	-0.280	0.065
Core Muscles Strength Tests								
Sit-ups Test	-0.388**	0.009	-0.327*	0.030	-0.431**	0.003	-0.629**	<0.001
Modified "push-ups" Test	-0.138	0.373	-0.174	0.259	-0.151	0.327	-0.418**	0.005

VAS: Visual Analog Scale; **Q-DASH:** Quick Disability of the Arm, Shoulder, and Hand; **r:** Spearman rho correlation coefficient; *****: $p < 0,05$ ******: $p < 0,01$

DISCUSSION

The findings from this study underscore the significant role of core stability in managing SIS symptoms. Improved strength and endurance of core stability muscles were associated with reduced pain and enhanced functional status. This supports the hypothesis that core stability is integral to managing SIS symptoms. Our results align with existing literature on the benefits of core strengthening in musculoskeletal rehabilitation (Huxel Bliven, K. C., & Anderson, B. E., 2013; Zemková, E., & Zapletalová, L., 2022). Specifically, the significant negative correlations between core stability measures and pain/functional impairment highlight the importance of targeted interventions to enhance core stability.

One notable finding was the significant negative correlation between the right lateral bridge test score with the VAS score at night and also the Q-DASH score. This suggests that greater lateral core endurance is associated with lower pain levels during the night, potentially improving sleep quality and reduces functional impairments. This is consistent with the concept that lateral core muscles play a crucial role in stabilizing the body during various activities, reducing undue stress on the shoulder joint (McGill, Childs, & Liebenson, 1999). Improved lateral core endurance may help maintain proper scapular positioning and movement patterns, thereby alleviating stress on the subacromial space and reducing impingement.

The significant correlations between trunk flexor endurance and all VAS scores, as well as the Q-DASH score, emphasize the importance of anterior core muscle endurance in reducing pain and improving functionality. Trunk flexors are critical for maintaining an upright posture and stabilizing the spine during dynamic movements (Hodges & Richardson, 1996). Enhanced endurance of these muscles likely contributes to better postural control and reduced compensatory movements that can exacerbate shoulder impingement. Incorporating exercises that specifically target trunk flexor endurance into rehabilitation programs for SIS patients may thus provide substantial benefits.

Additionally, the significant negative correlations between the Sit-ups test score and all VAS scores, along with the Q-DASH score, indicate that abdominal muscle strength is crucial for pain reduction and functional improvement. Strong abdominal muscles provide essential support for the lumbar spine and contribute to overall core stability (Akuthota & Nadler, 2004). By enhancing abdominal muscle strength, patients may experience improved postural control and reduced mechanical load on the shoulder joint, mitigating pain and functional limitations associated with SIS.

The significant negative correlation between the Modified Push-ups test score and the Q-DASH score highlights the importance of upper body and core strength in improving functional outcomes. This finding suggests that strengthening exercises for the upper body, in conjunction with core stability exercises, are important for comprehensive rehabilitation in SIS patients. The integration of modified push-ups and other upper body strengthening exercises into rehabilitation protocols can enhance shoulder stability and functional capacity, ultimately improving quality of life for SIS patients.

These findings have important clinical implications for the management of SIS. Rehabilitation programs for SIS should incorporate targeted core stability exercises to achieve better clinical outcomes. Exercises that enhance lateral core endurance, trunk flexor endurance, and overall core strength may be particularly beneficial. Clinicians should consider incorporating these exercises into routine rehabilitation protocols for SIS patients.

Future research should explore the long-term benefits of core stability interventions in SIS patients. Longitudinal studies could provide insights into the sustained effects of core stability training on pain and functionality. Additionally, investigating the underlying mechanisms through which core stability impacts shoulder function could enhance our understanding and inform more effective treatment strategies. There is also a need to examine the potential benefits of integrating core stability training with other therapeutic modalities, such as manual therapy and neuromuscular re-education, in a comprehensive rehabilitation approach for SIS.

Conclusion

In conclusion, this study underscores the importance of core stability in managing pain and improving functionality in patients with SIS. Rehabilitation programs for SIS should incorporate targeted core stability exercises to achieve better clinical outcomes. Future research should explore the long-term benefits of such interventions and investigate the underlying mechanisms through which core stability impacts shoulder function.

REFERENCES

- Akuthota, V., & Nadler, S. F. (2004). Core strengthening. *Archives of Physical Medicine and Rehabilitation*, 85(3), S86-S92.
- Beaton, D. E., Wright, J. G., Katz, J. N., & Upper Extremity Collaborative Group. (2001). Development of the QuickDASH: Comparison of three item-reduction approaches. *The Journal of Bone and Joint Surgery*, 83(5), 770-778.
- Bianco, A., Lupo, C., Alesi, M., Spina, S., Raccuglia, M., Thomas, E., ... & Palma, A. (2015). The sit up test to exhaustion as a test for muscular endurance evaluation. *Springerplus*, 4, 1-8.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

- Hodges, P. W., & Richardson, C. A. (1996). Inefficient muscular stabilization of the lumbar spine associated with low back pain. A motor control evaluation of transversus abdominis Spine, 21(22), 2640-2650.
- Huxel Bliven, K. C., & Anderson, B. E. (2013). Core stability training for injury prevention. Sports health, 5(6), 514-522.
- Juker, D., McGill, S., Kropf, P., & Steffen, T. (1998). Quantitative intramuscular myoelectric activity of lumbar spine stabilizers during a variety of tasks. Medicine and Science in Sports and Exercise, 30(2), 301-310.
- Kibler, W. B., Press, J., & Sciascia, A. (2006). The role of core stability in athletic function. Sports Medicine, 36(3), 189-198.
- Leetun, D. T., Ireland, M. L., Willson, J. D., Ballantyne, B. T., & Davis, I. M. (2004). Core stability measures as risk factors for lower extremity injury in athletes. Medicine and Science in Sports and Exercise, 36(6), 926-934.
- Ludewig, P. M., & Braman, J. P. (2011). Shoulder impingement: Biomechanical considerations in rehabilitation. Manual Therapy, 16(1), 33-39.
- McGill, S. M., Childs, A., & Liebenson, C. (1999). Endurance times for low back stabilization exercises: Clinical targets for testing and training from a normal database. Archives of Physical Medicine and Rehabilitation, 80(8), 941-944.
- Michener, L. A., McClure, P. W., & Karduna, A. R. (2003). Anatomical and biomechanical mechanisms of subacromial impingement syndrome. Clinical Biomechanics, 18(5), 369-379.
- Neer, C. S. (1983). Impingement lesions. Clinical Orthopaedics and Related Research, (173), 70-77.
- Page, P., Frank, C. C., & Lardner, R. (2010). Assessment and treatment of muscle imbalance: The Janda approach. Human Kinetics.
- Price, D. D., McGrath, P. A., Rafii, A., & Buckingham, B. (1983). The validation of visual analogue scales as ratio scale measures for chronic and experimental pain. Pain, 17(1), 45-56.
- Zemková, E., & Zapletalová, L. (2022). The role of neuromuscular control of postural and core stability in functional movement and athlete performance. Frontiers in Physiology, 13, 796097.

**RURAL AND URBAN HEALTH PROCUREMENT IN COVID-19 PREVENTION
MANAGEMENT AND BEHAVIORAL CONDUCT****Ananda Majumdar**

ORCID ID: 0000-0003-3045-0056

University of Alberta - Academia.edu

Abstract

The SARS-CoV-2 virus, which is also known as COVID-19, has infected millions of individuals in the United States (U.S.), with hundreds and thousands of Americans losing their lives. The discussion has been illustrated by efforts taken by the federal government, local agencies, and policymakers to the virus. The Centres for Disease Control and Prevention (CDC), members of the White House Coronavirus Task Force, governors, mayors and county judges have encouraged Americans to stay at home and find ways for the people to avoid social gatherings, avoid discretionary travel, wear masks and practice good hygiene, among other strategies. The spread of COVID-19 in the United States is particularly concerning because it has been directed toward rural communities rather than urban residents. Rural residents have limited access to quality health care and have more underlying chronic conditions that have been associated with adverse COVID-19 outcomes. It has been observed that rural residents also often forgo medical care and are more likely to present for treatment at more advanced stages of disease. Hospital closures in the rural areas have been on a steady increase. Comparatively worse health behaviours and outcomes combined with less investment in healthcare facilities positioned rural residents to be at higher risk for severe illness from COVID-19. Rural populations have consistently shown higher mortality rates from infectious disease outbreaks and pandemics. According to the military records during the 1918 pandemic, which was the Spanish Flu, it was noted that rural soldiers were at a higher risk of mortality despite their lower social interaction than their urban counterparts. More recently, excess mortality from infectious diseases increased significantly for the rural poor inhabitants through the 1990s and early 2000s. This trend remains with the emergence of COVID-19. Reports have shown that rural areas have seen lower COVID-19 testing rates and pointed out that rural healthcare facilities must be better equipped to handle the surge of patients needing care due to the Pandemic. The current concerns about the resilience of rural populations concerning COVID-19 are warranted. The paper aims to address the condition of rural and urban areas regarding the COVID-19 pandemic. The methodology has been conducted through documentary analysis. The feature question is, what were the changes in the rural and urban ratios through the government's action regarding COVID-19 initiatives?

Keywords: COVID-19 Pandemics, Rural and Urban Demography, Administration, Historical Pandemics, Global Diseases Prevention, Health Care, Health Concern, Prevention Measures, Rural and Urban Affiliation, Political administration, Policy Makers, Global Cooperation, Pandemic Concern, Clinical Facilities, Rural and Urban Behavioral Approach, Prevention Compliance, Geographical Distance between Urban and Rural Facilities, Urban and Rural Facilities and Health Concerns, Morbidity and Mortality, Infectious Diseases, Theory of the Reasoned Action (TRA), Social and Behavioral Science, Transportation Related Infection, Health Literacy, Informational Appraisal.

Introduction

Preventive measures, therefore, have been necessary for reducing the disease burden of COVID-19 in rural communities and elsewhere (Callaghan et al., 2021). Observational studies of COVID-19 have reported that rural residents were less likely to wear face coverings in line with ²CDC (The Centre for Disease Control and Presentation) recommendations. The study was limited to health behaviour and location. ³The differences between urban and rural in COVID-19 preventive behaviour compliance may stem from geographical differences in partisan affiliation; rural residents tend to be more. ⁴Conservative and more likely to support ⁵Republican candidates than their nonrural counterparts. It has also been observed that conservative individuals had taken fewer concerns and adopted lower preventive health behaviours against COVID-19. Therefore, ⁶differences in political affiliation have affected Differences between the behaviour of rural and urban individuals. In this context, research has been done on urban- and rural differences in COVID-19 prevention behaviour compliance. It has also been observed that no national studies have examined whether the adaption of COVID-related preventive measures varies along the urban-rural continuum and whether factors such as political ideology, race and ethnicity, and socioeconomic status played a role in adopting these health behaviours. ⁶Health behaviours have been defined through initiatives like mask-wearing, social distancing, personal hygiene, and sanitation procedures. ⁷Studies have found differences between rural and urban individuals in the United States regarding working from home as a prevention behaviour. Prevention behaviour and attitude have also related to preventing information, an essential narrative during the COVID-19 Pandemic.

An estimated 36.2 percent of rural Americans had done so, while 52.37 percent of urban Americans had done so. ⁸Similarly, an estimated 84.55 percent of urban Americans had worn masks, while ⁹73.64 percent of rural Americans had worn masks, following the recommendation of the health professional administration of the United States. Beyond these two prevention behaviours by the Americans, it has also been observed that rural residents were less likely to report sanitizing their home or workspace with disinfectant, less likely to avoid dining at restaurants or bars, and less likely to have changed travel plans. Regarding social distance, there was no statistical significance between the preventive measures by the American rural and urban communities (Callaghan et al., 2021). ¹⁰Therefore, there was no significance in staying 6 feet away from others in public spaces, regularly washing hands, and cancelling social engagements. ¹¹An estimated 80.86 percent of urban Americans sanitized their homes, while 74.91 percent of rural Americans sanitized them. ¹²Urban Americans had regularly washed their hands at an estimated 89.97 percent, while in the urban areas, it had been estimated at 88.34 percent. ¹³Urban Americans cancelled their social engagement at 73.02 percent, while in rural areas, people cancelled it at 69.68 percent. ¹⁴Urban areas of the United States avoid dining or restaurant bars, which is estimated at 85.87 percent, while it has been estimated at 81.67 percent in rural areas. ¹⁵Urban Americans changed travel plans at 65.93 percent,

² Rural and Urban Differences in COVID-19 Prevention Behaviors. Paragraph 1st.

³ Rural and Urban Differences in COVID-19 Prevention Behaviors. Paragraph 3rd.

⁴ Rural and Urban Differences in COVID-19 Prevention Behaviors. Paragraph 4th.

⁵ Rural and Urban Differences in COVID-19 Prevention Behaviors. Paragraph 4th.

⁶ Rural and Urban Differences in COVID-19 Prevention Behaviors. Paragraph 3rd.

⁷ Rural and Urban Differences in COVID-19 Prevention Behaviors. Paragraph 3rd.

⁸ Rural and Urban Differences in COVID-19 Prevention Behaviors. Results. Paragraph 1st.

⁹ Rural and Urban Differences in COVID-19 Prevention Behaviors. Result. Paragraph 1st.

¹⁰ Rural and Urban Differences in COVID-19 Prevention Behaviors. Result. Paragraph 1st.

¹¹ Rural and Urban Differences in COVID-19 Prevention Behaviors. Table 1.

¹² Rural and Urban Differences in COVID-19 Prevention Behaviors. Table 1.

¹³ Rural and Urban Differences in COVID-19 Prevention Behaviors. Table 1.

¹⁴ Rural and Urban Differences in COVID-19 Prevention Behaviors. Table 1.

¹⁵ Rural and Urban Differences in COVID-19 Prevention Behaviors. Table 1.

while rural Americans changed their travel plans at 61.58 percent. ¹⁶Urban Americans worked from home at 52.37 percent, while it has been in rural areas at 36.02 percent. These statistics have provided valuable information about the differences in COVID-19 prevention behaviours based on routine statistics. ¹⁷Rural residents, estimated 50 percent, had worn masks and were less likely to sanitize their homes or workplaces. Another feature was called ¹⁸preventative health behaviour adoption (Callaghan et al., 2021). Individuals who were worried about the COVID-19 Pandemic were more likely to take the virus seriously and engage in every prevention behaviour except working from home, which itself is a behaviour out of the control of the individual.

Literature Review: The prevention behaviour and the health advertisement prove that the United States' attitudes differed. It was affected by political ideology represented by the Conservative and Republican parties, as well as by ethnicity, community choice, and their everyday life practices about how they adopted both the health preventive measures and preventive attitudes for their safety. Because of the pandemic era, conducting an effective campaign and conducting research from the government, non-profit organizations, and researchers was impossible. The entire environment was fearful about the future of humanity as the kind of disaster was found 100 years after the Spanish Flu. Therefore, nothing was ever imagined of such a global disaster; neither were they prepared for measurement and protection, and, thus, neither were they expecting positive behaviour from the population. ¹⁹Rural populations face health disparities due to multiple barriers, such as the lack of healthcare resources, which are defined as transportation, health insurance providers, and facilities. ²⁰Geographic distance and lower socioeconomic status compared with urban residents; rural residents have higher rates of ²¹Morbidity and mortality from various diseases, including cancer and cardiovascular distress. ²²Rural populations also engage less in preventive health behaviours than urban populations. Preventive health behaviour refers to any activity undertaken by an individual who believes in being healthy to prevent diseases. ²³Children living in rural areas consume less food, fruit, and vegetables than their urban peers; rural residents are less likely to wear sunscreen to prevent skin cancer than urban residents; and ²⁴Women living in rural areas are less likely to receive mammography and Papanicolaou (Pap) smear screening to prevent cervical and breast cancer than their urban counterparts. Rural residents are still encountering health disparities regarding disease prevention and treatment. ²⁵Deaths from infectious diseases increased by 18 percent in the United States between 1980 and 2014; however, rural counties did not experience the same improvements as their urban counterparts. The outbreak of COVID-19, an infectious disease, caused a global public

¹⁶Rural and Urban Differences in COVID-19 Prevention Behaviors. Table 1.

¹⁷Rural and Urban Differences in COVID-19 Prevention Behaviors. Table 1.

¹⁸Rural and Urban Differences in COVID-19 Prevention Behaviors. Discussion. Paragraph 1st.

¹⁹ Practical Implications of Differences in Preventive Behaviors of COVID-19 between Urban and Rural Residents: Lessons Learned from A Cross-Sectional Study in China. Introduction. Paragraph 1st.

²⁰ Practical Implications of Differences in Preventive Behaviors of COVID-19 between Urban and Rural Residents: Lessons Learned from A Cross-Sectional Study in China. Introduction. Paragraph 1st.

²¹ Practical Implications of ²¹ Differences in Preventive Behaviors of COVID-19 between Urban and Rural Residents: Lessons Learned from A Cross-Sectional Study in China. Introduction. Paragraph 1st.

²² Practical Implications of Differences in Preventive Behaviors of COVID-19 between Urban and Rural Residents: Lessons Learned from A Cross-Sectional Study in China. Introduction. Paragraph 1st.

²³ Practical Implications of ²³ Differences in Preventive Behaviors of COVID-19 between Urban and Rural Residents: Lessons Learned from A Cross-Sectional Study in China. Introduction. Paragraph 1st.

²⁴ Practical Implications of Differences in Preventive Behaviors of COVID-19 between Urban and Rural Residents: Lessons Learned from A Cross-Sectional Study in China. Introduction. Paragraph 1st.

²⁵ Practical Implications of Differences in Preventive Behaviors of COVID-19 between Urban and Rural Residents: Lessons Learned from A Cross-Sectional Study in China. Introduction. Paragraph 2nd.

health crisis which has differed the mortality between the rural and urban areas of the United States and other countries.

Methodology: The paper has been assumed through subordinate data sources, including academic articles, websites, etc. The description of sources follows the essay's writing method, reading, gathering in-depth insights on topics, exploring ideas, summarizing, interpreting, and mainly expressing them in words (documentary analysis through a qualitative approach). This paper has illustrated the preventive measures for people's attitudes in the rural and urban areas of the United States and China, as well as a similar approach to the world's urban and rural population due to its global pandemic scenario. The prevention of health concerns and behavioural attitudes have been influenced by policies during the COVID-19 era and how they live, avoiding social engagement and wearing masks and other collaborations to secure their lives, thus following the administration's suggestions, healthcare suggestions and advice from the governmental, non-governmental and charity authority.

Discussion: ²⁶Public health researchers are concerned that rural communities might experience worse conditions relative to the COVID-19 pandemic regarding more excellent mortality rates than their urban counterparts due to health disparities in rural and urban communities. ²⁷The higher rates of chronic diseases and less physical exercise impose higher risks of disease illness in rural areas. ²⁸The research has shown that the spread of COVID-19 has been highly related to the transportation of people with no-to-mild symptoms. Therefore, health professionals recommended staying in the house and avoiding social engagements, wearing facemasks, and frequent handwashing as effective confinement measures. Promoting these preventive behaviours is good for slowing down the spread of the virus during the outbreak. The discussion has been illustrated by the ²⁹theoretical recommendation of social and behavioural sciences that provide insights for effective responses to the COVID-19 pandemic. ³⁰The theory of reasoned action (TRA) suggests that an individual preventive behaviour is a function of their intention to perform it, which is determined by an individual's attitudes and behavioural norms toward a particular behaviour.

Regarding the context of COVID-19, it can be hypothesized that people are behavioural; intention predicts preventive behaviours, while attitude and subjective norms are two determinants of behavioural intention. ³¹Therefore, rural and urban disparities in intention, attitude, and subjective norms lead to differences in preventive behaviours. Hence, health information is crucial for public health outcomes because of its helping hand to the individual regarding information and knowledge about COVID-19. The informational approach refers to the critical analysis of health-related information, an essential component of critical health literacy. The information approach helps mediate rural and urban differences in preventive behaviours against COVID-19 through intention,

26 Practical Implications of Differences in Preventive Behaviors of COVID-19 between Urban and Rural Residents: Lessons Learned from A Cross-Sectional Study in China. Introduction. Paragraph 3rd.

27 Practical Implications of Differences in Preventive Behaviors of COVID-19 between Urban and Rural Residents: Lessons Learned from A Cross-Sectional Study in China. Introduction. Paragraph 3rd.

28 Practical Implications of Differences in Preventive Behaviors of COVID-19 between Urban and Rural Residents: Lessons Learned from A Cross-Sectional Study in China. Introduction. Paragraph 3rd.

²⁹Unveiling the Practical Implications of Differences in Preventive Behaviors of COVID-19 between Urban and Rural Residents: Insights from a Cross-Sectional Study in China. This study's findings directly relate to your work as we explore the theoretical Framework—paragraph 1st.

30 Unveiling the Practical Implications of Differences in COVID-19 Preventive Behaviors between Urban and Rural Residents: Insights from a Cross-Sectional Study in China. This study's findings directly relate to your work as we explore the theoretical Framework—paragraph 1st.

31 Unveiling the Practical Implications of Differences in Preventive Behaviors of COVID-19 between Urban and Rural Residents: Insights from a Cross-Sectional Study in China. This study's findings directly relate to your work as we explore the theoretical Framework—paragraph 1st.

July 1-3, 2024 -PARIS

attitude, and subjective norms. Therefore, the ³²Theoretical concepts and the existing literature help discover many features of the rural and urban communities' facts during COVID-19, including preventive behaviours, intentions, attitudes, knowledge, and interpersonal information sources. In general concept, COVID-19 continues to spread throughout the country; the 46 million Americans residing in rural countries bear an increasing burden from the Pandemic, with viral transmission and death rates compared to their urban counterparts.

At the beginning of the COVID-19 pandemic, cases and deaths were concentrated in large urban centres. Once the Pandemic progressed, rural communities began to bear a higher burden from the virus. In the United States, ³³Rural residents account for an estimated 14 percent of the American population but are 16 percent of all new COVID-19 deaths through February 2021. At that time, the rural communities were experiencing an ³⁴Estimated 175 deaths per 100,000 residents, compared to 151 deaths per 100,000 residents for urban communities. The rate of fatalities has risen since March 2020. ³⁵Ethnically and racially, the Pandemic has had many impacts through many inequalities in health and healthcare. Highly diverse countries have experienced. ³⁶258 deaths per 100,000 residents, compared with 161 deaths per 100,000 residents for less diverse rural counties, which is a 60 percent higher death rate. ³⁷This discrepancy in mortality was higher than the discrepancy in urban areas, where it had been reported that an estimated 13 percent higher death per 100,000 residents than in less diverse communities. COVID-19 impacted racial and ethnic minorities in rural areas and has been overlooked as well.

Highly diverse rural communities, in which at least 33 percent of the population are people of colour, represent 14 percent of the rural population and are home to 6.4 million people. ³⁸Half of the American Indian and Alaska Native (AI/AN) population lives in rural communities and more than two-thirds in counties including or adjacent to tribal lands and reservations; it is essential to note that the ³⁹AI/AN population has the country highest COVID-19 hospitalization rate, at 281 per 100,000 residents. ⁴⁰National data on death rates showed that AI/AN people were experiencing the highest COVID-19 death rate, at 336 deaths per 100,000 individuals. ⁴¹In New Mexico, the death rate was estimated at 437 deaths per 100,000 in AI/AN community. Across the rural communities of the United States, it was estimated at 258 per 100,000 as of February 2021. ⁴²An estimated 82 percent of these counties have had at least 150 deaths from COVID-19 per 100,000 residents, compared with an estimated 54 percent of less diverse rural counties. ⁴³In Texas, an estimated 95 percent of the rural population with significant Hispanic communities have had more than 150 COVID-19 deaths per 100,000 residents, compared with 86 percent of all other Texas rural communities. ⁴⁴Highly diverse rural communities have experienced an estimated 1.6 times more COVID-19 deaths per capita than other rural counties. ⁴⁵There is an estimated 2.1 times higher rate of infection in AI/AN than in the different rural communities; an estimated 1.6 times higher rate of infection in ⁴⁶Black or African American communities than the other rural counties and rural original

³³ COVID-19 and rural communities: Protecting rural lives and health. COVID-19's disproportionate spread in rural communities—paragraph 1st.

³⁴ COVID-19 and rural communities: Protecting rural lives and health. COVID-19's disproportionate spread in rural communities—paragraph 1st.

³⁵ COVID-19 and rural communities: Protecting rural lives and health. COVID-19's disproportionate spread in rural communities—paragraph 2nd.

³⁶ COVID-19 and rural communities: Protecting rural lives and health. COVID-19's disproportionate spread in rural communities—paragraph 2nd.

³⁷ COVID-19 and rural communities: Protecting rural lives and health. COVID-19's disproportionate spread in rural communities—paragraph 2nd.

³⁸ COVID-19 and rural communities: Protecting rural lives and health. COVID-19 and highly diverse rural communities. Paragraph 2nd.

³⁹ COVID-19 and rural communities: Protecting rural lives and health. COVID-19 and highly diverse rural communities. Paragraph 2nd.

⁴⁰ COVID-19 and rural communities: Protecting rural lives and health. COVID-19 and highly diverse rural communities. Paragraph 2nd.

⁴¹ COVID-19 and rural communities: Protecting rural lives and health. COVID-19 and highly diverse rural communities. Paragraph 2nd.

⁴² COVID-19 and rural communities: Protecting rural lives and health. COVID-19 and highly diverse rural communities. Paragraph 2nd.

⁴³ COVID-19 and rural communities: Protecting rural lives and health. COVID-19 and highly diverse rural communities. Paragraph 3rd.

⁴⁴ COVID-19 and rural communities: Protecting rural lives and health. COVID-19 and highly diverse rural communities. Paragraph 4th.

⁴⁵ COVID-19 and rural communities: Protecting rural lives and health. COVID-19 and highly diverse rural communities. Paragraph 4th.

⁴⁶ COVID-19 and rural communities: Protecting rural lives and health. COVID-19 and highly diverse rural communities. Paragraph 4th.

American communities; an estimated 1.5 times higher infection rate in the Hispanic⁴⁷ communities than the original Americans in the rural areas had been observed through scientific research during the COVID-19 scenario. Racially and ethnically diverse rural communities faced more significant⁴⁸ socioeconomic vulnerabilities when compared with less varied rural communities. These⁴⁹ vulnerabilities have been reflected in housing financial insecurity compared to other rural American communities. Older adults and individuals face severe medical conditions through the spreading of COVID-19 symptoms, which contributes to higher hospitalization and death rates. Rural communities faced lower access to healthcare professionals and critical care resources.⁵⁰ Studies show that 65 percent of rural counties had no single intensive care unit (ICU) bed. Rural areas were lagging their urban counterparts in public health measures such as social distancing, stay-at-home orders, mask mandates, and travel restrictions. Urban areas established stay-at-home orders more quickly, making their residents more likely to comply than rural residents. Rural areas were also affected by the lack of structural and social barriers that could impact vaccine distribution and adoption. Rural residents were 1.2 times less likely than urban residents to indicate they would get the COVID-19 vaccine, with potential side effects indicated as the primary barrier.

Conclusion: The feature question is, what were the changes in the rural and urban ratios through the government's action regarding COVID-19 initiatives? The discussion here is intended to express the government initiatives. It is not only the governmental initiatives but many resources of the society, from people to people contact whether the initiatives have been taken or not correctly for the reduction of disparities between rural and urban infection scenarios among people and communities, among minorities, and underground communities who are illegally living in the United States. Therefore, only some actions must be taken as initiatives against the COVID-19 scenario to establish a balance between urban and rural populations. Public, private, and social sector stakeholders should consider a dedicated focus on protecting rural communities. Stakeholders could consider protecting rural residents during the Pandemic, as well as after the Pandemic, in a neo-normal world to begin a new journey.⁵¹ Rural stakeholders should manage COVID-19 on three fronts.⁵² First of all, through the maintenance of the resources-intensive effort of treating the most significant surge in COVID-19 cases since the onset of the Pandemic.

Secondly, more efforts should be made to campaign for strengthening public health strategies and vaccine administration, and⁵³ thirdly, to address the longer-term mental health and social well-being consequences of the Pandemic, related economic challenges, and social isolation. Address must be increasing the testing capacity, hospital beds, medical equipment and critical segments of the healthcare workforce, such as nurses, mental health workers, and peers.⁵⁴ The campaign must be based on expanding the workforce capacity of the existing rural healthcare workforce, implementing vaccine programs, providing evidence of safety policies, and maintaining the protocols.⁵⁵ They are

⁴⁷ COVID-19 and rural communities: Protecting rural lives and health. COVID-19 and highly diverse rural communities. Paragraph 4th.

⁴⁸ COVID-19 and rural communities: Protecting rural lives and health. COVID-19 and highly diverse rural communities. Paragraph 5th.

⁴⁹ COVID-19 and rural communities: Protecting rural lives and health. Socio-economic vulnerability. Paragraph 1st.

⁵⁰ COVID-19 and rural communities: Protecting rural lives and health. Access to care. Paragraph 1st.

⁵¹ COVID-19 and rural communities: Protecting rural lives and health. Near-term actions. Paragraph 1st.

⁵² COVID-19 and rural communities: Protecting rural lives and health. Near-term actions. Paragraph 1st.

