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Attitudes, Prejudices and Barriers of Healthcare Professionals towards Female Patients with Obesity

Sağlık Bakım Profesyonellerinin Obezite Sorunu Olan Kadın Hastalara Yönelik Tutum, Ön Yargı ve Obez Hasta Bakımına Yönelik Engelleri

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ABSTRACT

Objective: This descriptive and correlational study was conducted to evaluate the attitudes, prejudices, and patient care obstacles of healthcare professionals (HPs) who work in the healthcare and allied healthcare services and serve female patients with obesity in Türkiye.

Materials and Methods: The sample of the study included 411 HPs who provided care to female patients in public and university hospitals in Türkiye and who volunteered to participate in this study. Data were collected online using an Information Form, GAMS-27 Obesity Prejudice Scale (GAMS-27), the Attitudes Toward Obese People Scale (ATOP), and the Questionnaire on Patient Care Obstacles for Patients with Obesity (OHBEF).

Results: The mean scores of HPs on the abovementioned scales were OHBEF= 65.09±8.80, GAMS-27= 77.91±4.52, and ATOP= 59.24±0.23. The mean score of HPs on the OHBEF was related to age, mean Body Mass Index (BMI) of men, and occupational group ($p<0.05$). Additionally, the mean scores of HPs on the ATOP were not related to their sociodemographic characteristics ($p>0.05$).

Conclusions: This study revealed that HPs had prejudiced and negative attitudes toward female patients with obesity, and this was related to a lack of materials and equipment for patient care, sex, age, BMI, and occupational group.

Keywords: Attitudes, barriers, female, healthcare professionals, obesity

ÖZ

Amaç: Bu tanımlayıcı ve ilişki arayıcı çalışma, Türkiye'de obezite sorunu olan kadın hastalara bakım veren sağlık bakım profesyonellerinin (SBP) tutumlarını, önyargılarını ve hasta bakım engellerini değerlendirmek için yapılmıştır.

Materyal ve Metot: Çalışmanın örneklemini, Türkiye'deki kamu ve üniversite hastanelerinde kadın obez hastalara bakım sağlayan ve bu çalışmaya katılmayı gönüllü olan 411 SBP oluşturmuştur. Veriler, Bilgi Formu, GAMS-27 Obezite Önyargı Ölçeği (GAMS-27), Obez Bireylere Yönelik Tutum Ölçeği (ATOP) ve Obez Hasta Bakım Engelleri Soru Formu (OHBEF) kullanılarak online çevrimiçi toplanmıştır.

Bulgular: SBP'lerin ölçeklerdeki ortalama puanları, OHBEF=65,09±8,80, GAMS-27=77,91±4,52 ve ATOP= 59,24±0,23 idi. SBP'lerin OHBEF puan ortalaması yaş, erkeklerin ortalama Beden Kitle İndeksi (BKI) ve meslek grubu ile ilişkili olduğu belirlendi ($p<0,05$). Ayrıca, SBP'lerin ATOP puan ortalamaları, sosyodemografik özellikleri arasında ilişkili saptanmadı ($p>0,05$).

Sonuç: Bu çalışma, SBP'lerin obezite hastası olan kadınlara karşı önyargılı ve olumsuz tutumlar sergilediğini ve bunun hasta bakımı için malzeme ve ekipman eksikliği, cinsiyet, yaş, BKI ve meslek grubu ile ilişkili olduğunu ortaya koymuştur.

Anahtar Kelimeler: Kadın, obezite, sağlık bakım profesyoneli, tutum

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INTRODUCTION

Obesity is a growing global health concern due to its associated diseases and mortality. The Centers for Disease Control and Prevention reports a worldwide obesity prevalence of 39.8%.[1] Individuals with obesity are often stigmatized as unattractive, lazy, weak, selfish, and unsuccessful. They are exposed to negative societal behaviors and may be more vulnerable to epidemics and chronic diseases.[2-4] Negative attitudes of healthcare personnel cause individuals with obesity to stay away from treatment, lose trust in practitioners and performance and cancel or delay their appointments. Individuals with obesity are at risk of many diseases; thus, healthcare professionals' (HPs') behaviors that might push them away from healthcare services are worrisome for the future.[5,7]

Research indicates that individuals with a Body Mass Index (BMI) of 35 or higher are more likely to experience institutional and employment discrimination, including in healthcare settings. This suggests that as obesity severity increases, so does the likelihood of facing negative treatment from healthcare providers.[2,6] Women with obesity report experiencing more stigma and inappropriate comments from healthcare professionals compared to their male counterparts. Approximately 53% of women with obesity have noted inappropriate remarks about their weight during medical visits.[3] This gender disparity highlights that women may be particularly vulnerable to weight bias in healthcare. Eliminating the prejudice posed against individuals with obesity in healthcare institutions and changing the negative attitudes and behaviors toward them would maintain the continuity of care as well as increase its quality. The initial step toward eradicating negative attitudes and behaviors directed at women with obesity in healthcare institutions is to acknowledge the biases held by HPs against such individuals. This acknowledgement must be paired with improved education, providing causal information, emphasizing controllability, fostering empathy, and adopting a weight-inclusive approach.[8] Healthcare professionals often develop negative perceptions about treating obese patients when they lack the necessary equipment to provide adequate care. This can lead to feelings of frustration and inadequacy among providers, which may manifest as bias or discrimination against obese individuals.[9] This study was conducted to determine the attitudes and prejudices of HPs toward female patients with obesity and to evaluate the obstacles to the care provided to patients with obesity.

MATERIALS AND METHODS

Ethics Committee Approval: The approval of Istanbul University – Cerrahpasa, Social Humane Ethics Committee (Date: 07.01.2020, decision no: 2019/173) was obtained. The study adhered to the ethical guidelines of the Declaration of Helsinki. Informed consent was obtained from participants via email. The permissions of the authors of the scales used in the study were obtained via e-mail.

Design: This descriptive and correlational study was conducted to evaluate the attitudes and prejudices of HPs who work in healthcare and allied healthcare services in Türkiye toward female patients with obesity and the obstacles regarding the care provided to patients with obesity. The population of the study included HPs who worked at medical faculties affiliated with the Ministry of Health and university hospitals in Türkiye. According to the Turkish Statistical Institute (TSI) data, 525,197 HPs were employed in 2017.[10] The method of sampling with a known population was used to determine the sample size in line with these data. The sample of the study was measured based on the GAMS-27 Obesity Prejudice Scale. According to the study by Ünal in 2018, the prevalence of prejudice among HPs is 32.66%.[11] The number of HPs needed in the sample according to the method of sampling with a known population was calculated as 338 (95% confidence interval, 1% margin of error). The sample loss was predicted as 20%; thus, the snowball method was used to reach the lowest number of HPs (405) deemed acceptable. The sample size of this study was 411.

The inclusion criteria were being assigned to provide care to female patients whose BMI was higher than 30, not being on leave, and agreeing to participate in the study. The study was carried out between March 1, 2020, and March 1, 2021, when it was not possible to collect data face-to-face in Türkiye due to the COVID-19 pandemic; thus, the study data were collected from voluntary participants via Google.survey. The collection of the data was initiated by sending the scales to randomly selected physicians, nurses, midwiferies, and others (Surgery technicians, anesthesiologists, dietitians, physical therapy technicians, first and emergency aid technicians, laboratory technicians, audiologists, psychologists, x-ray technicians). Healthcare professionals defined as "other" were classified according to the TSI.[10] Only participants who cared for overweight women from other healthcare professions were included in the study sample. Similarly, only anesthesia technicians who cared for overweight women with obesity problems were included in the study. The data collection process was completed as the primary participants shared the Google.survey questionnaire was sent to them with their HP colleagues. The completion of each scale took between 10 and 15 minutes on average.

Study questions:

1. Are medical materials, diagnosis and screening materials, and the physical environments commonly used by HPs suitable for the care provided to patients with obesity?
2. What is the mean score of HPs on the Questionnaire on Patient Care Obstacles for Patients with Obesity?
3. What is the mean score of HPs on the GAMS-27 Obesity Prejudice Scale?
4. What is the mean score of HPs on the Attitudes Toward Obese People Scale?
5. Is there any relationship between the HPs' sociodemographic characteristics and mean scores on the scales?

Data collection tools

The Introductory Information Form: It was formed to determine the sociodemographic and anthropometric characteristics of the participants. It had six questions about the HPs' sociodemographic information, such as occupation, age, etc.

The Questionnaire on Patient Care Obstacles for Patients with Obesity (OHBEF): The questionnaire was prepared by the researchers to evaluate the obstacles to care provided to female patients with obesity in line with the literature. Items in the questionnaire included the difficulties faced by HPs in patient care and HPs' beliefs about women with obesity.[5-8, 11,13,14] It was prepared as a five-point Likert-type scale (1=Definitely agree; 5=Definitely disagree). Direct (positive) statements are scored reversely. The suitability of the questions was checked by HPs working in the clinical field. Increasing scores obtained from the questionnaire indicated increased obstacles to care provided to patients with obesity. The created form consists of 22 items (Table 1). The lowest score that can be obtained from the questionnaire is 22, while the highest score is 110. The Cronbach's alpha coefficient of the questionnaire was 0.83. Item analysis was used to determine the relationship between the items and the entire questionnaire. The correlation coefficients of the item-total score were between 0.30 and 0.58. To test the reliability of the developed form, the Cronbach's alpha value and the item-total correlation were examined. The Cronbach's alpha coefficient, which indicates the internal consistency of the measurements, is generally considered to be low in the range of 0.42–0.60, moderate in the range of 0.61–0.80 and highly reliable in the range of 0.81–1.00. Consequently, Cronbach's α value of 0.83 indicates that the scale used is reliable. In addition, the correlation coefficient of the item's total score, which is at least above 0.30, shows that the measurement instrument is reliable.[15]

GAMS-27 Obesity Prejudice Scale (GAMS-27): It was developed by Ercan et al. and its Cronbach's alpha coefficient is 0.85. The statements in the scale consist of negative statements about prejudices against obesity. There is no reverse scoring in the scale. An increase in the score on the scale indicates prejudice against obesity. It has 27 items in a five-point Likert-type style. The lowest score that can be obtained from the scale is 27, while the highest score is 135.[12] The Cronbach's alpha coefficient was 0.87.

The Attitudes Toward Obese People Scale (ATOP): The scale developed by Allison et al., which conducted the Turkish validity and reliability study by Dedeli et al., has a Cronbach's alpha of 0.86. The scale includes positive and negative statements in a six-point Likert format. Each item must be answered so that the calculation can be made correctly. In the

Table 1. The questionnaire on patient care obstacles for patients with obesity.

1.Caring for an obese patient is exhausting
2.Caring for an obese patient requires more time
3.I avoid touching an obese patient
4.I am reluctant to perform invasive procedures on an obese patient
5.I offer psychological support to an obese patient
6.I empathize when caring for an obese patient
7.I feel uncomfortable caring for an obese patient
8.I have difficulty getting an obese patient into the right position
9.I have difficulty transporting obese patients
10.Obese patients generally have difficulty complying with treatment
11.I avoid communicating with an obese person
12.Obese people have difficulty caring for themselves
13.Obese patients increase the cost of care
14.I need more healthcare professionals and other support staff to care for an obese patient
15.The physical environment in healthcare facilities is generally suitable for the care of an obese patient
16.The medical equipment used in the care of an obese patient is generally not appropriate
17.The diagnostic and screening tools used in the care of obese patients are generally appropriate
18.It is easy to teach obese patients health-promoting behaviors
19.Obese patients are insensitive to their health problems
20.Obese patients are unwilling to accept treatment and have poor compliance
21.Obese patients develop more complications
22.Obese patients are often late for their appointments

second step, 60 points are added to the mean item-total score, resulting in a scale range of 0 to 120. Higher total mean scores indicate more positive attitudes toward individuals with obesity.[13,14] The Cronbach's alpha coefficient was 0.70.

Statistical analysis: The data obtained were analyzed using the IBM Statistical Package for the Social Sciences Statistics 21 program. Cronbach's alpha was recalculated to assess the scale's reliability. Descriptive analyses were used to evaluate participants' sociodemographic characteristics, and the Kolmogorov-Smirnov test was applied to assess data distribution. The Independent Samples t-test and Kruskal Wallis test were used to evaluate the variables that didn't have a normal distribution. Intergroup comparisons were conducted using the Bonferroni and Tukey post-hoc tests while correlation analysis was conducted to examine the correlations between the scales. The statistical significance level was $p<0.05$.

RESULTS

Of the participants, 10.7% (n=44) were physicians, 66.2% (n=172) were nurses, 13.9% (n=57) were midwives, and 9.2% (n=38) were other HPs. The study found that the sphygmomanometer (70.1%; n=288), needle tip of injectors (30.9%; n=127), magnetic resonance device (20.7%; n=85), stretcher (67.6%; n=278), and wheelchair (72.7%; n=299), which are commonly used by HPs, were not suitable (Table 2).

The mean scores of HPs on the scales used in this study were OHBEF=65.09±8.80, GAMS-27= 77.91±4.52, ATOP=59.24±0.23. Considering the correlation between the HPs' mean score on OHBEF and sociodemographic variables, there was a weak positive correlation between age and men's mean BMI ($p<0.05$). A significant correlation was found between the mean OHBEF score and occupational groups ($p<0.001$). As a result of the Bonferroni post-hoc test conducted to determine which groups caused the difference, the difference was between physicians and nurses, and midwives and other HPs. A significant difference was found between the occupational groups in terms of GAMS-27 scores ($\chi^2=8.693$, $p=0.03$). In a further analysis, the difference was found to be between midwives and all other healthcare professionals ($p<0.05$) (Table 3).

A very weak positive correlation was found for GAMS-27 with OHBEF ($r= 0.208$, $p<0.001$) and ATOP ($r= 0.117$, $p= 0.018$) (Table 4).

Table 2. Data on the suitability of the medical materials, diagnosis devices, and physical environment for women with obesity (n= 411).

Materials*		n (%)	Materials*		n (%)
Sphygmomanometer	Suitable	105 (25.5)	**Magnetic resonance device**	Suitable	169 (41.1)
	Unsuitable	288 (70.1)		Unsuitable	85 (20.7)
	Unused	18 (4.4)		Unused	157 (38.2)
Weighing instrument	Suitable	144 (35.0)	**Ultrasonography device and probe**	Suitable	129 (31.4)
	Unsuitable	204 (49.6)		Unsuitable	62 (15.1)
	Unused	63 (15.3)		Unused	220 (53.5)
Injector needle tip	Suitable	258 (62.8)	**Mammography device**	Suitable	68 (16.5)
	Unsuitable	127 (30.9)		Unsuitable	163 (39.7)
	Unused	26 (6.3)		Unused	180 (43.8)
Stretcher	Suitable	116 (28.2)	**Gynecological examination table**	Suitable	120 (29.2)
	Unsuitable	278 (67.6)		Unsuitable	104 (25.3)
	Unused	17 (4.1)		Unused	187 (45.5)
Patient's bed and materials	Suitable	164 (39.9)	**Gynecological speculum**	Suitable	296 (72.0)
	Unsuitable	223 (54.3)		Unsuitable	68 (16.5)
	Unused	24 (5.8)		Unused	47 (11.4)
Patient's support materials	Suitable	240 (58.4)	**Patient's handling lift**	Suitable	267 (65.0)
	Unsuitable	134 (32.6)		Unsuitable	113 (27.5)
	Unused	37 (9.0)		Unused	31 (7.5)
Wheelchair	Suitable	79 (19.2)	**Door width of the patient's room**	Suitable	167 (40.6)
	Unsuitable	299 (72.7)		Unsuitable	192 (46.7)
	Unused	33 (8.0)		Unused	52 (12.7)
Surgical gown	Suitable	89 (21.7)	**Patient's restroom**	Suitable	261 (63.5)
	Unsuitable	266 (64.7)		Unsuitable	121 (29.4)
	Unused	56 (13.6)		Unused	29 (7.1)
Patient's diaper and pad	Suitable	150 (36.5)	**Room width (m^2)**	Suitable	213 (51.8)
	Unsuitable	196 (47.7)		Unsuitable	94 (22.9)
	Unused	65 (15.8)		Unused	104 (25.3)
Anti-embolism socks	Suitable	95 (23.1)			
	Unsuitable	207 (50.4)			
	Unused	109 (26.5)			

*: Commonly used materials; [a] : Oxygen mask, walker, etc.; Standard deviation

Table 3. Correlation between the participants' demographic characteristics and mean scale scores (n=411).

Scales		**Mean±SD**	**Min-max**					
OHBEF		65.09±8.80	36- 92					
GAMS-27		77.91±4.52	67- 89					
ATOP		59.24±0.23	58.65- 59.85					
			OHBEF		**GAMS-27**		**ATOP**	
Variable		**Mean±SD**	**Mean±SD**	**Statistic (p)**	**Mean±SD**	**Statistic (p)**	**Mean±SD**	**Statistic (p)**
Age, years		30.75±8.474	24.85±3.25	r= 0.152 (**0.002**)	77.91±4.52	r=-0.013 (0.790)	59.24±0.23	r=-0.051 (0.300)
BMI, female		23.20±3.64	64.81±8.68	r= -0.63 (0.243)	78.19±4.47	r=-0.081 (0.153)	59.24±0.23	r=0.037 (0.490)
BMI, male		24.85±3.25	66.58±9.36	r= 0.413 (**0.001**)	76.48±4.54	r= 0.276 (**0.033**)	59.23±023	r=0.076 (0.719)
		n (%)	**MR**	**Statistic (p)**	**MR**	**Statistic (p)**	**MR**	**Statistic (p)**
Profession	Physician	44 (10.7)	275.51	χ^2= 18.31 (**<0.001**)	199.08	χ^2= 8.693(**0.03**)	201.47	χ^2= 2.921 (0.404)
	Nurse	272 (66.2)	200.73		191.26		202.82	
	Midwife	57 (13.9)	169.14		207.28		234.82	
	Other	38 (9.2)	213.26		149.57		201.93	
Sex	Female	344 (83.7)	201.48	z= -1.751 (0.08)	196.00	z= -3.281(**0.001**)	207.34	z= -0.519 (0.604)
	Male	67 (16.3)	229.22		146.03		199.13	
Have you ever been overweight in your life?	Yes	153 (37.2)	201.86	z= -0.544 (0.586)	191.07	χ^2= -0.422 (0.673)	218.15	z= -1.601 (0.109)
	No	258 (62.8)	208.45		186.19		198.79	

SD: Standard deviation; r: Spearman correlation; t: Independent Samples t-test; χ^2: Kruskal Wallis Test; MR: Mean Rank; OHBEF: The Questionnaire on Patient Care Obstacles for Patients with Obesity; ATOP: The Attitudes Toward Obese People Scale; GAMS-27: GAMS 27- Obesity Prejudice Scale

Table 4. Correlation between GAMS-27, OHBEF, and ATOP (n= 411).

	OHBEF r (p)	ATOP r (p)
GAMS-27	0.208 (**<0.001**)	0.117 (**0.018**)

r: Spearman correlation

DISCUSSION AND CONCLUSION

The main reasons why individuals with obesity receive insufficient care services are negative stereotypes, unkind behaviors of health professionals, and the unsuitability of medical equipment and supplies.[11,16-21] The study revealed that commonly used items like sphygmomanometers, needle tips, MRI machines, stretchers, and wheelchairs, along with healthcare facility conditions, were not suitable for obese patients. A relevant study showed that gynecological examination devices or mammography devices suitable for the anatomical features of overweight women were insufficient, and this situation prevents women from having such screening tests.[7,18] A study that examined women's experiences as overweight patients reported that the sphygmomanometer, examination table, and examination gown that is used in healthcare centers and examination rooms and chairs and sofas in waiting rooms are unsuitable according to the participants.[18] A study reported that 69% of nurses lacked access to necessary equipment for obese patients, such as appropriately sized sphygmomanometers, injectors, stretchers, and wheelchairs, thus limiting effective care.[17] The results of the study are consistent with the existing literature.

Studies have shown that HPS are unwilling to care for patients with obesity.[6,17,19-21] The study found that HPs generally have negative perceptions of female patients with obesity, as indicated by their high mean scores on the OHBEF. These findings align with existing literature. Ak et al.'s study found that participants reported increased obstacles in providing care to patients with obesity as their age and years of experience grew.[2] Prejudices of older healthcare professionals towards obese women are due to social norms, personal biases, professional experiences and communication styles.[6,22] This study also determined that female HPs were more prejudiced against patients with obesity compared to male HPs. Similarly, studies in the literature show that women are more prejudiced against individuals with obesity than men.[28] Research suggests that female healthcare providers may exhibit more pronounced biases against obese women compared to their male counterparts. This could be due to a combination of societal pressures on women regarding body image and the internalization of these biases within the healthcare profession. Female providers might project their own insecurities or societal expectations onto their patients, leading to harsher judgments.[6,22,26] Nurses faced several barriers in caring for patients with obesity, mainly due to inadequate equipment and negative stereotypes and attitudes. Nurses' attitudes towards obese patients are often negative, influenced by personal beliefs and professional experiences. Moderately, those working in primary healthcare face unique challenges when addressing the needs of obese patients, though they tend to display lower levels of prejudice compared to other healthcare professionals.[19,20-24] This could be due to the fact that they have more to do with the different needs of patients in the communities. However, one study found that the lack of specialized equipment and resources in midwifery practice also contributes to a lower standard of care for obese patients.[24] Even though midwives may show fewer explicit they can still convey negative attitudes through nonverbal cues such as gestures and facial expressions, which can impact patients' comfort and willingness to seek care.[8,19,24]

Patients with obesity often face negative attitudes from healthcare professionals due to care barriers, as previous studies have shown.[17,20,23,29,30] This study also found that healthcare professionals displayed moderately negative attitudes toward women with obesity. Similarly, different studies found that BMI affected prejudice and attitudes against obesity.[4,25] In Usta and Akyolcu's study, having a person with obesity in their family/relatives and being overweight at some point in their life can impact negative attitudes and behaviors displayed toward overweight individuals or people with obesity.[17] The studies in the literature were mainly conducted with students in health-related departments. These studies showed that students displayed prejudiced and negative behaviors against individuals with obesity.[4,12,21,24-27] In a study by Ünal conducted with HPs in Türkiye, the mean score on GAMS-27 was 80.6±10.55.[11] This result was similar to previous studies. This study found a very weak positive correlation of GAMS-27 with OHBEF and ATOP. Yavuz and Baysal's study with midwives and nurses in primary healthcare institutions revealed lower levels of prejudice tendencies compared to this study.[24] This difference was attributed by researchers to the absence of specialized equipment for the healthcare professionals involved, as well as the challenges they encounter while providing care to individuals with obesity. Prejudices and negative attitudes pose an obstacle against care provided to individuals with obesity, while a lack of equipment and materials cause negative attitudes and prejudice.[17,23]

In conclusion, similar to this study, previous research confirms that HPs' prejudice and negative attitudes towards women with obesity are influenced

by factors such as age, gender, experience, and inadequate resources or training. However, further research with larger samples is needed to explore additional stereotypes contributing to these attitudes. A limitation of this study is the lack of stratified random sampling, which may affect the homogeneity of responses across different professional groups despite a diverse range of participants. Additionally, while the study examined demographic and professional variables like gender, occupation, and BMI, it did not explore other factors, such as the physical strength of HPs, which may influence their attitudes towards obese female patients. The primary focus was on general attitudes, limiting the depth of analysis on specific variables.

Ethics Committee Approval: The approval of Istanbul University – Cerrahpasa, Social Humane Ethics Committee (Date: 07.01.2020, decision no: 2019/173) was obtained. The permissions of the authors of the scales used in the study were obtained via e-mail. During the study, the Helsinki Declaration criteria were complied with to protect the healthcare professionals' data, and written via e-mail consent was obtained from all the healthcare professionals participating in the study.

Conflict of Interest: No conflict of interest was declared by the authors.

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REFERENCES

1. Centers for Disease Control and Prevention. Adult obesity prevalence maps. Updated September 21, 2023. https://www.cdc.gov/obesity/data/prevalence-maps.html. Accessed October 3, 2024.
2. Ak ES, Türkmen A, Özbaş A, Fındık ÜY. Examination of attitudes of nurses working in surgical services toward obesity and obese patients. Bariatr Surg Pract Patient Care. 2021;16(3). doi:10.1089/bari.2020.0072
3. Wang J, Zhu L, Liu L, et al. Overweight and Obesity are risk factors of severe illness in patients with COVID-19. Obesity (Silver Spring). 2020;28(11):2049-2055. doi:10.1002/oby.22979
4. Sert H, Seven A, Çetinkaya S, Pelin M, Aygin D. Evaluation of prejudice against obesity in health high school students. Online Turkish J Heal Sci. 2016;1(4):9-17.
5. Hales C, Gray L, Russell L, MacDonald C. A. Qualitative study to explore the impact of simulating extreme obesity on health care professionals' attitudes and perceptions. Ostomy Wound Manage. 2018;64(1):18-24.
6. Fulton M, Dadana S, Srinivasan VN. Obesity, stigma, and discrimination. Updated October 26, 2023. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; January 2024.
7. Perkins RB, Wentzensen N, Guido RS, Schiffman M. Cervical cancer screening: a review. Jama. 2023;330(6):547-558. doi:10.1001/jama.2023.13174
8. Talumaa B, Brown A, Batterham RL, Kalea AZ. Effective strategies in ending weight stigma in healthcare. Obesity Reviews. 2022;23 (10):e13494. doi:10.1111/obr.13494
9. Akpor OA, Akingbade TO, Olorunfemi O. Lack of adequate equipment for healthcare – the agony of patients and nurses: a review. Indian J Contin Nurs Educ. 2023;24(1):7-10. doi:10.4103/ijcn.ijcn_96_21
10. Turkish Statistical Institute. Health Statistics. Published 2017. https://data.tuik.gov.tr/Kategori/GetKategori?p=saglik-ve-sosyal-koruma-101&dil=1. Accessed July 3, 2024.
11. Ünal D. Evaluation of health care workers' attitudes towards obese individuals. Master's thesis, Başkent University, Institute of Health Sciences, Department of Nutrition and Dietetics; Ankara, Türkiye; 2018.
12. Ercan A, Akçil Ok M, Kiziltan G, Altun S. Development of the obesity bıas scale for health sciences students: GAMS 27-obesity bias scale. Int Peer-Reviewed J Nutr Res. 2015;2(3):29-43.
13. Allison DB, Basile VC, Yuker HE. The measurement of attitudes toward and beliefs about obese persons. Int J Eat Disord. 1991;10(5):599-607. doi:10.1002/1098-108X(199109)10:5<599::AID-EAT2260100512>3.0.CO;2-%23
14. Dedeli O, Bursalioglu SA, Deveci A. Validity and reliability of the Turkish version of the attitudes toward obese persons scale and the beliefs about obese persons scale. Clin Nurs Stud. 2014;2(4):105-116. doi:10.5430/cns.v2n4p105
15. Tavşancıl E. Tutumların Ölçülmesi ve SPSS ile Veri Analizi Yöntemleri. 6th ed. Ankara: Nobel Akademik Yayıncılık Eğitim Danışmanlık Tic. Ltd. Şti; 2019.
16. Puhl RM. Weight stigma and barriers to effective obesity care. Gastroenterology Clinics. 2023;52 (2):417-428. doi:10.1016/j.gtc.2023.02.002
17. Usta E, Akyolcu N. The evaluation of surgical nurses' knowledge and applications on the care of overweight. Florence Nightingale Journal of Nursing. 2014;(1):1-7.
18. Fuzzell LN, Perkins RB, Christy SM, Lake PW, Vadaparampil ST. Cervical cancer screening in the United States: Challenges and potential solutions for underscreened groups. Preventive Medi-

cine. 2021;(144):106-400. doi:10.1016/j.ypmed.2020.106400
19. Lawrence BJ, Kerr D, Pollard CM, Theophilus M, Alexander E, Haywood D, O'Connor M. Weight bias among health care professionals: a systematic review and meta-analysis. Obesity. 2021;29(11):1802-1812. doi:10.1002/oby.23266
20. Yılmaz HÖ, Yabancı Ayhan N. Is there prejudice against obese persons among health professionals? A sample of student nurses and registered nurses. Perspect Psychiatr Care. 2019;55(2):262-268. doi:10.1111/ppc.12359
21. Ercan A, Altun S, OK MA. The impact of occupational education on obesity prejudice of university students. Prog Nutr. 2021;23(1). doi:10.23751/pn.v23i1.8921
22. Puhl RM, Phelan SM, Nadglowski J, Kyle TK. Overcoming weight bias in the management of patients with diabetes and obesity. Clin Diabetes. 2016 Jan;34(1):44-50. doi:10.2337/diaclin.34.1.44.
23. Aker S, Şahin MK. Obesity bias and stigma, attitudes, and beliefs among intern doctors: A cross-sectional study from Türkiye. Obes Surg. 2024;34(1):86-97. doi:10.1007/s11695-023-06919-2
24. Yavuz AY, Baysal H. Prejudice obesity of midwives and nurses in the primary health care. Adnan Menderes University Faculty of Health Sciences Journal. 2020;4(3):195-202.
25. Aydin T, Erçelik ZE, Gönen B, Aydin D, Günşen U. Determining the obesity pre-judgments of university students. Balıkesir J Heal Sci. 2020;9(2):67-74.
26. Jayawickrama RS, O'Connor M, Flint SW, Hemmingsson E, Lawrence BJ. Explicit and implicit weight bias among health care students: a cross-sectional study of 39 Australian universities. E Clinical Medicine. 2023;58:101-894. doi:10.1016/j.eclinm.2023.101894
27. Robinson EL, Ball LE, Leveritt MD. Obesity Bias among health and non-health students attending an Australian university and their perceived obesity education. J Nutr Educ Behav. 2014;46(5):390-395. doi:10.1016/j.jneb.2013.12.003
28. Yılmaz HÖ, Nurcan Y, Ömer Yilmaz H, Ayhan NY. Attitudes and behaviors of nursing students towards obese individuals. ACTA Sci Med Sci. 2018;2(6):3-9.
29. Tomiyama AJ, Carr D, Granberg EM, et al. How and why weight stigma drives the obesity "epidemic" and harms health. BMC Med. 2018;16(1):123. doi:10.1186/s12916-018-1116-5
30. Wise FM, Harris DW, Olver JH. Attitudes to obesity among rehabilitation health professionals in Australia. J Allied Health. 2014;43(3):162–168.

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Evaluation of Post Traumatic Stress Disorder in Patients Aged 40-80 years Old with COVID-19 Registered with Family Health Centers

Aile Sağlığı Merkezlerine Kayıtlı COVID-19 Geçiren 40-80 yaş Arası Hastalarda Post Travmatik Stres Bozukluğunun Değerlendirilmesi

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ABSTRACT

Objective: This study aimed to investigate the levels of Post Traumatic Stress Disorder (PTSD) in Coronavirus Disease-2019 (COVID-19) patients during the pandemic and to determine the relationship of this situation with sociodemographic and other environmental factors.

Materials and Methods: Our research is a cross-sectional descriptive study in which a 20-question survey and the Impact of Events Scale (IES) were applied to 200 individuals between the ages of 40 and 80 who had COVID-19 and were registered in 5 different Family Health Centers.

Results: The participants' mean IES was 19.9±8.9. It was significantly higher in women, singles, individuals with primary education levels and before, and individuals with continued symptoms after COVID-19 ($p<0.05$). When the diagnostic cut-off value for PTSD for the IES is taken as 30, 26 (13.0%) individuals participating in the study have a risk for PTSD.

Conclusions: The participants' PTSD risk level after COVID-19 was lower than in the early times of the epidemic. This low rate is the better recognition of the disease in society, the widespread use of vaccines, and the relaxation of restrictive measures such as quarantine. Activities in this direction are also crucial in combating possible future epidemics.

Keywords: COVID-19, mental health, posttraumatic stress disorder

ÖZ

Amaç: Koronavirüs Hastalığı-2019 (COVID-19) hastalarının pandemi döneminde Post Travmatik Stres Bozukluğu (PTSB) düzeylerinin araştırılması ve bu durumun sosyodemografik ve diğer çevresel faktörlerle ilişkisinin saptanması amaçlanmıştır.

Materyal ve Metot: Araştırmamız 5 farklı Aile Sağlığı Merkezine kayıtlı, COVID-19 geçiren 40-80 yaş arası 200 bireye, 20 soruluk bir anket ve Olayların Etkisi Ölçeği (OEÖ) uygulanan kesitsel tanımlayıcı bir araştırmadır.

Bulgular: Katılımcıların ortalama OEÖ puanı 19,9±8,9 olup kadınlarda, bekarlarda, eğitim seviyesi ilköğretim ve öncesi olan ve koronavirüs hastalığı sonrası semptom devamı olan bireylerde anlamlı olarak daha yüksek saptanmıştır ($p<0,05$). OEÖ'nün PTSB için tanı koydurucu kesim değeri 30 alındığında, çalışmaya katılan bireylerin 26'sında (%13) PTSB açısından risk vardır.

Sonuç: Katılımcıların COVID-19 sonrası PTSB risk düzeyi, salgının ilk zamanlarına göre düşük saptanmıştır. Bu düşüklüğün sebebi hastalığın toplumda daha iyi tanınır hale gelmesi, aşı uygulamalarının yaygınlaşması, karantina gibi kısıtlayıcı önlemlerin gevşetilmesidir. Bu yöndeki faaliyetler, gelecekteki olası salgınlarla mücadele açısından da önem taşımaktadır.

Anahtar Kelimeler: COVID-19, mental sağlık, post travmatik stres bozukluğu

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INTRODUCTION

Any situation threatening a person's life or physical integrity can have a traumatic effect on the person. Sudden thoughts, nightmares, re-experiencing the traumatic event, avoidance of traumatic events, sensory sensitivity, and sleep disturbances characterize Post Traumatic Stress Disorder (PTSD). All of these lead to significant social, occupational, and interpersonal dysfunction.[1] Epidemics and pandemics are also included in traumatic events.[2]

The mental health of the individuals diagnosed with Coronavirus Disease-2019 (COVID-19) is under threat due to the clinical severity of the disease, fear of death, health anxiety, quarantine conditions, anxiety about contagion to their relatives, and stigma of the disease.[3] Therefore, evaluating the mental health of patients with COVID-19 and intervening early in psychopathologies can reduce the development of PTSD due to COVID-19.[4]

Determining the effects of epidemics on the mental health of the community can provide earlier and more accurate psychological intervention in future epidemics.[5] In the early days of the COVID-19 epidemic, it has been determined that the people who may be exposed to the negative consequences of the epidemic are primarily people over 50.[6]

The pandemic period is a new process that people have not had any experience with before and must struggle individually and socially. Two Italian studies on recovered severe COVID-19 survivors reported that the prevalence of PTSD is 10.4% and 30.2%, respectively.[7,8]

In this study, we aimed to determine the risk of developing PTSD in patients aged 40-80 diagnosed with COVID-19 during the pandemic. The effects of the current as well as of past epidemics on the mental health of survivors can help predict the psychopathological consequences of a severe life-threatening viral disease.

MATERIALS AND METHODS

Ethics Committee Approval: This study was approved by the Manisa Celal Bayar University School of Medicine Clinical Research Ethics Committee (Date: 22.09.2021, decision no: 20.478.486/948) and approved by Manisa Provincial Health Department (Date: 16.12.2021, decision no: E-79593712-604.02.01). This study was carried out in accordance with international standards.