⁵³ COVID-19 and rural communities: Protecting rural lives and health. Near-term actions. Paragraph 1st.

⁵⁴ COVID-19 and rural communities: The Urgent Need for Treating COVID-19. This policy brief underlines the criticality of immediate treatment in rural areas—paragraph 1st.

⁵⁵ COVID-19 and rural communities: Protecting rural lives and health. Ensuring an adequate supply of essential resources is crucial—paragraph 1st.

addressing the over-assurance of essential resources by establishing models to support decision-making in capacity planning and procurement of vital supplies, including testing kits, personal protective equipment, etc.⁵⁶The address must be to over-implement public health measures across the United States by examining obstacles to implementing essential and evidence-based interventions with the potential to reduce the spread of COVID-19 that may be unique to rural areas, such as lack of transportation or increased social isolation.⁵⁷The campaign must be focused on communication and essential public health measures, such as wearing face masks, social distancing, and providing support to the residents in dealing with basic needs, etc. Stakeholders must support⁵⁸vaccine allocation to priority populations in rural communities and distribute vaccines equally. Stakeholders must ensure⁵⁹behavioural health needs through COVID-19 testing, treatment, and vaccination programs that can help to raise awareness of behavioural health (B.H.) (Bradford et al., 2021) needs and resources. Community needs assessment will also help identify the most pressing challenges in a community, such as lack of food access, housing loss, etc. Stakeholders also think about long-term measures to transform access and care quality in the rural healthcare system regarding the widespread psychological distress (Bradford et al., 2021) associated with the Pandemic. The transformation can be done by pursuing new value-based care models, implementing more sophisticated population health measures, increasing the size of the healthcare workforce, increasing novel healthcare access points, investing in social determinants data to serve vulnerable populations better, addressing the unmet social needs that contribute to the poor health, improving community health etc. therefore if the stakeholders act swiftly, rural Americans will benefit both during the Pandemic and the beyond (Bradford et al., 2021).

References

- Bradford, J., Coe, E., Enomoto, K., & White, M. (2021, March 10). *COVID-19 and rural communities* / McKinsey. [Www.mckinsey.com. https://www.mckinsey.com/industries/healthcare/our-insights/covid-19-and-rural-communities-protecting-rural-lives-and-health](https://www.mckinsey.com/industries/healthcare/our-insights/covid-19-and-rural-communities-protecting-rural-lives-and-health)
- Callaghan, T., Lueck, J. A., Trujillo, K. L., & Ferdinand, A. O. (2021). Rural and urban differences in COVID-19 prevention behaviours. *The Journal of Rural Health*, 37(2). <https://doi.org/10.1111/jrh.12556>
- Chen, X., & Chen, H. (2020). Differences in Preventive Behaviors of COVID-19 between Urban and Rural Residents: Lessons Learned from A Cross-Sectional Study in China. *International Journal of Environmental Research and Public Health*, 17(12), 4437. <https://doi.org/10.3390/ijerph17124437>
- H. Joanna Jiang, Henke, R. M., Fingar, K. R., Liang, L., & Agniel, D. (2024). Mortality for Time-Sensitive Conditions at Urban vs Rural Hospitals During the COVID-19 Pandemic. *JAMA Network Open*, 7(3), e241838–e241838. <https://doi.org/10.1001/jamanetworkopen.2024.1838>
- Murthy, B., et al. *Morbidity and Mortality Weekly Report*. <https://www.cdc.gov/mmwr/volumes/70/wr/pdfs/mm7020e3-H.pdf>

⁵⁶ COVID-19 and rural communities: Protecting rural lives and health. Curbing the spread of COVID-19. Consistent implementation of public health measures across states. Paragraph 1st.

⁵⁷ COVID-19 and rural communities: Protecting rural lives and health and curbing the spread of COVID-19. Consistent implementation of public health measures across states. Paragraph 1st.

⁵⁸ COVID-19 and rural communities: Protecting rural lives and health and curbing the spread of COVID-19. Accelerate vaccine rollout and uptake—paragraph 1st.

⁵⁹ COVID-19 and rural communities: Protecting rural lives and health and addressing other health and social needs. *Address behavioural health (mental health and substance use) needs—paragraph 1st.*

INVESTIGATION OF THE EFFECTS OF SODIUM ARSENATE EXPOSURE ON PERIPHERAL TISSUES**Betül DANIŞMAN**

Health Sciences University, Gülhane Faculty of Medicine, Department of Biophysics, Ankara, Turkey

ORCID ID: <https://orcid.org/0000-0002-3812-9884>**Abstract**

Introduction and Purpose: Arsenic is a naturally occurring element that can be found in food, soil, air and water and is used for various purposes in industrial, agricultural and some medical fields. Arsenic exposure has serious toxic effects on humans and various organisms. Therefore, our study aims to investigate the effect of rosmarinic acid in alleviating testicular, liver, kidney and pancreas damage that may potentially occur due to sodium arsenate (NaAsO₂) toxicity. For this purpose, it was evaluated whether peripheral tissue is protected from inflammation induced by SA toxicity through RA.

Materials and Methods: Animals of the study were supplied from Experimental Animal Unit in Akdeniz University, Turkey. Three months aged, twenty-eight male albino Wistar rats, weighing 250–300 g, were used for experiment. Rats were randomly divided into 4 groups with seven rats in each group. Control: saline (1 ml/kg) was administered for 21 days, RA: 50 mg/kg/day RA was administered for 28 days, SA: 10 mg/kg/day NaAsO₂ was administered for 21 days, SA+RA: RA (50 mg/kg/day) was administered 7 days before NaAsO₂ (10 mg/kg/day,) and RA continued for 21 days (totally 28 days) concurrently with NaAsO₂ administration. Agents were given via gastric gavage. On the 22th day, rats were sacrificed and perfusion was performed by transcatheterially with heparinized saline. Then, tissues were removed and stored under appropriate conditions for IL-6, IL-1 β and Tnf- α biochemical analyses. One-way analysis of variance test (ANOVA) was employed in the comparison including all groups.

Results: The inflammation were found to be highest in SA group when compared to the control ($p < 0.05$). The comparison including all groups revealed that inflammation was significantly alleviated in RA+SA group compared to SA group.

Discussion and Conclusion: The current study has demonstrated that treatment of rats with RA could preserve the perifer tissues in terms of inflammation in NaAsO₂ toxicity. In conclusion, the therapeutic potential of RA in preventing SA-induced changes was investigated and curative results were obtained.

Key Words: Sodium Arsenite; Rosmarinic Acid; Perifer Tissue; Inflammation

OPEN BITE TREATMENT WITH FIXED AND REMOVABLE HABIT-BREAKER APPLIANCES: 2 CASE REPORTS**SABİT VE HAREKETLİ ALIŞKANLIK KIRICI APAREYLER İLE AÇIK KAPANIŞ TEDAVİSİ: 2 OLGU SUNUMU****Şükriye TÜRKOĞLU KAYACI**

Dr. Öğr. Üyesi, Sağlık Bilimleri Üniveristesi Çocuk DişHekimliği Anabilim Dalı

ORCID No: 0000-000201477-5283

Zeynep SOLMAZGÜL YAZICI

Dt., Sağlık Bilimleri Üniveristesi Çocuk DişHekimliği Anabilim Dalı

ORCID No: 0000-0001-7505-2962

Abstract

Anterior open bite is characterized by a gap between the upper and lower incisors. The etiology is multifactorial and can be caused by environmental factors such as thumb/finger sucking, tongue thrusting swallowing, mouth breathing and pacifier use. Other factors that cause open bite include genetic predisposition, jaw posture, an imbalance between occlusal and eruptive forces, abnormal head position, abnormal orofacial muscle structure and function, and interaction with skeletal components. For the treatment of open bite, the etiology should be determined and appropriate treatment should be applied. A 6-year-old girl was treated with fixed and habit-breaker appliances and the treatment lasted for 6 months. An 8-year-old boy was treated with a removable habit-breaker appliance and the treatment lasted for 10 months. In both pediatric patients, the treatment resulted in a great improvement in function and esthetics. The reason for the successful treatment of patients with non-surgical methods is the early intervention, the initial compliance of the patients and the application of the correct treatment with a detailed anamnesis.

Key words: open bite, habit-breaker appliance, pediatric dentistry, malocclusion

Özet

Anterior açık kapanış, üst ve alt kesici dişler arasında açıklık olması ile karakterizedir. Etiyolojisi çok faktörlü olup başparmak/parmak emme, dil iterek yutma, ağızdan nefes alma ve emzik kullanımı gibi çevresel faktörlerden kaynaklanabilir. Açık kapanışa neden olan diğer faktörler arasında genetik yatkınlık, çene duruşu, oklüzal ve erüptif kuvvetler arasındaki dengesizlik, anormal baş pozisyonu, anormal orofasiyal kas yapısı ve fonksiyonu, iskelet bileşenleriyle etkileşimi sayılabilir. Açık kapanış tedavisi için etiyoloji belirlenmeli ve buna uygun tedavi uygulanmalıdır. 6 yaşında kız hastanın açık kapanış tedavisi sabit alışkanlık kırıcı apareylerle yapılmış ve tedavisi 6 ay sürmüştür. 8 yaşında erkek hastanın açık kapanış tedavisi hareketli alışkanlık kırıcı aparey ile yapılmış ve tedavisi 10 ay sürmüştür. İki çocuk hasta için de tedavinin sonucunda fonksiyon ve estetikte büyük bir iyileşme sağlanmıştır. Hastaların cerrahi olmayan yollarla başarılı bir şekilde

tedavi edilebilmesinin sebebi; erken yaşta müdahale, hastaların başlangıçtaki uyumu ve iyi alınmış bir anemnez ile doğru tedavinin uygulanmasıdır.

Anahtar kelime: açık kapanış, alışkanlık kırıcı aparey, çocuk diş hekimliği, maloklüzyon

Giriş

Zararlı ağız alışkanlıkları, yaşam kalitesini etkileyen çocuk diş hekimleri ve ortodontistleri etkileyen ortak bir sorundur. Ağız alışkanlıkları, ağız boşluğundaki tekrarlayan davranışlardır ve parmak emme, emzik emme, dudak emme ve ısırma, tırnak yeme, brüksizm, kendine zarar verme alışkanlıkları, ağız solunumu ve infantil yutkunma gibi alışkanlıkları içerir(Piteo et al., 2011). Parafonksiyonel alışkanlıklar, diş maloklüzyonunun gelişimi için önemli bir etiyolojik faktör olarak kabul edilmektedir(Maguire, 2000). Başparmak emme ve infantil yutkunma yaygın olarak görülmektedir (Tulley, 1969). Etiyolojisi, etkilerini ve erken aşamalarda yönetimini anlamak, gelecekteki ciddi iskeletsel maloklüzyonu önlemek için yardımcı olabilir.

Tulley dil itimini, dil ucunun dişler arasında öne doğru hareket ederek yutkunma sırasında ve konuşma seslerinde alt dudakla buluşması, böylece dilin interdental hale gelmesi olarak tanımlamaktadır. Dil itme, çocukluk ve ergenlik döneminde infantil yutma modelinin devam etmesiyle ilişkili bir ağız alışkanlığı modelidir ve bu nedenle açık bir ısırık ve ön diş segmentinde çıkıntı oluşturur (Tulley, 1969).

Dil itmenin nedeni bir çok faktör ile açıklanabilir:

a. Genetik veya kalıtım faktörü: spesifik anatomik veya orofasiyal bölgede dil itimini tetikleyebilecek nöromusküler varyasyonlar.

b. Öğrenilmiş davranış (alışkanlık): Dil itme bir alışkanlık olarak edinilebilir. Aşağıdakiler dil itmeye yol açabilecek predispozan faktörlerden bazılarıdır:

1. Yanlış biberonla besleme

2. Uzun süreli parmak emme

3. Uzun süreli tonsiller ve üst solunum yolu enfeksiyonları

4. Diş eti veya dişlerdeki hassasiyetin uzun sürmesi, hassas bölgeye baskı yapılmasını önlemek için yutma düzeninde değişikliğe neden olabilir.c. Enfeksiyonlar: Ağız gibi üst solunum yolu enfeksiyonları

c. Enfeksiyonlar: Ağız solunumu, kronik bademcik iltihabı, alerji gibi üst solunum yolu enfeksiyonları, ağrı ve boşluk miktarının azalması nedeniyle dili öne doğru iter ve dil itmeli yutkunmaya neden olur. Yeterli bir hava yolunu korumak için fizyolojik ihtiyaç nedeniyle de mevcut olabilir. Yeterli bir hava yolunu korumaya yönelik fizyolojik ihtiyaç nedeniyle de mevcut olabilir.

d. Beslenme uygulamaları: Uzun süreli biberonla beslenme ve yanlış yutma şekli, dil itmenin etiyolojik faktörlerinden biri olarak düşünülmektedir (Gowri sankar & Chetan, 2009; Kharbanda et al., 2003).

Dil itme türleri 4 alt başlıkta incelenebilir: (1) Fizyolojik: Bu, bebeklik dönemindeki normal dil itme yutkunmasını içerir. (2) Alışkanlık: Dil itme yutkunması, maloklüzyonun düzeltilmesinden sonra bile bir alışkanlık olarak mevcuttur. (3) Fonksiyonel: Dil itme mekanizması ağız mührü elde etmek için geliştirilmiş adaptif bir davranış olduğunda, işlevsel olarak gruplandırılabilir. (4) Anatomik dil itimi: Genişlemiş dile sahip kişilerde ön dil duruşu olabilir (Gowri sankar & Chetan, 2009).

İnfanıl yutkunması devam eden bireylerde eğimli, aralıklı ve bazen genişlemiş üst ön kısım, artan aşırı jet, dil itme tipine bağılı olarak geriye doğru eğimli veya öne doğru eğimli alt anterior, ön açık kapanışın varlığı, posterior çapraz kapanışın varlığı, yutma eylemi esnasında anormal diş teması intraoral olarak görülmektedir. Ektra oral olarak ise genellikle dolikosefalik yüz, alt ön yüz yüksekliğinde artış, yetersiz dudaklar, komnuşma sorunları ve anormal mental kas aktivitesi görülmektedir (Burford & Noar, 2003).

Teşhisinde herhangi bir üst solunum yolu enfeksiyonu, parmak emme alışkanlığı, nöromusküler problemleri ekarte etmek, kalıtsal faktörleri kontrol etmek için kardeşlerde ve ebeveynlerde yutma paterni yapılır. Muayene esnasında lateral seflometrik analiz kullanarak veya hastayı dik oturarak istirahat halindeki dil duruşu incelenir. Yutma sırasında dil aktivitesine bakılır (Abraham et al., 2013).

Dil itme alışkanlığını düzeltmek için farklı yöntemler denenmiş ve değışken başarılar elde edilmiştir. Amerikan Akademisi Pediatrik Diş Hekimliği(AAPD), dil itme tedavisinin "miyofonksiyonel terapi, basit alışkanlık kontrolü, alışkanlık kırıcı apareyler, ortodonti ve olası cerrahiye" içerebileceğini belirtmektedir (American Academy of Pediatric Dentistry Clinical Affairs Committee & American Academy of Pediatric Dentistry Council on Clinical Affairs, n.d.).

Doğru yutma ve dilin duruşu egzersizleri ilgili kasların tonlanmasına yardımcı olarak dil itimini ortadan kaldırmaya yardımcı olabilir. Bunlara miyofonksiyonel egzersizler, ortodontik lastikler ve şekersiz meyve damlası egzersizleri, 4S egzersizleri, 2S egzersizi, ısıık çalma, 60'tan 69'a kadar sayma, gargara yapma, esnemek örnek olarak verilebilir. Bunlar yeterli olmadığında sabit veya hareketli alışkanlık kırıcı apareyler kullanılabilir (Abraham et al., 2013).

Bu vaka raporu 6 yaşında ve 10 yaşında iki hastanın sabit ve hareketli alışkanlık kırıcı apareyler kullanılarak infanıl yutkunmanın başarılı bir şekilde tedavisinin gerçekleştirildiğı bildirmektedir.

Vaka Raporu

6 yaşındaki kız hasta rutin kontrol için kliniğe başvurmuş. Muayene sırasında hastada hala devam eden infanıl yutkunma olduğu tespit edildi (Resim 1). Hastanın ekstraoral muayenesinde konveks bir profil, iyi bir yüz simetrisi izlendi. Hastanın dil alışkanlığı hakkında ayrıntılı bir öykü alındı ve bu sırada hasta yutkunurken dilini ön dişlerine doğru öne doğru yerleştirdiğı görüldü. Dil itme tedavisi için sabit bir alışkanlık kırıcı arapey olan palatal crib planlandı. Palatal crib 0,045 inç çelik telden imal edildi ve molar bantlar üzerine lehimlendi. Hasta düzenli aralıklarla kontrole çağırıldı ve 6 ay sonunda tedavisi sonlandırıldı (Resim 2).



Resim 1: 6 yaşındaki hastanın tedavi öncesi ağız içi görüntüsü



Resim 2: 6 yaşındaki hastanın tedavi sonrası ağız içi görüntüsü

10 yaşındaki erkek hasta üst ön dişlerinin öne doğru çıkık olması şikayetiyle kliniğe başvurdu (Resim 3). Hastanın ekstraoral muayenesinde konveks bir profil, iyi bir yüz simetrisi, akut nazolabial açı, istirahatte yetersiz dudaklar ve sık bir mentolabial sulkus görüldü. Ağız içi muayenede her iki tarafta sınıf I molar ve kanin ilişkileri, hafif açık ısırma eğilimi, dil itme alışkanlığı, orta hat diasteması, procline üst ve alt anteriorlar ve artmış overjet ile birlikte ağız solunumu görüldü. Hastanın dil alışkanlığı hakkında ayrıntılı bir öykü alındı ve bu sırada hasta yutkunurken dilini ön dişlerine doğru öne doğru yerleştirdiğini bildirdi. Klinik incelemeler ve hasta öyküsü temelinde, ağız solunumu ile birlikte dil itme tanısı konuldu. Hastaya hareketli alışkanlık kırıcı aparey uygulandı (Resim 4). Düzenli aralıklarla kontrole çağırıldı. 10 ay sonrasında tedavi sonlandırıldı (Resim 5).



Resim 3: 10 yaşındaki hastanın tedavi öncesi ağız içi görüntüsü



Resim 4: Hareketli alışkanlık kırıcı aparey



Resim 5: 10 yaşındaki hastanın tedavi sonrası ağız içi görüntüsü

Sonuç

Dil itme, yutkunma, konuşma ve dinlenme sırasında dilin ön dişlerin arasından çıkıntı yaptığı bir insan davranış kalıbıdır. Bu tür alışkanlıklar 4-5 yaşına kadar normal kabul edilir (Maguire, 2000). Ancak, bu alışkanlıklar daimi dişlerin sürmesinden sonra da devam ederse ağız boşluğunda zararlı etkilere yol açabilir. Etiyolojinin ortadan kaldırılması, dil itme alışkanlığının düzeltilmesinde birincil ve en önemli adımdır. Önleme her zaman tedaviden daha iyidir. Dil itme alışkanlığının erken yaşta tespit edilmesi ve tedavi edilmesi, ileride ciddi iskeletsel maloklüzyonların gelişmesini önlemektedir.

Kaynakça

Abraham, R., Kamath, G., Sodhi, J. S., Sodhi, S., Rita, C., & Kalyan, S. S. (2013). Habit breaking appliance for multiple corrections. *Case Reports in Dentistry*, 2013. <https://doi.org/10.1155/2013/647649>

American Academy of Pediatric Dentistry Clinical Affairs Committee, & American Academy of Pediatric Dentistry Council on Clinical Affairs. (n.d.). Guideline on periodicity of examination, preventive dental services, anticipatory guidance, and oral treatment for children. *Pediatric Dentistry*, 27(7 Suppl), 84–86.

Burford, D., & Noar, J. H. (2003). The causes, diagnosis and treatment of anterior open bite. *Dental Update*, 30(5), 235–241. <https://doi.org/10.12968/DENU.2003.30.5.235>

Gowri sankar, S., & Chetan, kumar. (2009). Tongue Thrust Habit - A Review. *Annals and Essences of Dentistry*.

Kharbanda, O. P., Sidhu, S. S., Sundaram, K., & Shukla, D. K. (2003). Oral habits in school going children of Delhi: a prevalence study. *Journal of the Indian Society of Pedodontics and Preventive Dentistry*, 21(3), 120–124.

Maguire, J. A. (2000). The evaluation and treatment of pediatric oral habits. *Dental Clinics of North America*, 44(3), 659–669, vii.

Piteo, A. M., Kennedy, J. D., Roberts, R. M., Martin, A. J., Nettelbeck, T., Kohler, M. J., & Lushington, K. (2011). Snoring and cognitive development in infancy. *Sleep Medicine*, 12(10), 981–987. <https://doi.org/10.1016/J.SLEEP.2011.03.023>

Tulley, W. J. (1969). A critical appraisal of tongue-thrusting. *American Journal of Orthodontics*, 55(6), 640–650. [https://doi.org/10.1016/0002-9416\(69\)90040-2](https://doi.org/10.1016/0002-9416(69)90040-2)

COMPARISON OF VARIOUS FEATURES AND OUTCOMES IN ADULTS WITH IMMUNE COMPLEX MEMBRANOPROLIFERATIVE GLOMERULONEPHRITIS AND C3 GLOMERULOPATHY

Safak MIRIOGLU

Division of Nephrology, Department of Internal Medicine, Istanbul Faculty of Medicine, Istanbul University, Istanbul, Turkey

Department of Immunology, Aziz Sancar Institute of Experimental Medicine, Istanbul University, Istanbul, Turkey

ORCID ID: <https://orcid.org/0000-0003-0362-8154>

Abstract

Introduction: C3 glomerulopathy (C3G) encompasses glomerulonephritis (GN) with extensive C3 deposition and absence or inadequacy of immunoglobulins in kidney biopsies. Since a considerable number of patients with C3G were diagnosed as primary membranoproliferative GN (MPGN) before the introduction of C3G as a different entity in 2013, we aimed to evaluate and compare clinical, laboratory, histopathological features and treatment responses of immune complex MPGN (IC-MPGN) and C3G.

Materials and Methods: Twenty patients with IC-MPGN and 15 with C3G, who were followed-up for a duration of 68 (IQR25-75: 23-97) months, were enrolled in this retrospective study. Biopsy samples were evaluated by an experienced nephropathologist. Primary outcome was defined as $\geq 50\%$ reduction in baseline eGFR or development of stage 5 chronic kidney disease (eGFR < 15 ml/min/1.73 m²). Secondary outcomes were complete (CR) or partial remission (PR). CR was described as a proteinuria level of < 0.5 g/24h and an eGFR of ≥ 60 ml/min/1.73 m² (or a return of $\pm 15\%$ of baseline values in those with eGFR < 60 ml/min/1.73 m²). PR was defined as a proteinuria reduction of $> 50\%$ (and a proteinuria level of < 3 g/24h in patients with nephrotic-range proteinuria at baseline) and stabilization ($\pm 25\%$) or improvement in renal function. Associations of demographic, clinical, laboratory and histopathological characteristics of patients with study outcomes were analyzed, as well.

Results: Demographic, clinical, laboratory and histopathological features at the time of diagnosis are summarized in the *Table*. Biopsy specimens involved a median of 17 (13-22) glomeruli. All patients were treated with ACEi/ARBs and corticosteroids. Mycophenolic acid derivatives were administered in 10 (50%) and 11 (73.3%) patients with IC-MPGN and C3G, respectively ($p=0.163$). Patients with refractory disease were treated with biological agents. Rituximab was administered in 5 (25%) and 3 (20%) cases with IC-MPGN and C3G, respectively ($p=0.727$); while eculizumab was used in only 2 patients (13.3%) with C3G. Overall 6 patients (17.1%) reached primary outcome [3 (15%) with IC-MPGN and 3 (20%) with C3G; $p=0.698$]. CR was seen in 14 patients (40%) [7 (35%) with IC-MPGN and 7 (46.6%) with C3G], while only 5 patients (25%) in MPGN group went into PR ($p=0.112$). Kaplan-Meier analysis revealed that kidney survival rates were 85% and 80% in IC-MPGN and C3G groups, respectively ($p=0.800$) (*Figure*). In multivariate Cox regression analysis, only hemoglobin [HR: 0.750 (0.566-0.995), $p=0.046$] and baseline eGFR levels [HR: 0.981 (0.967-0.996), $p=0.011$] were the predictors of CR or PR.

Conclusions: There is a significant similarity between patients with IC-MPGN and C3G in terms of not only clinical and laboratory features, but also kidney survival rates and treatment responses.

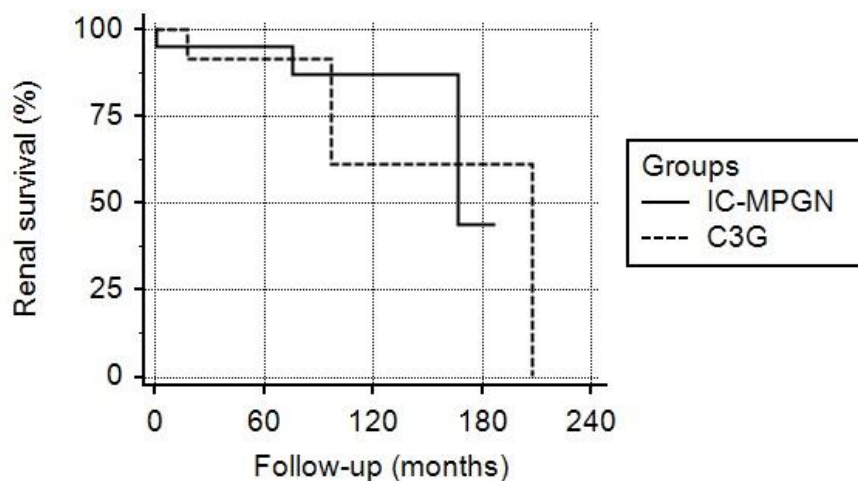
Keywords: C3 Glomerulopathy; Glomerulonephritis; Membranoproliferative Glomerulonephritis, Nephrotic Syndrome

Table. Demographic, clinical, laboratory and histopathological features of patients with IC-MPGN and C3G.

Characteristics	IC-MPGN (n=20)	C3G (n=15)	P value
Sex, male (%)	6 (30%)	7 (46.6%)	0.313
Age (years), mean±SD	27.8±12.3	27.6±10.4	0.973
Percentage of sclerotic glomeruli, median (IQR25-75)	6.27 (0-19.16)	7.69 (0-30.76)	0.799
Mesangial proliferation, n (%)	15 (75%)	14 (93.3%)	0.154
Presence of crescents, n (%)	6 (30%)	9 (60%)	0.076
Hypertension, n (%)	15 (75%)	11 (73.3%)	0.911
Hemoglobin (g/dl), mean±SD	11.4±1.7	11.4±2.4	0.984
eGFR* (ml/min/1.73 m ²), median (IQR25-75)	88.99 (58.37-128.93)	85.58 (48.09-119.12)	0.947
Serum albumin (g/dl), mean±SD	2.93±0.83	2.78±0.85	0.614
Proteinuria (g/24h), median (IQR25-75)	5.05 (2.87-8.12)	4.2 (2-7.4)	0.404
Hematuria, n (%)	13 (65%)	13 (86.6%)	0.147
Duration of follow-up (months), median (IQR25-75)	80.5 (49-101.75)	47 (18-87)	0.080
Complete or partial remission, n (%)	12 (60%)	7 (46.6%)	0.433

Abbreviations: eGFR: estimated glomerular filtration rate, IQR: interquartile range, SD: standard deviation. *eGFRs of patients were calculated using CKD-EPI formula.

Figure. Kidney survival rates in patients with IC-MPGN and C3G throughout the follow-up (85% and 80%, respectively) (p=0.800).



Number at risk

Group: IC-MPGN

20 14 4 1 0

Group: C3G

15 4 1 1 0

IN-SILICO INVESTIGATION OF OSIMERTINIB BASED COMPOUNDS AS POTENTIAL DOUBLE MUTANT EGFR KINASE INHIBITORS. INTEGRATING QSAR MODELING, MOLECULAR DOCKING, MD SIMULATIONS, AND ADME/TOX STUDIES

Salma El Bahi

Molecular Chemistry and Natural Substances Laboratory, Department of Chemistry, Faculty of Science, University of Moulay Ismail, Meknes, Morocco

Meryem Boutalaka

Molecular Chemistry and Natural Substances Laboratory, Department of Chemistry, Faculty of Science, University of Moulay Ismail, Meknes, Morocco

M'barek Choukrad

Molecular Chemistry and Natural Substances Laboratory, Department of Chemistry, Faculty of Science, University of Moulay Ismail, Meknes, Morocco

Abdelouahid Sbai

Molecular Chemistry and Natural Substances Laboratory, Department of Chemistry, Faculty of Science, University of Moulay Ismail, Meknes, Morocco

Mohammed Bouachrine

Molecular Chemistry and Natural Substances Laboratory, Department of Chemistry, Faculty of Science, University of Moulay Ismail, Meknes, Morocco

EST Khenifra, Sultan Moulay Slimane University, Beni Mellal, Morocco

Abstract

Epidermal growth factor receptor (EGFR) inhibitors have been proven as a high-potential therapeutic target for the treatment of advanced non-small-cell lung cancer (NSCLC). However, many patients still suffer from drug-resistant mutations and drug side effects. The current study used 3D-QSAR, molecular docking, and molecular dynamic (MD) simulations to develop novel potent double mutant EGFR^{L858R/T790M} inhibitors. CoMFA and CoMSIA approaches were used to create the 3D-QSAR models. Molecular docking and molecular dynamics simulation were performed to generate the binding mode and stability of the investigated inhibitors. The CoMFA model achieved good predictability with $Q^2 = 0.663$, $R^2 = 0.978$, $SEE = 0.115$, and an acceptable value for the coefficient of determination $R^2_{test} = 0.756$. In addition, based on the information retained by the CoMFA contour maps, we proposed four new molecules (T1-T4) with significantly higher inhibitory activity. Furthermore, molecular docking and MD simulation analysis were utilized to confirm the 3D-QSAR results, supporting the stability of the proposed molecules in the 3W2O receptor. Finally, the selected molecules showed favorable pharmacokinetic properties and were

non-toxic. The paper provides important information for future research on innovative and potent EGFR^{L858R/T790M} inhibitors.