Study Design and Participants: This cross-sectional descriptive study consisted of patients aged 40-80 who had COVID-19 in the last three months and registered in 5 different Family Health Centers in the central districts of Manisa province. According to the evaluation of whether there is a difference between the two groups in terms of PTSD risk in the study, it was determined that at least 134 patients should be included in the study in the sample size calculation made by considering an effect size of 0.50, a power of 0.80 and a margin of error of 0.05. Considering the universe that could be reached in the study, it was evaluated that the sample would not be normally distributed. The effect power was considered medium-sized and was analyzed at 0.50. Sample size calculation was made with the G*Power 3.1.9.7 program.

This study included two hundred people between December 2020 and February 2021. A signed "informed consent" document was obtained from these individuals. There are no missing data. The dependent variable of the study is the participants' PTSD risk. Independent variables in the descriptive information form are gender, educational status, and marital status. Individuals younger than 40 and older than 80 years old, having mental retardation, psychotic disorder, dementia, delirium, or one of the other amnestic disorders, and not carrying COVID-19 were not included in the study.

Data Collection: Study data were collected between 16.12.2020 and 16.02.2021. Data analysis and report writing started in March 2022 and ended in April 2022. Questionnaires were filled out face-to-face based on the individuals' self-reports.

Data Collection Tools: The study team created a questionnaire form by scanning the literature, and the Impact of Events Scale (IES) was used.

Data Form: The survey consists of 20 questions that will help determine the participants' sociodemographic information, smoking status, chronic disease history, psychological health, whether they need psychological support, symptoms when they have COVID-19 and hospitalization status.

Impact of Events Scale: The IES was developed by Creamer et al.[9] in 2003 to determine the stress of trauma cases during the application of the scale, and its Turkish validity reliability was performed by Çorapçıoğlu et al.[10] in 2006. In our study, IES evaluates how many people who have had COVID-19 disease in the last three months are disturbed and damaged by this disease. The scale is a 22-item scale consisting of three subscales: re-experiencing, avoidance, and hypervigilance. The scores that can be obtained from the scale range from 0 to 88, and as the total score increases, it is considered that the risk of PTSD increases. The diagnostic cut-off value for PTSD was taken as '30'. IES was used in a study on the psychological impact of the COVID-19 epidemic on healthcare workers at the beginning of the pandemic.[11] In another study, the risk of developing PTSD in patients who experienced earthquakes and fire was made IES.[12]

Data Analysis: Statistical Package for The Social Sciences (IBM SPSS) 15.0 statistical package program was used to evaluate and analyze the data obtained from the study. In the study, categorical variables were given as number (n) and percentage (%), and numerical data were presented as mean and standard deviation to show the patient distribution. It was determined whether the variables' distribution was normal according to the Skewness-Kurtosis values (-2/+2).[13] Normally distributed variables were compared using Student's t-test, and non-normally distributed variables were compared using the Mann -Whitney-U test. The Chi-square test was used to compare categorical variables. The obtained data were interpreted with the statistical significance level "p" value. Values with a p-value of <0.05 were considered statistically significant.[11] Regression analysis was performed to control confounding factors.[14] Multiple linear regression models were used to determine the effects of variables on the IES.

RESULTS

The average age of the participants was 48.1±9.4 years (Min: 40, Max: 80). 122 (61.0%) of the participants are women, and 180 (90%) of the study participants are married. 92 (46.0%) of them are primary school graduates and before. 117 (58.5%) currently work in any job, and 131 (65.5%) are non-smokers. It was determined that 11 (5.5%) of them lived alone. It was observed that 96 (48.0%) of participants had one or more chronic diseases, and the most common were hypertension at 43 (21.5%), diabetes mellitus at 26 (13.0%), and lung diseases at 17 (8.50%), respectively. 43 (21.5%) of the participants in the study had a psychiatric diagnosis (depression and anxiety), and 41 (20.5%) of these people received any treatment. 60 (30.0%) participants lost a relative due to COVID-19, and 1 (0.5%) needed follow-up in the intensive care unit. 64 (32.0%) had symptoms after the COVID-19 disease was over. These symptoms are cough at a rate of 17 (8.5%), loss of taste and smell at a rate of 14 (7.0%), weakness, and muscle pain at a rate of 10 (5.0%) (Table 1).

Table 2 compares the participants' total IES and subgroup scale scores according to their sociodemographic characteristics. The mean score of the IES was 19.9±8.9. However, when the diagnostic cut-off value for PTSD is taken as 30, 26 (13.0%) of the individuals participating in the study have a risk for PTSD. In evaluating the PTSD risk, the mean IES scores of women were statistically higher (p=0.007). The mean scores of those with primary and preschool education were statistically higher than those who studied high school and post-secondary education in the relationship between educational status (p=0.005). At the same time, the singles' average scores were statistically higher than those of married ones (p<0.001). The mean scores of IES of those who did not work in any job were significantly higher (p=0.016). The mean scores of IES were significantly higher in those whose symptoms continued after COVID-19 (p <0.001). The mean scores of IES were slightly higher in those who lost a loved one due to COVID-19 (p=0.052). The mean scores of the Re-experiencing subgroup for women and those who did not work in any occupation were statistically higher IES scores (p=0.010). This rate was

Table 1. Descriptive of participants by sociodemographic characteristics (n=200).

Characteristics		**Date**
Age, Mean±SD, (min-max)		48.1±9.4 years (40-80)
Gender, n (%)	Woman	122 (61.0)
	Man	78 (39.0)
Marital Status, n (%)	Single (Unmarried, Widow, Divorced)	20. (10.0)
	Married	180.(90.0)
Education Status, n (%)	Primary Education and before	92 (46.0)
	High school and beyond	108 (54.0)
Occupation, n (%)	Working	117 (58.5)
	Non-working (Housewife and retired)	83 (41.5)
Smoking Status, n (%)	Yes	69 (34.5)
	No	131 65.5
Status of Living Alone, n (%)	Yes	11 (5.5)
	No	189 (94.5)
Chronic Disease Status, n (%)	Yes	96 (48.0)
	No	104 (52.0)
Psychiatric Diagnosis, n (%)	Yes	43 (21.5)
	No	157 (78.5)
Undergoing Psychiatric Treatment, n (%)	Yes	41 (20.5)
	No	159 (79.5)
Continuation of symptoms after COVID-19, n (%)	Yes	64 (32.0)
	No	136 (68.0)

Table 2. Comparison of the participants' total IES and subgroup scale scores according to their sociodemographic characteristics.

Characteristics		IES Total Score Mean ± SD	Re-experiencing Mean ± SD	Avoidance Mean ±SD	Hypervigilance Mean ± SD
Age#	40-49	19.3±8.7	3.9±3.9	11.3±3.8	4.0±3.6
	50-59	20.2±8.8	4.6±4.7	11.3±3.2	4.3±3.8
	≥60	22.1±9.6	5.4±5.2	10.9±2.6	5.4±4.2
	p	0.275	0.171	0.858	0.184
Gender†	Women	21.2±9.4*	4.9±4.8*	11.2±3.0	5.0±4.1*
	Men	17.7±7.6	3.3±2.9	11.3±4.2	3.2±3.0
	p	**0.007**	**0.010**	0.840	**0.002**
Marital StatusΦ	Single	27.1±13.4*	7.5±6.1*	11.8±4.2	7.2±5.3*
	Married	19.1±7.9	3.9±3.8	11.2±3.4	4.0±3.4
	p	**0.001**	**0.001**	0.506	**0.001**
Education Status†	Primary Education and before	21.8±8.9*	4.6±4.6	12.0±3.1*	5.1±3.8*
	High school and beyond	18.2±8.6	3.9±3.9	10.6±3.8	3.6±3.7
	p	**0.005**	0.238	**0.008**	**0.009**
Occupation†	Working Individual	18.6±7.8*	3.6±3.3*	11.2±3.8	3.7±3.3*
	Non-working Individual	21.7±10.0	5.1±5.2	11.3±3.1	5.2±4.3
	p	**0.016**	**0.013**	0.984	**0.007**
Smoking Status†	Yes	19.4±8.5	3.9±3.7	11.6±3.9	3.9±3.6
	No	20.2±9.4	4.5±4.7	11.2±3.3	4.4±4.0
	p	0.553	0.392	0.436	0.379
Status of Living Alone†	Yes	21.8±12.1	5.0±5.3	11.4±4.3	5.0±5.5
	No	19.7±8.7	4.2±4.2	11.2±3.5	4.3±3.7
	p	0.467	0.523	0.879	0.507
Chronic Disease Status†	Yes	20.8±9.2	4.8±4.5	11.2±3.2	4.8±4.0
	No	19.0 ±8.6	3.8±3.9	11.3±3.8	3.9±3.6
	p	0.150	0.102	0.833	0.105
Psychiatric Diagnosis†	Yes	20.1±10.5	4.6±5.0	10.3±3.3	5.1±4.6
	No	19.8±8.4	4.1±4.0	11.5±3.5	4.1±3.5
	p	0.817	0.478	0.055	0.115
Undergoing Psychiatric Treatment†	Yes	20.3±10.7	4.7±5.1	10.4±3.41	5.1±4.7
	No	19.7±8.4	4.1± 4.05	11.5±3.58	4.1±3.5
	p	0.712	0.409	0.094	0.122
Continuation of symptoms after COVID-19†	Yes	22.4±10.6*	6.0±5.2*	10.7±3.2	5.7±4.6*
	No	18.6±7.7	3.4±3.4	11.5±3.6	3.6±3.1
	p	**0.001**	**0.001**	0.106	**0.001**
Relative Death Due to COVID-19†	Yes	21.7±8.7	5.0±4.4	11.7±3.5	5.1±3.6
	No	19.1±8.9	3.9±4.1	11.1±3.5	4.0±3.8
	p	0.052	0.099	0.239	0.068

IES: İmpact of Even Scale; *: Significance; †: Student t-test; Φ: Mann Whitney U test; #: ANOVA.

higher in singles, with a significant difference compared to married ones (p <0.001). The mean re-experiencing subgroup score was higher in those with symptoms after COVID-19 than those without symptoms (p = 0.001). It was determined that the mean scores of those who received primary and preschool education were statistically higher than those who received high school and post-secondary education in the Avoidance subgroup (p=0.008). Singles, women, those with primary and earlier education, those who do not work, and whose symptoms continued after COVID-19 had significantly higher scores in the Hypervigilance subgroup (p <0.001).

DISCUSSION AND CONCLUSION

Contagious epidemics such as COVID-19 are also considered traumatic experiences, causing fear and anxiety. Global concern has occurred due to the increasing epidemic threat, social isolation, unnecessary information overload by the media, panic buying requirements, and economic problems.[1]

Studies on the relationship between gender and risk of PTSD showed that women are more prone to stress-related psychiatric disorders than men.[15,16] At the same time, a study on marital status reported that married individuals experienced lower psychological distress than unmarried individuals after COVID-19

infection.[17] Women and unmarried people in our country were riskier regarding PTSD after COVID-19.

There are studies on the predisposition to posttraumatic risk of PTSD with a low level of education.[18,19] Zhang et al.,[20] in another study, it was reported that trauma scores increased as the level of education increased during the COVID-19 process. They attributed this result to the fact that people with higher education probably follow social media more and have more information about the possibilities that may happen to them. In our study, it was thought that the low level of education of the individuals increased the risk of PTSD. In another study evaluating PTSD due to COVID-19, nurses with lower education levels were found to have higher levels of PTSD.[21] This situation may have been affected by the fact that people with low education levels used social media or rumors that would increase people's anxiety levels, rather than scientific sources, in accessing information about COVID -19.

Although studies suggest that the death of a close relative due to COVID-19 increases the risk of PTSD, our study found that the death of a relative due to COVID-19 does not increase the risk of PTSD.[22,23]. This result was thought to be related to the fact that the disease became better known in society compared to the first periods and the initiation of social vaccination at the time of our study.

A study on the relationship between symptom persistence and risk of PTSD after COVID-19 disease showed that the prolonged duration of COVID-19 symptoms significantly contributes to psychopathology.[24] Our results were consistent with this situation, which can be explained by the persistence of symptoms in individuals, creating more psychological pressure on the individual.

In a study on the psychological effect of the COVID -19 epidemic on healthcare workers at the beginning of the pandemic, IES was used, and PTSD symptoms were found in 63.0%.[11] Social isolation, uncertainty, fear of being infected, and reluctance to work were the reasons for the high-stress level of the employees during this period. In a study by Zhu et al.,[25] this rate was 30.0%. In our study, PTSD risk levels in the first three months after COVID-19; 26 (13.0%) of the individuals participating had a risk in terms of PTSD risk, and 174 (87%) had no risk. A study conducted on an Italian population showed a significant correlation between PTSD and COVID-19. The Italian population has registered a considerably high percentage of PTSD (29.5%). Due to the increase in knowledge about COVID-19 and the start of vaccination during the period of the study, the risk of PTSD in people with COVID-19 was found to be lower than the risk seen in previous studies.[26]

The most important limitation of this study is that this study was carried out with individuals who applied to Family Health Centers. However, to prevent potential taking sides, it was tried to reach all individuals who applied to Family Health Centers and had COVID-19 during the research dates. The pandemic period is a new community that people have not had any experience with before and must struggle individually and socially. Developing strategies for spiritual needs in future epidemics with the research and results obtained during the pandemic is essential. Our study shows that some groups are disadvantaged in terms of mental health. This population should be considered more during pandemic periods. In addition, applying psychological support programs to this population will protect public health.

Considering all the information in this study, the PTSD risk rate was high in women, in those whose marital status was single, in those whose educational status was at primary school and before, and whose findings persisted after COVID-19 infection.[27] This risky group with low mental stability is thought to be more vulnerable to epidemics. To protect the mental health of these people, there is a need for awareness-raising training and timely psychological intervention. In the patient follow-up conducted by primary care physicians during pandemic periods, the psychological status of individuals should be briefly questioned, and early intervention should be made for possible diagnoses.

In conclusion, the participants' risk level of post-COVID-19 traumatic stress disorder was found to be lower compared to the early times of the epidemic. It was thought that the better recognition of the disease in the community, the widespread use of vaccines, and the relaxation of restrictive measures such as quarantine were influential in determining the low PTSD risk level of the participants after COVID-19.

Ethics Committee Approval: This study was approved by the Manisa Celal Bayar University School of Medicine Clinical Research Ethics Committee (Date: 22.09.2021, decision no: 20.478.486/948) and approved by Manisa Provincial Health Department (Date: 16.12.2021, decision no: E-79593712-604.02.01). This study was carried out in accordance with international standards.

Conflict of Interest: No conflict of interest was declared by the authors.

Author Contributions: Concept – TB, HE; Supervision – HE, FÖ; Materials – TB, HE; Data Collection and/or Processing - TB Analysis and/or Interpretation – HE; Writing - TB, HE, FÖ.

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REFERENCES

1. Rosen V, Ayers G. An update on the complexity and importance of accurately diagnosing posttraumatic stress disorder and comorbid traumatic brain injury. Neurosci Insights. 2020;15:1-8.
2. Bolu A, Erdem M, Öznur T. Post traumatic stress disorder. Anatol J Clin Investig. 2014;8(2):98-104.
3. Sun L, Sun Z, Wu L, et al. Prevalence and risk factors for acute posttraumatic stress disorder during the COVID-19 outbreak. J Affect Disord. 2021;283:129.
4. Taylor S. The psychology of pandemics: preparing for the next global outbreak of infectious disease. UK: Cambridge Scholars Publishing. 2019.
5. Polizzi C, Lynn SJ, Perry A. Stress and coping in the time of COVID-19: pathways to resilience and recovery. Clin Neuropsychiatry. 2020;17 (2):59-62.
6. Qiui J, Shen B, Zhao M, Wang Z, Xie B, Xu Y. A nationwide survey of psychological distress among Chinese people in the COVID-19 epidemic: Implications and policy recommendations. Gen Psychiatry. 2020;33(2):e100213. doi:10.1136/gpsych-2020-100213
7. Janiri D, Carfì A, Kotzalidis GD, et al. Posttraumatic stress disorder in patients after severe COVID-19 infection. JAMA Psychiatry. 2021;78 (5):567-569.
8. Tarsitani L, Vassalini P, Koukopoulos A, et al. Posttraumatic stress disorder among COVID-19 survivors at 3-month follow-up after hospital discharge. J Gen Intern Med. 2021;36(6):1702-1707.
9. Creamer M, Bell R, Failla S. Psychometric properties of the Impact of Event Scale-Revised. Behav Res Ther. 2003;41(12):1486-1496.
10. Çorapçıoğlu A, Yargıç İ, Geyran P, Kocabaşoğlu N . "Validity and reliability of Turkish version of "Impact of Event Scale-Revised. New Symp. 2006;44(1):14-22.
11. Lasalvia A, Bonetto C, Porru S, et al. Psychological impact of COVID-19 pandemic on healthcare workers in a highly burdened area of north-east Italy. Epidemiol Psychiatr Sci. 2021;30:e1.
12. Cankardaş S, Sofuoğlu Z. Posttraumatic stress disorder symptoms and predictors of symptoms in people who experienced an earthquake or fire. Turkish Journal of Psychiatry. 2019;30(3):151-156.
13. Demir S. Comparison of normality tests in terms of sample sizes under different skewness and kurtosis coefficients. IJATE. 2022;9(2):397-409.
14. Hayran O. How scientific is scientific research: mixers, colliders and impact modifiers J Biotechnol Strateg. Health Res. 2021;5(3):166-177.
15. Blekas A, Voitsidis P, Athanasiadou M, et al. COVID-19: PTSD symptoms in Greek health care professionals. Psychol Trauma. 2020;12 (7):812-819.
16. Otte MW, Vinkers CH, Habets PC, Van Ijzendoorn DGP, Tijdink JK . Analysis of 567,758 randomized controlled trials published over 30 years reveals trends in phrases used to discuss results that do not reach statistical significance. PloS Biol. 2022;20(2):e3001562.
17. Ma YF, Li W, Deng HB, et al. Prevalence of depression and its association with quality of life in clinically stable patients with COVID-19. J Affect Disord. 2020;275:145-148.
18. Kvestad I, Ranjitkar S, Ulak M, et al. Earthquake exposure and posttraumatic stress among Nepalese mothers after the 2015 earthquakes. Front. Psychol. 2019;10:734. doi:10.3389/ fpsyg.2019.00734
19. Sun X, Li X, Huang J, An Y. Prevalence and predictors of PTSD, depression and posttraumatic growth among Chinese firefighters. Arch Psychiatr Nurs. 2019;34(1):14-18.
20. Zhang Y, Ma ZF. Impact of the COVID-19 pandemic on mental health and quality of life among local residents in Liaoning Province, China: A cross-sectional study. Int J Environ Res Public Health. 2020;17(7):2381. doi:10.3390/ ijerph17072381
21. Qutishat M, Abu Sharour L, Al-Dameery K, Al-Harthy I, Al-Sabei S. COVID-19–related posttraumatic stress disorder among Jordanian nurses during the pandemic. Disaster Med Public Health Prep. 2021;17:1-8. doi.org/10.1017/ dmp.2021.199
22. Bromet EJ, Atwoli L, Kawakami N, et al. Post traumatic stress disorder associated with natural and human-made disasters in the World Mental Health Surveys. Psychol Med. 2017;47(2):227-241. doi:10.1017/S0033291716002026
23. Azoulay E, Kentish-Barnes N. A 5-point strategy for improved connection with relatives of critically ill patients with COVID-19. Lancet Respir Med. 2020;8(6):e52. doi:10.1016/S2213-2600 (20)30223-X
24. Poyraz BÇ, Poyraz CA, Olgun Y, et al. Psychiatric morbidity and protracted symptoms after COVID-19. Psychiatry Res. 2021;295:113604. doi:10.1016/j.psychres
25. Zhu Z, Xu S, Wang H, et al. COVID-19 in Wuhan: Sociodemographic characteristics and hospital support measures associated with the immediate psychological impact on healthcare workers. EClinical Medicine. 2020;24:100443.
26. Forte, G, Favieri, F, Tambelli R, Casagrande M. The enemy which sealed the World: Effects of COVID-19 diffusion on the psychological state

of the Italian population. J Clin Med. 2020;9 (6):1802. doi:10.3390/jcm9061802

27. Sekowski M, Gambin M , Hansen K, et al. Risk of developing posttraumatic stress disorder in severe COVID-19 survivors, their families and frontline healthcare workers: What should mental health specialists prepare for? Front Psychiatry. 2021;12:562899. doi:10.3389/fpsyt.2021.562899

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How does being Overweight Affect the Choroid in Children?

Fazla Kilolu Olmak Çocuklarda Koroidi Nasıl Etkiler?

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ABSTRACT

Objective: The study aimed to compare the effect of overweight on choroidal thickness (CT) and choroidal vascular index (CVI) in children.

Materials and Methods: This study included forty-four overweight and obese children and 35 children with normal weight. After a complete ophthalmological examination of the participants, macula and choroidal images were taken with optical coherence tomography. The fovea's central macular thickness, subfoveal, 1000-µm nasal, and 1000-µm temporal CT were measured. Total choroidal area (TCA), luminal area (LA), and stromal area (SA) were measured using the binarization method.

Results: The mean body mass index (BMI) value of the overweight group was 27.70±1.55. The obese group was 35.73±3.84, and the control group was 21.56±1.44. Subfoveal CT, TCA, and SA values significantly differed between the groups (p=0.019, p=0.016, p=0.028, respectively). A significant positive correlation existed between BMI and subfoveal CT, TCA, and SA (r=0.264, p=0.019; r=0.233, p=0.038; r=0.231, p=0.041, respectively).

Conclusions: The obese group had significantly higher subfoveal CT, TCA, and SA values than the control group, and a significant positive correlation was found between BMI and subfoveal CT, TCA, and SA.

Keywords: Choroidal thickness, choroidal vascularity index, optical coherence tomography, overweight, pediatric obesity

ÖZ

Amaç: Bu çalışma kilo fazlalığının çocuklarda koroid kalınlığı (KT) ve koroid vasküler indeksini (KVİ) üzerine etkisini karşılaştırmayı amaçlamıştır.

Materyal ve Metot: Çalışmaya 44 fazla kilolu ve obez çocuk ile 35 normal kilolu çocuk dahil edildi. Katılımcıların tam oftalmolojik muayenesinin ardından optik koherens tomografi ile makula ve koroid görüntüleri alındı. Foveanın merkezi makula kalınlığı, subfoveal, 1000 µm nazal ve 1000 µm temporal KT ölçüldü. Toplam koroid alanı (TKA), luminal alanı (LA) ve stromal alan (SA), ikilileştirme yöntemi kullanılarak ölçüldü.

Bulgular: Aşırı kilolu grubun ortalama vücut kitle indeksi (VKİ) değeri 27,70±1.55; obez grubun ortalama VKİ değeri 35,73±3,84; kontrol grubunun ortalama VKİ değeri ise 21,56±1,44 idi. Subfoveal KT, TKA ve SA değerleri gruplar arasında anlamlı farklılık gösterdi (sırasıyla p=0,019, p=0,016, p=0,028). BMI ile subfoveal KT, TKA ve SA arasında anlamlı pozitif bir korelasyon mevcuttu (sırasıyla r=0,264, p=0,019; r=0,233, p=0,038; r=0,231, p=0,041).

Sonuç: Obez grubun subfoveal KT, TKA ve SA değerlerinin kontrol grubuna göre anlamlı derecede yüksek olduğunu gösterdi. Ayrıca VKİ ile subfoveal KT, TKA ve SA arasında anlamlı pozitif korelasyon bulundu.

Anahtar Kelimeler: Aşırı kilo, koroid kalınlığı, koroid vaskülarite indeksi, optik kohorens tomografi, pediatrik obezite

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INTRODUCTION

Obesity is a significant and growing health problem worldwide. The increase in obesity causes various childhood diseases.[1] It affects many systems, one of which is the eye. Ocular diseases such as dry eye, glaucoma, cataracts, diabetic retinopathy, and age-related macular degeneration are more common in obese individuals.[2-4] Although the reasons for this are unknown, conditions caused by obesity, such as oxidative stress and vascular damage, may cause these diseases.[5] The most vascular tissue of the eye is the choroid. The choroid supplies approximately more than two-thirds of the blood requirement of the ocular tissues. It is responsible for the nutrition of the outer retinal layers, oxygen demand, adjustment of intraocular pressure, and thermoregulation.[6,7] It can be affected by systemic diseases such as hypertension, diabetes, and endocrine in patients, as well as systemic inflammatory diseases, such as rheumatoid arthritis and systemic lupus erythematosus. The choroid can also be affected by ocular diseases such as central serous chorioretinopathy, retinitis pigmentosa, age-related macular degeneration, glaucoma, and chorioretinal inflammation.[8,9] Evaluation of the choroidal layer can result in important findings in terms of early detection and prevention of these diseases.

Advances in optical coherence tomography (OCT) and other technological developments have allowed us to examine the choroid layer. Enhanced depth imaging optic coherence tomography (EDI-OCT) enables us to evaluate the choroid layer in vivo, rapidly, non-invasively, and objectively.[10-13] Although studies on choroidal thickness (CT) in obese children exist in the literature, the results are inconsistent. A few studies have evaluated the choroidal vascular index (CVI), allowing us to assess vascular changes better.

In the current study, we aimed to compare the subfoveal and perifoveal CTs and CVIs of overweight and obese children with those of children with normal weight.

MATERIALS AND METHODS

Ethics Committee Approval: This was a retrospective study that was conducted in the pediatric endocrine and ophthalmology departments of XX University's Erol Olçok Training and Research Hospital. Approval was obtained from the ethics committee of XX University (date: 2022, decision no:109). The study was carried out in accordance with the Helsinki Declaration. Oral and written consent forms were obtained from the participating children and their parents.

Subjects: Forty-four children with a body mass index (BMI) of 25 and above and 35 healthy children with a normal BMI were included in the study. Individuals with strabismus and a history of ocular surgery, who use systemic and topical drugs, who suffer from systemic disease (diabetes, hypertension, heart disease), who have spherical equivalent (SE) values of ±3 diopters (D) and above or intraocular pressure (IOP) >21 mmHg, participants with ocular diseases such as amblyopia, uveitis, cataract, glaucoma, vitreous, and retinal disorders, and who wear contact lens were excluded in the study.

The weight and height of the children with a BMI of 25 or more who were seen in the paediatric endocrinology department were measured and recorded. Weight and height measurements were made with a digital automatic height weight scale without shoes and with light clothes (Densi GL-150, Industrial Weighing Systems). BMI was calculated using the kg/m2 formula. Those with a BMI of 25–29.9 kg/m2 were considered overweight, and those with a weight of 30 and above were considered obese. The control group consisted of 35 healthy children examined in the ophthalmology clinic with a BMI within normal limits (20–24.9). BMI standard deviation score (BMI SDS) reference values determined for Turkish children were used.[14]

Measurements: Refraction and IOP measurements were performed on the participants with an autorefractometer and an integrated non-contact tonometry device (Topcon Corporation, Tokyo, Japan). The best corrected visual acuities were measured using Snellen's chart. Those with vision worse than 10/10 were excluded from the study. Anterior segment examinations were performed with a slit lamp. The optic nerve and macula were evaluated by performing posterior segment examinations without dilation with a +90 D lens. Axial lengths were obtained with an optical biometry device (AL-Scan; Nidek Co., Ltd). The central macula and choroidal layer with EDI mode were obtained with a Spectralis OCT device (Spectralis, Heidelberg Engineering, Heidelberg, Germany). Measurements were subsequently taken. For CT, the section from the retinal pigment epithelium to the inner layer of the sclera was measured. These measurements were recorded subfoveal, 1000-micron nasal, and temporal to the fovea. The images of the choroidal tissue were transferred to the ImageJ program (National Institutes of Health, Bethesda, USA) in B-scan mode (Figure 1).

Binarization: Total choroidal area (TCA) and luminal area (LA) were calculated as described by Agrawal et al.[15] A subfoveal scan (central B-scan) was selected for CVI calculation. Images were transferred to the ImageJ programme (National Institutes of Health, Bethesda, MD, USA). After the TCA was selected, a region of interest (ROI) manager was added. The image was 8-bit inverted using Niblack

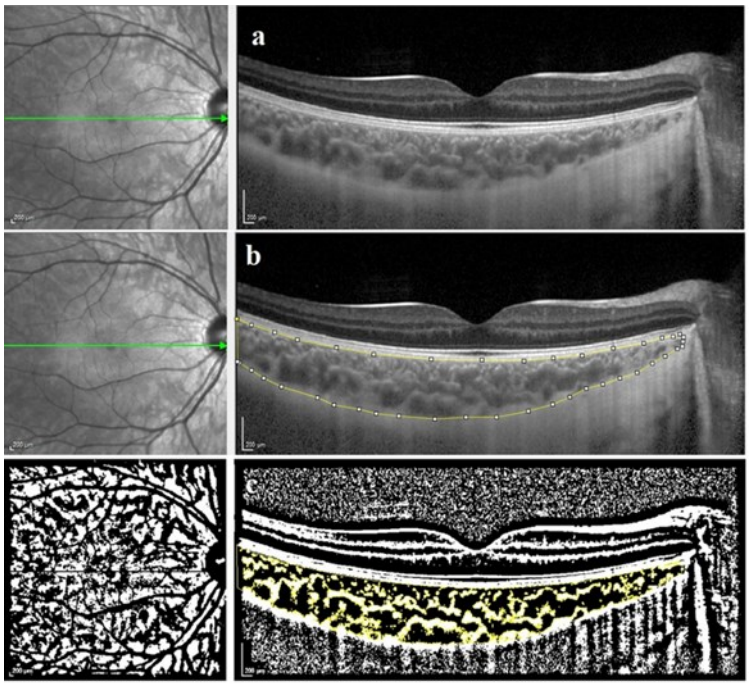

Figure 1. a) EDI-OCT imaging of the subfoveal choroidal layer, b) Image of marking the total choroidal area, c) Determination of luminal and stromal areas using the color threshold tool.

auto local thresholding. Colour thresholding was used to highlight luminal areas. The LA was transferred to the ROI manager. TCA and LA merged by 'AND', selected in the ROI manager and added a third field to the ROI manager. The first field in the ROI manager was calculated as TCA, and the third field was calculated as LA. Stromal area (SA) was calculated as the difference between TCA and LA, and CVI was calculated as the LA/TCA ratio. LA/SA was calculated by dividing the LA by the SA. Measurements were performed in a blinded fashion by two independent observers (SC, MD). Measurements were made between 10–12 am to avoid the effects of diurnal variation. Measurements of each participant's right eye were used in the study.

Statistical analysis: The obtained data were evaluated using SPSS 22.0 (SPSS, Inc., Chicago, IL, USA). The conformity of the data to the normal distribution was evaluated with the Kolmogorov–Smirnov test. An ANOVA test was used for those with normal distribution in triple comparisons, and Tukey's test was used for post hoc analysis. A Kruskal-Wallis test was used for those not normally distributed; pairwise comparisons were made using the Mann–Whitney U test and evaluated using Bonferroni correction. Correlation analysis was performed using Spearman correlation analysis. Data were given with mean and standard deviation (mean±SD) values; $p < 0.05$ was considered significant.

RESULTS

A total of 79 individuals—27 males and 52 females—were included in the study. The overweight group consisted of eight males (30.8%) and 18 females (69.2%); the obese group consisted of eight males (44.4%) and ten females (55.6%), and the control group consisted of 11 males (31, 4%), 24 females (68.6%). In terms of gender, there was no significant difference between the groups (p=0.984). The mean age of the overweight group was 12.04±2.81; the mean age of the obese group was 14.06±1.92; and the mean age of the control group was 12.29±3.75. There was no significant age difference between the groups (p=0.096). Height, weight, BMI, BMI SDS, SE, IOP, AL, and CMT values are shown in Table 1. There was a significant difference between the groups in terms of weight, BMI, and BMI SDS (for all, $p<0.001$).

A statistically significant difference was detected between the groups in terms of subfoveal CT (p=0.019). In the evaluation of choroidal structures, there was a significant difference between the groups in terms of TCA and SA (p=0.016, p=0.028, respectively). There was no significant difference between the groups in terms of LA/SA and CVI (p=0.270, p=0.279, respectively) (Table 2).

Table 1. Demographic characteristics, SE, IOP, AL and CMT of groups.

Demographic Characters	Overweight (n=26)	Obese (n=18)	Control (n=35)	p
Age (year), mean±SD	12.4±2.81	14.06±1.92	12.29±3.75	0.096*
Gender, m/f	8/18	8/10	11/24	0.984***
Height, cm, mean±SD	154.14±16.37	163.17±8.77	152.09±18.72	0.064*
Weight, kg, mean±SD	66.74±14.73	98.97±14.39	50.51±12.54	**0.001****
BMI, kg/m, mean±SD	27.70±1.55	35.73±3.84	21.56±1.44	**0.001***
BMI SDS, mean±SD	1.62±0.30	2.46±0.31	0.51±0.33	**0.001****
SE, D, mean±SD	-0.59±1.02	-0.60±0.77	-0.56±1.31	0.831*
IOP, mmHg, mean±SD	14.23±3.46	14.77±3.98	14.71±3.30	0.791*
AL, mm, mean±SD	23.48±0.95	23.49±0.74	23.58±0.99	0.900**
CMT, µm, mean±SD	264.73±18.38	253.00±20.34	264.94±15.25	0.047**

BMI: Body mass index; BMI SDS: BMI standard deviation score; SE: Spherical equivalent; D: Diopter; IOP: Intraocular pressure; AL: Axial length; CMT: Central macular thickness; *: Kruskal Wallis test; **: ANOVA test; ***: Chi-square test; bold: p<0.05.

Table 2. Comparison of CT, choroidal areas and CVI of groups.

	Overweight	Obese	Control	p
Temporal CT, µm, mean±SD	349.04±60.68	368.94±70.31	323.46±79.48	0.084*
Subfoveal CT, µm, mean±SD	350.35±57.88	386.78±71.79	324.00±86.85	**0.019***
Nasal CT, µm, mean±SD	314.04±65.47	343.44±83.77	295.91±86.45	0.126*
TCA, mm^2, mean±SD	0.54±0.09	0.60±0.12	0.51±0.12	**0.016***
LA, mm^2, mean±SD	0.35±0.06	0.40±0.09	0.33±0.09	0.058**
SA, mm^2, mean±SD	0.19±0.04	0.20±0.04	0.17±0.04	**0.028****
LA/SA, %, mean±SD	1.85±0.24	1.95±0.28	1.95±0.25	0.270**
CVI, %, mean±SD	0.65±0.03	0.66±0.03	0.66±0.03	0.279**

CT: Choroidal thickness; TCA: Total choroidal area; LA: Luminal area; SA: Stromal area; CVI: Choroidal vascular index; *: ANOVA test; **: Kruskal Wallis test; bold: p<0.05.

The correlation analysis showed a positive correlation between weight and subfoveal CT (r=0.239, p=0.034). There was a significant positive correlation between BMI and subfoveal CT, TCA, and SA (r=0.264, p=0.019; r=0.233, p=0.038; r=0.231, p=0.041, respectively). Figure 2 shows a correlation plot of subfoveal CT, TCA, and SA with BMI (Figure 2). There was a significant difference between the obese and control groups in the post hoc analysis of subfoveal CT, TCA and SA values (p=0.014, p=0.012, p=0.012, respectively).