Keywords: EGFR inhibitor; 3D-QSAR; Molecular Docking; Molecular Dynamics simulation

References

- [1] Miyashita Y, Ko R, Shimada N, Mitsuishi Y, Miura K, Matsumoto N, Asao T, Shukuya T, Shibayama R, Koyama R, Takahashi K (2021) Impact of the generation of EGFR-TKIs administered as prior therapy on the efficacy of Osimertinib in patients with non-small cell lung cancer harboring EGFR T790M mutation. *Thorac Cancer* 12(3):329–338.
- [2] Oxnard GR, Hu Y, Mileham KF, Husain H, Costa DB, Tracy P, Feeney N, Sholl LM, Dahlberg SE, Redig AJ, Kwiatkowski DJ, Rabin MS, Paweletz CP, Thress KS, Jänne PA (2018) Assessment of resistance mechanisms and clinical implications in patients with EGFR T790M-positive lung cancer and acquired resistance to osimertinib. *JAMA Oncol* 4(11):1527–1534
- [3] Ding S, Dong X, Gao Z, Zheng X, Ji J, Zhang M, Liu F, Wu S, Li M, Song W, Shen J, Duan W, Liu J, Chen Y (2022) Design synthesis and biological evaluation of novel N-(3-amino-4-methoxyphenyl) acrylamide derivatives as selective EGFR^{L858R/T790M} kinase inhibitors. *Bioorg Chem* 118:105471

THE INHIBITION OF SOME PHYTOPATHOGENIC FUNGI BY ACTINOBACTERIA ISOLATED FROM ALGERIAN SAHARAN SOILS**Fedwa BEGHDADI**

Laboratory of Molecular Biology, Genomics and Bioinformatics (LBMGB), Faculty of Natural Sciences and Life (SNV), Hassiba Benbouali University of Chlef, Hay Salem, 02000 Chlef, Algeria.

El-Hadj DRICHE

Laboratory of Molecular Biology, Genomics and Bioinformatics (LBMGB), Faculty of Natural Sciences and Life (SNV), Hassiba Benbouali University of Chlef, Hay Salem, 02000 Chlef, Algeria.

Abstract

Fungi are non-motile eukaryotic organisms that do not contain the green pigment chlorophyll, which means that they are parasitic, non-autotrophic organisms. They live parasitizing on the remains of living organisms such as: animals and plants... It must be noted that they are organisms that spread throughout the world. It has a wide range and grows in wet areas.

Pathogenic fungi in plants cause severe damage to them, leading to their wilting, damage, and consequently death, by secreting solvents to the plant tissues on which they feed.

There are many types of fungi that vary depending on the quality of the soil and the plant, and they are among the most important fungi pathogenic to plants: *Botrytis ceneria*, *Fusarium oxysporum*, *Alternaria*, *Phytophthora infestans* ... this has a negative impact on food security and leads to significant losses.

Faced with these problems, the search for new bioactive molecules is more than necessary to fight against these phytopatogens. Among the most promising sources of bioactive substances are microorganisms, especially actinobacteria, which are gram-positive bacteria with a high percentage of G+C.

Isolation of pathogenic fungi carried out on PDA medium and purification on the same medium, microscopic observation after staining with methylin blue made it possible to determine the genera of the Pathogenic fungi. study of anti- Pathogenic fungi activity carried out on ISP2 medium using the cross-streak technique indicate a significant important inhibition of some phytopathogenic fungi.

Keywords: Actinobacteria; Inhibition; phytopathogenic fungi; bioactive molecules.

ALTERNARIA IS A DISEASE THAT THREATENS TOMATO CROPS**Fedwa BEGHDADI**

Laboratory of Molecular Biology, Genomics and Bioinformatics (LBMGB), Faculty of Natural Sciences and Life (SNV), Hassiba Benbouali University of Chlef, Hay Salem, 02000 Chlef, Algeria.

El-Hadj DRICHE

Laboratory of Molecular Biology, Genomics and Bioinformatics (LBMGB), Faculty of Natural Sciences and Life (SNV), Hassiba Benbouali University of Chlef, Hay Salem, 02000 Chlef, Algeria.

Abstract

Tomatoes, it ranks first among vegetable crops in terms of area planted annually, production and consumption, and it is consumed either fresh or manufactured. Tomatoes are a high source of the antioxidant lycopene and are used to prevent cancer. It is also a source of vitamins (A, B, C), potassium, iron, and calcium.

Like other agricultural crops, tomatoes are exposed to a number of bacterial, fungal and viral diseases... which leads to significant losses in this strategic crop.

Alternaria is a very well-known disease that affects tomato crops and leads to significant losses. Our goal through this work is to isolate and identify it based on a tomato sample infected with this disease.

Alternaria is a fungal disease, i.e. caused by fungi. The culprits are: *Alternaria solani* (for the tomato) and *Alternaria alternata*! Like all fungi, they occur in a humid and warm atmosphere. While this disease mainly affects tomatoes, it can also affect potatoes, beetroot, fruit trees, cabbage, carrots and eggplants. These fungi remain in the soil and survive winter temperatures. They are carried by rain, wind, contact with the soil and the plant or seeds that are already infected. In a humid and warm atmosphere, spores germinate and quickly infect tomato plants.

Alternaria are common mushrooms in our environment. they belong to atmospheric molds. they can be isolated from very diverse plants. alternaria comprises nearly 275 species, with saprophytic and phytopathogenic lifestyles that can affect field crops or plant products during harvest and post-harvest. As weak parasites, alternaria are capable of leading a saprophytic existence for more or less long periods.

Keywords: Tomato crops, Alternaria, phytopathogenic fungus, Food security.

THE EFFECT OF ANTIOXIDANT ON POLYCYCLIC AROMATIC HYDROCARBONS (PAHs)**Yeganeh Mazaheri**

Department of Environmental Health Engineering, Food Safety Division, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

Parisa Sadighara

Department of Environmental Health Engineering, Food Safety Division, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

Ebrahim Molaee-Aghaee

Department of Environmental Health Engineering, Food Safety Division, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

Nabi Shariati Far

Department of Environmental Health Engineering, Food Safety Division, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran

Abstract

Natural antioxidants have shown promise in the removal of polycyclic aromatic hydrocarbons (PAHs) due to their ability to inhibit the formation of these harmful compounds. PAHs like benzo[a]pyrene (BaP) exert their toxicity through free radical activity, leading to oxidative stress by generating reactive oxygen species (ROS) and disrupting antioxidant enzyme activity. Antioxidants such as vitamin E, curcumin, quercetin, and others can mitigate BaP-induced oxidative stress by regulating gene expression related to oxidative stress and inflammation, thereby reducing ROS levels and lipid peroxidation while enhancing antioxidant levels. Also, studies have highlighted the effectiveness of various natural extracts like green tea extract (GTE), bamboo leaf extract (EBL), grape seed extract (GSE), and rosemary extract (RE) in reducing PAHs in roast duck, with GTE exhibiting the highest inhibitory effects on PAH formation. Additionally, the activation of antioxidant defense systems in plants and microbes during bioremediation processes has been observed, where enzymatic and nonenzymatic antioxidants play crucial roles in detoxifying reactive oxygen species induced by organic pollutants like PAHs.

Key words: Natural antioxidant, polycyclic aromatic hydrocarbons (PAHs), oxidative stress

**INVESTIGATION OF POSTGRADUATE THESES ON CANCER AND CHILD
CONTEXT: THE CASE OF TURKEY****Büşra ERGİN**Selcuk University, Faculty of Education, Department of Elementary Education, Konya, Turkey¹ORCID ID: <https://orcid.org/0000-0001-5177-7096>**Esra ERGİN**Selcuk University, Faculty of Education, Department of Educational Sciences, Konya, Turkey²ORCID ID: <https://orcid.org/0000-0002-3810-4142>**Abstract**

Introduction and Purpose: The opportunities offered to children in co-operation with family and society enable them to live a happy life in harmony. In the case of being deprived of these opportunities and facing various dangers, different risk situations can be mentioned. Today, the rapid change processes experienced by societies increase the risk situations that children may face. At the same time, children tend to exhibit negative behaviours depending on the basic characteristics of the family and society of which they are members. In this sense, we can call children who are exposed to dangers and risks that are not suitable for the child's age as children at risk. While social problems arising from the social systems that children are members of can be seen as a source of risk for children, situations that develop due to health problems can be considered as a source of risk. One of these is the risk situation that develops for children due to cancer, which is a chronic disease. In this context, the main purpose of the research is to systematically examine the postgraduate studies conducted in the context of cancer and children in Turkey.

Materials and Methods: Postgraduate theses will be analysed with a comprehensive and structured data collection tool. The data will be classified according to the specific characteristics of the postgraduate theses.

Results: The data obtained will be shared in detail in the presentation text.

Key Words: Cancer, child, risk.

INTRODUCTION

Cancer is defined by the National Cancer Institute (NIH) as a tissue mass that can affect different organs or the whole body by affecting the blood circulation and lymphatic system with the uncontrolled growth of abnormal cells (Töret et al., 2019). According to the International Classification of Childhood Cancers (ICCC), childhood cancers are analysed in 12 main groups (Kutluk, 2006). These include leukaemias, myeloproliferative and myelodysplastic diseases, lymphomas and reticuloendothelial neoplasms, brain and spinal canal tumours, neuroblastoma and other peripheral nerve cell tumours. The causes of childhood cancers are expressed as genetic/familial, immunological, viral and environmental factors (Törüner & Büyükgönceç, 2017; Ward et al., 2014). For example, the causes of acute lymphoid leukaemia are ionising radiation, race, genetic conditions and birth weight. At this point, the effect of ionising radiation is explained by

prenatal diagnostic X-rays, the effect of race factor is explained by the fact that whites are diagnosed with acute lymphoid leukaemia more than blacks in the United States of America, the effect of genetic conditions is explained by the higher risk of being seen in a child with Down syndrome, and the effect of birth weight is explained by the child being born under 400 grams (Sezer, 2016).

Another important factor for childhood cancers is that they differ from adult cancers. Some of these are that in children and adults who suffer from the same type of cancer, the cancer progresses more slowly in adults, while it matures faster in children. This may cause the child to be more worn out due to the disease, although the child looks very healthy. In addition, while smoking or dietary habits can be shown among the factors leading to cancer in adults, the causes leading to cancer formation in children are mostly embryogenic in origin (Potts & Mandleco, 2012). Considering all these reasons and the impact of the diagnosis and treatment process on the child in childhood cancer, psychological support of the child and family in this process will lead to a healthier process.

The child is born with a certain value structure, beliefs, traditions and practices caused by all these. This situation plays a decisive role in the evaluations of health personnel regarding the needs of the family and the child. The psychosocial principles that are effective in the correct care practices of health personnel are that the family and the child should be handled together as a system and that each child has a unique perception capacity (Baykara et al., 2011). There is a strong connection between the level of children's perception of the concept of illness and the child's age and cognitive development. In addition, the experiences of the child are also effective in the level of perception of illness. If children's experiences about the disease are positive, the healing process of the disease becomes easier, and if they are negative, anxiety increases during the disease process, which makes the healing process difficult (Çamur, 2017). More comprehensively, the factors that are effective in the treatment process of cancer in childhood can be categorised into three groups: disease-related factors, child-related factors and environmental factors. Disease-related factors include the type, severity and duration of the disease, age of onset of the disease, treatment process, decreased physical activity, changes in physical appearance and psychological reasons that may be caused by these. Factors related to the child include the level of psychological development, adaptability, coping mechanisms, and characteristics of the developmental period. Environmental factors, on the other hand, can be explained by the hospital environment, the approach of health personnel, the child's social environment and maintaining communication with his/her social environment (Eker, 2019). It is seen that the impact of cancer and treatment processes on children is quite high. At this point, the phenomenon of cancer and children has been addressed in studies from the perspective of different fields and the important points to be considered on the subject have been presented in the studies. In this study, it is aimed to present a holistic perspective on the subject by examining the postgraduate theses in the Yök Thesis Database related to cancer and children.

METHOD

In this study, it is aimed to analyse the postgraduate theses conducted in the context of cancer and children.

Analysing the Data

In the study, content analysis of postgraduate theses related to cancer and children was conducted and the findings related to the analysis were explained in detail. The data related to the theses on cancer and children were accessed by using Yök National Thesis Database. As a result of the application of the inclusion/exclusion criteria used in the analysis of postgraduate theses, 10 postgraduate theses were reached. The postgraduate theses were analysed in terms of method, sample and research findings. The inclusion/exclusion criteria for the theses are as follows:

- The postgraduate theses were accessed using the keywords "cancer" and "child".
- The keywords were also filtered as "only as specified" and "thesis name".
- Theses that were open to access were included in the study.

RESULTS

The findings of the postgraduate theses reached in the research regarding the method, sample and results of the thesis are shown in Table 1. As a result of the analysis, it was seen that quantitative research methods were mostly used in the 10 postgraduate theses and the study groups of the theses were health personnel, families and children. The table also analyses the studies by including the prominent findings of the theses.

Table 1. Table on the method, sample and findings of the theses

Thesis Name	Method	Sampling	Research Findings
<i>(Ghazi Kaadan, 2021)</i>	Quantitative research	120 healthcare worker and patient's family	Healthcare environments can influence the extent to which patients recover or adapt to specific acute and chronic conditions. It is concluded that while healing environments are intended to improve patient health outcomes as therapeutic and nurturing spaces, they should also be designed for their well-being by reducing patient and family anxiety.
<i>(Çiçek, 2023)</i>	Single-center and cross-sectional study	122 patients aged 0-18 years	The rate of malnutrition is high, especially in children with cancer, and it needs to be evaluated multifacetedly. There remains a need for both diagnostic criteria for malnutrition and guidelines for its prevention and treatment in this population.
<i>(Umman, 2023)</i>	Experimental method	75 patients aged 7-18 years and 75 healthy children of the same age group	It was observed that the increase in quality of life positively affected sleep in children treated for cancer, and there was a negative correlation between quality of life and depression. Total sleep duration was found to be shorter in children and adolescents treated for cancer compared to healthy children. It was determined that the quality of life of the cancer-treated group was lower than healthy children and especially the physical well-being and school scores of the patient group were lower. It was observed that depression score increased as sleep problems increased in children who had cancer. In our study, a decrease in quality of life was observed in both groups as depression increased.
<i>(Erkul, 2020)</i>	Experimental/non-randomized	25 children and parents in the intervention group and 25 children and parents in the control group between the ages of 9-18	It was determined that the interventions made in line with the VIDESOF training programme had an effect on the child's knowledge, anxiety and patient adaptation process towards the disease, and on the parents' knowledge and anxiety level towards the disease, and on the level of family-centred care.
<i>(Duyu, 2017)</i>	Quantitative research	80 patients aged 0-18 years	Patient euthyroid syndrome was found in a significant proportion of paediatric patients newly diagnosed with cancer.
<i>(Baytekin, 2017)</i>	Quantitative research	56 children, 56 mothers and 56 fathers in the	It was determined that the lowest mean score belonged to the "illness" sub-dimension in accordance with child, mother and father reports, and the highest mean score

		paediatric oncology clinic	belonged to the "family" sub-dimension in accordance with child, mother and father reports.
<i>(Aksu, 2014)</i>	Quantitative research	100 patient relatives caring for children hospitalised in paediatrics haematology-oncology wards	The care burden of caregivers whose child had cancer was found to be mild and moderate. This situation is affected by the educational status, income status and occupation of the caregiver. It was found that the care burden of the caregivers whose children were in the age group of 4-7 years, who had male children and who cared for the child between 2-4 years was higher than the other groups.
<i>(Moğulkoç, 2014)</i>	Quantitative research	117 parents	It was found that parents experienced moderate posttraumatic stress disorder and high level of posttraumatic development, mothers experienced higher levels of posttraumatic development than fathers, but there was no difference in the levels of posttraumatic stress disorder in terms of gender of parents.
<i>(Yeter, 2012)</i>	Quantitative research	85 parents	Family members use complementary and alternative therapies for symptoms and want to be informed about complementary and alternative therapies by nurses who are primarily responsible for the care of patients.
<i>(Öztürk, 2008)</i>	Quantitative research	101 children with cancer and their parents	It was concluded that the developed scale is a tool with high reliability for child cancer patients in the 7-18 age group and can be used to evaluate the quality of life of child cancer patients and to recognise children.

CONCLUSION AND DISCUSSION

In this study, it is aimed to present a holistic perspective on the subject by examining the postgraduate theses in the Yök Thesis Database related to cancer and children. For this purpose, content analysis of the theses reached in the research was performed. In the results obtained as a result of the subject context of the theses, childhood cancer, children in cancer and treatment processes, family and child interaction in the diagnosis and treatment of cancer, psychosocial support provided to the child during cancer treatment and the effect of health professionals in the treatment process were explained within the framework of cancer and children.

Cancer is an important disorder that affects the child, the family and the social environment of the child. During the treatment of the disease, the child's daily activities, academic success, social and emotional development are affected (Baysal, 1993). Especially the reaction of the family members who provide primary care to the child in this process and their adaptation behaviours to the treatment of the disease is a facilitating factor for the treatment of the disease for the child. In addition, factors such as the socioeconomic status of the family, witnessing the treatment process of someone previously diagnosed with cancer, the age of the child, the family's acceptance of the disease, receiving support for the disease, and the developmental characteristics of the child affect the course of treatment (Algier, 1994). There are important findings regarding these factors in the theses reached in the research. Baytekin (2017) concluded that families whose children were diagnosed with cancer need information and support. It was determined that this situation reduces the anxiety of families and enables them to take an active role in the child care process. When the knowledge levels of the parents about the disease were compared in the study, it was seen that mothers had more information than fathers due to the fact that they were the primary caregivers. In relation to this situation, it is considered important for the family and the child to benefit from support services in order to overcome the psychological acceptance process of the disease in a healthy way through the stages of shock, denial, guilt, anger and sadness (Baysal, 1993).

Supporting social development in children is a factor that positively affects the course of treatment of the disease. In studies, it has been determined that the child's going to school during the illness prevents fatigue, decreased attention and concentration, and decreased IQ due to treatment. In addition, it is emphasised that children's distancing from the social environment during the disease process, weight changes that occur over time due to the disease, embarrassment due to reasons such as hair loss or amputation of an organ, anxiety of being ridiculous, may cause deterioration of social relations (Sefil, 2000). Similarly, Umman (2023) concluded that cancer treatment in children decreases the quality of life, increases sleep disturbance and this situation leads to depression. It is seen that it is important for parents to participate in the treatment process of the disease together, for parents and children to receive psychological support about the disease, to receive information from health personnel about the disease, not to remove the child from the social environment and to facilitate social adaptation.

In the postgraduate theses, it was also concluded that the physical facilities of the hospital were effective in the treatment process of children. The development of child and family-centred hospital environments and the implementation of child-friendly health service policies play an important role at this point. In addition to high level of medical quality in these environments, it is stated that the provision of health services for the protection of the rights to be informed in accordance with age groups, not to be separated from their families, counselling and rest facilitates the treatment process of the disease for the child and family (Kara, 2022). As a result, the physical facilities of hospitals should be able to make the hospital a "second home" for children during the cancer disease process and provide support services to families to this extent. This study is important in terms of addressing the context of cancer and children in detail from different perspectives. In addition, the detailed prediction of children's perception of hospital and illness in cancer and other chronic diseases in future studies will contribute to the field and the improvement of health service policies.

REFERENCES

- Aksu, A. (2014). *Kanser tanısı konmuş çocuk yakınlarının bakım yüklerinin belirlenmesi*. [Yayımlanmamış Yüksek Lisans Tezi]. Haliç Üniversitesi, Sağlık Bilimleri Enstitüsü.
- Algier, L. (1994). Kanserli hastalarda semptomların kontrolü. *Türk Hemşireler Dergisi*, 44(56), 811.
- Baykara, A, Güvenir, T, & Miral, S. (2011). *Ben hasta değilim-çocuk sağlığı ve hastalıklarının psikososyal yönü* içinde A. Ekşi (Ed.) Hastalık ve hastaneye yatışın çocuk üzerine etkisi. Nobel Kitapevi.
- Baysal, B. (1993) Kronik hastalıkların çocuk ve ailesi üzerindeki psikososyal etkileri. *Türk Psikiyatri Dergisi*, 4(4) 273280.
- Baytekin, M. (2017). *Kanser tanısı almış çocukların yaşam kalitesi: Çocuk ve ebeveyn değerlendirmesi*. [Yayımlanmamış Yüksek Lisans Tezi]. Trakya Üniversitesi, Sağlık Bilimleri Enstitüsü.
- Çamur, Z. (2017). *Hastanede yatan çocuğun bakımına ebeveyn katılımının ebeveyn memnuniyetine, ebeveyn ve çocuk anksiyetesine etkisi*. [Yayımlanmamış Yüksek Lisans Tezi]. Adnan Menderes Üniversitesi, Sağlık Bilimleri Enstitüsü.
- Çiçek, M. (2023). *Çocuk hematoloji onkoloji servisinde yatan kanser hastalarında malnütrisyon değerlendirilmesi*. [Yayımlanmamış Yüksek Lisans Tezi]. Sağlık Bilimleri Üniversitesi, Adana Şehir Eğitim ve Araştırma Hastanesi.
- Duyu, A. (2017). *Kanser tanısı yeni almış ve tedavi başlanmamış çocuk hastalarda hasta ötiroid sendromu sıklığı*. [Uzmanlık Tezi]. Mersin Üniversitesi, Tıp Fakültesi.

- Eker, T. (2019). *Çocukluk çağı hematoloji ve onkoloji hastalarının ailelerinin stres, kaygı ve umutsuzluk durumlarının değerlendirilmesi*. [Yayımlanmamış Yüksek Lisans Tezi]. Yıldırım Beyazıt Üniversitesi, Sağlık Bilimleri Enstitüsü.
- Erkul, M. (2020). *Kanser tanılı çocuk ve ebeveynlerine yönelik geliştirilen eğitim programının hasta uyumu, bilgi ve kaygı düzeylerine etkisi*. [Yayımlanmamış Yüksek Lisans Tezi]. Akdeniz Üniversitesi, Sağlık Bilimleri Enstitüsü.
- Ghazi Kaadan, G.F. (2021). *Environmental factors acting upon healing in childhood cancer in hospital buildings in İstanbul*. [Yayımlanmamış Yüksek Lisans Tezi]. Bahçeşehir Üniversitesi, Fen Bilimleri Enstitüsü.
- Kara, G. (2022). *Sağlık yapılarında mekan ile iyileşme arasındaki ilişki: Çocuk Kanser Hastanesi örneği*. [Yayımlanmamış Yüksek Lisans Tezi]. Toros Üniversitesi, Fen Bilimleri Enstitüsü.
- Kutluk T. (2006). Çocukluk çağı kanserlerinin epidemiyolojisi. *İ.Ü. Cerrahpaşa Tıp Fakültesi Sürekli Tıp Eğitimi Etkinlikleri*, (49), 11-15.
- Moğulkoç, H. (2014). *Kanser hastası çocuk ve ergenlerin ebeveynlerinde travma sonrası stres bozukluğunun ve travma sonrası gelişimin belirleyicileri: Sosyal destek, ruminasyon ve yüklenme biçimleri*. [Yayımlanmamış Yüksek Lisans Tezi]. Uludağ Üniversitesi, Sosyal Bilimler Enstitüsü.
- Öztürk, G. (2008). *7-18 yaş çocuk kanser hastaları için yaşam kalitesi değerlendirme ölçeğinin geliştirilmesi*. [Yayımlanmamış Yüksek Lisans Tezi]. Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü.
- Potts, N.L. & Mandleco, B.L. (2012). *Cellular alterations*. In Potts, L.N. & Mandleco, B.H. (Eds.), *Pediatric Nursing: Caring for Children and Their Families* (3th edition). Delmar Cengage Learning, 1024-1071.
- Sefil, Y. (2000). Çocukluk kanserlerinin aile ve çocuk üzerindeki etkileri. [Yayımlanmamış Yüksek Lisans Tezi]. Marmara Üniversitesi, Eğitim Bilimleri Enstitüsü.
- Sezer, A. (2016). *Merkezimizde tedavi edilen çocukluk çağı kanserlerinde sağkalım oranları*. [Uzmanlık Tezi] Dokuz Eylül Üniversitesi Tıp Fakültesi.
- Töret, E., Düzenli Kar, Y., Bozkurt Turhan, A., Özdemir, Z.C., & Bor O. (2019). Diagnosis and laboratory features of the childhood acute leukemias. *Osmangazi Journal of Medicine*, 42(3), 296-300.
- Törüner, E.K., & Büyükgöncü, L. (2017). Çocuk sağlığı temel hemşirelik yaklaşımları. Ankara Nobel Tıp Kitabevi.
- Umman, N. (2023). *Çocukluk çağında kanser tedavisi görmüş çocuk ve adolesanlarda uyku bozukluğunun değerlendirilmesi, depresyon ve yaşam kalitesi ile ilişkinin araştırılması*. [Yayımlanmamış Yüksek Lisans Tezi]. Sağlık Bilimleri Üniversitesi, Hamidiye Uluslararası Tıp Fakültesi.
- Ward, E., DeSantis, C., Robbins, A., Kohler, B., & Jemal, A. (2014). Childhood and adolescent cancer statistics. *Ca Cancer J Clin*, 64, 83-103.
- Yeter, G. (2012). *Çocuk kanser hastalarında semptomlara yönelik tamamlayıcı ve alternatif tedavi kullanımı*. [Yayımlanmamış Yüksek Lisans Tezi]. Mersin Üniversitesi, Sağlık Bilimleri Enstitüsü.

RELATIONSHIP BETWEEN GASTROESOPHAGEAL REFLUX AND NIGHT EATING SYNDROME AND DEPRESSION, ANXIETY AND STRESS LEVELS IN UNIVERSITY EMPLOYEES**ÜNİVERSİTE ÇALIŞANLARINDA GASTROÖZEFAGEAL REFLÜNÜN GECE YEME SENDROMU VE DEPRESYON, AKSİYETE, STRES DÜZEYLERİ İLE İLİŞKİSİ****Aliye ÖZENOĞLU**

Ondokuz Mayıs University, Faculty of Health Sciences, Department of Nutrition and Dietetics,
Samsun, Turkey

ORCID ID: <https://orcid.org/0000-0003-3101-7342>

Gül Eda KILINÇ

²Ondokuz Mayıs University, Faculty of Health Sciences, Department of Nutrition and Dietetics,
Samsun, Turkey

ORCID ID: <https://orcid.org/0000-0002-9068-3081>

Yasemin AÇAR

Ondokuz Mayıs University, Faculty of Health Sciences, Department of Nutrition and Dietetics,
Samsun, Turkey

ORCID ID: <https://orcid.org/0000-0002-3567-0384>

Abstract

Introduction and Purpose: Gastroesophageal reflux disease (GERD) is an upper gastrointestinal system disease and is affected by many factors. This study aimed to investigate GERD, night eating syndrome and its relationship with depression, anxiety and stress levels in university employees.

Materials and Methods: 194 individuals between ages of 20-65 working at Istinye University in 2022 were included. Sociodemographic information form, reflux questionnaire, night eating questionnaire and depression, anxiety, stress scale (DASS) were used. SPSS27 was used and significance level was determined as $p < 0.05$.

Results: 73.7% of participants were women and 26.3% were men, It was found 65.5% consumed 3-4 meals a day; 73.2% skipped meals; 33.5% skipped breakfast. Average age is 33.67 ± 13.25 years and average BMI is 23.80 ± 4.55 kg/m². Reflux symptoms were detected in 10.1%. Women had higher anxiety scores than men ($p=0.019$). Those who skipped lunch experienced hyperphagia more than those who skipped breakfast ($p=0.022$); who skipped snacks and did not skip meals experienced more morning loss of appetite compared to those who skipped breakfast ($p=0.045$). Participants who consumed 5-6 meals experienced more reflux symptoms than those who consumed 3-4 meals ($p = 0.044$). In addition, those who consumed 5-6 meals a day had more night eating behavior than those who consumed 1-2 meals and 3-4 meals ($p = 0.037$). Positive and significant relationships were

determined between presence of reflux, reflux complications and esophageal symptoms and night eating, evening hyperphagia, morning anorexia, anxiety, depression and stress ($p<0.05$).