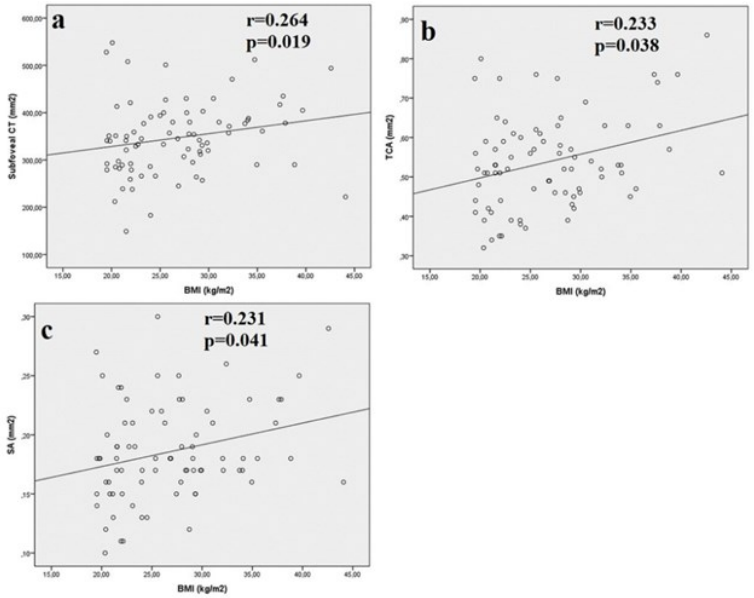

Figure 2. Correlation plot between BMI and a) subfoveal choroidal thickness (CT), b) total choroidal area (TCA), and c) stromal area (SA).

DISCUSSION AND CONCLUSION

We found that the overweight and obese group had higher CT and choroidal area values than the control group. Only the subfoveal CT, TCA, and SA values were significantly higher in the obese participants than in the control participants. There was no significant difference between the groups in terms of CVI.

Mean subfoveal CT values in healthy children were different in other related studies. The CT value was 267 μm in the study of Xiong et al.,[16] 319.44 μm in the study of Kara et al.,[17] and 248.91 μm in the study of Yao et al.[18] In our study, the subfoveal CT values of the control group were found to be 324 μm, similar to results of Kara et al.[17] It has been shown that CT is affected by many factors, such as refraction, age, and axial length.[19,20] In addition to these factors, some studies have shown that BMI affects CT. Teberik et al.[21] found CT values in the morbidly obese group to be significantly thinner in their study conducted with 101 morbidly obese (BMI ≥ 40) adults and 95 adults with normal BMI. Ozen et al.[12] found CT to be significantly thinner in the obese group in their study with 38 obese and 40 control children. Baran et al.[22] reported that there was no difference in CT between the obese participants and the control participants. In our study, unlike the previously mentioned ones, CT was thicker in the obese group. Differences may exist because CT is affected by many ocular and systemic changes. The presence of other systemic diseases in addition to obesity in the adult age group and the longer duration of obesity in adults may have caused the thinning of the choroidal layer. The pediatric patients in our study group did not have any other systemic diseases, and the duration of obesity was shorter than in adults. Different results may also be due to the different OCT devices used.

Contrary to the previously mentioned studies, Gonul et al. evaluated 40 morbidly obese patients scheduled for bariatric surgery and found that CT was thicker in the obese group. The authors showed that after surgery, the CT thinned with a decrease in BMI. They stated this might be due to venous congestion in obese patients.[23] Bulus et al.[24] found subfoveal CT at a range of 385.77±69.09 μm in the obese group and 348.77±73.21 μm in the control group in their study with 44 obese and 42 healthy children. Subfoveal CT, nasal CT, and temporal CT measurements were also found to be higher in the obese participants significantly by Bulus et al.[24] In our study, temporal, subfoveal, and nasal CT were at higher values in the overweight and obese participants than in the control group. There was only a significant difference between the obese and the control participants in subfoveal CT. Unlike our study, the above-mentioned studies did not evaluate choroidal areas and CVI.

Although CT is an important parameter that provides information about the choroid, it cannot distinguish between vascular and stromal changes. As a result of the evaluation of OCT images using the binarization method, the vascular and stromal values of the choroid can be calculated and used separately. The CVI, defined by Agrawal et al.,[9] is obtained using the ratio of LA to TCA. This parameter can be used as a helpful marker in many ocular diseases.[25,26] In this study, the values of the overweight and obese participants in terms of CVI were similar to the control participants. TCA, LA, and SA values were higher in the overweight and obese groups compared to the control group. However, in the analysis of TCA and SA, a significant difference was detected. This difference demonstrates that the increase in LA lags behind the increase in SA and TCA. Obesity-related vasodilation and vasoconstriction imbalance may occur with vascular tissues. It has been reported that the nitric oxide level, which provides vasodilation, decreases in obese individuals, and vasoconstrictor molecules such as endothelin-1 and angiotensin-2 increase.[27,28] This may be a reason why LA lags behind the increase in tissue.

There are some limitations in the current study. The first is that the number of participants is relatively small, so these data need to be confirmed with larger patient groups. Second, this is a cross-sectional study. Long follow-up studies are needed to understand how changes in the choroid lead to changes in both the choroid and the retina in the future. Thirdly, investigating the changes in CT in overweight individuals after weight loss may provide more accurate results about the relationship between BMI and CT.

The strength of our study is that it is one of the few that evaluate both overweight and obese children during childhood; it is also the first study to evaluate CVI.

In conclusion, this study showed that obese children had significantly higher subfoveal CT, TCA, and SA values. On the other hand, there was no significant difference between the groups in terms of CVI. There was a significant positive correlation between BMI and subfoveal CT, TCA, and SA. Studies with a large population and long follow-ups are needed to evaluate the ocular changes caused by the increase in CT caused by being overweight.

Ethics Committee Approval: Our study was approved by the Ethics Committee of XX University (Date: 28.12.2022- decision no: 109). The study was carried out in accordance with the international declaration, guidelines, etc.

Conflict of Interest: No conflict of interest was declared by the authors.

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REFERENCES

1. Faienza MF, Chiarito M, Molina-Molina E, et al. Childhood obesity, cardiovascular and liver health: a growing epidemic with age. World J Pediatr. 2020;16(5):438-445.
2. Tan AG, Kifley A, Flood VM, et al. Evaluating the associations between obesity and age-related cataract: a Mendelian randomization study. Am J Clin Nutr. 2019;110(4):969-976.
3. Jung Y, Han K, Park HYL, Lee SH, Park CK. Metabolic health, obesity, and the risk of developing open-angle glaucoma: Metabolically healthy obese patients versus metabolically unhealthy but normal weight patients. Diabetes Metab J. 2020;44(3):414-425.
4. Ng Yin Ling C, Lim SC, Jonas JB, Sabanayagam C. Obesity and risk of age-related eye diseases: a systematic review of prospective population-based studies. Int J Obes (Lond). 2021;45 (9):1863-1885.
5. Čolak E, Pap D. The role of oxidative stress in the development of obesity and obesity-related metabolic disorders. J Med Biochem. 2021;26;40 (1):1-9.
6. Ferrara M, Lugano G, Sandinha MT, Kearns VR, Geraghty B, Steel DHW. Biomechanical properties of retina and choroid: a comprehensive review of techniques and translational relevance. Eye (Lond). 2021;35(7):1818-1832.
7. Spaide RF. Choroidal blood flow: Review and potential explanation for the choroidal venous anatomy including the Vortex Vein System. Retina. 2020;40(10):1851-1864.
8. Steiner M, Esteban-Ortega MDM, Muñoz-Fernández S. Choroidal and retinal thickness in systemic autoimmune and inflammatory diseases: A review. Surv Ophthalmol. 2019;64(6):757-769.
9. Agrawal R, Ding J, Sen P, et al. Exploring choroidal angioarchitecture in health and disease using choroidal vascularity index. Prog Retin Eye Res. 2020;77:100829. doi:10.1016/ j.preteyeres.2020.100829
10. Singh RB, Perepelkina T, Testi I, et al. Imaging-based assessment of choriocapillaris: A comprehensive review. Semin Ophthalmol. 2023;38 (5):405-426.
11. Uslu Dogan C, Culha D. Subfoveal choroidal thickness and peripapillary retinal nerve fiber layer thickness in young obese males. Eur J Ophthalmol. 2021;31(6):3190-3195.
12. Özen B, Öztürk H, Çatlı G, Dündar B. Does obesity affect the ocular choroid tissue in children and adolescents? The Journal of Pediatric Research. 2018;5(3):112-117.
13. Bulut E, Köprübaşı S, Dayi Ö, Bulut H. Clinical relevance of choroidal thickness in obese and healthy children: A machine learning study. Turk J Ophthalmol. 2023;21;53(3):161-168.
14. Neyzi O, Bundak R, Gökçay G, et al. Reference values for weight, height, head circumference, and body mass index in Turkish children. J Clin Res Pediatr Endocrinol. 2015;7(4):280-293.
15. Agrawal R, Jain M, Khan R, et al. Choroidal structural changes in sympathetic ophthalmia on swept-source optical coherence tomography. Ocul Immunol Inflamm. 2021;3;29(3):537-542.
16. Xiong S, He X, Zhang B, et al. Changes in Choroidal thickness varied by age and refraction in children and adolescents: A 1-year longitudinal study. Am J Ophthalmol. 2020;213:46-56. doi:10.1016/j.ajo.2020.01.003
17. Kara O, Altintas O, Karaman S, Emre E, Caglar Y. Analysis of Choroidal Thickness Using Spectral-Domain OCT in Children With Unilateral Amblyopia. J Pediatr Ophthalmol Strabismus. 2015;52(3):159-166.
18. Yao Y, Fu J, Liu J, Li L, Chen W, Meng Z. Assessment of macular choroidal and retinal thickness: a cohort study in Tibetan healthy children. Sci Rep. 2024;16;14(1):1383. doi:10.1038/ s41598-024-51949-0
19. Muhiddin HS, Mayasari AR, Umar BT, et al. Choroidal thickness in correlation with axial length and myopia degree. Vision (Basel). 2022;6 (1):16. doi:10.3390/vision6010016
20. Xie R, Qiu B, Chhablani J, Zhang X. Evaluation of choroidal thickness using optical coherent tomography: A Review. Front Med (Lausanne). 2021;8:783519. doi:10.3389/fmed.2021.783519
21. Teberik K, Eski MT, Doğan S, Pehlivan M, Kaya M. Ocular abnormalities in morbid obesity. Arq Bras Oftalmol. 2019;82(1):6-11.
22. Baran RT, Baran SO, Toraman NF, Filiz S, Demirbilek H. Evaluation of intraocular pressure and retinal nerve fiber layer, retinal ganglion cell, central macular thickness, and choroidal thickness using optical coherence tomography in obese children and healthy controls. Niger J Clin Pract. 2019;22(4):539-545.
23. Gonul S, Yilmaz H, Gedik S, Ozturk BT, Oflaz AB, Sahin M. Evaluation of the choroidal thickness and retinal nerve fiber layer and visual fields in morbid obesity: Does bariatric surgery affect retinal structure and function? Indian J Ophthalmol. 2021;69(2):301-306.
24. Bulus AD, Can ME, Baytaroglu A, Can GD, Cakmak HB, Andiran N. Choroidal thickness in childhood obesity. Ophthalmic Surg Lasers Ima-

ging Retina. 2017;1;48(1):10-17.
25. Iovino C, Pellegrini M, Bernabei F, et al. Choroidal vascularity index: An in-depth analysis of this novel optical coherence tomography parameter. J Clin Med. 2020;21;9(2):595. doi:10.3390/jcm9020595
26. Betzler BK, Ding J, Wei X, et al. Choroidal vascularity index: a step towards software as a medical device. Br J Ophthalmol. 2022;106(2):149-155.
27. Iantorno M, Campia U, Di Daniele N, et al. Gut hormones and endothelial dysfunction in patients with obesity and diabetes. Int J Immunopathol Pharmacol. 2014;27(3):433-436.
28. Baretella O, Chung SK, Barton M, Xu A, Vanhoutte PM. Obesity and heterozygous endothelial overexpression of prepro-endothelin-1 modulate responsiveness of mouse main and segmental renal arteries to vasoconstrictor agents. Life Sci. 2014;24;118(2):206-212.

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Determination of Pregnant Women's Views on Fasting and Religious Attitudes: A Cross-sectional Study in Türkiye

Gebe Kadınların Oruç Tutmaya İlişkin Görüşlerinin ve Dini Tutumlarının Belirlenmesi: Türkiye'de Kesitsel Bir Çalışma

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ABSTRACT

Objective: This study aims to determine pregnant women's views on Ramadan fasting, their religious attitudes, and the relationship between them.

Materials and Methods: The study was designed as a descriptive and cross-sectional study and was conducted from the July-October 2021 with 252 pregnant women. The data were collected using the "Pregnancy Identification Form", "Opinions on Fasting During Pregnancy Form", and "Religious Attitude Scale".

Results: Of the pregnant women, 37.7% stated that Ramadan fasting should not be practised during pregnancy, according to Islam, and 29.0% of the pregnant women stated that they fasted during Ramadan. Pregnant women were found to have a high level of religious attitude with a mean total score of 35.57±5.62. The mean behavioral subscale score of women who fasted during Ramadan during pregnancy was lower than the mean score of women who did not fast (p=0.023).

Conclusions: It was found that one out of every three women fasted during pregnancy, their knowledge and opinions about fasting during pregnancy were insufficient, and they did not know the effects of fasting on maternal and infant health. Women who did not fast during pregnancy were found to have higher religious attitudes than those who fasted.

Keywords: Fasting, pregnancy, religion

ÖZ

Amaç: Bu çalışmanın amacı; gebe kadınların oruç tutmaya ilişkin görüşleri ile dini tutumlarının ve bunlar arasındaki ilişkinin belirlenmesidir.

Materyal ve Metot: Çalışma, tanımlayıcı ve kesitsel olarak tasarlandı ve Temmuz-Ekim 2021 tarihleri arasında 252 gebe kadınla gerçekleştirildi. Veriler "Gebe Tanımlama Formu", "Gebelikte Oruç Tutmaya İlişkin Görüşler Formu" ve "Dini Tutum Ölçeği" kullanılarak toplandı.

Bulgular: Gebelerin %37,7'si İslam dinine göre gebelikte oruç tutulmaması gerektiğini, %29,0'ının gebeliğinde ramazan orucu tuttuğunu ifade etti. Gebelerin DTÖ toplam puan ortalaması 35,57±5,62 ile yüksek düzeyde dini tutuma sahip olduğu bulundu. Gebeliğinde ramazan orucu tutan kadınların davranışsal alt boyut puan ortalaması, tutmayan kadınların puan ortalamasına göre daha düşüktür (p=0,023).

Sonuç: Her üç kadından birinin gebelikte oruç tuttuğu, gebelikte oruç tutmaya ilişkin bilgi ve görüşlerinin yetersiz olduğu, oruç tutmanın anne ve bebek sağlığına etkilerini bilmediği ortaya çıkmıştır. Gebeliğinde oruç tutmayan kadınların dini tutumlarının, tutanlara göre daha yüksek olduğu belirlendi.

Anahtar Kelimeler: Din, gebelik, oruç

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INTRODUCTION

Fasting, one of the five pillars of Islam, is obligatory for all healthy Muslims. However, according to Islamic law, women who have chronic health problems, are menstruating, pregnant or breastfeeding are exempted from fasting.[1] According to some verses in the Qur'an as well as some hadiths (Ibn Mâja, "Ṣıyâm", 12; Tirmidhi, "Ṣavm", 21; Nesâî, "Ṣıyâm", 51, 62), it has been ruled that "a woman who is afraid that fasting will harm herself or the baby in her womb or the baby she is breastfeeding can postpone her fast and break the fast she has started".[2] There are 1.9 billion Muslims worldwide. Over 98% of people living in countries like Iran, Yemen, Niger and Türkiye are Muslim.[3] The duration of a one-day fast varies from 10–19 hours, depending on the geographical location of the country and the season. This period is of particular importance during pregnancy because the health of the expectant mother, fetus and newborn during this period is closely related to the quality of nutrition and adequate fluid intake of the mother. Prolonged fasting and dehydration may be dangerous for pregnant women. However, studies indicate that the percentage of Muslim pregnant women fasting at least one day during their pregnancy varies between 30% and 80%.[4-7]

The effects of fasting during pregnancy on maternal, fetal, newborn and child health are not known.[6] Some studies have reported that fasting during long and hot summer days is closely associated with maternal fluid deprivation and dehydration,[8] the risk of preterm birth,[9] and low amniotic fluid index.[10] However, some studies show that fasting has no adverse effects on perinatal health.[11, 12] Safari et al. found that women who fasted during the second trimester of pregnancy had a reduced risk of gestational diabetes and excessive weight gain during pregnancy.[11] Savitri et al. reported that fasting didn't affect perinatal mortality and morbidity.[12]

Many pregnant women fast during Ramadan for social, cultural, and religious reasons.[13,14] Women's reasons for fasting during pregnancy are related mainly to religious reasons and religious necessity, whereas the reasons for not fasting are related to concerns about their health and the health of their babies.[5,15]

However, no study was found that examined pregnant women's views on fasting, their religious attitudes, and the relationship between them. In this study, we aim to pregnant women's views on fasting their religious attitudes, and the relationship between them.

MATERIALS AND METHODS

Ethics Committee Approval: Approval was obtained from Ondokuz Mayıs University Social and Human Sciences Ethics Committee (Date: 28.05.2021, decision no: 2021/461). Written and verbal consent was obtained from the pregnant women who agreed to participate in the study, and the identity information of the participants was not recorded on the data forms. The principles of the Declaration of Helsinki were followed at every stage of the research.

Study Design and Participants: This descriptive and cross-sectional study was conducted between July and October 2021. The study universe consisted of pregnant women who presented to the obstetrics outpatient clinic of a university hospital located in the Black Sea Region of Türkiye. A simple random sampling method was used for sample selection. Using the sample size calculation formula (N=728, p=0.50, q=0.50, d=0.05, t=1.96), 252 pregnant women were included in the study.

Inclusion Criteria: (i) Being Muslim, (ii) Being literate, (iii) Agreeing to participate in the study, (iv) To be able to communicate verbally and not have cognitive problems.

Exclusion criteria: (i) Having communication problems, (ii) Desire to leave the research.

Data collection instruments: The data of the study were collected using the "Pregnancy Identification Form", "Opinions on Fasting During Pregnancy Form", and "Religious Attitude Scale".

Pregnant Identification Form: This form, prepared by the researchers, includes a total of 13 questions to determine the demographic and obstetric characteristics of pregnant women.

Form of Opinions on Fasting in Pregnancy: This question form was developed by the researchers by reviewing the relevant literature.[4,5,17] The form included a total of eight questions aiming to determine the opinions of pregnant women about fasting during pregnancy.

Religious Attitude Scale: It is a scale developed to measure individuals' attitudes towards Islam. The scale was developed in our country in 2011 by Ok.[18] It consists of 8 items and 4 subscales in total. The subscale of the scale consists of cognitive, behavioral, emotional, and relational subscales. A 5-point Likert-type scale is used to calculate the scale score (1: strongly disagree, 5: strongly agree). Items 1 and 2 in the scale are scored inversely. The total score that can be obtained from the scale varies between 8 and 40. High scores on the scale indicate that individuals have high religious attitudes. In addition, according to the scores obtained from the scale items, the participants were classified as not religious at all (1.00-1.49=highly secular/completely secular), less religious (1.50-2.49=very secular), moderately religious (2.50-3.49=moderately secular), very religious (3.50-4.49=less secular), and very quite religious (4.50-5.00=very little secular or

not secular at all). The Cronbach's Alpha coefficient of the scale was 0.90.[18] In this study, Cronbach's Alpha coefficient was found to be 0.89.

Data Collection: The researchers first informed the pregnant women who came to the outpatient clinic about the purpose, content and importance of the study. Written and verbal consent was obtained from pregnant women who agreed to participate in the study. Afterwards, the data was collected by the researchers using questionnaire forms and face-to-face interview techniques, taking into account the pandemic conditions (personal distance). In order to obtain reliable data, the names of the participants were not taken except for the consent form. Pregnant women were told that the data would only be used for scientific purposes and that personal information would remain confidential. It takes an average of 10 minutes to administer all questionnaire forms.

Statistical Analysis: The research data was analyzed using the IBM SPSS 22.0 version package program. Descriptive data were evaluated using "mean, standard deviation, number, percentage, minimum and maximum values". The Kolmogorov-Smirnov test was used to examine whether the variables were normally distributed. Independent groups t-test, and one-way analysis of variance were used in the analysis. The statistical significance level was accepted as $p<0.05$.

RESULTS

Regarding some demographic characteristics, the mean age of the pregnant women was 28.73±6.12 years (min:17, max:45), 43.3% were middle school graduates, and 76.6% were not working (Table 1).

Some obstetric characteristics of the pregnant women were as follows: number of pregnancies was 2.33±1.21 (min:1, max:6), number of births was 0.96±0.99 (min:0, max:5), 79.0% of the women had planned pregnancies, and 25.8% had risky pregnancies (Table 2).

Table 1. Distribution of some demographic and obstetric characteristics of pregnant women (n=252).

Characteristics		n (%)
Educational status	Primary school	83 (32.9)
	Secondary school	109 (43.3)
	Higher education	60 (23.8)
Spouse's educational status	Primary school	93 (36.9)
	Secondary school	92 (36.5)
	Higher education	67 (26.6)
Employment status	Working	59 (23.4)
	Not working	193 (76.6)
Family income status	Income less than expenditure	52 (20.6)
	Income equal to expenditure	159 (63.1)
	Income more than expenditure	41 (16.3)
Planning status of current pregnancy	Planned	199 (79.0)
	Not planned	53 (21.0)
Current gestational week	First trimester	32 (12.7)
	Second trimester	64 (25.4)
	Third trimester	156 (61.9)
Pregnancy type	Spontaneous	224 (88.9)
	Assisted reproductive techniques	28 (11.1)
Risk status in the current pregnancy	Risky	65 (25.8)
	Normal	187 (74.2)

Table 2. The mean of pregnancy, birth, miscarriages and living children of women.

Characteristics	Mean±SD (min-max)
Age	28.73±6.12 (17-45)
Number of pregnancies	2.33±1.21 (1-6)
Number of births	0.96±0.99 (0-5)
Number of miscarriages	0.47±0.77 (0-4)
Number of living children	0.94±0.98 (0-5)

SD: Standard deviation; Min: minimum; Max: maximum.

It was found that 37.7% of the pregnant women stated that fasting should not be practised during pregnancy according to Islam, 46.0% wanted to fast during pregnancy even though it was not necessary, 29.0% fasted during Ramadan, and 47.6% of the pregnant women reported that their spouses had negative opinions about not fasting. While 27.4% of the women thought that fasting during pregnancy was harmful to the mother, 38.9% did not know whether fasting was harmful to themselves (Table 3).

Pregnant women were found to have a high level of religious attitude with a mean total score of 35.57±5.62. According to these findings, it can be said that the religious attitudes of pregnant women are quite good at the cognitive level. In contrast, their religious attitudes are less good at the behavioral level. According to the responses of the pregnant women to the scale items (4.44±0.70), it was found that they had a highly religious (less secular) view (Table 4).

Table 3. Distribution of pregnant women's views on fasting (n=252).

Characteristics		n (%)
Consideration of the necessity of fasting during pregnancy according to your faith	Required	85 (33.7)
	Not required	95 (37.7)
	I don't know	72 (28.6)
Willing to fast when it is not necessary according to one's beliefs	Wants	116 (46.0)
	Does not want to	90 (35.7)
	Undecided	46 (18.3)
Ramadan fasting during pregnancy	Fasted	73 (29.0)
	Did not fast	179 (71.0)
Fasting beyond the Ramadan fasting period during pregnancy	Fasted	43 (17.1)
	Did not fast	209 (82.9)
Changes in baby movements during fasting[a] (n=68)	Decreased	12 (17.6)
	Unchanged	26 (38.2)
	I didn't notice	30 (44.1)
Thinking that fasting during pregnancy harms the baby	I think so	85 (33.7)
	I don't think so	63 (25.0)
	I don't know	104 (41.3)
Thinking that fasting during pregnancy harms the mother	I think so	69 (27.4)
	I don't think so	85 (33.7)
	I don't know	98 (38.9)
Your partner's opinion about fasting during pregnancy	Positive	52 (20.6)
	Negative	120 (47.6)
	No idea	80 (31.8)

a: Answered by women who fasted during pregnancy.

Table 4. Distribution of total, subscale and mean scores of the Religious Attitude Scale (RAS) of pregnant women.

Scale		Mean±SD	Min-max
RAS	Cognitive subscale	9.61±1.31	2-10
	Behavioral subscale	8.30±2.27	2-10
	Emotional subscale	8.49±1.80	2-10
	Relational subscale	9.16±1.51	2-10
	Scale Total	35.57±5.62	10-40
RAS Items	1. I think religion is unnecessary.	4.83±0.65	1-5
	2. I think that religious belief does more harm than good to people.	4.77±0.76	1-5
	3. I get emotional when I listen to religious readings such as call to prayer, prayer or verse.	4.13±1.23	1-5
	4. I really enjoy when I participate in religious activities.	4.17±1.13	1-5
	5. I pay attention to whether my life is in accordance with religious values.	4.16±1.04	1-5
	6. I try to fulfil the requirements of the religion I believe in.	4.32±0.86	1-5
	7. I think that God helps me in difficult times.	4.56±0.80	1-5
	8. I feel that God is very close to me.	4.59±0.73	1-5
	Item Scale Total	4.44±0.70	1-5

SD: Standard deviation; Min: minimum; Max: maximum.

There was a statistically significant difference ($p<0.05$) between their responses to the questions "Ramadan fasting status during pregnancy" and "Fasting status other than Ramadan fasting during pregnancy" and the mean scores on the RAS. The mean behavioral subscale score of women who fasted during Ramadan during pregnancy was lower than the mean score of women who did not fast ($p=0.023$). The mean scores in the behavioral and relational subscale and total scale scores of women who fasted during pregnancy other than Ramadan fasting were lower than the mean scores of women who did not fast ($p=0.000$, $p=0.046$, $p=0.000$, respectively) (Table 5).

Table 5. Comparison of pregnant women's opinions about fasting and mean total and subscale scores on RAS.

Characteristics		**RAS Subscales**				**RAS**
		Cognitive Mean±SD	**Behavioral Mean±SD**	**Emotional Mean±SD**	**Relational Mean±SD**	**Total Mean±SD**
Consideration of the necessity of fasting during pregnancy according to your faith	Necessary (n=85)	9.76±0.85	8.40±2.18	8.75±1.42	9.32±1.09	36.24±4.41
	Not necessary (n=95)	9.45±1.73	8.60±1.93	8.56±1.89	9.14±1.57	35.76±5.77
	Don't know (n=72)	9.65±1.08	7.79±2.69	8.08±2.04	8.98±1.81	34.51±6.55
Test	***F/p***	1.315/0.270	2.752/0.066	2.849/0.060	1.015/0.364	1.958/0.143
Willing to fast when it is not necessary according to one's beliefs	Wants (n=116)	9.79±0.77	8.35±2.29	8.67±1.60	9.27±1.24	36.09±4.79
	Does not want (n=90)	9.48±1.59	8.52±1.95	8.37±1.95	9.06±1.63	35.45±5.98
	Undecided (n=46)	9.41±1.69	7.73±2.71	8.26±1.98	9.06±1.85	34.47±6.71
Test	***F/p***	2.048/0.131	1.878/0.155	1.134/0.324	0.602/0.549	1.394/0.250
Ramadan fasting during pregnancy	Fasted (n=73)	9.67±1.01	7.79±2.60	8.34±1.75	9.09±1.39	34.90±5.29
	Did not fast (n=179)	9.59±1.41	8.50±2.09	8.55±1.83	9.18±1.55	35.84±5.74
Test	***t/p***	0.433/0.665	-2.282/**0.023**	-0.838/0.403	-0.448/0.655	-1.204/0.230
Fasting beyond the Ramadan fasting period during pregnancy	Fasted (n=43)	9.48±1.38	6.58±2.72	8.02±1.62	8.74±1.31	32.83±5.07
	Did not fast (n=209)	9.64±1.29	8.65±1.99	8.58±1.83	9.24±1.53	36.13±5.57
Test	***t/p***	-0.695/0.488	-5.796/**0.000**	-1.876/0.062	-2.008/**0.046**	-3.581/**0.000**
Changes in baby movements during fasting [b]	Decreased (n=12)	9.83±0.57	8.25±2.45	8.91±1.24	9.50±0.90	36.50±4.16
	Unchanged (n=26)	9.73±1.04	8.34±2.33	8.23±1.90	9.03±1.37	35.34±5.28
	Did not notice (n=30)	9.51±1.66	8.00±2.47	8.89±1.71	9.37±1.49	35.79±5.05
Test	***F/p***	0.320/0.727	0.147/0.864	1.208/0.305	0.640/0.531	0.220/0.803
Thinking that fasting during pregnancy harms the baby	She thinks so (n=85)	9.38±1.80	8.62±1.84	8.41±2.01	9.08±1.62	35.50±6.03
	She does not think so (n=63)	9.73±0.97	7.95±2.48	8.60±1.54	9.26±1.31	35.55±4.97
	She does not know (n=104)	9.73±0.95	8.25±2.43	8.49±1.79	9.16±1.53	3.63±5.70
Test	***F/p***	1.933/0.147	1.633/0.197	0.201/0.818	0.277/0.758	0.012/0.988
Thinking that fasting during pregnancy harms the mother	She thinks so (n=69)	9.47±1.63	8.50±1.89	8.24±1.92	8.92±1.67	35.15±6.28
	She does not think so (n=85)	9.80±0.84	8.22±2.30	8.74±1.61	9.35±1.20	36.11±4.75
	She does not know (n=98)	9.55±1.38	8.22±2.49	8.44±1.87	9.16±1.61	35.38±5.84
Test	***F/p***	1.341/0.263	0.388/0.679	1.476/0.230	1.518/0.221	0.636/0.530
Your partner's opinion about fasting during pregnancy	Positive (n=52)	9.69±1.02	8.61±1.92	8.51±1.74	9.46±1.05	36.28±4.38
	Negative (n=120)	9.59±1.53	8.45±2.14	8.57±1.83	9.17±1.55	35.79±5.76
	No opinion (n=80)	9.60±1.10	7.87±2.60	8.35±1.82	8.95±1.66	34.77±6.09
Test	***F/p***	0.114/0.893	2.183/0.115	0.377/0.686	1.828/0.163	1.319/0.269

b: Answered by women who fasted during pregnancy; SD: Standard deviation, t: independent groups t-test; F: one-way analysis of variance. Bold indicates statistically significant values.

DISCUSSION AND CONCLUSION

Looking at the studies on the subject, 30% of women living in the United States,[16] 43% of women living in Germany,[5] 55% of women living in Iraq,[1] 64% of women living in India,[15] 84.9% of women living in Lebanon[14] fasted during pregnancy. According to the study results, the rate of fasting among pregnant women varies between 30% and 88%. In this study, the proportion of women who fasted during the Ramadan fasting period during pregnancy was 29.0%. Compared to other Muslim countries (Indonesia, Pakistan, Iraq, India), this rate is relatively low. Women's decision to fast during pregnancy may have been influenced by the sociocultural characteristics of the country in which they lived, their religious beliefs, how they perceived the practice of fasting, and the people they consulted for information on the subject (spouse, friends, family, religious officials and health professionals, etc.).

In Islamic law, it is clearly stated that pregnant women are exempted from fasting.[1] In the study by Seiremann et al., more than 80% of pregnant women reported that fasting is necessary during pregnancy.[7] Leimer et al. found that 64% of women who fasted in the Ramadan fasting period during pregnancy did so due to religious obligation.[5] In the study by Safari et al., 60% of women who fasted during pregnancy believed that fasting was mandatory for healthy pregnant women, and 18.1% believed that fasting was mandatory for risky pregnant women.[11] Ghazal et al. found that women who fasted did so because of the spiritual environment, and women who did not fast because of fear of harming themselves or their baby.[14] In this study, 33.7% of pregnant women reported that fasting was necessary during pregnancy, 28.6% did not know whether fasting was necessary during pregnancy, and 46.0% reported that they wanted to fast even though it was not necessary. In addition, in this study, when pregnant women were asked about their husbands' attitudes towards fasting, 20.6% of the women stated that their husbands had a positive attitude. In the study by Seiremann et al., 80.1% of pregnant women reported that their husbands believed that fasting is necessary during pregnancy.[7] In contrast, in the study by Leimer et al., only 8% of women who fasted during pregnancy stated that their husbands thought that they should fast during pregnancy.[5] The factors that influence pregnant women's decision to fast include mostly religious necessity-obligation, spiritual environment and personal preference.

There is insufficient evidence on the long-term and short-term positive or negative effects of fasting during pregnancy on maternal and infant health.[6] It has been reported that women who fasted during the second trimester of pregnancy had a lower risk of gestational diabetes and excess weight gain during pregnancy than those who did not fast.[11] The proportion of women who thought fasting would be harmful to both themselves and their babies was 46% in the study by Lou and Hammoud.[16] In the study by Seiermann et al., 33.7% of women stated that fasting during pregnancy was harmful to the baby, and 27.4% stated that fasting during pregnancy was harmful to the mother.[7] These results suggest that women have inadequate knowledge about fasting and pregnancy outcomes and do not receive adequate information and counselling from health professionals.

Baby movements are an important parameter indicating fetal health status.[19] In the study by Ghazal et al., 11.3% of fasting women reported a decrease in infant movements.[14] Similarly, in this study, 17.6% of women reported a decrease in infant movements during fasting, and 44.2% did not notice it. The fact that most women do not know the effects of fasting during pregnancy on fetal health suggests that they are not aware of the changes in fetal movements. For this reason, women who choose to fast during pregnancy should be taught how to count fetal movement and should be told that if fetal movement decreases, they should immediately consult a healthcare provider.

Religious beliefs and religious attitudes affect women's health behaviors. High levels of spirituality and religiosity are known to improve mental health and quality of life in pregnant women.[20] In a study conducted in Iran, pregnant women were found to have moderate religious attitudes.[21] In a study conducted with women with risky pregnancies in Türkiye, it was found that women had a high level of religious attitude.[22] Similarly, in this study, it was determined that pregnant women had a high level of religious attitude and a very religious view. In addition, the mean behavioral subscale scores of women who did not fast during pregnancy were found to be significantly higher than women who did not fast during pregnancy, and the mean total and behavioral and relational subscale scores of women who did not fast beyond the Ramadan fasting period during pregnancy were significantly higher than women who fasted. The behavioral subscale reflects the extent to which religious values guide one's behavior, and the relational subscale reflects the extent to which one needs divine help.[18] These results suggest that women do not consider fasting during pregnancy as a religious requirement.