Discussion and Conclusion: Due to close relationship between GERD and nutrition and stress, including psychological counseling as well as nutrition and lifestyle change education may increase success of treatment.

Key Words: Gastroesophageal reflux disease, night eating, stress, anxiety

Özet

GİRİŞ: Gastroözofageal reflü hastalığı (GÖRH), bir üst gastrointestinal sistem hastalığı olup modern yaşam koşulları, obezite, depresyon, stres, anksiyete, gece yeme sendromu, cinsiyet vb. faktörlerden etkilenebilmektedir. Bu çalışmada üniversite çalışanlarında GÖRH, gece yeme sendromu ve depresyon, anksiyete, stres düzeyleri ile ilişkisinin araştırılması amaçlanmıştır.

METHOD: Araştırmaya 2022 yılında İstinye Üniversitesi'nde çalışmakta olan 20-65 yaş arası 194 birey dahil edilmiştir. Çalışmada sosyodemografik bilgi formunun yanında reflü anketi, gece yeme anketi ve depresyon, anksiyete, stres ölçeği (DASS) kullanılmıştır. Verilerin istatistiksel analizi SPSS27 istatistik paket programıyla yapılmış, anlamlılık düzeyi $p<0,05$ olarak belirlenmiştir.

BULGULAR: Katılımcıların %73,7'si kadın ve %26,3'ü erkeklerden oluşmuş olup %65,5'inin günde 3-4 öğün tükettiği; %73,2'inin öğün atladığı; %33,5'inin kahvaltı öğününü atladığı bulunmuştur. Yaş ortalaması $33,67\pm 13,25$ yıl, BKİ ortalaması $23,80\pm 4,55$ kg/m^2 'dir. Katılımcıların %10,1'inde reflü semptomları varlığı belirlenmiştir. Kadınların erkeklere oranla anksiyete puanlarının daha yüksek olduğu saptanmıştır ($p=0.019$). Akşam hiperfajisi olan bireylerden öğle öğününü atlayanların kahvaltı öğününü atlayanlara kıyasla hiperfaji durumunu daha fazla yaşadıkları ($p=0,022$); ara öğünleri atlayanlar ve öğün atlamayanların ise kahvaltıyı atlayanlara kıyasla daha fazla sabah iştahsızlığı yaşadıkları belirlenmiştir ($p=0,045$). Katılımcılardan 5-6 öğün tüketenlerin 3-4 öğün tüketenlere göre daha fazla reflü semptomları yaşadığı sonucuna ulaşılmıştır ($p=0,044$). Ayrıca, günde 5-6 öğün tüketenlerin 1-2 öğün ve 3-4 öğün tüketenlere göre gece yeme davranışının daha fazla olduğu belirlenmiştir ($p=0,037$). Reflü varlığı, reflü komplikasyonları ve özofagus semptomları ile gece yeme, akşam hiperfajisi, sabah iştahsızlığı ve anksiyete, depresyon, stres arasında pozitif yönde anlamlı ilişkiler belirlenmiştir ($p<0,05$).

SONUÇ: Stresli yaşam koşulları bireylerin beslenme tarzları yanında fiziksel ve mental sağlıklarını da olumsuz yönde etkileyebilmektedir. Stres, beslenme alışkanlığını etkileyerek gece yeme davranışını artırırken hem stres hem gece yeme birlikte reflü gelişimine ya da semptomlarının şiddetlenmesine katkı sağlayabilir. Reflü semptomlarının artması ise stres, anksiyete ve depresyona yol açarak ve beslenme durumunu daha da bozarak bir kısır döngüye neden olabilir. GÖRH'nın beslenme ve stres ile yakın ilişkisi nedeniyle tedavisinde beslenme ve yaşam tarzı değişikliği eğitimi yanında psikolojik danışmanlığa da yer verilmesi tedavinin başarısını artırabilir.

Anahtar Kelimeler: Gastroözofageal reflü hastalığı, gece yeme, stres, anksiyete

GİRİŞ

Gastroözofageal reflü hastalığı (GÖRH), 1988 yılında James Black tarafından keşfedilmiş olup günümüzde sık karşılaşılan hastalıklardan birisidir. GÖRH, toplumun farklı kesimlerinde %4 ile %20 arasında görülmektedir. Batı ülkelerinde GÖRH prevalansı %10-20 arasında iken, Asya ülkelerinde %5'in altında görüldüğü bildirilmiştir. Bu oranların modern yaşam koşulları, obezite, ekonomik durum ve yaşlılık gibi nedenlerle zamanla daha fazla yükseleceği düşünülmektedir (Çakır et al., 2018). GÖRH'nın tipik semptomları mide ekşimesi ve mide içeriğinin orofarenks içine

regürjitasyonudur. Bu semptomlar bireylerin yaşam kalitesini olumsuz etkilemektedir. Aşırı yağlı ve baharatlı yiyecekler tüketmek, sigara ve alkol kullanımı, sağlıksız pişirme yöntemlerinin tercih edilmesi, koyu kahve ve çay tüketimi gibi beslenme davranışları reflüyü tetikleyebilmektedir (Kellerman and Kintanar, 2017). GÖRH, yemek sonrası ve uykunun hızlı göz hareketi (REM) fazı başta olmak üzere günde 10 ile 50 kez görülebilen fizyolojik bir olaydır. GÖRH, gece kötü uyku kalitesi ile ilişkilendirilmekte olup sindirim sisteminin uyku durumuna fizyolojik adaptasyonları, gece reflü olaylarını uzatmakta ve yoğunlaştırmaktadır.

Yaşam koşullarının değişmesi ile beslenme biçimi değişebilmektedir. Bireylerin sabah yemek yeme ihtiyacı azalmakta ve akşam yemeğinden sonra daha fazla besin tüketimine yönelim artmaktadır. Bu durum Gece Yeme Sendromu (GYS) olarak bilinmektedir. Yapılan çalışmalarda GYS görülen kişilerde gece yedikleri yiyeceklerin %70'ini karbonhidratlar oluştururken, gündüz ise %47'sini oluşturduğu gösterilmiştir. Bu durumlar reflü haricinde hipoglisemi ve peptik ülser gibi çeşitli sağlık sorunlarını meydana getirebilmektedir (Kellerman and Kintanar, 2017).

Gastrointestinal sistemin beslenme alışkanlıkları ve psikiyatrik hastalıklarla ilişkisi uzun süredir bilinmektedir. Bedende yaşanan fizyolojik hastalıkların altında belirli duygunun yer aldığı belirtilmektedir. Bu kapsamda, mide bölgesinde öfke – kızgınlık gibi duyguların yerleştiği gözlemlenmiştir. Yapılan psikoterapilerle öfke ve kızgınlık duygularının giderilmesiyle midedeki fizyolojik rahatsızlıkların çok daha hızlı bir iyileşme gösterdiği tespit edilmiştir. Olumsuz duygu durumunun gece yeme eğilimini artırması ve bunun da reflü gelişimini kolaylaştırması beklenen bir sonuç haline gelmektedir (Özenoğlu et al., 2023). Yemek borusunun alt ucunda bulunan alt özefagus sfinkteri mide asidinin yemek borusuna geri kaçmasını önlemektedir. GÖRH durumunda ise bu sfinkter sıklıkla gevşemekte ve midenin asidik içeriği yemek borusuna geri kaçmaktadır. Stresli yaşam koşulları ve çalışma ortamı da mide asidinin artışına neden olabilmektedir. Stres ile reflü için bariyer olan sfinkterin basıncı azalmakta ve bu durum da reflüyü olumsuz etkilemektedir.

Bu bilgiler ışığında bu çalışmada üniversite çalışanlarında GÖRH'nın gece yeme sendromu ve depresyon, anksiyete, stres düzeyleri ile ilişkisinin araştırılması amaçlanmıştır.

YÖNTEM

Çalışma evrenini İstinye Üniversitesi'nde çalışmakta olan 20-65 yaş arası personel oluşturmaktadır. Örneklem büyüklüğü GÖRH prevalansının %20 olduğu varsayımı temel alınarak, $\alpha:0,05$ yanılma olasılığı alınarak 246 kişi şeklinde hesaplanmıştır. Araştırma 2021-2022 yılı bahar döneminde yürütülmüş olup toplam 194 gönüllü ile çalışma tamamlanmıştır. Çalışmada sosyodemografik bilgi formunun yanında reflü anketi, gece yeme anketi ve depresyon, anksiyete, stres ölçeği (DASS) kullanılmıştır. Ayrıca bireylerin boy uzunluğu (cm), vücut ağırlığı (kg) bilgileri sorgulanarak vücut ağırlığının boy uzunluğunun metre cinsinden karesine bölünmesiyle Beden kütle indeksi (BKİ) hesaplanmıştır. Çalışma kapsamında uygulanacak anket ve ölçekler katılımcılara online olarak ulaştırılmış olup çalışma için İstinye Üniversitesi Sosyal ve Beşerî Bilimler Araştırmaları Etik Kurulu'nun 11/02/2022 tarih 2022/02-06 sayılı kararı ile etik kurul onayı alınmıştır.

REFLÜ ANKETİ

Çakır ve arkadaşları (2018) tarafından geliştirilen anket 25 maddeden oluşmaktadır. Ölçek içerisinde yer alan maddeler: 1 = Yok, 2 = 3 ayda 1, 3 = Ayda 2'den az, 4 = Ayda 2 kez, 5 = Haftada 2 kez, 6 = Her gün şeklindedir. Anket yanma hissi, regürjitasyon varlığı, yutma güçlüğü, vücut ağırlığındaki değişiklikler, bulantı, kusma, öksürük ve uyku durumu gibi özellikler içermektedir. İlk 5 soru GÖRH varlığını ortaya koyarken, 6, 7, 17, 22 numaralı sorular komplikasyonları irdelemekte; 1, 2, 3, 4, 5, 9, 16, 24 numaralı sorular özofagus semptomları ile ilişkili iken 8, 10, 11, 12, 13, 14,

15, 16, 17, 18, 19, 20, 21, 22, 23, 24 numaralı sorular ise ekstra özofageal semptomları sorgulamaktadır. 17, 18 ve 25 numaralı sorular hariç diğer tüm sorular 1'den 6'ya kadar semptomun şiddetine göre derecelendirilmektedir. Buna göre ilk 5 soruya (4, 5'e ilaveten/veya 1, 2, 3) derece olarak 4, 5, 6 cevabını verenler reflü pozitif olarak değerlendirilmektedir (Çakır et al., 2018).

GECE YEME ANKETİ

Allison ve ark. (2010) tarafından oluşturulan Gece Yeme Anketi 14 adet sorudan oluşmaktadır (Allison et al., 2010). Bu anketin Türkçe geçerlik ve güvenilirliği Atasoy ve ark. tarafından yapılmıştır (Atasoy et al., 2013). Anket, sabah iştahı, günün ilk besin alımı, akşam ve gece yeme durumları, akşam yemeğinden sonra besin alımı oranı, aşermeler, gece yeme davranışı üzerindeki kontrol, uykuya dalma gücü, gece uyanarak yeme sıklığı, gece yemeleri sırasında farkındalık ve duygu durumu ile ilgili soruları içermektedir. Anketteki ilk dokuz soru tüm katılımcılar tarafından doldurulması gereken sorulardır. Sonraki sorular ise gece uyanmayan veya atıştırması olmayan katılımcılar tarafından işaretlenmemesi gereken sorulardır. Soru 10-12 gece uyanmaları olan, soru 13 ve 14 ise gece atıştırmaları olan katılımcılar tarafından doldurulmalıdır. Anketteki 7. madde dışındaki maddeler beşli Likert tipi ölçümle 0-4 arasında puanlanmaktadır. Yedinci maddede gün içi duygu durum değişikliği sorgulanmakta ve gün içi değişiklik olmayanlar 0 puan almaktadır. Madde 1, 4 ve 14 ters puanlanmaktadır. Gece yarısı atıştırmalarının ne kadar farkında olduğunu soran madde 13, GYS'nin uykuyla ilişkili yeme bozukluğundan ayırt edilebilmesi için sorulmakta, ancak puanlamaya katılmamaktadır. Toplam puan 0-52 arasında olabilmektedir. Anketteki 15. ve 16. soruların ek soru olarak kullanılması önerilmiş, puanlamaya katılmamıştır. Özgün çalışmada 25 ve üzerindeki puan için pozitif öngörü değerinin düşük (%40,7) olduğu, 30 ve üzerindeki puan için bu değer %72,7'ye yükseldiği bildirilmiştir. Aynı çalışmada GYA için negatif öngörü değeri 25 ve 30 puan üzeri kesme noktalarının ikisinde de yüksek (sırasıyla %95,2 ve %94) bulunmuştur.

DEPRESYON, ANKSİYETE, STRES ÖLÇEĞİ (DASS)

Lovibond ve Lovibond (1995) tarafından geliştirilen Depresyon Anksiyete Stres Ölçeği (DASS) 42 maddeden oluşmaktadır. Ölçeğin Türkçe geçerlik ve güvenilirliği ise alınmış olup ölçek 0 "bana hiç uygun değil", 1 "bana biraz uygun", 2 "bana genellikle uygun", ve 3 "bana tamamen uygun" şeklinde 4'lü likert tipi bir derecelendirmeye sahiptir. DASÖ'nde 14'ü depresyon, 14'ü anksiyete ve 14'ü stres boyutlarına ait olmak üzere toplam 42 madde bulunmaktadır. Depresyon maddeleri (3, 5, 10, 13, 16, 17, 21, 24, 26, 31, 34, 37, 38, 42) hoşnutsuzluk, çaresizlik, değersizlik, ilgi kaybı ve düşük enerji düzeyini ölçmektedir. Anksiyete maddeleri (2, 4, 7, 9, 15, 19, 20, 23, 25, 28, 30, 36, 40, 41) bireyin otonomik uyarılmışlık, durumsal anksiyete, öznel anksiyete ve kas tepkisi düzeyini değerlendirmektedir. Stres maddeleri (1, 6, 8, 11, 12, 14, 18, 22, 27, 29, 32, 33, 35, 39) ise, rahatlama gücü, sinir uyarımı, kolay üzülmeye ve sıkılma, rahatsızlık, aşırı tepki verme ve tahammülsüzlük belirtilerinin düzeyini ölçmektedir. Bu ölçekte (DASS-21) depresyon, stres ve anksiyete boyutlarını ölçmek için 7'şer soru bulunmaktadır. Ölçek 4'lü Likert Tipi Ölçek olup; 0 "bana uygun değil", 1 "bana biraz uygun", 2 "bana genellikle uygun", ve 3 "bana tamamen uygun" şeklinde kodlanmıştır. Depresyonun puanlandırılması yapılırken; 0-9 arası normal, 10-13 arası hafif, 14-20 arası orta, 21-27 arası ileri, 28 ve üstü ise çok ileri olarak değerlendirilmiştir. Anksiyete puanlandırılması yapılırken; 0-7 arası normal, 8-9 arası hafif, 10-14 arası orta, 15-19 arası ileri, 20 ve üstü ise çok ileri olarak değerlendirilmiştir. Stresin puanlandırılması yapılırken; 0-14 arası normal, 15-18 hafif, 19-25 orta, 26-33 ileri, 34 ve üstü ise çok ileri olarak değerlendirilmiştir (Akın and Çetin, 2007).

İSTATİKSEL ANALİZ

Verinin istatistiksel analizi SPSS27 istatistik paket programıyla yapılmıştır. Anlamlılık düzeyi $p < 0,05$ olarak belirlenmiştir.

BULGULAR VE TARTIŞMA

GÖRH özellikle batı toplumlarında sık görülen bir sindirim sistemi hastalığıdır. Tedavi edilmeyen ileri derece GÖRH yaşam kalitesini olumsuz yönde etkilemektedir. Yapılan çalışmalarda beslenme ve yaşam tarzının reflü ile ilişkili olduğunu belirtmektedir. Beslenme alışkanlıkları ve yaşam kalitesi arasında önemli bir ilişki bulunmaktadır. Kişiler gündelik yaşantılarında çok fazla strese maruz kaldıklarından dolayı beslenme düzenleri, fiziksel aktiviteleri, uyku düzenleri olumsuz etkilenebilmektedir. Bu durum ise çeşitli sağlık sorunlarını beraberinde getirmektedir. Beslenme kalitesinin belirlenmesinde öğün düzeni ve öğün sayısı önemlidir. Öğün düzeni ve sayısı bireyler arasında değişiklik göstermektedir. Bireylerin öğün ve uyku düzenlerinin bozulması ile GYS görülebilmektedir. GYS sabahları anoreksiya, akşam hiperfaji ve insomnia ile karakterize bir yeme bozukluğudur. GYS, özellikle çalışan bireylerde sık görülmektedir (Özenoğlu et al., 2023, Burnatowska et al., 2023). GÖRH komplikasyonlarının prevalansı dünya çapında git gide artmaktadır. GÖRH ile insan psikolojisi arasında bir bağlantı vardır. Depresyon varlığında duygusal sıkıntıların ortaya çıkması sonucu gastrointestinal sistem etkilenmektedir. Aynı zamanda depresyon varlığı sonucunda ortaya çıkan psikolojik faktörlerin gastrointestinal bozukluğun tedavisini güçleştirerek tedavi sürecini olumsuz etkilemektedir. Stres, insan ilişkilerini, kişinin bedensel ve psikolojik sağlığını negatif etkileyebilen, baskı altında hissedildiği anlarda verilen tepkilerdir ve GÖRH ile pozitif yönde bir ilişki bulunmaktadır. Sebebi bulunamayan bir göğüs ağrısı varlığında stresin neden olabileceği düşünülmelidir (Fass et al., 2020). Ayrıca GÖRH tanısı olan hastalarda en yaygın görülen psikolojik hastalık anksiyete ve depresyon olarak bulunmuştur (Zhang et al., 2021).

Katılımcıların demografik bilgileri Tablo 1’de verilmiştir. Katılımcıların %73,7’si kadın iken %26,3 ‘ü erkek bireydir. Bireylerin %59,8’inin bekar, %62,9’unun üniversite mezunu, %67,5’inin çalışmada belirtilen mesleklerden farklı alanlarda çalıştığı; %65,5’inin günde 3-4 öğün tükettiği; %73,2’sinin öğün atladığı; %33,5’inin kahvaltı öğününü atladığı sonucuna ulaşılmıştır. Katılımcıların yaş ortalamasının $33,67 \pm 13,25$ yıl olduğu ve BKİ ortalamasının $23,80 \pm 4,55$ olduğu belirlenmiştir. Bireylerin %10,1’inde reflü semptomları varlığı belirlenmiştir.

Tablo 1. Katılımcıların demografik bilgileri

Değişkenler	n	%
Cinsiyet		
Kadın	143	73,7
Erkek	51	26,3
Toplam	194	100,0
Medeni Durum		
Evli	78	40,2
Bekar	116	59,8
Toplam	194	100,0
Eğitim Durumu		
İlköğretim ve ortaokul	2	1,0
Lise	19	9,8
Üniversite	122	62,9
Yüksek Lisans	20	10,3
Doktora	31	16,0
Toplam	194	100,0
Meslek		
Öğretim Elemanı	47	24,2
Yönetici	9	4,6
Sekreter	5	2,6
Hizmetli Personel	2	1,0
Diğer	131	67,5
Toplam	194	100,0
Günlük Tüketilen Öğün Sayısı		
1-2 öğün	46	23,7
3-4 öğün	127	65,5
5-6 öğün	21	10,8
Toplam	194	100,0
Öğün Atlama Durumu		
Evet	142	73,2
Hayır	52	26,8
Toplam	194	100,0
Atlanılan Öğün		
Kahvaltı	65	33,5
Öğle	50	25,8
Akşam	4	2,1
Ara Öğünler	40	20,6
Öğün Atlamıyorum	35	18,0
Toplam	194	100,0
Reflü Sıklığı	20	10,1
Reflü Anketi Ortalama Puanı	11,66±6,01	
Yaş (yıl) (X±SS)	33,67±13,25	
BKİ (kg/m²) (X±SS)	23,80±4,55	

Cinsiyete göre ölçeklerin değerlendirilmesi Tablo 2’de gösterilmiştir. DASS ölçeğinin alt boyutlarından anksiyete alt boyutunun erkeklere kıyasla kadınlarda anlamlı düzeyde daha yüksek olduğu saptanmıştır (p=0,019).

Yapılan bir çalışmada, 201 kişi arasında reflü varlığında stresi olanların sayısı 20 olduğu bulunmuştur. Analiz sonucunda anksiyete alt boyutunda anlamlı bir farkın olduğu sonucuna ulaşılmıştır (p<0.05). Anksiyete alt boyutunda kadınların (X: 11,48±Ss: 3,74) erkeklere göre (X: 10,16±Ss: 3,18) anksiyete düzeylerinin daha yüksek olduğu sonucuna ulaşılmıştır (Bilgi, M., 2013).

Tablo 2. Cinsiyete göre ölçeklerin değerlendirilmesi

Anksiyete*	(X±SS)	t	p
Kadın	11,48±3,74	2,391	0,019
Erkek	10,16±3,18		
Depresyon*			
Kadın	13,04±5,21	1,230	0,222
Erkek	12,08±4,41		
Stres*			
Kadın	13,54±4,73	1,751	0,083
Erkek	12,34±3,98		
Reflü Varlığı*			
Kadın	11,87±6,08	1,591	0,115
Erkek	10,40±5,47		
Özofagus Semptomları*			
Kadın	30,43±8,56	1,182	0,240
Erkek	28,90±7,63		
Akşam Hiperfajisi*			
Kadın	6,83±1,41	-0,060	0,952
Erkek	6,84±1,17		
Sabah İştahsızlığı*			
Kadın	9,31±1,96	-1,091	0,279
Erkek	9,64±1,83		
Reflü Komplikasyonları**			
Kadın	6,07±2,98	-0,715	0,581
Erkek	6,48±3,53		
Gece Yeme**			
Kadın	7,21±2,90	0,399	0,850
Erkek	7,03±2,63		

*Bağımsız T Testi, **Mann Whitney U Testi

Atlanan öğün durumuna göre ölçeklerin değerlendirilmesi Tablo 3'te verilmiştir. Akşam hiperfajisi olan bireylerde öğle öğününü atlayanların (X:7,32±Ss: 1,16) kahvaltı öğününü atlayanlara kıyasla (X: 6,46±Ss: 1,49) bu durumu daha fazla yaşadığı (p=0,022); sabah iştahsızlığı açısından ise ara öğünleri atlayanlar (X: 9,62±Ss: 1,89) ve öğün atlamayanların (X: 10,11±Ss: 1,92), kahvaltıyı atlayanlara kıyasla (X: 8,84±Ss: 1,88) daha fazla sabah iştahsızlığı yaşadığı sonucuna ulaşılmıştır (p=0,045).

2013 yılında yapılan bir çalışmada, bireylerin öğün atlama durumu ile GÖRH semptomlarının öncesi ve sonrası değerlendirilmiş ve öğün atlamayan GÖRH semptomları ile önemli farklılıklar oluşturduğu belirlenmiştir (p<0,05). Semptom öncesi öğün atlamayanların oranın %46,7 olduğu, semptom sonrası bu oranın %56,0'ya yükseldiği gözlemlenmiştir. Öğün atlama obeziteye neden olduğundan dolayı olarak GÖRH ile ilişkilendirilebilmektedir (Seremet, 2013). Yapılan bir başka çalışmada, öğün atlama ile depresyon ilişkisi arasında anlamlı bir fark bulunamamıştır. Öğün atlama durumları depresif belirti görülme sıklığını etkilemezken, diyet yapanlarda depresif belirti görülme sıklığı daha yüksek bulunmuştur (Ulas et al., 2015). Bir diğer çalışmada çalışanların stres kaynaklı olarak beslenme durumlarının etkilendiği ve öğün atladıkları sonucuna varmıştır. Çalışma sonuçlarında stres düzeyi yüksek olan bireylerin öğün atlama durumu %79,7 iken stres düzeyi düşük olan bireylerin öğün atlama durumu %74,4 olarak bulunmuştur (Toprak, 2017). Başka bir çalışmada gece yeme sendromunun varlığı sabah öğününün atlanması ile ilişkilendirilmiştir. Yapılan bu çalışmalarda öğün atlama ile gece yeme sendromu varlığı arasında anlamlı bir fark saptanmıştır (Bektaş and Garipağaoğlu, 2016). 2019 yılında yapılan 484 kişinin dahil edildiği bir başka çalışmada öğün atlama ile anksiyete bozukluğu arasında anlamlı bir ilişki bulunamamıştır (Çatak, 2019). Yapılan bu çalışmada ise öğün atlayan kişi sayısı 75'tir. Öğün atlayan ve reflü hastalığı olan

bireylerin oranı %22,66'dır. Öğün atlayan ancak reflü hastalığı olmayan bireylerin oranı %77,33'tür. Ayrıca bu çalışmada öğün atlayan birey sayısı 147'dir. Hem öğün atlayan hem de reflü hastalığı var olan bireylerin oranı %11,56'dır. Öğün atlaması var olan ancak reflüsü olmayan bireylerin oranı %88,43'tür. Yapılan bu çalışmada, 194 kişi arasında hem öğün atlama hem de depresyonu olan kişi %39,3'tür. Öğün atlaması olan fakat depresyonu olmayan kişi %33,8'dir. Hem öğün atlaması hem de depresyonu olmayan kişi %13,9'dur. Öğün atlaması olmayan fakat depresyonu olan kişi ise %12,9'dur. Ayrıca %51,7'sinde hem öğün atlama durumu hem de stres vardır. Katılımcıların %17,4'ünde stres olduğu halde öğün atlama durumu yoktur. %21,4'ünde stres yoktur ancak öğün atlama durumu vardır. Ayrıca bireylerin %9,5'inde ise stres de öğün atlama durumu da yoktur. Hem öğün atlayan hem de gece yeme sendromu olan kişiler ise tüm bireylerin %4,47'sidir. Öğün atlaması olan fakat gece yeme sendromu olmayan kişi sayısı %68,65'tir. Hem öğün atlaması olmayan hem de gece yeme sendromu olmayan kişi sayısı %25,87'dir. Öğün atlaması olmayan fakat gece yeme sendromu olan kişi sayısı %0,99'dur.

Tablo 3. Atlanan öğün durumuna göre ölçüklerin değerlendirilmesi

Değişkenler	Kruskal Wallis D.	P
Anksiyete	5,858	0,210
Depresyon	1,397	0,845
Stres	1,980	0,739
Reflü Varlığı	5,661	0,226
Reflü Komplikasyonu	1,074	0,898
Özofagus Semptomları	4,208	0,379
Gece Yeme	4,464	0,347
Akşam Hiperfajisi	11,404	0,022
Sabah İştahsızlığı	9,729	0,045

*Kruskal Wallis Testi

Öğün sayısı açısından ölçüklerin değerlendirilmesi Tablo 4'te gösterilmiştir. Anksiyete alt boyutunda 5-6 öğün tüketenlerin (X: 12,95±Ss: 3,32) 3-4 öğün tüketenlere göre (X: 10,70±Ss: 3,21) daha fazla anksiyete yaşadığı (p=0,025); depresyon alt boyutunda 5-6 öğün tüketenlerin (X: 15,66±Ss: 5,44) 3-4 öğün tüketenlere göre (X: 12,18±Ss: 4,54) daha fazla depresyon yaşadığı (p=0,021); stres alt boyutunda ise 5-6 öğün tüketenlerin (X: 15,95±Ss: 4,57) 3-4 öğün tüketenlere göre (X: 12,55±Ss: 4,10) daha fazla stres yaşadığı sonucuna ulaşılmıştır (p=0,004). Reflü varlığı boyutunda 5-6 öğün tüketenlerin (X: 14,28±Ss: 6,06) 3-4 öğün tüketenlere göre (X: 10,77±Ss: 5,42) daha fazla reflü varlığı yaşadığı sonucuna ulaşılmıştır (p=0,044). Gece yeme boyutunda 5-6 öğün tüketenlerin (X: 8,80±Ss: 3,60) 1-2 öğün tüketenlere (X: 7,17±Ss: 2,96) ve 3-4 öğün tüketenlere (X: 6,88±Ss: 2,54) göre gece yeme davranışının daha fazla olduğu (p=0,037); akşam hiperfajisine göre değerlendirildiğinde 1-2 öğün (X: 7,08±Ss: 1,47) ve 3-4 öğün tüketenlerin (X: 6,90±Ss: 1,27) 5-6 öğün tüketenlere göre (X: 5,85±Ss: 1,15) bu durumun daha fazla olduğu (p=0,001); sabah iştahsızlığı durumuna göre 5-6 öğün tüketenlerin (X: 10,19±Ss: 1,91) 1-2 öğün tüketenlere (X: 8,82±Ss: 2,22) ve 3-4 öğün tüketenlere (X: 9,48±Ss: 1,77) göre sabah iştahsızlığı durumlarının yüksek olduğu sonucuna ulaşılmıştır (p=0,022).

Tablo 4. Öğün sayısı açısından ölçeklerin değerlendirilmesi

Değişkenler	Kruskal Wallis D.	P
Anksiyete	7,392	0,025
Depresyon	7,769	0,021
Stres	11,116	0,004
Reflü Varlığı	6,228	0,044
Reflü Komplikasyonu	3,629	0,163
Özofagus Semptomları	4,689	0,096
Gece Yeme	6,599	0,037
Akşam Hiperfajisi	14,308	0,001
Sabah İştahsızlığı	7,589	0,022

***Kruskal Wallis Testi**

Yapılan korelasyon analizi sonucunda akşam hiperfajisi boyutunun diğer ölçeklerle negatif yönde korelasyon, diğer boyutların ise birbirleri arasında pozitif yönde bir korelasyon gösterdiği sonucuna ulaşılmıştır ($p<0,05$). Reflü varlığı, reflü komplikasyonları ve özofagus semptomları ile gece yeme, akşam hiperfajisi, sabah iştahsızlığı ve anksiyete, depresyon, stres arasında pozitif yönde anlamlı bir ilişki belirlenmiştir ($p<0,05$).

Tablo 5. Ölçekler Arasındaki Korelasyon***

	Anksiyete	Depresyon	Stres	Reflü Varlığı	Reflü Komplikasyonu	Özofagus Semptomları	Gece Yeme	Akşam Hiperfajisi	Sabah İştahsızlığı
Anksiyete	1								
Depresyon	0,699**	1							
Stres	0,754**	0,865**	1						
Reflü Varlığı	0,573**	0,332**	0,416**	1					
Reflü Komplikasyonu	0,437**	0,228**	0,309**	0,506**	1				
Özofagus Semptomları	0,516**	0,270**	0,389**	0,635**	0,656**	1			
Gece Yeme	0,518**	0,601**	0,599**	0,327**	0,183*	0,319**	1		
Akşam Hiperfajisi	-0,108	0,189**	-0,131	-0,138	-0,064	-0,049	0,353**	1	
Sabah İştahsızlığı	0,307**	0,197**	0,235**	0,293**	0,203**	0,320**	0,385**	0,274**	1

* $p<0,05$, ** $p<0,00$, ***Spearman Korelasyon

SONUÇ VE ÖNERİLER

Üniversite çalışanlarında yapılan bu çalışma sonucunda elde edilen bulgulara genel olarak bakıldığında akşam hiperfajisi durumu haricinde var olan bütün ölçeklerin birbiri ile pozitif ilişkisi olduğu saptanmıştır. Yoğun çalışma koşullarının beraberinde getirdiği stres, reflü gibi gastrointestinal hastalıklara neden olabilmekte ve gece yeme tarzında sağlıksız beslenme alışkanlıklarının gelişmesine de neden olarak bu üç faktör arasında bir kısır döngü oluşabilmektedir. Bozulmuş ruh sağlığı ve gastrointestinal hastalıkların daha ciddi boyutlara ulaşmasını önlemek amacıyla beslenme eğitiminin yanında psikolojik desteklerin de yararlı olacağı düşünülmektedir.

KAYNAKLAR

Akın, A. & Çetin, B. (2007). Depresyon Anksiyete Stres Ölçeği (DASÖ): Geçerlik ve Güvenirlik Çalışması.

Allison, K.C., Lundgren, J.D., O'reardon, J.P., Geliebter, A., Gluck, M.E., Vınaı, P., Mitchell, J.E., Schenck, C.H., Howell, M.J. & Crow, S. J. (2010). Proposed Diagnostic Criteria For Night Eating Syndrome. *International Journal Of Eating Disorders*, p. 43, s.241-247.

Atasoy, N., Saraçlı, Ö., Konuk, N., Ankaralı, H., Gurız, S.O., Akdemir, A., Sevinçer, G.M. & Atık, L. (2013). Gece Yeme Anketi-Türkçe Formunun Psikiyatrik Ayaktan Hasta Popülasyonunda Geçerlilik Ve Güvenilirlik Çalışması.

Bektaş, B.D. & Garıpağaoğlu, M. (2016). Yetişkin Kadınlarda Beden Kütle İndeksi İle Gece Yeme Sendromu Ve Uyku Düzeni Arasındaki İlişkinin Değerlendirilmesi. *Beslenme Ve Diyet Dergisi*, 44, 212-219.

Bilgi, M.M. (2013). Gastroözofageal reflü hastalığının psikopatoloji, mizaç-karakter yönünden incelenmesi: Sağlıklı kontrollerle karşılaştırmalı kesitsel bir çalışma.

Burnatowska, E., Wikarek, A., Oboza, P., Ogarek, N., Glinianowicz, M., Kocelak, P. & Olszanecka-Glinianowicz, M. (2023). Emotional Eating And Binge Eating Disorders And Night Eating Syndrome In Polycystic Ovary Syndrome—A Vicious Circle Of Disease: A Systematic Review. *Nutrients*, 15, 295.

Çakır, Ö.Ö., Çızmecioğlu, A., Bıyık, M., Çıfçı, S., Ataseven, H., Polat, H. & Demir, A. (2018). Konya İl Merkezinde Gastroözofageal Reflü Hastalığı Prevalansı. *Akademik Gastroenteroloji Dergisi*, 17, 2-11.

Çatak, Ş. (2019). Üniversite Öğrencilerinin Beslenme Alışkanlıkları Ve Probiyotik Süt Ürünleri Tüketim Sıklıklarının Anksiyete Bozukluğuna Etkisi. Aydın Adnan Menderes Üniversitesi Sağlık Bilimleri Enstitüsü Beslenme ve Diyetetik Yüksek Lisans Programı. Aydın.

Fass, R., Talley, N. & Grove, S. (2020). Approach To Refractory Gastroesophageal Reflux Disease In Adults. *Uptodate. Waltham, Ma: Uptodate*.

Kellerman, R. & Kintanar, T. (2017). Gastroesophageal Reflux Disease. *Primary Care*, 44, 561-573.

Özenoğlu, A., Anul, N. & Özçelikçi, B. (2023). The Relationship Of Gastroesophageal Reflux With Nutritional Habits And Mental Disorders. *Human Nutrition & Metabolism*, 20203.

Seremet, B. (2013). Yeni Tanı Alan Gastroözofageal Reflü Hastalarının Beslenme Durumunun Saptanması, Hacettepe Üniversitesi Sağlık Bilimleri Enstitüsü Diyetetik Ana Bilim Dalı. Ankara.

Toprak, K. (2017). Bir Medya Kurumunda Çalışanlarda Beslenme ve İş Stres Durumlarının Değerlendirilmesi. Hacettepe Üniversitesi Sağlık Bilimleri Enstitüsü Diyetetik Programı Yüksek Lisans Tezi, Ankara.

Ulas, B., Tatlıbadem, B., Nazık, F., Sonmez, M. & Uncu, F. (2015). Üniversite Öğrencilerinde Depresyon Sikliği Ve İlişkili Etmenler. *Celal Bayar Üniversitesi Sağlık Bilimleri Enstitüsü Dergisi*, 2, 71-75.

Zhang, M., Hou, Z.-K., Huang, Z.-B., Chen, X.-L. & Liu, F.-B. (2021). Dietary And Lifestyle Factors Related To Gastroesophageal Reflux Disease: A Systematic Review. *Therapeutics And Clinical Risk Management*, 305-323.

ADAPTATION TO DISEASE AND NURSING APPROACH IN ELDERLY PEOPLE WITH CHRONIC DISEASES**KRONİK HASTALIĞA SAHİP YAŞLILARDA HASTALIĞA UYUM VE HEMŞİRELİK YAKLAŞIMI****Fatmanur BALAMUT**

Ondokuz Mayıs Üniversitesi, Lisansüstü Eğitim Enstitüsü, Halk Sağlığı Hemşireliği Yüksek Lisans Öğrencisi, Samsun, Türkiye

ORCID: 0000-0002-2824-7668

Özge ÖZ YILDIRIM

Ondokuz Mayıs Üniversitesi, Sağlık Bilimleri Fakültesi, Halk Sağlığı Hemşireliği Bölümü, Samsun, Türkiye

ORCID: 0000-0003-4810-563X

Abstract

According to the definition of the World Health Organization, chronic disease is a disease that progresses slowly and lasts for a long time. It is affected by each of genetic, physiological, environmental and behavioral factors. Nowadays, the extension of human life has led to an increase in the elderly population in societies. There is an increase in the incidence of chronic diseases due to the increase in the elderly population. According to the data of the Turkish Statistical Institute in Turkey, the rate of individuals over the age of 65 with chronic diseases was 78.7% in 2023. In addition, deaths due to chronic diseases constitute 60% of all deaths in the world. Therefore, controlling chronic diseases is important for societies. Since the 1970s, many countries have developed and implemented programs and action plans to prevent and control chronic diseases. The role of health professionals in the implementation of these programs is very important. In order to control chronic diseases, compliance with the disease and treatment is necessary. Adaptation to the disease is a process that includes regular use of medications, non-interrupted control, compliance with treatment, following the recommendations of health professionals and shaping the lifestyle according to the disease. Adaptation to the disease can affect the course of the disease positively or negatively. Therefore, it is an important concept for the management of chronic diseases.

There are situations that affect adaptation. To these; Factors such as age, socio-economic characteristics, family, comorbidity, inadequate communication, lack of social support, individual factors, environment and culture can be given as examples. In this regard, nurses should understand compliance and guide patients. According to the report of the World Health Organization; Well-trained nurses and experienced health professionals are expected to make a great contribution to lifestyle changes and increased adaptation to the disease after chronic disease. Nurses working with individuals with chronic diseases should examine patients as a whole and assist the patient when necessary. Behavioral changes in the patient and her family may require a long process. Therefore, the nurse must be patient, creative and courageous. In addition, nurses should have skills such as health assessment, therapeutic communication, patient education, counseling, self-responsibility and self-care development.

Keywords: Chronic disease, adaptation to disease, elderly, nursing

Özet

Dünya Sağlık Örgütü'nün tanımına göre kronik hastalıklar yavaş ilerleme gösteren ve uzun süreli olan hastalıklardır. Genetik, fizyolojik, çevresel ve davranışsal faktörlerin her birinden etkilenir. Hastalıkların görülme sıklığında artış yaşanmaktadır. Türkiye'de Türkiye İstatistik Kurumu verilerine göre 2023 yılında kronik hastalığa sahip 65 yaş üstü bireylerin oranı %78,7 olmuştur. Ayrıca kronik hastalıklara bağlı ölümler dünyadaki tüm ölümlerin %60'ını oluşturmaktadır. Bu nedenle kronik hastalıkları kontrol altına almak toplumlar için önemlidir. 1970li yıllardan itibaren birçok ülke kronik hastalıkları önlemek ve kontrol Günümüzde insan ömrünün uzaması toplumlarda yaşlı nüfusun artmasına neden olmuştur. Yaşlı nüfusun artmasına bağlı kronik altımda tutmak için programlar, eylem planları geliştirmiş ve uygulamıştır. Bu programların uygulanmasında sağlık profesyonellerinin yeri oldukça önemlidir. Kronik hastalıkların kontrol altına alınabilmesi için hastalığa ve tedaviye uyum gereklidir. Hastalığa uyum ilaçların düzenli kullanılmasını, kontrollerinin aksatılmamasını, tedaviye uyumu, sağlık profesyonellerinin tavsiyelerinin yerine getirilmesini ve yaşam tarzının hastalığa göre şekillenmesi içeren bir süreçtir. Hastalığa uyum hastalığın seyrini olumlu ya da olumsuz yönde etkileyebilmektedir. Bu nedenle kronik hastalıkların yönetimi için önemli bir kavramdır.

Uyumu etkileyen durumlar vardır. Bunlara; yaş, sosyo-ekonomik özellikler, aile, komorbidite, yetersiz iletişim, sosyal destek eksikliği, bireysel faktörler, çevre, kültür gibi etkenler örnek gösterilebilir. Bu konuda hemşireler uyumu anlamalı ve hastalara kılavuzluk etmelidir. Dünya Sağlık Örgütü'nün raporuna göre; kronik hastalık sonrası yaşam tarzı değişikliklerinde ve hastalığa uyumun artmasında iyi eğitilmiş hemşirelerden ve deneyimli sağlık profesyonellerinden büyük katkı sağlamaları beklenmektedir. Kronik hastalığı olan bireylerle çalışan hemşireler hastaları çevresiyle bir bütün olarak incelemeli ve gerekli durumlarda hastaya yardımcı olmalıdır. Hasta ve ailesinde davranış değişiklikleri olması uzun bir süreç gerektirebilir. Bu nedenle hemşire sabırlı, yaratıcı ve cesaretli olmalıdır. Ayrıca hemşireler sağlığı değerlendirebilme, terapötik iletişim, hasta eğitimi, danışmanlık, öz-sorumluluk ve öz-bakımı geliştirme gibi becerilerine sahip olmalıdır.

Anahtar Kelimeler: Kronik hastalık, hastalığa uyum, yaşlı, hemşirelik

GİRİŞ

Dünya Sağlık Örgütü'nün tanımına göre kronik hastalıklar uzun süreli hastalıklardır. Genetik, fizyolojik, çevresel ve davranışsal faktörlerin her birinden etkilenir. Sıklıkla görülen kronik hastalıklar; kanserler, solunum yolu rahatsızlıkları, diyabet, kardiyovasküler hastalıklardır (WHO,2023). Hastalık Kontrol ve Önleme Merkezleri ise kronik hastalıkları bir yıl veya daha uzun süren ve devamlı tıbbi müdahale gerektiren ya da günlük yaşam aktivitelerini kısıtlayan veya her iki durumunda görüldüğü rahatsızlıklar olarak tanımlamıştır (CDC,2024). Kronik hastalıklardan tüm yaş grupları ve ülkeler etkilense de genellikle ileri yaş grupları ve düşük ve orta gelirli ülkelerle ilişkilidir (WHO,2023). Zamanla gelişen tanı ve tedavi yöntemleri, koruyucu sağlık hizmetlerinin önem kazanması, yaşam sürelerinin uzaması birçok bölgede kronik hastalıkların kontrol altında tutulmasını sağlarken; yaşlanan dünya nüfusu, hızlı kentleşmenin beraberinde getirdiği stresör faktörler, teknolojik gelişmelerle birlikte sedanter yaşam tarzının yaygınlaşması, sağlıksız beslenme gibi faktörlerin değişiyor olması kronik hastalıkların insidans ve prevalansında artış yaşanmasına sebep olmuştur (Kumsar ve Yılmaz, 2014). Kronik hastalıklar dünyada devamlı artış gösteren bir halk sağlığı ve kalkınma sorunu ve haline gelmektedir (HSGM, 2018). Türkiye'de 2023 yılında kronik hastalığı olan 65 yaş üstü bireylerin oranı %78,7'dir (TÜİK,2024).

Kronik hastalıklar her sene 41 milyon insanın ölüm nedeni olmaktadır. Bu sayı tüm ölümlerin %74'üne denk gelmektedir (WHO, 2023). Kronik hastalıklar insan sağlığı yönünden etkilerinin yanı sıra hem bireylerin hem de devletlerin ekonomik anlamda doğrudan veya dolaylı şekilde zarara

uğramasına sebep olmaktadır. Bu gibi sebepler dolayısıyla devletler birçok sağlık politikası geliştirmiştir (HSGM,2018). Bu konuda ilk adımlar 1970 yıllarında başlamış ve günümüze kadar devletler birçok program ve eylem planı geliştirmiştir. Kronik hastalıkların önlenmesi ve yönetilmesinde hemşirelere ihtiyaç vardır. Uluslararası Hemşireler Birliği 2010 yılında kronik hastalıklarla mücadele edebilmek için hemşirelerin topluma sağlıklı alışkanlıklar kazandırması, bakımda sürekliliğin sağlanması ve bilgilerini arttırmaları gerektiğini bildirmiştir (Demirbağ,2023).

Kronik hastalıkların kontrol altında tutulabilmesi ve yönetilmesi için tedaviye uyum gereklidir. Bu hastalıklar yetersiz yönetildiğinde durum gittikçe kötüleşebilmektedir (Erikmen ve Keskin,2022). Uyum kronik hastalıklar için tedavinin temelini oluşturur. Uyum süreci sadece reçete edilen ilaçların kullanımını değil hastaların sağlık profesyonellerinin önerilerini uygulaması ve davranış değişikliklerinin olmasını kapsayan bir süreçtir. Kabullenme ve uyum gösterme bireyler için uzun bir süreçtir. Kronik hastalıkların bireyi etkileme düzeyi uyum sürecini daha zorlaştırabilmektedir. Uyumu etkileyen birçok faktör bulunmaktadır (Ovayolu ve Ovayolu, 2017; Altındağ, 2018). Literatürde bu faktörleri inceleyen birçok araştırma bulunmaktadır (Demirbaş ve Kutlu, 2020; Günel ve Demirtaş,2024; Kankaya ve ark., 2017; Mekonnen ve ark, 2017)

KRONİK HASTALIKLAR

Kronik sözcüğü Yunancada “zaman” anlamına gelen “Khranos” kelimesinden gelmektedir. 3 ay veya daha uzun süren bakıma ihtiyaç duyulan sağlık sorunlarıdır (Demirbağ,2023). Kronik hastalıklar “tamamen tedavi edilemeyen ve iyileşme göstermeyen uzamış durumlar” olarak tanımlanmaktadır (Ovayolu ve Ovayolu, 2017). Dünya genelinde yaşam süresi uzamakta ve yaşlı nüfus gün geçtikçe artmaktadır. Son demografik veriler bu artışın devam edeceğini göstermektedir (Maresova, 2019). Yaşlı nüfus artışı kronik hastalıkların insidans ve prevalansında artışa sebep olan faktörlerdendir (Kumsar, 2014). Kronik hastalıkların yaşam kalitesini olumsuz etkilemesinin yanı sıra ekonomik sorunlara da yol açmaktadır. Kronik hastalıklarda ki hızlı artış sağlık hizmetlerini olumsuz etkilemekte ve sağlığa ayrılan bütçenin büyük kısmını kapsamaktadır (Çöl ve Öztürk, 2022; Ovayolu, Ovayolu, 2017).

Kronik hastalıklar dünya genelinde ve Türkiye’de başlıca morbidite ve mortalite sebeplerindendir (Çöl ve Öztürk, 2022). En önemli kronik hastalıklar diyabet, kardiyovasküler sistem hastalıkları, kanserler ve kronik akciğer hastalıklarıdır. Bu hastalıklara bağlı ölüm oranı dünya genelindeki tüm ölümlerin %74ünü oluşturmaktadır. Ölüm nedenleri detaylı incelendiğinde 2022 yılında dünyada kardiyovasküler hastalıklar 17,9 milyon, kanserler 9,3 milyon, kronik solunum yolu hastalıkları 4,1 milyon ve diyabet 2,0 milyon kişinin ölümüne sebep olmuştur (WHO,2023). Ülkemizde ise 2022 TÜİK verilerine göre kardiyovasküler hastalıklar %35,4, kanserler %15,2, solunum sistemi hastalıkları %13,5 oranıyla en çok ölüme sebep olan hastalıklardır (TÜİK, 2023).

Gelişmiş ülkelerde ölümlerin başlıca sebebi olan kronik hastalıklar gelişmekte olan ülkelerde giderek artmaktadır. Önlem alınmazsa artış hızla devam edeceği için korunma ön planda tutulmakta ve devletler kronik hastalıklara karşı birçok strateji ve plan geliştirmekte ve uygulamaktadır (Çöl ve Öztürk, 2022). Bu planlara 2013-2020 yılları arasında uygulanması planlanan Bulaşıcı Olmayan Hastalıkların Önlenmesine ve Kontrolüne İlişkin Küresel Eylem Planı veya 2017-2025 yıllarını için planlanan Türkiye Bulaşıcı Olmayan Hastalıklar Çok Paydaşlı Eylem Planı gibi örnekler verilebilir. Kronik hastalıkları önlemek için geliştirilen bu strateji ve planların hedeflerini kronik hastalıklara sebep olan risk faktörleri oluşturmaktadır (Sağlık Bakanlığı, 2013; Sağlık Bakanlığı, 2017).

KRONİK HASTALIKLARDA RİSK FAKTÖRLERİ

a) Tütün Kullanımı

Tütün kullanımı kardiyovasküler hastalıklar, solunum yolu hastalıkları ve kanser için ciddi derecede risk faktörüdür. Sadece tütün kullanımı değil dumanına maruz kalma bile bireylerin sağlığını olumsuz etkilemekte ve hastalıkların görülmesine sebep olmaktadır (Demirbağ,2023; Çöl ve Öztürk, 2022). Tütün her yıl 8 milyondan fazla ölümüne neden olmaktadır (WHO,2023), ABD Sağlık ve İnsan Hizmetleri Bakanlığının 2014 yılında yayınladığı raporda son 50 yılda yapılan 7000'den fazla makale incelenmiş tütün kullanımı ve maruziyetinin birçok hastalığa sebep olduğu görülmüştür (U.S, 2014)

b) Alkol Kullanımı

Alkol merkezi sinir sistemi, sindirim sistemi ve kardiyovasküler sistemde ciddi toksik etkilere sahiptir (Demirbağ,2023). Alkol kullanımına bağlı yıllık 3 milyondan fazla ölüm görülmektedir. Bu ölümlerin yarısından fazlası kronik hastalıklarla ilişkilidir (WHO,2023). Rumgay ve arkadaşlarının yaptığı çalışmada 2020 yılında dünya genelindeki tüm kanser vakalarının %4,1'inin alkol kaynaklı olduğu sonucuna ulaşılmıştır (Rumgay ve ark., 2021).

c) Fiziksel Hareketsizlik

Hareketsizlik kronik hastalık ve ölüm için başlıca sebeplerden biridir (Demirbağ,2023). Yılda 830.000 ölüm hareketsiz yaşam sebeplidir (WHO,2023). Fries'in koşucular çalışmasında yaklaşık 12 yıllık koşucular ve koşucuların yıllık koşularının %10unu koşan kişiler karşılaştırıldı. Bu veriler sonucunda koşucularda kontrol grubuna göre sakatlık yaklaşık 10-16 yıl, mortalite 3,4-7 yıl ertelenmiş olduğu sonucuna varılmıştır (Fries,2015).

d) Sağlıksız Beslenme/Diyet

Beslenme, sağlığın önemli bir parçasıdır. Sağlıksız beslenme doğrudan kronik hastalık sebebidir (Demirbağ,2023; Çöl ve Öztürk, 2022). Yıllık 1,8 milyon ölüm aşırı tuz/sodyum alımına bağlıdır (WHO, 2023). 20.995 kişiyle Çin'de yapılan bir çalışmada tuz ve tuz yerine kullanılan başka madde kullanan kişiler karşılaştırıldı. Araştırma sonucunda inme insidansı, mortalite ve olumsuz kardiyovasküler olay görülme sıklığında azalma olduğu görüldü (Tsao ve ark., 2023).

UYUM

Hastalığa uyumun önemi ilk kez 2000 yıl önce Hipokrat tarafından öne sürülmüştür. Hastalığa uyum günümüzde de önemli bir kavramdır. Roy'a göre yaşam her zaman aynı devam etmez, olumlu ve olumsuz değişiklikler yaşanır. Roy Uyum Modelinde uyum; iç ve dış ortamdaki veya çevresinde gelişen değişikliklere kişilerin yanıt verebilme yeteneğidir. Sağlık ise uyarılara yanıt olarak verilen uyumlu davranışların tamamıdır (Ovayolu ve Ovayolu, 2017; Şimşek ve Sarıkaya, 2015)

Uyumsuzluk yüksek oranda hastaneye yatış, optimal olmayan sağlık sonuçları, artan morbidite ve mortalite ve artan sağlık bakım maliyetlerine neden olabilmektedir (Neiman ve ark, 2017). Örneğin yapılan bir çalışmada mutlak ve göreceli risk değerlendirmeleri, tüm kardiyovasküler hastalıkların önemli bir oranının ilaç uyumsuzluğundan kaynaklanabileceği sonucuna ulaşmıştır (Chowdhury ve ark., 2013). Hastalığa uyum ve yaşam kalitesi arasındaki ilişkinin incelendiği çalışma sonuçlarında hastalığa uyum arttıkça yaşam kalitesinde artış olduğu görülmüştür (Bilgiç ve Pehlivan,2023; Erci ve ark,2018).

UYUMU ETKİLEYEN FAKTÖRLER

Uyumu etkileyen faktörlerden biri yaşıdır. Kankaya ve arkadaşlarının yaptığı çalışma sonucunda yaş arttıkça tedaviye uyumun azaldığı sonucuna ulaşılmıştır (Kankaya ve ark., 2017). Demirbaş ve Kutlu'nun çalışma sonucunda 65 yaş altındaki hastaların daha uyumlu olduğu sonucuna ulaşılmıştır (Demirbaş ve Kutlu, 2020). Gün ve Korkmaz'ın 2014 yılında hipertansif hastalarla yaptığı çalışmada yaş arttıkça medikal ve beslenme uyumunun azaldığı sonucuna varılmıştır (Gün ve Korkmaz, 2014). Bunun yanı sıra anlamlı fark olmadığı sonucuna ulaşan çalışmalar da bulunmaktadır. Örneğin Günel ve Demirtaş genç ve yaşlı hastaların ilaç uyumu ve akılcı ilaç kullanım bilgi düzeyleri incelemiştir. Bu araştırma sonucunda ise genç ve yaşlı hastaların ilaç uyumlarında fark olmadığı ancak gençlerde akılcı ilaç kullanım düzeyinin daha yüksek olduğu görülmüştür (Günel ve Demirtaş,2024).

Faktörlerden biri ise sosyo-ekonomik özellikler ve yaşanılan yerdir. Hastalar gelirin giderden az olmasına bağlı olarak beslenme, diyet, ilaç temini ve sağlık kontrollerine gitme gibi önerileri gerçekleştirilmede uyumsuzluk yaşayabilmektedirler (Tümer ve ark., 2016). 2020 yılında yapılan bir çalışma incelendiğinde gelir gidere denk veya gelirin daha fazla olduğu durumlarda ve il merkezinde yaşamakta olan hastaların uyum puanının daha yüksek olduğu sonucuna ulaşılmıştır (Demirbaş ve Kutlu, 2020).

Bir diğer faktör aile ve çevresel etkenlerdir. Oğuz ve arkadaşlarının hipertansif hastalarıyla yaptığı çalışma sonucunda ailede hipertansiyon hastası birinin bulunması kişilerin ilaç ve diyet tedavisine daha fazla uyumlu oldukları sonucuna ulaşılmıştır. Aynı çalışmada stresli yaşamın uyumu olumsuz etkilediği sonucu ortaya çıkmıştır (Oğuz ve ark., 2019). Ayrıca yapılan başka bir çalışmada evli hastaların bekar hastalara göre daha uyumlu olduğu sonucuna ulaşılmıştır (Kankaya ve ark., 2017).

Kontrole gitme durumu, ek hastalık varlığı, ilacı kullanım süresi ve sayısı da uyumu etkileyen faktörlerdendir. Örneğin Mekonnen ve arkadaşlarının 2017 yılında Kuzeybatı Etiyopya'da tansiyon hastalarının ilaç uyumu hakkında yaptıkları çalışmada ek hastalığı bulunmayan kişilerin ilaç uyumu diğer hastalara göre dört kat fazla olduğu sonucuna ulaşılmış ayrıca üç yıldan fazla süredir ilaç kullanan hastaların diğer hastalara göre ilaç kullanımına uyumu üç kat daha fazla olduğu sonucuna ulaşılmıştır (Mekonnen ve ark, 2017). Kankaya ve arkadaşlarının yaptığı çalışma sonucunda ilaç sayısının artması tedaviye uyumu olumsuz etkilediği görülmüştür (Kankaya ve ark., 2017)

Uyumu etkileyen önemli bir diğer faktör eğitim alma durumudur. Altundağ'ın diyabet tanısı almış çocuklarla yaptığı çalışmada diyabetli çocuklara verilen eğitim sonrası kontrolde olumlu sonuçlar görülmüştür. Bu nedenle uyum için düzenli aralıklarla eğitim verilmesi önerilmektedir (Altundağ, 2018).

HEMŞİRENİN ROLÜ

Dünya Sağlık Örgütü Raporuna göre; Eğitimli hemşirelerin ve deneyimli sağlık profesyonellerinin, yaşam tarzı değişikliklerinin uygulanmasında ve tedaviye uyum konusunda olumlu katkıları olması beklenmektedir. Hemşireler hastaların yaşam tarzı değişikliklerine uyum sağlamalarına yardımcı olmalı, yarar sağlamayan davranışların önüne geçmeli, hasta ve ailesine baş etme mekanizmaları geliştirerek hastalığa uyumlarını arttırmalıdır. Kronik hastalıklarda hemşirelerin hastaların tüm bakımlarını planlama, yaşam kalitesini artırma ve hastalığa uyumlarını arttırma gibi rolleri vardır. Bu nedenle hemşirenin bu rolleri gerçekleştirebilmesi için; sağlığı değerlendirebilme, öz-bakımı geliştirme, terapötik iletişim ve emosyonel destek ile yaşam kalitesi, uyum ve motivasyonu arttırma gibi bilgi ve becerilere sahip olmalıdır (Ovayolu ve Ovayolu, 2017; Okur ve Nural,2022; Demirbağ, 2023)

Kronik hastalıkların oluşum gibi bu süreci kabullenmek ve uyum sağlayabilmek de uzun zaman alabilir. Bu nedenle hemşire sabırlı, cesaretli ve yaratıcı olmalıdır. Ayrıca hemşire hastaya yardımcı olurken sadece hastayı değil hasta, ailesi ve çevreyi bir bütün olarak kabul etmeli ve buna göre gerekli durumlarda hastaya yardımcı olmalıdır (Ovayolu ve Ovayolu, 2017).