In conclusion, it was found that women had high levels of religious attitudes; approximately one out of every three women fasted during pregnancy, their knowledge and opinions about fasting during pregnancy were insufficient, and they did not know how fasting affected maternal and infant health. It was determined that women who did not fast during

pregnancy had higher religious attitudes than those who fasted. All healthcare professionals, including midwives and nurses, should provide information and counseling to pregnant women in their care about the effects of fasting on maternal and infant health, explain the importance of nutrition and fluid intake to women who choose to fast, refer them to a nutritionist if necessary, and cooperate with religious leaders in this regard. The limitation of this study is that it was conducted only with pregnant women in a city in the Black Sea region of Türkiye.

Ethics Committee Approval: Our study was approved by the Ondokuz Mayıs University Social and Human Sciences Ethics Committee (Date: 28.05.2021, decision no: 2021/461). The study was carried out following the international declaration and guidelines.

Conflict of Interest: No conflict of interest was declared by the authors.

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REFERENCES

1. Atan ÖF. Bakara Sûresinin 184. ayeti bağlamında orucun fıkhî boyutu ve tâkat tartışmaları. Diyanet İlmi Dergi. 2020;56(3): 999-1018.
2. Oruç. Türkiye Diyanet Vakfı İslam Ansiklopedisi. https://islamansiklopedisi.org.tr/oruc#1. Accessed March 5, 2023.
3. Muslim Population by Country 2023. https://worldpopulationreview.com/country-rankings/muslim-population-by-country . Accessed March 5, 2023.
4. Glazier JD, Hayes DJL, Hussain S, et al. The effect of Ramadan fasting during pregnancy on perinatal outcomes: a systematic review and meta-analysis. BMC Pregnancy Childbirth. 2018;18 (1): 421. doi:10.1186/s12884-018-2048-y
5. Leimer B, Pradella F, Fruth A. Queisser A, van Ewijk R. Ramadan observance during pregnancy in Germany: a challenge for prenatal care. Geburtshilfe Frauenheilkd. 2018;78(7): 684-689. doi:10.1055/a-0633-1720
6. Oosterwijk VNL, Molenaar JM, van Bilsen LA, Jong JKDC. Ramadan fasting during pregnancy and health outcomes in offspring: a systematic review. Nutrients. 2021;13(10):3450. doi:10.3390/nu13103450
7. Seiermann AU, Al-Mufti H, Waid JL, Wendt AS, Sobhan S, Gabrysch S. Women's fasting habits and dietary diversity during Ramadan in rural Bangladesh. Matern Child Nutr. 2021;17(3): e13135. doi:10.1111/mcn.13135
8. Bayoglu Tekin Y, Guvendag Guven ES. Mete Ural U, Yazici ZA. Kirbas A, Kir Sahin F. Evaluation of the effects of fasting associated dehydration on maternal NGAL levels and fetal renal artery Doppler parameters. J Matern Fetal Neonatal Med. 2016;29(4):629-632. doi:10.3109/14767058.2015.1014789
9. Tith RM, Bilodeau-Bertrand M, Lee GE, Healy-Profitós J, Auger N. Fasting during Ramadan increases risk of very preterm birth among Arabic-speaking women. J Nutr. 2019;149(10):1826–1832. doi:10.1093/jn/nxz126
10. Sakar MN, Gultekin H, Demir B, et al. Ramadan fasting and pregnancy: Implications for fetal development in summer season. J Perinat Med. 2015;43(3):319-323. doi:10.1515/jpm-2013-0289
11. Safari K, Piro TJ, Ahmad HM. Perspectives and pregnancy outcomes of maternal Ramadan fasting in the second trimester of pregnancy. BMC Pregnancy Childbirth. 2019;19(1):128. doi:10.1186/s12884-019-2275-x
12. Savitri AI, Painter RC, Lindeboom M, Roseboom TJ, van Ewijk RJG. Ramadan exposure and birth outcomes: A population-based study from the Netherlands. Journal of Developmental Origins of Health and Disease. 2020;11(6):664-671. doi:10.1017/S2040174419000837
13. Alshehri AM, Barner JC, Wong, SL, Ibrahim KR, Qureshi S. Perceptions among Muslims regarding fasting, medication use and provider engagement during Ramadan in the United States. Int J Health Plann Manage. 2021;36(3): 945-957. doi:10.1002/hpm.3147
14. Ghazal K, Khazaal J, Chahine, R., et al. Ramadan fasting during pregnancy: characteristics and outcomes. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2020;9(10):3936-3943. doi:10.18203/2320-1770.ijrcog20204275
15. Placek C, Mohanty S, Bhoi GK, Joshi A, Rollins L. Religion, fetal protection, and fasting during pregnancy in three subcultures. Human Nature. 2022;33(3):329-348. doi:10.1007/s12110-022-09433-z
16. Lou A, Hammoud M. Muslim patients' expectations and attitudes about Ramadan fasting during pregnancy. Int J Gynaecol Obstet. 2016;132(3): 321-324. doi:10.1016/j.ijgo.2015.07.028
17. Uludağ E, Göral Türkcü S. Ramadan fasting as a

religious obligation: a qualitative study on opinions and experiences of Muslim pregnant women about fasting in Turkey. J Relig Health. 2022;61(4):2960-2974. doi:10.1007/s10943-022-01588-4
18. Ok, Ü. Religious attitude scale: scale development and validation. Journal of Human Sciences. 2011;8(2): 528-549.
19. Smith V. Muldoon K, Brady V, et al. Assessing fetal movements in pregnancy: a qualitative evidence synthesis of women's views, perspectives and experiences. BMC Pregnancy Childbirth. 2021;21:197. doi:10.1186/s12884-021-03667-y
20. Nourimand F, Bahia SJ, Namavar AN, et al. Studying the correlation between spiritual well-being and religious attitude with mental health and quality of life in pregnant women. Pakistan Journal of Medical & Health Sciences. 2020;14 (1):681-684.
21. Dokuhaki S, Ghodrati F. Investigation of relationship between maternal religious attitude and mental health of infant at birth. Women's Health Bulletin. 2019;6(3): 36-40. doi:10.5812/ whb.93292
22. Polat F, Karasu F, Yıldız M. The Effect of religious attitudes on anxiety and psychological well-being in risky pregnancies: a cross-sectional study from Turkey. J Relig Health. 2022;61(4): 2992-3010. doi:10.1007/s10943-022-01597-3

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The Relationship Between Body Image and Anxiety and Depression in Pregnant Women in Türkiye

Türkiye'deki Gebe Kadınlarda Beden İmajı ile Anksiyete ve Depresyon Arasındaki İlişki

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ABSTRACT

Objective: This study was conducted to examine the relationship between body image and anxiety and depression during pregnancy.

Materials and Methods: A cross-sectional and correlational study was conducted with 300 pregnant women in a public hospital and family health centers between October 2022 and February 2023. Data were collected with the Personal Information Form, Body Understanding Scale for Pregnancy (BUMPs) and Hospital Anxiety and Depression (HAD) Scale. Mean, percentage, Independent Sample t-test, One-Way ANOVA, Correlation and Multiple Linear Regression were used for data analysis.

Results: Correlation analysis showed significant positive correlations between Body Image and Anxiety and Depression in Pregnancy. In the multiple linear regression analysis, it was found that 13% (R^2 adj. = 0.13) of the variance in the HADS-A subscale variable was explained by independent variables. It was found that 27% of the variance in the HAD-D subscale variable (R^2 adj.= 0.27) was explained by independent variables.

Conclusions: This study showed that body image during pregnancy is a multifaceted problem that affects anxiety and depression in pregnant women. The high prevalence of prenatal anxiety and depression highlights the importance of this condition as a public health problem.

Keywords: Anxiety, body image, depression, pregnancy, regression

ÖZ

Amaç: Bu çalışma gebelikte beden imajının anksiyete ve depresyon ile ilişkisini incelemek amacıyla yapılmıştır.

Materyal ve Metot: Bu çalışma Ekim 2022 ile Şubat 2023 tarihleri arasında bir devlet hastanesi ve aile sağlığı merkezlerinde 300 gebe ile kesitsel ve korelasyonel bir çalışma yapılmıştır. Veriler Kişisel Bilgi Formu, Gebelikte Beden Algısı Ölçeği (GBAÖ) ve Hastane Anksiyete ve Depresyon (HAD) Ölçeği ile toplandı. Veri analizi için ortalama, yüzde, Bağımsız Örneklem T Testi, Tek Yönlü ANOVA, Korelasyon ve Çoklu Doğrusal Regresyon kullanıldı.

Bulgular: Korelasyon analizi, Gebelikte Beden İmajı ile Anksiyete ve Depresyon arasında anlamlı pozitif korelasyonlar olduğunu gösterdi. Çoklu doğrusal regresyon analizinde HAD-A alt boyutu değişkenindeki varyansın % 13'ünün (R^2 adj.= 0,13) bağımsız değişkenler tarafından açıklandığı bulunmuştur. HAD-D alt ölçeği değişkenindeki varyansın (R^2 adj.= 0,27) %27'sinin bağımsız değişkenler tarafından açıklandığı bulunmuştur.

Sonuç: Bu çalışmada gebelikte ki beden imajının gebe kadınlarda anksiyeteyi ve depresyonu etkileyen önemli bir faktör olduğunu göstermiştir. Doğum öncesi anksiyete ve depresyonun yüksek prevalansı, bu durumun bir halk sağlığı sorunu olarak önemini vurgulamaktadır.

Anahtar Kelimeler: Anksiyete, beden imajı, depresyon, gebelik, regresyon

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INTRODUCTION

Body image is a multifaceted construct thought to have emotional and perceptual components that are based on one's efforts to change the thoughts one has about the physical dimension of one's body, a mental reflection of what one thinks how one's body should or should not look like.[1] Body image in women is more at the forefront than in men. It differs from person to person physiologically and psychologically in life periods such as pregnancy, postpartum, pre-menopause, menopause, and adolescence.[2] While pregnancy is a physiological process per se, pregnant women go through a series of psychological, emotional, and physical changes in their bodies in a short time, and they sometimes have difficulty adapting to these changes.[3] Although these changes are considered normal during pregnancy, pregnant women may feel the urge to stay slim as they compare their bodies with others due to social pressure, leaving them with low self-esteem, unhappiness, and emotional distress. Physical and emotional changes experienced during this period, which can affect maternal and infant health, can take a toll on pregnant women's body image and, thus, give rise to stress and anxiety.[4,5] It has been reported that pregnant women find their bodies unattractive, especially in the third trimester.[6] In some studies in the literature, it was stated that women with high BMI (Body Mass Index) were dissatisfied with their bodies during pregnancy.[5,7] A study found that fear of weight gain during pregnancy leads some women to adopt poor diets, risking severe health issues for both mother and child. Negative body image during pregnancy can cause depression, low breastfeeding rates, and poor mother-infant bonding, with increased susceptibility to psychiatric disorders.[8] Stress, anxiety, and depression during pregnancy can have a deteriorating effect on maternal and fetal health. Therefore, identifying and preventing factors that can cause stress, anxiety, and depression during pregnancy is essential for maternal and infant health.[9]

Pregnancy-related body image and its impact on women's anxiety and depression is a critical issue for both maternal and infant health. This study aims to guide midwives and nurses in supporting women during pregnancy. This study will examine body image during pregnancy from both physiological and psychological perspectives, focusing on its direct relationship with anxiety and depression.

MATERIALS AND METHODS

Ethics Committee Approval: Ethics committee approval (Date: 25.11.2022, decision no: 292/12) from Bayburt University and institutional permission from Bayburt Provincial Health Directorate were obtained before the study. The Declaration of Helsinki informed participants about the investigation, and their consent was obtained with an Informed Consent Form. Informed consent was obtained from the legal representatives of the illiterate and underage participants in the study.

Study design: This cross-sectional and correlational study was conducted in a state hospital and family health centers between October 2022 and February 2023.

Population and sample: Three hundred pregnant women from a state hospital and family health centers participated in this study between October 2022 and February 2023. The sample size, calculated with G*Power for 95% confidence, 5% margin of error, and 80% power, was set at 270 and increased by 10% to account for potential losses, totalling 300 participants. As a result of post hoc analysis, when the number of samples obtained as a result of the study, the effect size of d = 0.3 and the error rate (1-α) are kept constant at 5%, the power of the test is obtained as 98%. Inclusion criteria included being 4-6 weeks pregnant, having a single healthy fetus, being communicative, free of mental disorders, having a spontaneous pregnancy, and consenting to participate.

Data collection tools: Data were collected face-to-face with a "Personal Information Form," the "Body Understanding Measure for Pregnancy Scale" (BUMPs), and the "Hospital Anxiety and Depression Scale" (HAD).

Personal Information Form: The researchers developed a personal information form based on a literature review. It included 12 items on sociodemographic details such as age, education, occupation, economic status, family type, spouse's employment and education, place of residence, number of pregnancies, gestational week, kinship with a spouse, and marital satisfaction.[2,3,5]

Body Understanding Measure for Pregnancy Scales (BUMPs): Güleç and Satır conducted the Turkish validity and reliability study of the scale, developed initially by Kirk and Preston in 2019 in 2021.[10,11] The scale Cronbach's alpha value is 0.87. It is a 17-item, five-point Likert-type scale. The lowest score that can be obtained from the scale is 17 points, and the highest score is 85. The higher the score indicates, the higher the level of negative body image in pregnancy.[10] The Cronbach's alpha value of this study was 0.80.

Hospital Anxiety and Depression (HAD) Scale: Zigmond and Snaith[12] developed this scale in 1983. Aydemir et al.[13] conducted the scale's Turkish validity and reliability study in 1997. HAD is a 14-item scale comprising two subscales: anxiety (HAD-A) and depression (HAD-D). Of the 14 items on the scale, all odd-numbered items are about anxiety and

even-numbered items about depression. HAD is a four-point Likert-type assessment tool, and the scores for each item are between 0-3. The cut point for the anxiety subscale of HAD Turkish was set at 10, and the cut point for the depression subscale was set at 7. Individuals with scores above these two points can be considered a risk group.[13] Aydemir et al.[13] determined that Cronbach's Alpha coefficient for the anxiety and depression sub-dimensions of the scale was 0.85 and 0.78, respectively. While the Hospital Anxiety and Depression Scales (HADS) was initially designed to identify depression and anxiety in clinical populations, Matsudaira et al.[14] have confirmed that this measurement is also appropriate for nonclinical populations. The Cronbach's alpha value found in our study or the scale's anxiety and depression sub-dimensions was 0.70 and 0.65, respectively.

Data analysis: Data analysis was conducted using SPSS 26.0 (Chicago, IL, USA). Normality was assessed via skewness and kurtosis, with values between ±1 considered acceptable.[15] Descriptive statistics were presented as numbers, percentages, means, standard deviations (SD), and min-max values. Parametric tests were employed due to the normal distribution of data. Independent Samples t-tests and One-Way ANOVA were used to compare participants' descriptive characteristics and scale scores. Pearson's correlation analysis examined relationships between variables, and Multiple Linear Regression identified associations between dependent and independent variables. Statistical significance was set at $p<0.05$ and $p<0.001$.

RESULTS

Table 1 presents the mean BUMPs, HAD-A, and HAD -D scores, along with their associations with participants' sociodemographic and obstetric characteristics. Significant differences in BUMPs total scores were observed based on place of residence (p=0.001), spouse's employment status (p=0.000), family type (p=0.032), gestational week (p=0.003), number of pregnancies (p=0.001), and marital satisfaction (p=0.000). Subscale analyses revealed associations between weight gain anxiety and physical difficulty scores and factors such as place of residence (p=0.000), spouse's employment status (p=0.002), family type (p=0.005), gestational week (p=0.003), marital satisfaction (p=0.000), and kinship with spouse (p=0.003). Body Image in Pregnancy subscale scores significantly differed by age (p=0.005), education level (p=0.011), place of residence (p=0.013), number of pregnancies (p=0.000), and marital satisfaction (p=0.029). HAD-A scores were significantly associated with age (p=0.029), employment (p=0.001), education (p=0.029), spouse's family type (p=0.006), and marital satisfaction (p=0.000). HAD-D scores showed significant differences based on education (p=0.041), spouse's employment status (p=0.001), family type (p=0.000), number of pregnancies (p=0.001), gestational week (p=0.002), marital satisfaction (p=0.000), and kinship with spouse (p=0.003; Table 1).

Table 1. Comparison of the sociodemographic and some obstetric characteristics of pregnant women with the scale mean scores (n= 300).

Variables		n (%)	HAD-A	HAD-D	BUMPs total score	BUMPs-Weight gain concerns and physical difficulty sub-dimension score	BUMPs-Satisfaction with the pregnancy outlook sub-dimension score
Year	19 years and under[1]	13 (4.3)	9.84±4.33	6.69±3.90	42.76±6.27	27.23±5.86	15.53±2.60
	20-24 years[2]	42 (14.0)	8.52±4.04	7.00±3.34	44.52±10.75	28.21±7.99	16.30±4.51
	25-29 years[3]	123 (41.0)	7.82±3.60	6.54±3.76	43.73±9.70	27.13±7.98	16.60±4.81
	30-34 years[4]	94 (31.3)	9.23±3.28	7.01±2.99	46.05±10.54	27.70±8.33	18.35±5.28
	35 years and above[5]	28 (9.4)	9.07±2.85	7.85±3.55	47.53±10.44	28.07±8.86	19.46±6.00
Statistical analysis			F=2.729[a] **p=0.029****	F=0.899 p=0.465	F=1.352 p=0.251	F=0.192 p=0.942	F=3.794[b] **p=0.005****

*: Independent T test; **: One-Way ANOVA; ***: According to pregnant women's own statements; [a]: Bonferroni= 3<4; [b]: Games-Howell= 1<4, 1<5; [c]Scheffe= 2>5; [d]: Scheffe= 2>3; [e]: Scheffe= 2>3; [f]: Games-Howell= 1<2, 1<3; [g]: Bonferroni= 1<3; [h]: Bonferroni= 1<2, 1<3; [j]: Games-Howell= 1<2, 1<3; [k]: Games-Howell= 2>3; [m]: Bonferroni= 2>3; [n]: Games-Howell= 2>3. BUMPs: Body Understanding Measure for Pregnancy Scales; HAD: Hospital Anxiety and Depression Scale; HAD-A: Anxiety scale; HAD-D: Depression scale.