Hemşirelerin temel rollerinden biri olan eğitim verme rolü kronik hastalıklara uyum için önemlidir. Hemşire hasta ve ailesine eğitim vermelidir. Bu eğitimler hastanın bu süreçte meydana gelen fiziksel ve psikolojik değişiklikleri anlamasına, tedaviye katılım sağlamasına olanak sağlar böylece tedavi uyumu artar ve hastalığın yönetimi kolaylaşır (Okur ve Nural,2022). Irmak ve arkadaşlarının hipertansiyon hastalığına sahip hastalara eğitim vererek yaptığı çalışma sonucunda eğitimden 6 ay sonra diyete uyan ve egzersiz yapan hastaların oranında ciddi artış yaşandığı ve ilaç uyumunun çok iyi olduğu sonucuna ulaşılmıştır (Irmak ve ark., 2007). Bu konuda yapılan diğer araştırmalarda bu sonucu destekler şekilde sonuçlanmıştır. Eğitim ve hastalığa uyum arasında anlamlı ilişki olduğu görülmüştür (Saounatsou ve ark., 2001).

Yapılan bazı çalışmalarda ilaca uyumu etkileyen diğer faktörlerin tespiti için kanıta dayalı hemşirelik bakım uygulamalarını içeren çalışmalar yapılması önerilmiştir. Bunun için hemşire araştırmacı rolünü kullanmalıdır (Vatansever ve Ünsar, 2014).

SONUÇ

Kronik hastalıklar bireylerin hayatını birçok yönden etkilemektedir. Kronik hastalıkların kontrolü hastalığa uyum ile bağlantılıdır. Hastalığa uyum sağlanmadığı durumlarda morbidite ve mortalite oranlarında artış yaşanmaktadır. Bu nedenle kişilerden bu sürece uyum sağlayarak yaşam tarzlarını değiştirmeleri beklenmektedir. Bu zorlu süreçte hemşirelere fazlasıyla ihtiyaç duyulmaktadır. Hemşireler temel rollerini kullanarak hasta ve ailesinin yeni duruma adapte olmasını sağlamalıdır.

KAYNAKÇA

- World Health Organisation. (2023), Noncommunicable diseases. Retrieved May , 2024, <https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases>
- Centers for Disease Control and Prevention. (2024), About Chronic Diseases, Retrieved May 2024, <https://www.cdc.gov/chronic-disease/about/index.html>
- Kumsar, K.A., Yılmaz, T.F., (2014). Kronik hastalıklarda yaşam kalitesine genel bakış. Erciyes Üniversitesi Sağlık Bilimleri Fakültesi Dergisi,2(2),62-70
- Türkiye İstatistik Kurumu (2024), Türkiye Yaşlı Profili Araştırması, 2023. Erişim Tarihi: Nisan, 2024, <https://data.tuik.gov.tr/Bulten/Index?p=Turkiye-Yasli-Profil-Arastirmasi-2023-53809#:~:text=Kronik%20hastal%C4%B1%C4%9F%C4%B1%20olan%2065%2B%20ya%C5%9Ftaki,oran%C4%B1%20%78%2C7%20oldu>.
- Halk Sağlığı Genel Müdürlüğü (2018), Türkiye’de bulaşıcı olmayan (kronik) hastalıkların önlenmesi ve kontrolü için Yatırım Gereçekleri Raporu. Erişim tarihi: Mayıs, 2024, <https://hsgm.saglik.gov.tr/depo/birimler/kronik-hastaliklar-ve-yasli-sagligi-db/Dokumanlar/Raporlar/BizzCaseTrSS.pdf>
- Demirbağ, BC., (2023) Toplum/Halk Sağlığı Hemşireliği. Ankara Nobel Tıp Kitabevleri, Ankara, 640-653
- Erikmen, E., & Keskin, G. (2022). Kronik hastalığı olan bireylerin tedaviye uyum sürecinde aile faktörü: Motivasyonel görüşmenin etkileri açısından gözden geçirme. Gümüşhane Üniversitesi Sağlık Bilimleri Dergisi, 11(4), 1392-1400.
- Ovayolu, N., Ovayolu, Ö., (2017). Temel İç Hastalıkları Hemşireliği ve Farklı Boyutlarıyla Kronik Hastalıklar. Çukurova Nobel Tıp Kitabevi, Antalya, 370-375

- Altundağ, S. (2018). Tip 1 diyabetli çocukların hastalığa uyumunda eğitimin ve sosyal desteğin etkisi. Pamukkale Tıp Dergisi, 11(2), 137-144
- Çöl, M., Öztürk, ENY., (2022), Halk Sağlığı Açısından Bulaşıcı Olmayan Hastalıklar, Ankara Üniversitesi Yayınları No: 762, Ankara
- Türkiye İstatistik Kurumu (2023), Ölüm ve Ölüm Nedenleri İstatistikleri 2022, Erişim Tarihi: Haziran, 2024, <https://data.tuik.gov.tr/Bulten/Index?p=Death-and-Causes-of-Death-Statistics-2022-49679>
- Maresova P, Javanmardi E, Barakovic S, Barakovic Husic J, Tomsone S, Krejcar O, Kuca K. Consequences of chronic diseases and other limitations associated with old age - a scoping review. BMC Public Health. 2019 Nov 1;19(1):1431. doi: 10.1186/s12889-019-7762-5. PMID: 31675997; PMCID: PMC6823935.
- Gün, Y., & Korkmaz, M. (2014). Hipertansif hastaların tedavi uyumu ve yaşam kalitesi. Dokuz Eylül Üniversitesi Hemşirelik Fakültesi Elektronik Dergisi, 7(2), 98-108.
- Adıgüzel, İ., Özkan, E., Nohutcu, N. Z., & Bayrakçı, H. (2019, September). İzmir’de Sağlık Çalışanlarının Kronik Hastalık Sıklığı ve İlişkili Faktörler. In 3. International 21. National Public Health Congress.
- U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. The health consequences of smoking – 50 years of progress: a report of the Surgeon 1st ed. General: Atlanta; 2014.
- Rungay H, Shield K, Charvat H, Ferrari P, Sornpaisarn B, Obot I, Islami F, Lemmens VEPP, Rehm J, Soerjomataram I. Global burden of cancer in 2020 attributable to alcohol consumption: a population-based study. Lancet Oncol. 2021 Aug;22(8):1071-1080. doi: 10.1016/S1470-2045(21)00279-5. PMID: 34270924; PMCID: PMC8324483.
- Fries JF. Perspectives from masters in rheumatology and autoimmunity: perspectives on the conventional wisdom. Arthritis Rheumatol : 2806–2812, 2015. doi: 10.1002/art.39207.
- Tsao, C. W., Aday, A. W., Almarzooq, Z. I., Anderson, C. A., Arora, P., Avery, C. L., ... & American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. (2023). Heart disease and stroke statistics—2023 update: a report from the American Heart Association. Circulation, 147(8), e93-e621.
- Günel, M., & Demirtaş, A. (2024). Kronik hastalığa sahip genç ve yaşlı hastaların ilaç uyumu ve akılcı ilaç kullanım bilgi düzeylerinin incelenmesi. Sağlık Akademisyenleri Dergisi, 11(1), 82-92.
- Mekonnen, H. S., Gebrie, M. H., Eyasu, K. H., & Gelagay, A. A. (2017). Drug adherence for antihypertensive medications and its determinants among adult hypertensive patients attending in chronic clinics of referral hospitals in Northwest Ethiopia. BMC Pharmacology & Toxicology, 18(1), 27. <https://doi.org/10.1186/s40360-017-0134-9>
- Kumsar, K.A., Yılmaz, T.F., (2014). Kronik hastalıklarda yaşam kalitesine genel bakış. Erciyes Üniversitesi Sağlık Bilimleri Fakültesi Dergisi, 2(2), 62-70
- Sağlık bakanlığı (2013), Bulaşıcı Olmayan Hastalıkların Önlenmesine ve Kontrolüne İlişkin Küresel Eylem Planı 2013-2020. Erişim Tarihi: Haziran, 2024, <https://ekutuphane.saglik.gov.tr/Yayin/544>
- Neiman AB, Ruppert T, Ho M, Garber L, Weidle PJ, Hong Y, George MG, Thorpe PG. CDC Grand Rounds: Improving Medication Adherence for Chronic Disease Management - Innovations and Opportunities. MMWR Morb Mortal Wkly Rep. 2017 Nov 17;66(45):1248-1251. doi: 10.15585/mmwr.mm6645a2. PMID: 29145353; PMCID: PMC5726246.
- Sağlık Bakanlığı (2017), Türkiye bulaşıcı olmayan hastalıklar çok paydaşlı eylem planı 2017-2025. Erişim tarihi: Haziran 2024, <https://ekutuphane.saglik.gov.tr/Yayin/547>

- Oğuz, S., Yanmış, S., Yılmaz, B. & Atman, R. (2019). Hipertansiyon hastalarının ilaç ve diyet tedavisine uyum düzeyleri. *Kardiyovasküler Hemşirelik Dergisi*, 10(21), 1-7.
- Bilgiç, Ş., & Pehlivan, E. (2023). Kronik hastalığa sahip bireylerin hastalığa uyumunun yaşam kalitesi ile ilişkisi. *Samsun Sağlık Bilimleri Dergisi*, 8(1), 63-76.
- Erci, B., Elibol, M., & Aktürk, Ü. (2018). Hipertansiyon hastalarının tedaviye uyumunu ve yaşam kalitesini etkileyen faktörlerin incelenmesi. *Florence Nightingale Hemşirelik Dergisi*, 26(2), 79-92.
- Demirbas, N. & Kutlu, R. (2020). Çoklu ilaç kullanan yetişkin bireylerin tedaviye uyumu ve öz-etkililik düzeyleri. *Ankara Medical Journal*, 20(2).
- Şimşek, A. B., & Sarıkaya, A. (2015). Hemşirelik modeli ve bakım: primer beyin tümörlü hastaların Roy'un uyum modeli ile değerlendirilmesi. *Hemşirelikte Eğitim ve Araştırma Dergisi (HEAD)*.
- Kankaya H, Özer S, Korkmaz M, Karabulut Ö, Kurt E. Yaşlı Hipertansif Hastalarda İlaç Tedavisine Uyum Öz-Etkililiği. *EÜ Hemşirelik Fakültesi Dergisi* 2017;33(3),1-10.
- Altundağ, S. (2018). Tip 1 diyabetli çocukların hastalığa uyumunda eğitimin ve sosyal desteğin etkisi. *Pamukkale Medical Journal*, 11(2), 137-144.
- Chowdhury R, Khan H, Heydon E, Shroufi A, Fahimi S, Moore C, Stricker B, Mendis S, Hofman A, Mant J, Franco OH. Adherence to cardiovascular therapy: a meta-analysis of prevalence and clinical consequences. *Eur Heart J*. 2013 Oct;34(38):2940-8. doi: 10.1093/eurheartj/eh295. Epub 2013 Aug 1. PMID: 23907142.
- Vatansever, Ö. ve Ünsar, S. (2014). Esansiyel hipertansiyonlu hastaların tedavisine uyum/öz etkililik düzeylerinin ve onların davranışlarının belirlenmesi.
- Tümer, A., Dereli, F., & Demir Uysal, D. (2016). Hipertansiyon hastalarının ilaç tedavisine uyum düzeyleri.
- Okur, E., & Nural, N. (2022). Kronik obstrüktif akciğer hastalığı olan bir hastanın hastalığa uyumu ve hemşirelik girişimleri: Olgu sunumu. *Sürekli Tıp Eğitimi Dergisi*, 31(4), 314-320.
- Irmak, Y. D. D. Z., Düzöz, Ö. G. G. T., & Bozyer, Ö. G. İ. (2007). Bir eğitim programının hipertansiyonlu hastaların yaşam tarzı ve ilaç tedavisi uyumuna etkisi. *Hacettepe Üniversitesi Hemşirelik Fakültesi Dergisi*, 14(2), 39-47.
- Saounatsou M, Patsi O, Fasoı G, Stylianou M, Kavga A, Economou O, Mandi P, Nicolaou M. The Influence of the hypertensive patient's education in compliance with their medication. *Public Health Nursing* 2001;18(6):436-442

AN INVESTIGATION OF POSTGRADUATE THESES PREPARED IN TURKEY IN THE CONTEXT OF CHILDREN AT RISK**Büşra ERGİN**Selcuk University, Faculty of Education, Department of Elementary Education, Konya, Turkey¹ORCID ID: <https://orcid.org/0000-0001-5177-7096>**Esra ERGİN**Selcuk University, Faculty of Education, Department of Educational Sciences, Konya, Turkey²ORCID ID: <https://orcid.org/0000-0002-3810-4142>**Abstract**

Introduction and Purpose: Children at risk is a concept used to express the dangers that children whose physical and psychological development is in danger, who have lost their parents, who have been abused by their caregivers, who have been forced into prostitution, begging, substance abuse, and who have been dragged into crime are experiencing or may experience. Today, the concept of child at risk has become the focus of attention of different disciplines. In the studies conducted in health sciences, the concept of child at risk is mostly addressed in terms of the consequences of a disease experienced by children, while in social sciences, the concept of child at risk is addressed in terms of neglect, abuse, alcohol or substance abuse. When the results of the studies conducted in this direction are examined, it is seen that deprivations such as information, health, cleanliness or education that children may experience especially in early childhood negatively affect the development of disadvantaged children. Based on this importance, this study aims to examine the postgraduate theses on children at risk.

Materials and Methods: In the research, postgraduate theses related to "children at risk/group" will be examined by using YÖK thesis database within the framework of the determined keywords. The data obtained from the analysis of the research will be content analysed.

Results: The results of the research will be discussed within the framework of the relevant literature.

Keywords: Childhood, children at risk, disadvantaged children.

INTRODUCTION

When the increasing population rate is examined, especially in underdeveloped and poor countries worldwide, approximately 600 million children are disadvantaged in terms of their development and living conditions due to poverty (Sos Children's Villages, 2016). There are economic and social differences between individuals living in rural areas and individuals living in high welfare areas. These differences in areas such as education, income or access to health services are considered as an important indicator for the welfare levels of societies (Şengür & Şengür, 2020). The inequality between the welfare levels of individuals has made it important to protect and support children at risk. Children at risk or children at risk group is a concept used for children who are in need of protection, who have no caregivers, who are in a developmental risk group, who are accustomed to

bad habits (such as prostitution, begging), who are dragged into alcohol or substance abuse, and who are left vulnerable to different social dangers (Çoban, 2015).

Children at risk are evaluated in eleven categories according to different risk groups (Seçer et al, 2018). These are; working/employed children, children who are victims of neglect/abuse, children with single parent, refugee/asylum-seeker children, substance addicted children, children who are dragged/directed to crime, children with emotional/behavioural disorders, children with health problems, children with special needs, children living on the street, children with virtual addiction. Many studies have been conducted on these risk groups in the literature. In these studies, children at risk were addressed under headings such as peer bullying (Elledge et al., 2016), neglect and abuse (Wanlass et al., 2006), smoking or alcohol addiction (Staff et al., 2016), being disadvantaged in terms of socioeconomic level (Güngör, 2013), children who are employed (Bilgin, 2012). In the studies, it is emphasised that the number of studies on children at risk should increase and the education, health and social needs of children at risk should be supported. Based on this importance, this study aims to examine the postgraduate theses on children at risk in our country.

METHOD

The aim of this study is to analyse the postgraduate theses on children at risk.

Analysing the Data

In the study, content analysis of postgraduate theses on children at risk was conducted and the findings related to the analysis were explained in detail. Data on children at risk were accessed by using Yök National Thesis Database. As a result of the application of the inclusion/exclusion criteria used in the analysis of postgraduate theses, nine postgraduate theses were reached. Graduate theses were analysed in terms of year, thesis type, field, method, sample and research findings. The inclusion/exclusion criteria for the theses are as follows:

- The postgraduate theses were accessed by using the keywords "children at risk" or "children in risk groups".
- The identified keywords were also filtered as "included in".

RESULTS

A descriptive analysis of the theses on children at risk was made in Table 1 in terms of year, thesis type and field. When the distribution of the theses related to the subject according to the year was analysed; it was concluded that there was an increase in the number of studies since 2010, and when the distribution of the theses according to the type of thesis was analysed; it was concluded that 7 theses were master's theses and 2 theses were doctoral theses. In addition, when the distribution of theses according to the field of the thesis was analysed; the highest number of theses belonging to the field of "Education and Training" was reached.

Table 2. Distribution of graduate theses by year, thesis type and field

Thesis Name	Year	Thesis Type	Field
<i>(Coşgun, 2019)</i>	2019	Master Thesis	Psychology/Sociology
<i>(Kahraman, 2022)</i>	2022	Master Thesis	Law
<i>(Sencer, 2018)</i>	2018	Master Thesis	Social Services
<i>(Arslan, 2018)</i>	2018	Master Thesis	Labour Economics and Industrial Relations
<i>(Demirel, 2015)</i>	2015	Doctoral Thesis	Education and Training Fine Arts
<i>(Özer, 2013)</i>	2016	Master Thesis	Fine Arts
<i>(Özer, 2011)</i>	2011	Master Thesis	Education and Training
<i>(Yaprak, 2006)</i>	2006	Master Thesis	Education and Training
<i>(Altundağ Kumaş, 2019)</i>	2019	Doctoral Thesis	Education and Training

In Table 2, the methodology of the nine theses on children at risk, the sample reached within the scope of the research and information about the findings of the research are given.

Table 3. Table of method, sample and research findings of postgraduate theses

Thesis Name	Method	Sampling	Research Findings
<i>(Coşgun, 2019)</i>	Experimental design with single control group	70 mothers/80 children	Syrian mothers were found to have higher levels of depression and perceived social support than Turkish mothers. In addition, it was determined that there was a significant relationship between mother's psychological health, education level and cognitive functions of children. In the study, the educational level, physical and psychological health of the mother affect the home environment and mother-child relationship.
<i>(Kahraman, 2022)</i>	Qualitative Research	Document research	In the study, juvenile delinquency was analysed holistically. It is thought that it should be handled with a multidisciplinary approach.
<i>(Sencer, 2018)</i>	Pre-test-post-test experimental design Qualitative Research	300 children between the ages of 7-15 and their parents	It has been observed that poverty and problems of communication within the family are common in families with different sociocultural characteristics. As a result of the pre-test post-test data, it was concluded that children with behavioural problems such as hyperactivity, introversion, violence tendency were distanced from educational activities and their academic achievement decreased, and after psychosocial support was provided, there was a decrease in existing behavioural problems.
<i>(Arslan, 2018)</i>	Qualitative Research	Document research	It was concluded that the public social responsibility project carried out by an enterprise operating as a private sector organisation for disadvantaged and at-risk children had positive contributions to the solution of the social problem in this field.
<i>(Demirel, 2015)</i>	Single group pre-test-post-test model Qualitative research	54 children	In addition to showing that the art criticism programme and visual arts education in this context is an effective and efficient learning area that can be used for the development of students' critical thinking skills, the results of the research showed that students follow a developmental process in which they can associate the achievements related to their families, perspectives, problem solving,

			personality development and lessons with target behaviours that they can adapt to their daily lives. On the other hand, the results of the study showed that the art criticism programme significantly contributed to the high-level cognitive and critical thinking skills of social risk group students such as problem solving, establishing cause-effect relationships between events, interpreting events and revealing their perspectives, and using the skills they gained through art effectively in solving their problems.
(Özer, 2013)	Qualitative research	11 children 5 parent 4 institution officials and 8 trainers	It was concluded that art centres contribute to the multidimensional development of children at risk with a multidisciplinary art education approach.
(Özer, 2011)	Experimental model of initial test-final test	120 children at risk	It was observed that the art education programme significantly reduced the aggression levels of the children at risk in the research group.
(Yaprak, 2006)	Quantitative research/ Survey model	1022 students	It was found that the risk of having symptoms related to psychoactive substance use was lower in cases where parents and children lived together compared to other situations. It was found that as the level of academic achievement increased, the level of having symptoms related to psychoactive substance use decreased. As the grade level increases, the level of having symptoms related to psychoactive substance use increases. It was concluded that the attitude of the family towards the child affects the child's level of having symptoms of psychoactive substance use.
(Altındağ Kumaş, 2019)	Pretest-posttest with control group experimental model	Children aged 60-72 months	The children in the experimental group at lower income level were more successful than the children in the control group in the tests assessing early maths skills.

CONCLUSION AND DISCUSSION

In this study, it was aimed to analyse the postgraduate theses on children at risk. For this purpose, nine postgraduate theses were reached. When the year distribution of the theses was analysed, it was concluded that there were more theses in 2010 and after, and when the classification according to the type of thesis was examined, it was concluded that the theses were mostly master's theses. When the phenomenon of children at risk was analysed according to the field of thesis, it was seen that this subject was related to the fields of psychology, sociology, fine arts, educational sciences, law, labour economics and industrial relations and social sciences. The postgraduate theses were also analysed in terms of method, sample and findings. When the theses were analysed in terms of method, it was determined that they were mostly in quantitative research model and the study group of the theses consisted of children and their families. Findings related to the theses were also included in the study.

In the theses, the development of children in the risk group is discussed in the context of different variables. Coşgun (2019) concluded that Syrian mothers had higher levels of depression and lower levels of social support compared to Turkish mothers. In addition, it has been observed that depressed mothers, who also lack social support, have difficulty in providing a stimulus-rich environment for their children, and this situation has a negative effect on children's verbal abilities, cognitive functions, school success and social adaptation (Vernon-Feagans & Cox, 2013). It has also been observed that depressed mothers, who lack social support, have difficulty in providing a stimulus-rich environment for children, and this has a negative effect on children's verbal abilities,

cognitive functions, school success and social adjustment (Vernon-Feagans & Cox, 2013). In another study, it was concluded that children with behavioural problems such as hyperactivity, introversion and tendency to violence were distanced from educational activities and their academic achievement decreased, and after psychosocial support was provided, there was a decrease in existing behavioural problems (Sencer, 2018). In Demirel's (2015) study, it was observed that the art criticism programme significantly contributed to the high-level cognitive and critical thinking skills of children in the social risk group such as problem solving, establishing cause-effect relationships between events, interpreting events and revealing their perspectives, and using the skills they acquired through art effectively in solving problems. Altındağ Kumaş (2019) concluded that children at risk in terms of socioeconomic level were more successful in mathematics skills than children with high income levels. These studies show that supporting children in the risk group with a multidimensional perspective, monitoring their development, and providing family support so that families can be effective in children's education will contribute significantly to the development of children in the risk group.

Another important finding obtained from the theses is that children in the risk group who live with their parents have less risk of symptoms related to psychoactive substance use (Yaprak, 2006). Yaprak (2006) explained in his study that increasing academic success in children decreases the use of psychoactive substances and parental attitude is effective in the use of psychoactive substances. As a result; children in the risk group will be successful individuals in their academic and social relationships by providing a positive family attitude by taking their development into consideration. At this point, it is very valuable to plan studies that will minimise the negative effects of the disadvantaged situation of children in their lives. Maximising the individual development of children by considering the benefit of children in regional or country-based decisions taken for children in the risk group is also a supportive element of social development. In addition, it is thought that the expansion and accessibility of child health services, the production of child-centred education policies, and the observance of universal principles of children's rights will significantly reduce the number of children in the risk group. At this point, studies conducted by reaching different risk groups will enable different perspectives to emerge and will contribute significantly to the support of children in risk groups.

REFERENCES

- Altındağ Kumaş, Ö. (2019). *Küçük çocuklar için büyük matematik eğitim programının risk grubu çocukların erken matematik becerileri üzerindeki etkililiği*. [Yayımlanmamış Yüksek Lisans Tezi]. Eğitim Bilimleri Enstitüsü.
- Arslan, A. (2018). *Türkiye'de dezavantajlı ve risk altındaki çocuklara yönelik kurumsal sosyal sorumluluk faaliyetleri: Bir kurumsal sosyal sorumluluk projesi incelemesi*. [Yayımlanmamış Yüksek Lisans Tezi]. Sosyal Bilimler Enstitüsü.
- Bilgin, R. (2012). Sokakta çalışan çocukları bekleyen risk ve tehlikeler: Diyarbakır örneği. *Zonguldak Karaelmas Üniversitesi Sosyal Bilimler Dergisi*, 15(8), 79-96.
- Coşgun, B. (2019). *Self-regulation in at-risk children: Exploring factors that affect cognitive functions in refugee children*. [Yayımlanmamış Yüksek Lisans Tezi]. Sosyal Bilimler Enstitüsü.
- Çoban, S. (2015). Türkiye'de risk altındaki çocuklar ve çocuk suçluluğu üzerine bir değerlendirme [An evaluation on children at risk and child delinquency in Turkey]. *Sosyoloji Konferansları*, 52(2), 791-810.

- Demirel, İ., N. (2015). *Sosyal risk altındaki çocukların eleştirel düşünme becerileri ile davranışları arasındaki ilişkinin görsel sanatlar eğitimi yoluyla çözümlenmesi*. [Yayımlanmamış Yüksek Lisans Tezi]. Eğitim Bilimleri Enstitüsü.
- Elledge, L.C., Elledge, A.R., Newgent, R.A. & Cavell, T.A. (2016). Social risk and peer victimization in elementary school children: The protective role of teacher-student relationships. *Journal of Abnormal Child Psychology*, 44(4), 691-703.
- Güngör, M. (2013). Risk altındaki çocukların aile yapıları ve suça yönelimleri (Mersin İli Örneği). *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, 9(2), 421-434.
- Kahraman, S. (2022). *Risk altındaki çocuklara yönelik önleme ve toplum destekli polislik uygulamaları*. [Yayımlanmamış Yüksek Lisans Tezi]. Lisansüstü Programlar Enstitüsü.
- Özer, S. (2013). *Sanat eğitiminin risk altındaki çocuklar üzerindeki etkisi*. [Yayımlanmamış Yüksek Lisans Tezi]. Sosyal Bilimler Enstitüsü.
- Seçer, Z., Salı, G., Ceylan, R., Ummanel, A., Özkan, B., Ayyıldız, E., . . . Tepe, B. (2018). *Risk altındaki çocuklar ve eğitimleri*. Eğiten Kitap.
- Sencer, G. (2018). *Risk altındaki çocuklara yönelik psikososyal destek hizmetleri: Limon Ağacı Çocuk Danışma Merkezi Projesi örneği*. [Yayımlanmamış Yüksek Lisans Tezi]. Sağlık Bilimleri Enstitüsü.
- SOS Children's Villages International (2015). *Child at risk*. Retrieved from: <https://www.sos-childrensvillages.org/getmedia/384bc38a-62aa-4c2a-9563-a5ecc61b6a77/SOS-Child-at-risk-report-web.pdf>
- Staff, J., Maggs, J.L., Cundiff, K., & Evans-Polce, R.J. (2016). Childhood cigarette and alcohol use: Negative links with adjustment. *Addictive Behaviors*, 62, 122-128.
- Şengür, M., & Şengür, S. (2020). Effects of income and rural area on education. *Ekinoks Ekonomi İşletme ve Siyasal Çalışmalar Dergisi*, 7(1), 10-23.
- Tuncay Özer, A. (2011). *Risk altındaki çocukların agresif davranışlarının azaltulmasında sanat eğitiminin rolü*. [Yayımlanmamış Yüksek Lisans Tezi]. Sosyal Bilimler Enstitüsü.
- Vernon-Feagans, L., & Cox, M. (2013). The Family Life Project: An epidemiological and developmental study of young children living in poor rural communities: I. Poverty, rurality, parenting, and risk: An introduction. *Monographs of the Society for Research in Child Development*, 78(5), 1-23. <https://doi.org/10.1111/mono.12047>
- Wanlass, J., Moreno, J.K. ve Thomson, H.M. (2006). Group therapy for abused and neglected youth: Therapeutic and child advocacy challenges. *The Journal for Specialists in Group Work*, 31(4), 311-326.
- Yaprak, G. (2006). *İlköğretim ikinci kademe çocuklarında psikoaktif madde kullanımına ilişkin semptomlara sahip olma düzeyi ve okul başarısı (risk altındaki çocukların madde kullanımını önlemeye ilişkin eğitim programı önerisi)*. [Yayımlanmamış Yüksek Lisans Tezi]. Sosyal Bilimler Enstitüsü.

EVALUATION OF THE ANTIBACTERIAL ACTIVITY OF *URTICA DIOÏCA* ESSENTIAL OIL ON THREE STRAINS RESPONSIBLE FOR URINARY TRACT INFECTIONS**KEDDAR Fayza**

Laboratory of local natural bioresources (LBRN), Faculty of Natural and Life Sciences, Hassiba Benbouali University of Chlef, 02000

BOUALEM Malika

Laboratory of Plant Protection, Faculty of Natural and Life Sciences, Abdelhamid Ibn Badis University of Mostaganem, 27000

BRADA Moussa

Laboratory of valorization of Natural Substances, Faculty of Natural and Life Sciences, Khemis Miliana University, Algeria

BENGUENNOUNA Nouredine

Laboratory of physiology animal applied, Faculty of Natural and Life Sciences, Abdelhamid Ibn Badis University of Mostaganem, 27000

Abstract

Urinary tract infections (UTIs) are a real public health problem, affecting many patients, especially women. In some cases, urinary tract infections can lead to infectious lithiasis. The bacteria tested are commonly encountered in these urinary tract infections (*Klebsiella* ATCC 70603, *Pseudomonas aeruginosa* ATCC 27853, *Proteus mirabilis* ATCC 35659). Infections caused by these antibiotic-resistant bacteria are difficult to treat, making them one of the major public health problems of our time. On the other hand, natural substances and medicinal plants in particular represent an enormous source of bioactive molecules that can be used as remedies, including *Urtica dioïca* L., a medicinal plant belonging to the Urticaceae family, widely used in traditional medicine for its many virtues. The aim of this work is to extract the essential oil of *Urtica dioïca* and evaluate its antimicrobial activity. To this end, EO was extracted by steam distillation, antibacterial activity was determined using the disc method, and MICs were determined using the microdilution method on 96-well microplates. A yield of *U. dioïca* EO of 0.07% was obtained. The EO tested reacted positively on all three strains, with MICs equal to 0.46mg/ml for *Klebsiella* and 0.11mg/ml for *Proteus mirabilis* and *Pseudomonas aeruginosa*. The results confirm that the plant *U. dioïca* L. has bacteriostatic properties for *P. mirabilis* and *P. aeruginosa*, and bactericidal properties for *Klebsiella* with MIC equal to 0.92mg/ml.

Key words: urinary tract infection, *Urtica dioïca* L., Essential oil, Antimicrobial activity, Essential oil extraction.

RAMAN SPECTROSCOPY: PHOSPHORENE AND PHOSPHORENE NANORIBBONS**Zakariya Arbaoui**

Advanced Material and Applications Laboratory (LEM2A), Moulay Ismail University FSM-ESTM-ENS, BP 11201, Zitoune, Meknes, 50000, Morocco

Oussama Boutahir

Advanced Material and Applications Laboratory (LEM2A), Moulay Ismail University FSM-ESTM-ENS, BP 11201, Zitoune, Meknes, 50000, Morocco

Abdelhai Rahmani

Advanced Material and Applications Laboratory (LEM2A), Moulay Ismail University FSM-ESTM-ENS, BP 11201, Zitoune, Meknes, 50000, Morocco

Abstract

This study introduces a specialized force constant model designed for Black phosphorene, aimed at accurately replicating its vibrational properties as predicted by density functional theory (DFT) calculations. To evaluate the model's accuracy, we conducted a comparative analysis with experimental Raman spectroscopy data, demonstrating a strong correlation between the theoretical predictions and experimental results. Our findings confirm the group theory predictions regarding the number of Raman-active modes in Black phosphorene. Additionally, we investigated the influence of edge type and ribbon width on the vibrational characteristics of phosphorene nanoribbons (PNRs). Notably, as the ribbon width increases, the A_{2g} Raman-active mode exhibits significant behavior variations: it shifts to higher frequencies in armchair-edged PNRs and to lower frequencies in zigzag-edged PNRs and conductive coatings. This dual electronic behavior underscores the versatile utility of phosphorene nanotubes across varied domains, while providing insights into their tunable electronic properties for tailored applications in advanced nanotechnology and materials science.

**TELOMERASE AS A BIOMARKER AND THERAPEUTIC TARGET IN CANCER:
RECENT DEVELOPMENTS AND FUTURE PROSPECTS****Berrin ÖZDİL BAY**

Izmir Institute of Technology, Faculty of Science, Department Of Physics, TÜRKİYE
Süleyman Demirel University, Faculty of Medicine, Department of Histology and Embryology,
TÜRKİYE

ORCID ID: <https://orcid.org/0009-0005-4243-3271>**Yagmur DINDORUK**

Ege University, Faculty of Science, Department of Biochemistry, Izmir, Turkiye

ORCID ID: <https://orcid.org/0000-0001-6081-2308>**Sinan AKGÖL**

Ege University, Faculty of Science, Department of Biochemistry, Izmir, Turkiye

ORCID ID: <https://orcid.org/0000-0002-8528-1854>**Abstract**

Introduction and Purpose: Cancer is characterized by the uncontrolled proliferation of some of the body's cells and their spread to other parts of the body. It is a genetic disease caused by changes to genes that control how our cells function, particularly how they grow and divide. Therapy for patients with advanced cancer generally includes surgical tumor resection, intensive multimodal chemotherapy, radiation therapy, or a combination of these regimens. The ideal cancer treatment would specifically target cancerous cells and have little or no effect on normal cells. Due to the limitations of current treatments, new therapies are continually being researched. One significant factor contributing to cancer is the activity of telomerase in cancer cells.

Materials and Methods: Telomerase (TERTase) is a unique reverse transcriptase believed to be prevalent in almost all cancer-derived cells and primarily responsible for maintaining telomere (TLM) length. Various methods have been developed to detect telomerase activity. One approach involves a dark-field microscopy (DFM) visual single-particle detection scheme utilizing gold nanoparticles (AuNPs) to detect telomerase activity, achieving a low limit of detection and high specificity. Another method employs a fluorometric technique with a cationic conjugated polymer (CCP) to quantify telomerase activity, offering simplicity, sensitivity, and accuracy. Additionally, a single-enzyme sensitivity telomere repeat amplification protocol enables the quantification of telomerase activity down to a single telomerase complex, proving useful for both research and clinical applications. Furthermore, a novel method combining single-molecule fluorescence correlation spectroscopy (FCS) with the telomerase repeat amplification protocol (TRAP) provides ultrahigh sensitivity and reliable quantification, showing promise for clinical diagnosis and inhibitor screening.

Results: Telomerase activity is associated not only with cellular benignity and malignancy but also closely related to tumor differentiation, recurrence, and metastasis. Notably, telomerase is upregulated in over 85% of tumor cells (e.g., breast cancer, lung cancer, ovarian cancer, acute leukemia, colorectal cancer, and gastric cancer) to enable limitless cell proliferation, but it is almost absent or repressed in normal somatic cells (except for germline and stem cells). The aberrant telomerase activity in cancer cells makes telomerase a promising biomarker for cancer detection. In addition, telomerase inhibition can effectively prevent cancer cell growth. Since telomerase activity is absent from most human somatic cells, telomerase-based therapies should possess greater specificity, lower toxicity, and reduced side effects compared to conventional chemotherapeutic approaches. Thus, targeting telomerase is considered a novel approach to cancer therapeutics.

Key Words: Telomerase, Cancer therapy, Biomarker, Detection methods, Targeted therapy

FUNCTIONAL ASSESSMENT OF MALE ATHLETES COMPETING IN THE MASTERS CATEGORY**Patrycja WIDŁAK**

Józef Piłsudski University of Physical Education in Warsaw, Faculty of Physical Education,
Department of Human Biology, Warsaw, Poland

ORCID ID: <https://orcid.org/0000-0003-3433-1310>

Dariusz BOGUSZEWSKI

Józef Piłsudski University of Physical Education in Warsaw, Faculty of Physical Education,
Department of Individual Sports , Warsaw, Poland

ORCID ID: <https://orcid.org/0000-0002-8343-8870>

Jakub ADAMCZYK

Józef Piłsudski University of Physical Education in Warsaw, Faculty of Physical Education,
Department of Sport Theory , Warsaw, Poland

ORCID ID: <https://orcid.org/0000-0003-4558-1585>

Bartłomiej MICHALAK

Józef Piłsudski University of Physical Education in Warsaw, Faculty of Physical Education,
Department of Sport Theory , Warsaw, Poland

ORCID ID: <https://orcid.org/0000-0002-4469-8004>

Abstract

Introduction and Purpose: Functional fitness of the musculoskeletal system is extremely important for every athlete, not only for potential performance outcomes but also due to the risk of sports injuries during training or competitions. The objective of this study was to conduct a functional assessment of male track and field athletes competing in the masters age category.

Material and Methods: The study sample consisted of 32 male athletes aged 50 and above. The participants, representing various nationalities, competed in the 14th European Masters Indoor Championships in Toruń, Poland. The assessment included measuring the range of motion (ROM) of the upper and lower limb joints using an electronic goniometer, performing the Functional Movement Screen (FMS) using a professional testing kit where each participant completed the 7 required FMS tests, and conducting the most significant part of the Y Balance Test – the anterior reach of the lower limb.

Results: Based on the collected data, it can be concluded that the participants have high mobility in all major joints of the upper and lower limbs. The ROM values obtained fall within the normal range for the respective joints, and the average mobility of the joints on the left and right sides of the body is almost symmetrical. There is also notable symmetry in the anterior reach values of the lower

limbs – the average value for the left limb was 107.19 cm, while for the right limb it was 103.75 cm. The average FMS score among the evaluated athletes was 11.44 points.

Discussion and Conclusions : The analysis of the results suggests that regular physical activity positively influences the maintenance of proper joint ROM. The FMS score indicates a relatively high risk of sports injuries; however, the results of the selected Y Balance Test show that the participants exhibit considerable body stability.

Keywords: functional assessment, joint range of motion, FMS, athlete, masters category.

The study conducted as part of the University Research Project No. 4 entitled: "Effectiveness of methods and means supporting sports training, post-exercise recovery, and prevention of musculoskeletal injuries in athletes" / Task No. 2 entitled: "Functional assessment of the musculoskeletal system in athletes practicing various disciplines with consideration of risk factors for sports injuries." / Józef Piłsudski University of Physical Education in Warsaw, Poland

**RISK ASSESSMENT OF ULCERATIVE GASTRODUODENAL BLEEDING
RECURRENCE****ÜLSERATİF QASTRODUODENAL KANAMANIN TEKRARLAMA RİSKİNİN
DEĞERLENDİRİLMESİ****Doç. Valeh Rahimov**

Azərbaycan Tıp Universiteti 3. Cərrahi xəstəliklər ana bilim dalı, Bakı, Azərbaycan

ORCID ID: 0000-0003-0477-9296

Doç. Alovət Aliyev

Azərbaycan Tıp Universiteti 3. Cərrahi xəstəliklər ana bilim dalı, Bakı, Azərbaycan

ORCID ID: 0000-0003-3433-5944

Doç. Cümşüd Ramazanov

Azərbaycan Tıp Universiteti 3. Cərrahi xəstəliklər ana bilim dalı, Bakı, Azərbaycan

ORCID ID: 0000-0001-6844-8328

Ass. Şabnam Rahimli

Azərbaycan Tıp Universiteti 3. Cərrahi xəstəliklər ana bilim dalı, Bakı, Azərbaycan

ORCID ID: 0000-0003-0120-4059

Farah Rahimova

Adnan Menderes Universiteti Tıp fakultesi öđrencisi, Aydın, Türkiye

ORCID ID: 0009-0008-9937-3136

Abstract

Importance of the topic: Bleeding from ulcers of the gastroduodenal zone for many years has been a very urgent problem in surgery. According to a few authors, with their relapse, the mortality rate is up to 30–40%.

Purpose: To create a prognostic scale for assessing the risk of relapse of ulcerative gastroduodenal bleeding.

Materials and methods: The work is based on a retrospective analysis of 462 case histories of patients treated at the Azersutikinti Hospital the basis of the Department of Faculty Surgery of the «Azerbaijan Medical University», regarding ulcerative gastroduodenal bleeding during 2011-2022. In the SPSS-2.0 program a comparative analysis of two groups of patients (depending on the

occurrence or absence of relapse) is made using a logistic regression method to identify a combination of factors influencing the prognosis of the disease.

Results and their discussion: The patient's age, the size of the ulcer, the use of combined endoscopic hemostasis, the intensity of bleeding at the time of an emergency EGD, the localization of the ulcer defect has a significant impact on the risk of recurrence. According to the data obtained, we have developed a scale for assessing the risk of recurrence of ulcerative gastroduodenal bleeding.

Conclusion: The presented method allows to attribute a patient to one or another risk group and it helps to choose the optimal treatment tactics in a short period of time.

Key words: peptic ulcer, ulcer gastroduodenal bleeding, rebleeding, prognostic scales

Özet

Alaka düzeyi: Gastroduodenal bölgedeki ülserlerden kaynaklanan kanama, uzun yıllardan beri cerrahide çok acil bir sorun olmuştur. Bazı yazarlara göre tekrarlandığında ölüm oranı%30-40'a kadar çıkmaktadır

Hedef: Ülseratif gastroduodenal kanamanın tekrarlama riskini değerlendirmek için prognostik bir ölçek oluşturmak.

Malzemeler ve yöntemler: Çalışma, Azerbaycan Tıp Üniversitesi Cerrahi Fakültesi'nin temeli olan Azersutikinti Hastanesinin Cerrahi bölümünde ülseratif gastroduodenal kanama nedeniyle tedavi edilen hastaların 462 tıbbi kaydının retrospektif analizine dayanmaktadır. 2011-2022 dönemi SPSS-2.0 programı kullanılarak, hastalığın prognozunu etkileyen bir dizi faktörü tanımlamak amacıyla lojistik regresyon yöntemi kullanılarak iki hasta grubunun karşılaştırılarak bir analizi (nüksetme oluşumuna veya yokluğuna bağlı olarak) gerçekleştirildi.

Sonuçlar ve tartışılması: Hastanın yaşı, ülserin çapı, kombine endoskopik hemostaz kullanılması, acil endoskopisirasındaki kanamanın yoğunluğu ve ülserin lokasyonunüksetme riski üzerinde önemli etkiye sahiptir. Elde edilen verilere göre ülseratif gastroduodenal kanamanın tekrarlamariskini değerlendirmeye yönelik bir ölçek geliştirdik.

Çözüm: Sunulan teknik, hastayı bir veya başka bir risk grubuna sınıflandırmamıza olanaktanır ve bu da en uygunedavi taktiklerini hızlı bir şekilde seçmemize olanak tanır.

Anahtar kelimeler: peptik ülser, ülseratif gastroduodenal kanama, tekrarlayan kanam, prognostik ölçekler

VIOLENCE AGAINST MIGRANT WOMEN AND THE ROLE OF THE NURSE**GÖÇ EDEN KADINLARA YÖNELİK ŞİDDET VE HEMŞİRENİN ROLÜ****Doç. Dr. Fatma KARASU**

Kahramanmaraş Sütçü İmam Üniversitesi Sağlık Bilimleri Fakültesi

ORCID ID: <https://orcid.org/0000-0002-7347-0981>**Doç. Dr. Filiz POLAT**

Osmaniye Korkut Ata Üniversitesi Sağlık Bilimleri Fakültesi

ORCID ID: <https://orcid.org/0000-0001-8326-9504>**ÖZET**

Kadınlar savaş, doğal afetler, çatışma, ekonomik güçlükler, psikolojik/fiziki şiddet ve insan hakları ihlalleri gibi durumlar nedeniyle zorunlu olarak göç etmektedirler. Özellikle zorunlu göç nedeniyle yaşadıkları yerden ayrılan kadınlar fiziksel, duygusal, cinsel ve ekonomik şiddetle mücadele etmektedir. Şiddet; göç sürecinde kadınların sıklıkla yaşadığı en önemli sorunlardan birisidir.

Kadınlar göç kararının alınmasından itibaren göç esnasında ve göçten sonraki süreçte toplumsal cinsiyet temelli şiddete maruz kalmaktadır. Göç, sosyoekonomik durumu ve eğitim düzeyi düşük olan kadınların savunmasızlıklarını artarak göç ettikleri ülkelerde insan ticareti, cinsel istismar ve şiddet gibi olumsuz ve insanlık dışı durumlara karşılaşmalarına neden olmaktadır. Göçmen kadınlar özellikle mülteci kamplarında birçok tehlike ile karşı karşıya kalmakta, partnerleri veya eşleri tarafından her türlü şiddete maruz kalmaktadır. Savaş ve silahlı çatışmaların olduğu ortamlarda, savunmasız grupta yer alan kadınlar daha fazla cinsel şiddete maruz kalmaktadır. Dolayısıyla toplum tarafından damgalanan ve dışlanan göçmen kadınlar sosyal açıdan yalnızlaşmakta ve strese bağlı olarak bir çok psikolojik sorun yaşamaktadırlar. Cinsel şiddete uğrayan göçmen kadınlar haklarını bilmeme ve sınır dışı edilme korkusu nedeniyle destek alabilecekleri kurumlara başvurmamaktadır.

Hemşireler toplumun her kesimindeki bireylerle yakından çalışan sağlık profesyonelleridir. Bu nedenle şiddete duyarlı olmalı, şiddeti gösteren/düşündüren belirtileri bilmeli ve gözlemlemelidir. Hemşireler şiddete uğrayan göçmen kadınların kültürel değerleri hakkında bilgi sahibi olmalı, kadını sorgulamadan ve ön yargılı davranmadan bakım vermeli, transkültürel hemşirelik yaklaşımını uygulanmalıdır. Ayrıca şiddete ve istismara uğrayan kadınlara ruh sağlığı konusunda destek ve rehabilitasyon hizmetlerini sağlamalı, şiddetin ve oluşabilecek yaralanmaların önlenmesinde kadınları eğitmeli, gerektiğinde başvurabilecekleri birimleri öğretmelidir.

Anahtar Kelimeler: Göç, Kadın, Şiddet, Hemşire

ABSTRACT

Women are forced to migrate due to situations such as war, natural disasters, conflict, economic difficulties, psychological/physical violence and human rights violations. Especially women who leave their homes due to forced migration struggle with physical, emotional, sexual and economic violence. Violence; It is one of the most important problems that women frequently experience during the migration process.

Women are exposed to gender-based violence after the decision to migrate, during and after migration. Migration increases the vulnerability of women with low socioeconomic status and low education levels, causing them to encounter negative and inhumane situations such as human trafficking, sexual abuse and violence in the countries they migrate to. Immigrant women face many dangers, especially in refugee camps, and are exposed to all kinds of violence by their partners or spouses. In environments where there is war and armed conflict, women in the vulnerable group are more exposed to sexual violence. Therefore, immigrant women who are stigmatized and excluded by society become socially isolated and experience many psychological problems due to stress. Immigrant women who are subjected to sexual violence do not apply to institutions where they can receive support due to not knowing their rights and fear of deportation.

Nurses are healthcare professionals who work closely with individuals from all segments of society. For this reason, one must be sensitive to violence, know and observe the signs that show/suggest violence. Nurses should have knowledge about the cultural values of immigrant women who are subjected to violence, provide care without questioning the woman or acting prejudiced, and apply a transcultural nursing approach. In addition, they should provide mental health support and rehabilitation services to women who are subjected to violence and abuse, educate women on preventing violence and possible injuries, and teach the units they can apply to when necessary.

Key Words: Migration, Women, Violence, Nurse

**INVESTIGATION OF THE RELATIONSHIP BETWEEN IMMIGRANT PERCEPTION
AND INTERCULTURAL SENSITIVITY AMONG MIDWIFYING DEPARTMENT
STUDENTS****EBELİK BÖLÜMÜ ÖĞRENCİLERİNDE GÖÇMEN ALGISI VE KÜLTÜRLERARASI
DUYARLILIK ARASINDAKİ İLİŞKİNİN İNCELENMESİ****Doç. Dr. Filiz POLAT**

Osmaniye Korkut Ata Üniversitesi Sağlık Bilimleri Fakültesi

ORCID ID: <https://orcid.org/0000-0001-8326-9504>**Doç. Dr. Fatma KARASU**

Kahramanmaraş Sütçü İmam Üniversitesi Sağlık Bilimleri Fakültesi

ORCID ID: <https://orcid.org/0000-0002-7347-0981>**ÖZET**

Amaç: Bu araştırmada amaç, ebelik öğrencilerinde göçmen algısı ve kültürel duyarlılık arasındaki ilişkinin incelenmesidir.

Material ve Metod: Tanımlayıcı-kesitsel tipteki araştırmanın evrenini Osmaniye Korkut Ata Üniversitesi Sağlık Bilimleri Fakültesi Ebelik bölümünde okuyan 286 öğrenci oluşturdu. Araştırmanın verileri, 18-22 Mart 2024 tarihleri arasında 215 öğrenciden toplandı. Veriler Kişisel Bilgi Formu, Göçmen Algısı Ölçeği (GAÖ) ve Kültürlerarası Duyarlılık Ölçeği (KDÖ) kullanılarak toplandı. Verilerin analizinde Kolmogorov-Smirnov testi, tanımlayıcı istatistikler, bağımsız gruplarda t testi, ANOVA ve pearson korelasyon testi kullanıldı.

Bulgular: Çalışmadaki öğrencilerin; %82.3'ünün 18-22 yaş aralığında, %34.4'ünün 1.sınıf öğrencisi, %88.8'inin yurttan kaldığı, %82.8'inin ebelik bölümünü isteyerek tercih ettiği, %62.3'ünün başka kültürden arkadaşının olduğu, %80.5'inin başka kültürden bireylerle bir arada olmayı istediği, %34.4'ünün sosyal medyada başka kültürden bireylerle iletişim kurduğu belirlendi. Öğrencilerin; yaş, sınıf, kaldığı yer, ebelik bölümünü isteyerek okuma, başka kültürden arkadaşı olma, başka kültürden bireylerle bir arada olmayı isteme ve sosyal medyada başka kültürden bireyle iletişim kurma durumları ile GAÖ toplam puan ortalamaları arasındaki farkın anlamlı olmadığı belirlendi ($p>0.05$). Öğrencilerin; yaş, başka kültürden bireylerle bir arada olmayı isteme ile KDÖ puan ortalamaları arasındaki farkın anlamlı olduğu ($p<0.05$), okuduğu sınıf, kaldığı yer, ebelik bölümünü isteyerek okuma, başka kültürden arkadaşı olma ve sosyal medyada başka kültürden bireyle iletişim kurma ile KDÖ puan ortalamaları arasındaki farkın anlamlı olmadığı belirlendi ($p>0.05$). GAÖ ile KDÖ arasında pozitif yönde zayıf ilişki olduğu belirlendi.

Sonuç: Öğrencilerin göçmen algısı düzeyleri arttıkça kültürlerarası duyarlılık düzeyleri artmaktadır.

Anahtar Kelimeler: Ebelik, Öğrenci, Göçmen Algısı, Kültürlerarası Duyarlılık

ABSTRACT

Purpose: The aim of this research is to examine the relationship between immigrant perception and cultural sensitivity in midwifery students.

Material and Method: The population of the descriptive-cross-sectional study consisted of 286 students studying in the Midwifery Department of Osmaniye Korkut Ata University, Faculty of Health Sciences. The data of the research was collected from 215 students between 18-22 March 2024. Data were collected using the Personal Information Form, Immigrant Perception Scale (GAS) and Intercultural Sensitivity Scale (ITS). Kolmogorov-Smirnov test, descriptive statistics, t test in independent groups, ANOVA and Pearson correlation test were used to analyze the data.

Results: The students in the study; 82.3% were between the ages of 18-22, 34.4% were first year students, 88.8% lived in dormitories, 82.8% chose midwifery voluntarily, 62.3% had friends from another culture, 80.5% were from another country. It was determined that they wanted to be together with individuals from different cultures, and 34.4% communicated with individuals from other cultures on social media. Students; It was determined that the difference between age, class, place of residence, studying midwifery voluntarily, having friends from another culture, wanting to be with individuals from another culture, and communicating with individuals from another culture on social media and VAS total score averages were not significant ($p>0.05$). Students; The difference between age, wanting to be together with individuals from another culture and KDS score averages was significant ($p<0.05$), the class studied, place of residence, studying midwifery voluntarily, having friends from another culture and communicating with individuals from another culture on social media and KDS score averages were found to be significant ($p<0.05$). It was determined that the difference between them was not significant ($p>0.05$). It was determined that there was a weak positive relationship between VAS and KDS.

Conclusion: As students' level of immigrant perception increases, their level of intercultural sensitivity increases.

Key Words: Midwifery, Student, Immigrant Perception, Intercultural Sensitivity

GİRİŞ

Göç, insanların zorunlu veya gönüllü olarak bireysel ya da kitlesel olarak kısa ya da uzun süreli olarak buldukları bölgeyi terk ederek başka bir bölgeye yerleşmeleri olarak tanımlanmaktadır (Adıgüzel, 2016). Göç savaş, dini ve etnik çatışmalar, zulüm, politik baskı, coğrafi şartlar, ekonomi gibi olumsuz yaşam koşulları nedeniyle gerçekleşmekte, bireyler sağ kalmak veya daha iyi yaşam koşullarına kavuşmak için göç etmek zorunda kalmaktadır (Güler, 2021).

Göç, tarih boyunca toplumları ve ulusları etkileyen derin bir kültürel ve sosyal bir olgu olmuştur. Göç, sadece göç eden bireylerin hayatlarını değil, aynı zamanda göç ettikleri toplumları da etkilemiştir (Başoğlu, 2023). Göçle birlikte göç alan toplumlarda kültür, dil, ırk ve din çeşitliliği meydana gelmektedir (Yardım, 2023).

Mülteci evini, ülkesini, özellikle savaş, dini, politik ve kıtlık gibi nedenlerden terk etmeye zorlanan kişi olarak tanımlanmaktadır. Bu yönüyle başka ülkelere göç etmek zorunda kalan bu bireyleri sorun olarak görmekten çok konuk olarak algılamak gerekir (Aykaç & Aykaç, 2019). Mültecilerle birlikte yaşamı sağlamak için bir takım siyasal, sosyal ve ekonomik tedbirlerin hayata geçirilerek başarılı olunması beklenirken dışlamanın olduğu görülmekte, göçmenler ve göçmen çocukları öteki olarak algılanmaktadırlar (Yardım, 2023).

Toplumun göçmenlere yönelik algısı göçmenlerin göçe ettikleri topluma uyum sürecini olumlu veya olumsuz yönde etkilemektedir. Konuyla ilgili araştırmalara baktığımızda; Korkmaz ve Avcı'nın

(2019) çalışmasında hemşirelik öğrencilerinin göç ve göçmenlere yönelik olumsuz algılara sahip oldukları tespit edilmiştir (Korkmaz & Avcı, 2019). Yelpaze ve Güler'in (2018) üniversite öğrencileriyle yaptığı araştırma da empati, anlayış ve merhamet düzeyi yüksek öğrencilerin göçmenlere karşı daha olumlu bir tutuma sahip oldukları belirlenmiştir (Yelpaze & Güler, 2018)

Göçmenlere yönelik toplumdaki algının belirlenerek ön yargılar nedeniyle ortaya çıkan olumsuz algıların olumlu yönde değiştirilmesi ve kültürlerarası duyarlılığın artırılması önemlidir (Aykaç & Aykaç, 2019). Kültürlerarası duyarlılık; bireyleri kültürel farklılıkların anlaşılmasında, tanımlanmasında etkili ve uygun davranış biçimine teşvik ettiği için kültürlerarası iletişimde pozitif duygu geliştirebilme yeteneğidir. Kültürlerarası duyarlılık; kültürlerarası farklılıkları anlama ve takdir etmede bireyin kendini motive etmesini sağlayan aktif istektir (Abaslı & Polat, 2018), empati düzeyi, benlik saygısı ve tecrübe gibi birçok faktörden etkilenmektedir (Öğüt & Olkun, 2018).

Ebeler toplum içerisinde farklı kültürel özellikteki bireylere sağlık hizmeti veren sağlık çalışanlarıdır. Farklı kültürlerden bireylere sağlık hizmeti sunacak olan ebelerin göçmenlere yönelik algılarının ve kültürlerarası duyarlılık geliştirilebilmesi, öğrencilik dönemlerinde konu ile ilgili durumlarının belirlenmesi önem arz etmektedir. Bu bağlamda bu çalışma, ebelik öğrencilerinin göçmenlere yönelik algılarının ve kültürlerarası duyarlılık düzeylerini ve etkileyen faktörlerin belirlenmesi amacıyla yapıldı.

Araştırma Soruları

- 1.Ebelik bölümü öğrencilerinin göçmenlere yönelik algısı ve kültürlerarası duyarlılık düzeyleri nedir?
- 2.Ebelik bölümü öğrencilerinin sosyodemografik özellikleriyle göçmen algısı ve kültürlerarası duyarlılık düzeyleri arasında fark var mıdır?
- 3.Ebelik bölümü öğrencilerinin göçmen algısı düzeyleri ile kültürlerarası duyarlılık düzeyleri arasında ilişki var mıdır?

MATERYAL VE METOD

Araştırmanın tipi, Evreni ve Örneklemi

Tanımlayıcı nitelikteki araştırmanın evrenini, Osmaniye Korkut Ata Üniversitesi Sağlık Bilimleri Fakültesi Ebelik bölümünde öğrenim gören 286 öğrenci oluşturdu. Araştırmanın örneklemini, evreni bilenen örneklem hesaplamasına göre %95 güven aralığında %5 hata payında 165 öğrenci olarak belirlendi ve çalışma 215 öğrenci ile tamamlandı.

Araştırmaya dahil etme ve dışlama kriterleri;

Araştırmaya; 2023-2024 eğitim öğretim yılında Osmaniye Korkut Ata Üniversitesi Sağlık Bilimleri Fakültesi Ebelik bölümünde derslere aktif olarak katılan öğrenciler dahil edildi. Çalışmaya katılmaya gönüllü olmayan öğrenciler araştırmaya dahil edilmedi.

Veri Toplama Araçları

Veriler toplanmasında, katılımcıların sosyodemografik bilgilerini içeren Kişisel Bilgi Formu, Göçmen Algısı Ölçeği ve Kültürlerarası Duyarlılık Ölçeği kullanıldı.

Kişisel Bilgi Formu: Öğrencilerin yaş, cinsiyet, sınıfı, en uzun yaşadığı yer, şu an kaldığı yer, ebelik mesleğini isteme, farklı kültürden arkadaşı olma ve başka kültürden bireylerle bir arada olma isteği vb. sorulardan oluşturuldu.

Göçmen Algısı Ölçeği (GAÖ): Tecim ve Karakoyunlu tarafından (2021) geliştirilen ölçek 21 maddeden oluşmaktadır. 5'li likert tipindeki ölçek; Kesinlikle Katılmıyorum (1), Katılmıyorum (2), Ne katılıyorum ne katılmıyorum (veya orta derecede katılıyorum) (3), Katılıyorum (4) ve Kesinlikle Katılıyorum (5) şeklinde derecelendirilmiştir. Ölçek kendi içerisinde puanlanabilir, ölçekten alınabilecek en düşük puan 21, en yüksek 105'tir. Ölçeğin Cronbach Alpha güvenilirlik katsayısı 0.93'dir. Çalışmamız için Cronbach Alpha değeri 0.93 olarak bulundu.

Kültürlerarası Duyarlılık Ölçeği (KDÖ): Chen ve Staros tarafından geliştirilen ölçeğin (Chen &Starosta, 2000), Türkçe geçerlik güvenilirliği Bulduk ve arkadaşları (2017) tarafından yapılmıştır. Ölçek, 5'li tipindedir ve "(1) kesinlikle katılmıyorum, (2) katılmıyorum, (3) kararsızım, (4) katılıyorum ve (5) kesinlikle katılıyorum" şeklinde derecelendirilmiştir. Ölçek 24 maddeden oluşmakta ve bazı maddeleri "2, 4, 7, 9, 12, 15, 18, 20 ve 22. maddeleri" ters olarak kodlanmaktadır. Olumsuz olan bu ifadeler, okumada olumlu olarak anlamlandırılmaktadır. Ölçekten alınabilecek en düşük puan 24, en yüksek puan 120'dir. Ölçekten alınan puan arttıkça kültürlerarası duyarlılık düzeyi artmaktadır. Ölçeğin Cronbach Alpha güvenilirlik katsayısı 0.72'dir. Çalışmamız için Cronbach Alpha değeri 0.66 olarak bulundu.

Verilerinin Toplanması

Araştırmanın verileri, 18-22 Mart 2024 tarihleri arasında çalışmaya katılmayı kabul 215 öğrenciden yüz yüze toplandı. Veri toplama formunun doldurulması yaklaşık 10-15 dakika sürdü.

Verilerin Analizi

Elde edilen veriler SPSS 24.0 paket programında analiz edildi. Verilerin normal dağılıma uygunluğunu belirlemek için Kolmogorov-Smirnov testi yapıldı ve normal dağılım gösterdiği belirlendi. Verilerin analizinde, frekans, ortalama, yüzde ve standart sapma gibi tanımlayıcı analizler, bağımsız gruplarda t testi, ANOVA ve Pearson korelasyon testleri kullanıldı. İç tutarlılık Cronbach Alpha katsayısı hesaplandı ve $p < 0.05$ anlamlılık düzeyi belirlendi.

Araştırmanın Etik Yönü

Araştırmaya başlamadan önce Osmaniye Korkut Ata Üniversitesi Fen Bilimleri Bilimsel Araştırma ve Yayın Etiği Kurulundan izin (Etik Kurul Tarihi: 08.03.2024, Etik Kurul No: E.164674) ve kurum izni alındı. Veriler toplanmadan önce katılımcılara çalışmanın amacı, içeriği hakkında bilgi verildi ve çalışmaya katılımın gönüllülük esasına dayalı olduğu belirtildi. Araştırmaya katılmak isteyen öğrencilerden sözlü ve yazılı onam alındıktan sonra öğrenciler anket sorularını doldurdular. Ankette katılımcıların bilgileri kaydedilmedi. Araştırma Helsinki Deklarasyonu Prensipleri 'ne uygun bir şekilde yapıldı ve toplanan tüm veriler için katılımcıların anonimliği korundu.

Araştırmanın Güçlükleri ve Sınırlılıkları

Öğrenciler çalışmaya katılmak istememeleri ve sorulara gerçek cevap vermemeleri bu araştırmanın güçlükleridir. Sınırlılıkları ise; araştırmanın bir üniversitenin ebelik bölümünde okuyan öğrencilerle yapılmasıdır bu nedenle elde edilen veriler öğrencilerin verdikleri beyanlarla sınırlıdır.

BULGULAR

Çalışmaya katılan öğrencilerin; %82.3'ünün 18-22, %34.4'ünün 1.sınıf öğrencisi, %88.8'inin yurttan kaldığı, %82.8'inin ebelik bölümünü isteyerek tercih ettiği, %62.3'ünün başka kültürden arkadaşının olduğu, %80.5'inin başka kültürden bireylerle bir arada olmayı istediği, %34.4'ünün sosyal medyada başka kültürden bireylerle iletişim kurduğu belirlendi (Tablo 1).

Tablo 1. Öğrencilerin sosyodemografik ve kültürlerarası iletişim özellikleri (n=215)

		n	%
Yaş	18-22 yaş aralığı	177	82.3
	23-27 yaş aralığı	38	17.7
Sınıf	1.sınıf	74	34.4
	2.sınıf	58	27.0
	3.sınıf	55	25.6
	4.sınıf	28	13.0
Şu an kaldığı yer	Ailesiyle	16	7.4
	Yurtta	191	88.8
	Ev arkadaşıyla	8	3.7
Ebelik bölümünü isteyerek tercih etme	Evet	178	82.8
	Hayır	37	17.2
Başka kültürden arkadaşı var mı	Evet	134	62.3
	Hayır	81	37.7
Başka kültürden bireylerle bir arada olmayı istiyor mu?	Evet	173	80.5
	Hayır	42	19.5
Sosyal medyada başka kültürden bireyle iletişim kurma durumu	Hiç	66	30.7
	Nadiren	74	34.4
	Ara sıra	57	26.5
	Çoğu zaman	11	5.1
	Her zaman	7	3.3
Yaş ortalaması (yıl) 20.87±1.64	Toplam	215	100.0

Çalışmaya katılan öğrencilerin; yaş, okuduğu sınıf, şu an kaldığı yer, ebelik bölümünü isteyerek okuma gibi sosyodemografik özellikleriyle Göçmen Algısı Ölçeği toplam puan ortalamaları arasındaki farkın anlamlı olmadığı belirlendi ($p>0.05$). Öğrencilerin başka kültürden arkadaşı olma, başka kültürden bireylerle bir arada olmayı isteme ve sosyal medyada başka kültürden bireyle iletişim kurma durumları ile Göçmen Algısı Ölçeği toplam puan ortalamaları arasındaki farkın anlamlı olmadığı belirlendi ($p>0.05$) (Tablo 2).

Çalışmaya katılan öğrencilerin yaş aralıkları ve başka kültürden bireylerle bir arada olmayı isteme durumları ile Kültürlerarası Duyarlılık Ölçeği toplam puan ortalamaları arasındaki farkın istatistiksel olarak anlamlı olduğu belirlendi ($p<0.05$). Öğrencilerin okuduğu sınıf, şu an kaldığı yer, ebelik bölümünü isteyerek okuma, başka kültürden arkadaşı olma ve sosyal medyada başka kültürden olan bireylerle iletişim kurma durumları ile Kültürlerarası Duyarlılık Ölçeği toplam puan ortalamaları arasındaki farkın istatistiksel olarak anlamlı olmadığı belirlendi ($p>0.05$) (Tablo 2).

Tablo 2. Öğrencilerin sosyodemografik özelliklerine göre GAÖ ve KDÖ toplam puanlarının karşılaştırılması (n=215)

	GAÖ $\bar{X} \pm SS$	KDÖ $\bar{X} \pm SS$
Yaş		
18-22 yaş aralığı	62.97±7.73	84.30±8.33
23-27 yaş aralığı	63.42±5.98	81.31±8.77
**Önemlilik	p=0.737	p=0.048
Okuduğu sınıf		
1.sınıf	62.37±7.47	82.59±8.72
2. sınıf	62.41±7.92	86.15±7.08
3. sınıf	64.30±8.00	83.49±8.70
4. sınıf	63.67±4.71	82.53±9.38
*Önemlilik	p=0.426	p=0.082
Şu an kaldığı yer		
Ailesiyle	62.37±4.99	84.00±9.25
Yurtta	63.04±7.69	83.67±8.17
Ev arkadaşıyla	64.50±5.63	85.75±13.9
*Önemlilik	p=0.806	p=0.589
Ebelik bölümünü isteyerek okuma		
Evet	62.61±6.99	84.03±8.58
Hayır	65.13±9.13	82.51±7.90
**Önemlilik	p=0.061	p=0.320
Başka kültürden arkadaşı var mı		
Evet	62.85±7.48	84.24±8.79
Hayır	63.37±7.42	83.00±7.91
**Önemlilik	p=0.626	p=0.297
Başka kültürden bireylerle bir arada olmayı istiyor mu?		
Evet	62.85±7.48	84.33±8.52
Hayır	63.37±7.42	81.47±7.93
**Önemlilik	p=0.626	p=0.050
Sosyal medyada başka kültürden bireyle iletişim kurma durumu		
Hiç	62.49±8.74	82.94±8.37
Nadiren	62.63±6.93	83.52±8.34
Ara sıra	64.38±7.06	84.47±8.86
Çoğu zaman	62.00±4.93	87.18±7.15
Her zaman	63.66±5.12	83.33±10.48
*Önemlilik	p=0.878	p=0.579
Toplam	63.05 ±7.44	83.77 ± 8.47

GAÖ= Göçmen Algısı Ölçeği, KDÖ=Kültürlerarası Duyarlılık Ölçeği*ANOVA testi.**Bağımsız gruplarda t testi. p< 0.05.

Göçmen Algısı Ölçeği ve Kültürlerarası Duyarlılık Ölçeği arasında pozitif yönde zayıf ilişki ($r=0.039$, $p=0.573$) olduğu, öğrencilerin göçmen algısı düzeyleri arttıkça kültürlerarası duyarlılık düzeylerinin artacağı belirlendi (Tablo 3).

Tablo 3. GAÖ, KDÖ toplam puan ortalamaları korelasyon dağılımı (n=215)

		GAÖ
	r	.039
*KDÖ	p	0.573

GAÖ=Göçmen Algısı Ölçeği, KDÖ=Kültürlerarası Duyarlılık Ölçeği, *Perason korelasyon.

TARTIŞMA

Çalışmamıza katılan öğrencilerin; yaşa göre göçmen algısı düzeyleri arasındaki farkın anlamlı olmadığı belirlendi. Tecim ve arkadaşlarının (2021) yaptıkları çalışmada yaş küçük olan bireylerin göçmen algılarının olumsuz olduğu belirtildiği için çalışmamızla farklılık göstermektedir. Bu farklılık, çalışmamızdaki öğrencilerin olaya bakış açıları ve durumu olgunlukla karşılamalarından kaynaklanabilir.

Çalışmamızda öğrencilerin göçmen algısı düzeylerinin (63.05 ± 7.44) orta düzeyde olduğu belirlendi. Çalışma bulgumuzdan farklı olarak, Korkmaz ve Avcı (2019) çalışmasında da hemşirelik öğrencilerinin öğrencilerin çoğunluğunun göçmenlere yönelik olumsuz algıya sahip oldukları, Aldemir'in (2019) çalışmasında da Uluslararası İlişkiler öğrenimi gören öğrencilerin göçmenlere yönelik algılarının olumsuz olduğu belirlenmiştir.

Çalışmaya katılan öğrencilerin kültürlerarası duyarlılık düzeylerinin (83.77 ± 8.47) orta düzeyin üstünde olduğu belirlendi. Yapılan çalışmalarda çalışma bulgumuza benzer olarak öğrencilerin kültürlerarası duyarlılık düzeylerinin orta düzeyin üstünde olduğu belirlenmiştir (Meydanlıoğlu ve ark., 2015; Aslan ve ark., 2016; Kılıç & Sevinç, 2018). Abaslı ve Polat'ın (2018), Akın'ın (2016), Repo ve ark. (2017) yaptıkları çalışmalarda öğrencilerin kültürlerarası duyarlılık düzeylerinin orta düzeyde olduğu belirtilmiştir. Elde edilen bulgular çalışmamızla farklılık göstermektedir. Bu farklılık; çalışmamızdaki öğrencilerin empatik özelliklerinden, farklı insanları tanımaya açık olmalarından, öğrenci profilinin çoğunun yaşadıkları bölgede göçmen yoğunluğunun fazla olması nedeniyle edindikleri tecrübelerden kaynaklanabilir.

Çalışmaya katılan öğrencilerin başka kültürden bireylerle bir arada olmayı isteme durumları ile kültürlerarası duyarlılık düzeyleri arasındaki farkın anlamlı olduğu belirlendi. Çalışma bulgumuza benzer olarak Bulduk ve arkadaşlarının (2017), Sağlık hizmetleri meslek yüksekokulu öğrencileriyle yaptıkları çalışmada farklı kültürlerdeki insanlarla birlikte olmaya olumlu bakan öğrencilerin kültürlerarası duyarlılığının daha yüksek olduğu belirtilmiştir.

Çalışmamızdaki öğrencilerin yaş, ebeklik bölümünü isteyerek okuma durumları ile kültürlerarası duyarlılık düzeyleri arasındaki farkın anlamlı olmadığı belirlendi. Bilgiç ve Şahin'in (2019) yaptıkları araştırmada, öğrencilerin hemşireliğe isteyerek tercih etme ile kültürlerarası duyarlılık düzeyleri arasında anlamlı bir farklılık bulunmamıştır. Bulduk ve arkadaşlarının (2017) çalışmasında da öğrencilerin yaşları ve mesleğe bakış açıları ile kültürlerarası duyarlılıkları arasında farklılık olmadığı belirtildi. Elde ettiğimiz bulgu literatürle benzerlik göstermektedir. Çalışma bulgumuzdan farklı olarak Aktaş ve arkadaşlarının (2015) çalışmasında hemşirelik bölümünü isteyerek tercih eden öğrencilerin kültürlerarası duyarlılık düzeylerinin daha yüksek olduğu bulunmuştur. Empatik eğilimler, kişilik özellikleri, farklı kültürden olan bireylere de sağlık hizmeti verme konusunda önyargıların olmaması sonuç üzerinde etkili olabilir.

Çalışmamızda öğrencilerin başka kültürden arkadaşı olma ve sosyal medyada başka kültürden olan bireylerle iletişim kurma durumları ile kültürlerarası duyarlılık düzeyleri arasında anlamlı bir fark olmadığı belirlendi. Yapılan araştırmalarda farklı kültürlerle sahip bireylerle etkileşim içinde olan

öğrencilerin kültürlerarası duyarlılık daha yüksek olduğu belirlenmiştir (Bulduk ve ark., 2017; Demir & Üstün, 2017; Meydanlıoğlu ve ark., 2015). Elde ettiğimiz bulgu literatürden farklılık göstermektedir. Sosyokültürel özellikler, çevresel faktörler, daha önceki tecrübeler ve kişilik özellikleri bu farklılığın nedeni olabilir.

Çalışmamızdaki öğrencilerin göçmen algısı düzeyleri ile kültürlerarası duyarlılıkları arasında pozitif yönde zayıf ilişki olduğu, öğrencilerin göçmen algısı düzeyleri arttıkça kültürlerarası duyarlılık düzeylerinin artacağı belirlendi. Çalışma bulgumuzu destekler biçimde Aykaç ve Aykaç'ın (2019) çalışmasında, göç algısına ilişkin verilen eğitim uygulamalarının kişilerde kültürlerarası duyarlılığı artırdığı ve dolayısıyla göçmenlere yönelik algıyı olumlu yönde etkilediği, ön yargıları kırdığı ve empati sağladığı tespit edilmiştir.

SONUÇ VE ÖNERİLER

Çalışmamızda öğrencilerinin, göçmen algısı düzeyleri ile kültürlerarası duyarlılık düzeylerinin orta düzeyin üzerinde olduğu belirlendi. Yaş ve başka kültürden bireylerle bir arada olma isteğinin kültürlerarası duyarlılıkta önemli bir değişken olduğu, göçmen algısı ile kültürlerarası duyarlılık arasında pozitif yönde bir ilişki olduğu görüldü. Başka bir ifade ile öğrencilerin göçmen algısı düzeyleri arttıkça, kültürlerarası duyarlılık düzeylerinin arttığı belirlendi.

Elde edilen bulgular doğrultusunda; farklı kültürden bireylere sahip bireylere sağlık hizmeti verecek ebelik öğrencilerinin kültürlerarası duyarlılık düzeyleri ile göçmenlere yönelik algılarının olumlu yönde artırmanın, meslek yaşamlarında aktif olmaları ve empati duygularının gelişimi açısından oldukça önemlidir. Bu nedenle sağlıkla ilgili eğitim verilen bölümlerde göçle ilgili derslerin ve uygulamalarının müfredat içerisinde yer verilmelidir. Ayrıca konu ile ilgili farklı değişkenlerde göz önüne alınarak geniş çaplı araştırmaların yapılması önerilir.

KAYNAKLAR

- Abaslı, K., & Polat, Ş. (2018). Öğrencilerin kültürlerarası duyarlılık ve kültürel zekâya ilişkin görüşlerinin incelenmesi. *Anemon Muş Alparslan Üniversitesi Sosyal Bilimler Dergisi*, 7 (1), 193-202
- Adıgüzel, Y. (2016). *Göç sosyolojisi*. İstanbul: Nobel Yayınevi.
- Akın, E. (2016). Türkçe öğretmen adaylarının kültürlerarası duyarlılıklarının çeşitli değişkenler açısından incelenmesi (Siirt Üniversitesi örneği). *Turkish Studies*, 11(3), 29-42.
- Aktaş, D., Ertuğ, N., & Öztürk, E. (2015). Investigation into intercultural sensitivity among nursing students at a university in Turkey. *The New Educational Review*, 40(2): 48-57.
- Aldemir, E. (2019). Bursa Uludağ Üniversitesi uluslararası ilişkiler bölümü öğrencilerinin Türkiye'de yaşayan Suriyeli sığınmacılarla ilgili tutumlarının incelenmesi. *Sinop Üniversitesi Sosyal Bilimler Dergisi*, 3(2), 265-296.
- Aslan, S., Yılmaz, D., Kartal, M., Erdemir, F., & Güleç, H.Y. (2016). Determination of intercultural sensitivity of Nursing Students in Turkey. *International Journal of Health Sciences & Research*, 6(11), 202-8.
- Aykaç, M., & Aykaç, N. (2019). Yaratıcı drama temelli etkinliklerin kültürlerarası duyarlılık ve göçmen algısı üzerine etkisi. *Yaratıcı Drama Dergisi*, 14(1), 73-9.
- Başoğlu, M.Y. (2023). Toplumda medyanın rolü: Göçmen algısı üzerine bir inceleme. *Muhakeme Dergisi* 6(2), 58-67.

- Bilgiç, Ş., & Şahin, İ (2019). Hemşirelik öğrencilerinin kültürlerarası duyarlılık ve etnik merkezilik düzeyleri. *SDÜ Sağlık Bilimleri Dergisi*, 10 (3), 230-236
- Bulduk, S., Usta, E., & Dinçer, Y. (2017). Kültürlerarası duyarlılık ve etkileyen faktörlerin belirlenmesi: Bir sağlık hizmetleri meslek yüksekokulu örneği. *Düzce Üniversitesi Sağlık Bilimleri Enstitüsü Dergisi*, 7 (2), 73-77.
- Chen, G.M. & Starosta, W. (2000). The development and validation of the Intercultural Sensitivity Scale, Paper Presented at the Annual Meeting of the National Communication Association WA, November 8-12, Seattle.
- Demir, S., & Üstün, E. (2017). Öğretmen adaylarının kültürlerarası duyarlılık ve etnik merkezilik düzeylerinin çeşitli değişkenler açısından incelenmesi. *Yüzüncü Yıl Üniversitesi Eğitim Fakültesi Dergisi*, 14(1), 182-204.
- Güler, A. (2021). Göç olgusunun çok boyutlu etkileri ve Türkiye'ye yansımaları. *Kırklareli Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 10 (2), 218-239.
- Kılıç, S.P., & Sevinç, S. (2018). The Relationship between cultural sensitivity and assertiveness in nursing students from Turkey. *Journal of Transcultural Nursing*, 29(4): 379- 386
- Korkmaz, M. ve Avcı, İ. A. (2019). Hemşirelik Öğrencilerinin Göç ve Göçmen Olgusuna Yönelik Algılarının Değerlendirilmesi, Ed. Çer, E. Kahraman, N. ve Yılmaz, T. IV. Uluslararası Kültür Sempozyumları Uluslararası Sağlık Toplum ve Kültür Sempozyumu Tam Metin Kitabı içinde (228-234).
- Meydanlıoğlu, A., Arıkan, F., & Gözüm, S. (2015). Cultural sensitivity levels of university students receiving education in health disciplines. *Adv Health Sci Educ Theory Pract.*, 20(5), 1195-204.
- Öğüt, N., & Olkun, E.O. (2018). Üniversite öğrencilerinin kültürlerarası duyarlılık düzeyi: Selçuk Üniversitesi örneği. *Selçuk İletişim*, 11 (2), 54-73.
- Repo, H., Vahlberg, T., Salminen, L., Papadopoulos, I., & Leino-Kilpi, H. (2017). The cultural competence of graduating nursing students. *Journal of Transcultural Nursing*, 28(1), 98- 107.
- Tecim, E. & Karakoyunlu, M. (2021). Göçmen Algısı Ölçeği geliştirilmesi, geçerliği ve güvenilirliği. *İnsan ve Toplum Bilimleri Araştırmaları Dergisi*, 10(3), 2832-2852. <https://doi.org/10.15869/itobiad.957721>
- Yardım, M. (2023) Irkçılık ve zenofobiden islamofobiye: İstila miti ve islamlaşma miti arasında göçmen algısı. *Medeniyet ve Toplum Dergisi*, 7 (2), 188-200.
- Yelpaze., İ, & Güler, D. (2018). The relationship between attitudes towards asylum seekers and compassion levels of university students. *International Journal of Assessment Tools in Education*, 5(3), 524-543

CHANGES IN SOME QUALITY CHARACTERISTICS OF AYVALIK TYPE TABLE OLIVES DURING STORAGE**AYVALIK ÇEŞİDİ SOFRALIK ZEYTİNİN DEPOLAMA SIRASINDA BAZI KALİTE ÖZELLİKLERİNDE MEYDANA GELEN DEĞİŞİMLER****Doç. Dr. Aziz KORKMAZ**

Mardin Artuklu Üniversitesi, Sağlık Bilimleri Fakültesi, Beslenme ve Diyetetik Bölümü,
Mardin, Artuklu

0000-0002-5221-6722

Özet

Ayvalık zeytini, Ege bölgesi başta olmak üzere Türkiye’de yaygın olarak yetiştirilen zeytin çeşididir. Yüksek yağ oranı (%24-25) nedeniyle çoğunlukla yağlık olarak işlenirse de ülkemizde sofralık olarak değerlendirilen bir çeşittir. Bu çalışmada, doğal yöntemle tatlandırılıp salamuraya bırakılan Ayvalık çeşidi yeşil zeytinlerin bazı kalite özelliklerinde altı aylık raf ömrü süresince meydana gelen değişimler araştırılmıştır. Üçer aylık periyotlar halinde örnekleme yapılarak salamuradaki zeytinlerin tuz, titrasyon asitliği (TA), glikoz, laktik asit, toplam polifenolik (TPM), toplam flavonoid (TFM), majör fenolik bileşikler (oleuropein, hidroksitirozol, tirozol, luteolin, pinosresinol, kateşin, kafeik asit, vanilik asit, p-kumarik asit ve ferrulik asit) miktarları ve toplam antioksidan kapasitesi (TAK) belirlenmiştir. Depolama süresince zeytinlerin tuz içeriği %4.24±0.08’den %4.95±0.15’ yükselmiştir (P<0.05). Benzer şekilde, örneklerin TA ve laktik asit içerikleri de raf ömrü süresinde artış (P<0.05) eğilimi göstermiş olup TA ve laktik asit içerikleri sırasıyla 1.511±0.022-4.615±0.068 (% laktik asit cinsinden, g/g) ve 3.83±0.49-13.36±0.18 mg/g aralığında değişmiştir. Zeytinlerin glikoz içeriği %0.43±0.02 seviyesinden %0.23±0.01’e azalmıştır (P<0.05). Fenolik bileşiklerden, depolama başında 591.89±12.56 mg/kg içeriğiyle hidroksitirozol en yüksek miktara sahipken, ferrulik asit 6.71±0.08 mg/kg içeriğiyle en düşük içerikteki fenolik bileşik olarak bulunmuştur. Fenolik bileşiklerin içerikleri özellikle depolamanın son üç ayında keskin bir şekilde azalmış ve depolama sonuna gelindiğinde ilk miktarlarının büyük bölümü kaybedilmiş oldu. Depolamanın sonunda fenolik bileşik içeriklerinin 0.50±0.40 mg/kg (oleuropein) ile 7.74±0.58 mg/kg (kateşin) aralığında değişmiştir. Depolama sırasında fenolik bileşiklerdeki bireysel azalmalara dayalı olarak TPM ve TFM değerleri de sırasıyla 3216.35±5.10 mg gallik asit eşdeğeri (GAE) /kg’dan 1729.04±2.74 mg GAE/kg’a ve 1452.60±17.40 mg kateşin eşdeğeri (KE)/kg’dan 388.60±4.65 mg KE/kg’a azalmıştır (P<0.05). Depolama sonunda TAK değeri (DPPH) ilk seviyesine göre 4.28 kat azalarak 106.23±0.39 mg troloks eşdeğeri/kg’a azalmıştır (P<0.05). Bu çalışma, üç ayı aşan sürelerle depolanan sofralık zeytinlerin biyoaktif bileşenlerinin önemli oranda azalabileceğini ortaya koymuştur.

Anahtar kelimeler: Ayvalık zeytini, sofralık zeytin, fenolik bileşikler, depolama, kalite özellikleri

Abstract

Ayvalık olive is a type of olive that is widely grown in Turkey, especially in the Aegean region. Although it is mostly processed as oil due to its high oil content (24-25%), it is a variety that is also used as table food in the country. In this study, the changes in some quality characteristics of Ayvalık variety green olives, naturally sweetened and left in brine, were investigated during the six-month shelf life. By sampling in three-month periods, salt, titratable acidity (TA), glucose, lactic acid, total polyphenolic (TPM), total flavonoid (TFM), major phenolic compounds (oleuropein, hydroxytyrosol, tyrosol, luteolin, pinoresinol, catechin, caffeic acid, vanillic acid, p-coumaric acid, and ferulic acid) amounts, and total antioxidant capacity (TAC) were determined. During storage, the salt content of olives increased from $4.24 \pm 0.08\%$ to $4.95 \pm 0.15\%$ ($P < 0.05$). Similarly, the TA and lactic acid contents of the samples also tended to increase ($P < 0.05$) during the shelf life period, and the TA and lactic acid contents were 1.511 ± 0.022 - 4.615 ± 0.068 (% in lactic acid, g/g) and 3.83 ± 0.49 - 13.36 ± 0.18 mg/g, respectively. The glucose content of olives decreased from $0.43 \pm 0.02\%$ to $0.23 \pm 0.01\%$ ($P < 0.05$). Among the phenolic compounds, hydroxytyrosol had the highest content at the beginning of storage with a content of 591.89 ± 12.56 mg/kg, while ferulic acid was found to have with the lowest content at 6.71 ± 0.08 mg/kg. The contents of phenolic compounds decreased sharply, especially in the last three months of storage, and by the end of storage, most of their initial amounts were lost. At the end of storage, phenolic compound contents varied between 0.50 ± 0.40 mg/kg (oleuropein) and 7.74 ± 0.58 mg/kg (catechin). Based on the individual decreases in phenolic compounds during storage, TPM and TFM values also decreased from 3216.35 ± 5.10 mg gallic acid equivalent (GAE)/kg to 1729.04 ± 2.74 mg GAE/kg and 1452.60 ± 17.40 mg catechin equivalent (CE)/kg to 388.60 ± 4.65 mg CE/kg, respectively ($P < 0.05$). At the end of storage, the TAC value (DPPH) decreased 4.28 times compared to its initial level and decreased to 106.23 ± 0.39 mg trolox equivalent/kg ($P < 0.05$). This study revealed that the bioactive components of table olives stored for periods exceeding three months can significantly decrease.

Key words: Ayvalık olive, table olive, phenolic compounds, storage, quality characteristics