Table 1. Continue.

	Literate/ Illiterate[1]	17 (5.7)	10.11±2.34	8.17±3.18	49.35±6.67	32.82±4.50	16.52±4.50
Educational status	Primary school[2]	31 (10.3)	8.93±3.05	8.03±3.32	47.41±6.23	27.03±6.31	20.38±5.09
	Middle school[3]	40 (13.3)	8.52±3.85	6.97±3.53	43.97±8.93	27.10±7.65	16.87±5.12
	High school[4]	80 (26.7)	8.61±3.18	7.08±3.48	45.15±10.58	27.97±8.77	17.17±4.80
	University[5]	132 (44.0)	8.27±3.94	6.29±3.42	43.83±11.05	26.88±8.28	16.94±5.10
Statistical analysis			F=1.105 p=0.354	F=2.520 **P=0.041****	F=1.788 p=0.131	F=2.194 p=0.070	F=3.309[c] **p=0.011****
Economic level***	Income is less than expenses	53 (17.7)	8.94±3.47	7.24±3.40	47.16±11.59	29.43±8.97	17.73± 4.83
	Income equals expenses	189 (63.0)	8.69±3.67	6.89±3.37	44.64±9.78	27.35±7.68	17.28±5.08
	Income is more than expenses	58 (19.3)	7.81±3.34	6.51±3.82	43.60±9.53	26.48±8.25	17.12±5.31
Statistical analysis			F=1.718 p=0.181	F=0.612 p=0.543	F=1.886 p=0.153	F=2.020 p=0.134	F=0.227 p=0.797
Working status	I am working	88 (29.3)	8.48±3.63	7.19±2.90	46.11±10.69	28.71±8.82	17.39±5.27
	I am not working	212 (70.7)	8.60±3.57	6.75±3.67	44.38±9.83	27.07±7.69	17.30±4.99
Statistical analysis			t=-0.253 p=0.801	t=1.097 p=0.274	t=1.356 p=0.176	t=1.608 p=0.109	t=0.149 p=0.882
Husband's education	Primary school	39 (13.0)	8.84±2.80	7.94±3.45	46.25±8.72	29.66±7.58	16.58±4.19
	Middle school	34 (11.3)	9.38±3.02	7.17±3.35	45.38±7.67	26.79±6.83	18.58±5.15
	High school	99 (33.0)	9.09±4.05	6.97±3.37	45.96±10.36	28.51±8.38	17.45±5.20
	Universty	128 (42.7)	7.86±3.45	6.40±3.52	43.50±10.77	26.37±8.11	17.12±5.18
Statistical analysis			F=3.055 **p=0.029****	F=2.169 p=0.092	F=1.454 p=0.227	F=2.407 p=0.067	F=1.065 p=0.364
Residential area	Village[1]	36 (12.0)	8.52±3.50	7.19±3.42	43.88±9.07	28.69±7.07	15.19±4.13
	District [2]	80 (26.7)	9.05±3.41	7.42±3.13	48.42±9.19	30.23±7.54	18.18±3.93
	Province [3]	184 (61.3)	8.36±3.67	6.58±3.59	43.54±10.35	26.16±8.17	17.37±5.55
Statistical analysis			F=1.006 p=0.367	F=1.805 p=0.166	F=6.967[d] **p=0.001****	F=7.848[e] **p=0.000****	F=4.442[f] **p=0.013****
Husband's employment status	I am working	272 (90.7)	8.43±3.68	6.67±3.45	44.37±10.30	27.10±7.99	17.27±5.18
	I am not working	28 (9.3)	9.92±1.94	8.89±2.87	49.82±6.18	31.93±7.50	17.89±3.86
Statistical analysis			t=-3.486 **p=0.001***	t=-3.274 **p=0.001***	t=-4.105 **p=0.000***	t=-3.054 **p=0.002***	t=-.781 p=0.440
Family type	Nuclear family	241 (80.3)	8.31±3.65	6.44±3.36	44.26±10.13	26.90±7.97	17.36±5.06
	Extended family	59 (19.7)	9.62±3.07	8.66±3.32	47.40±9.69	30.20±7.94	17.20±5.14
Statistical analysis			t=-2.830 **p=0.006***	t=-4.538 **p=0.000***	t=-2.149 **p=0.032***	t=-2.846 **p=0.005***	t=.214 p=0.831
Number of pregnancies	1[1]	112 (37.3)	8.44±3.77	6.04±3.30	42.25±9.48	26.31±7.56	15.93±4.81
	2[2]	106 (35.3)	8.37±3.79	6.97±3.58	45.65±10.59	28.23±8.26	17.45±4.36
	3 and more	82 (27.4)	8.98±3.01	7.91±3.26	47.45±9.55	28.37±8.33	19.07±5.72
Statistical analysis			F=.775 p=0.462	F=7.235[g] **p=0.001****	F=7.056[h] **p=0.001****	F=2.151 p=0.118	F=9.621[j] **p=0.000****
Gestational week	1-12 mid-week[1]	19 (6.3)	9.78±2.85	8.00±3.60	47.63±5.79	29.52±4.78	18.10±4.05
	13-27 mid-week[2]	53 (17.7)	9.41±3.02	8.20±2.57	48.60±11.31	30.66±8.82	17.94±4.07
	28-40 mid-week[3]	228 (76.0)	8.27±3.71	6.48±3.54	43.79±9.87	26.67±7.91	17.12±5.34

*: Independent T test; **: One-Way ANOVA; ***: According to pregnant women's own statements; [a]: Bonferroni= 3<4; [b]: Games-Howell= 1<4, 1<5; [c]Scheffe= 2>5; [d]: Scheffe= 2>3; [e]: Scheffe= 2>3; [f]: Games-Howell= 1<2, 1<3; [g]: Bonferroni= 1<3; [h]: Bonferroni= 1<2, 1<3; [j]: Games-Howell= 1<2, 1<3; [k]: Games-Howell= 2>3; [m]: Bonferroni= 2>3; [n]: Games-Howell= 2>3. BUMPs: Body Understanding Measure for Pregnancy Scales; HAD: Hospital Anxiety and Depression Scale; HAD-A: Anxiety scale; HAD-D: Depression scale.

Table 1. Continue.

Statistical analysis			F=3.412 p=0.034	F=6.621[k] **p=0.002**[**]	F=5.795[m] **p=0.003**[**]	F=6.065[n] **p=0.003**[**]	F=.799 p=0.451
Satisfaction with marriage	Pleased	224 (74.7)	8.18±3.75	6.32±3.46	43.08±9.94	26.08±7.55	17.00±5.35
	Not satisfied	76 (25.3)	9.71±2.76	8.52±2.93	50.18±8.68	31.89±8.00	18.28±3.99
Statistical analysis			t=3.781 **p=0.000**[*]	t=5.391 **p=0.000**[*]	t=5.543 **P=0.000**[*]	t=5.706 **p=0.000**[*]	t=2.209 **p=0.029**[*]
Kinship status	Yes	47 (15.7)	9.08±2.96	8.23±3.67	47.46±10.38	30.76±8.44	16.70±4.28
	No	253 (84.3)	8.47±3.68	6.63±3.37	44.40±10.00	26.96±7.86	17.44±5.20
Statistical analysis			t=1.073 p=0.284	t=2.947 **p=0.003**[*]	t=1.915 p=0.056	t=3.011 **p=0.003**[*]	t=-0.924 p=0.356

*: Independent T test; **: One-Way ANOVA; ***: According to pregnant women's own statements; [a]: Bonferroni= 3<4; [b]: Games-Howell= 1<4, 1<5; [c]Scheffe= 2>5; [d]: Scheffe= 2>3; [e]: Scheffe= 2>3; [f]: Games-Howell= 1<2, 1<3; [g]: Bonferroni= 1<3; [h]: Bonferroni= 1<2, 1<3; [j]: Games-Howell= 1<2, 1<3; [k]: Games-Howell= 2>3; [m]: Bonferroni= 2>3; [n]: Games-Howell= 2>3. BUMPs: Body Understanding Measure for Pregnancy Scales; HAD: Hospital Anxiety and Depression Scale; HAD-A: Anxiety scale; HAD-D: Depression scale.

Table 2 shows the scale mean scores of pregnant women participating in the study, their min-max values, and the cut points. With the HAD-A cut point set at 10, it was determined that 30% of pregnant women were at risk for anxiety. With the HAD-D cut point set at 7, it was determined that 49% of pregnant women were at risk for depression (Table 2).

Table 3 shows the correlation between Body Image in Pregnancy and anxiety and depression. A positive, r: 0.378, and statistically significant correlation was found between the HAD-A sub-dimension and BUMPs total scores (p: 0.001; p<0.001). There was a positive, r: 0.520 moderate and statistically significant correlation between HAD-D sub-dimension and BUMPs total scores (p: 0.001; p<0.001, Tablo 3).

Table 4 presents the multiple linear regression analysis of factors predicting Body Image in Pregnancy and its subscales. The model demonstrated a good fit (F/p) and was statistically significant (p<0.001).

Table 2. Scale score averages, min-max values and cut-off points.

Scales	n	Min- Max	Min-Max that can be taken from the scale	Mean±SD	Anxiety (over 10 points) and depression (over 7 points) level
BUMPs	300	19-80	17-85	44.88±10.10	
BUMPs-Weight-gain concerns and physical difficulty sub-dimension	300	11-55	11-55	27.55±8.06	
BUMPs-Satisfaction with the pregnancy outlook sub-dimension	300	6-29	6-30	17.33±5.07	n **(%)**
HAD-A	300	0-21	0-21	8.57±3.58	89 **(%30)**
HAD-D	300	0-14	0-21	6.88±3.46	147 **(%49)**

BUMPs: Body Understanding Measure for Pregnancy Scales; HAD: Hospital Anxiety and Depression Scale; HAD-A: Anxiety scale; HAD-D: Depression scale.

Table 3. Inter-scale correlation coefficients.

Variables		1	2	3	4	5
BUMPs	r	1				
	p	-				
BUMPs-Weight-gain concerns and physical difficulty sub-dimension	r	0.868[**]	1			
	p	0.001	-			
BUMPs-Satisfaction with the pregnancy outlook sub-dimension score	r	0.613[**]	0.140[*]	1		
	p	0.001	0.015	-		
HAD-A	r	0.378[**]	0.312[**]	0.258[**]	1	
	p	0.001	0.001	0.001	-	
HAD-D	r	0.520[**]	0.438[**]	0.340[**]	0.503[**]	1
	p	0.001	0.001	0.001	0.001	-

Pearson correlation; *: p<0.05 (two-tailed); **: p<0.001 (two-tailed); BUMPs: Body Understanding Measure for Pregnancy Scales; HAD: Hospital Anxiety and Depression Scale; HAD-A: Anxiety scale; HAD-D: Depression scale.

Independent variables explained 12% of the variance in BUMPs total scores, 10% in the weight gain anxiety and physical difficulty subscale, and 6% in the Body Image in Pregnancy subscale (adjusted R^2 = 0.12, 0.10 and 0.06, respectively; p<0.001).

Table 5 shows a multiple linear regression analysis model of the predictive factors of depression and anxiety subscales according to the Body Understanding Measure for Pregnancy Scale subdimensions. A multiple linear regression model examined the relationship between BUMPs and HAD-D and HAD-A (Table 5). The result of the analysis showed a significant regression model ($F_{(2,297)}$= (25.03), p<0.001) and that independent variables explained the variance in the HAD-A subscale variable to 13% (R^2 adj.= 0.13). BUMPs weight gain anxiety and physical difficulty subscales predict HAD-A positively and significantly (β=0.282, t (297) =5.19, p<0.001, pr^2=0.083). BUMPs Body Image in Pregnancy subscale indicates HAD-A positively and significantly (β=0.218, t (297) =4.02, p<0.001, pr^2=0.051). The analysis results between HAD-D and independent variables revealed a significant regression model ($F_{(2,297)}$ = 55.15, p < 0.001). Additionally, 27% of the variance in the HAD-D subscale was explained by the independent variables (R^2 adj. = 0.27). BUMPs weight gain anxiety and physical difficulty subscales predict HAD-D positively and significantly (β=0.398, t (297) =7.94, p<0.001, pr^2=0.17). BUMPs Body Image in Pregnancy subscale indicates HAD-D positively and significantly (β=0.285, t (297) =5.68, p<0.001, pr^2=0.097).

Table 4. Multiple linear regression analysis models of the predictive factors of pregnancy-specific body image and sub-dimensions according to some characteristics of pregnant women.

Scale	Variables	Statistics					95,0 Cl		
		B	SE	β	t	p	Lower	Upper	Model fit
BUMPs-Weight-gain concerns and physical difficulty sub-dimension	**(Constant)**	14.618	0.606	-	5.609	0.000	9.489	19.748	**Adj. R^2 = 0.06 F = 5.924**
	Number of pregnancy	1.545	0.366	0.243	4.220	**0.000**	.824	2.265	
	Gestational week	-0.332	0.521	-0.038	-0.636	0.525	-1.357	0.694	
	Satisfaction with marriage	-0.674	0.703	-0.058	-0.959	0.338	-2.057	0.709	
	Kinship status	1.369	0.796	0.098	1.719	0.087	-0.198	2.935	
BUMPs-Satisfaction with the pregnancy outlook sub-dimension score	**(Constant)**	48.510	4.038	-	12.013	0.000	40.563	56.456	**Adj. R^2 = 0.10 F = 10.187**
	Number of pregnancy	0.262	0.567	0.026	.462	0.644	-0.854	1.378	
	Gestational week	-0.786	0.807	-0.057	-.974	0.331	-2.375	0.803	
	Satisfaction with marriage	-5.106	1.089	-0.276	-4.691	**0.000**	-7.249	-2.964	
	Kinship status	-2.879	1.233	-0.130	-2.335	0.020	-5.306	-0.452	
BUMPs	**(Constant)**	63.128	5.057	-	12.483	0.000	53.176	73.080	**Adj. R^2 = 0.12 F = 10.350**
	Number of pregnancy	1.807	0.710	0.143	2.544	**0.011**	0.409	3.204	
	Gestational week	-1.117	1.011	-0.064	-1.105	0.270	-3.107	0.872	
	Satisfaction with marriage	-5.780	1.363	-0.249	-4.240	**0.000**	-8.463	-3.097	
	Kinship status	-1.510	1.544	-0.054	-0.978	0.329	-4.549	1.529	

Adj.R^2: Adjusted R square; B: Partial regression coefficient; β: Standard partial regression coefficient; 95% CI: 95% confidence interval**;** BUMPs: Body Understanding Measure for Pregnancy Scales

Table 5. Multiple linear regression analysis model of the predictive factors of depression and anxiety sub-dimensions according to pregnancy-specific body image scale sub-dimensions.

Scale	Variables	Statistics					95,0 CI		
		B	SE	β	t	p	Lower	Upper	Model fit
HAD-A	**(Constant)**	2.442	0.892	-	2.737	0.007	0.686	4.198	**Adj. R^2 = 0.13**
	BUMPs-Weight-gain concerns and physical difficulty sub-dimension	0.125	0.024	0.282	5.198	**0.000**	0.078	0.173	**F = 25.036**
	BUMPs-Satisfaction with the pregnancy outlook sub -dimension score	0.154	0.038	0.218	4.027	**0.000**	0.079	0.230	
HAD-D	**(Constant)**	-1.196	0.796	-	-1.503	0.134	-2.762	0.370	**Adj. R^2 = 0.06 F = 55.156**
	BUMPs-Weight-gain concerns and physical difficulty sub-dimension	0.171	0.022	0.398	7.949	**0.000**	0.129	0.213	
	BUMPs-Satisfaction with the pregnancy outlook sub -dimension score	0.194	0.034	0.285	5.686	**0.000**	0.127	0.262	

Adj.R^2: Adjusted R square; B: Partial regression coefficient; β: Standard partial regression coefficient; 95% CI: 95% confidence interval.

DISCUSSION AND CONCLUSION

This study examined the relationship between body image, anxiety, and depression in pregnant women, identifying several influencing factors. Women living in urban areas, with employed spouses, in nuclear families, experiencing their first pregnancy, in later gestational weeks, or satisfied with their marriage reported a more positive body image. The literature highlights the variability in findings due to differences in measurement tools used to assess body image in pregnancy. Meireles et al.[16] demonstrated that body appreciation was significantly higher in women during the third trimester compared to the first and second trimesters, consistent with the findings of this study. Przybyła-Basista et al.[17] reported a positive correlation between negative appearance evaluation, maternal age, and anxious pregnancy attitudes. In contrast, Şeker et al.[18] found no significant relationship between body image during pregnancy and variables such as education, employment status, income level, place of residence, age, or number of pregnancies.

This study identified a significant relationship between body image and anxiety and depression, with 30% of pregnant women found to be at risk for anxiety. Similarly, Patel et al.[19] reported mild, moderate, and severe anxiety in 51.54%, 46.92%, and 0.76% of pregnant women, respectively, while Khan et al.[20] found these rates to be 21.18%, 23.53%, and 14.12%. Cena et al.[8] observed a 6.8% prevalence of comorbid anxiety and depression. In this study, lower anxiety levels were associated with having a spouse with a university education, being aged 25–29, having an employed spouse, living in a nuclear family, and being satisfied with one's marriage.

A notable finding of this study was that the participants' anxiety levels were influenced by their husbands' education and employment status rather than their own. Previous studies have shown that anxiety decreases with higher education levels,[19] is higher in working women,[19] increases with age,[8,19] is lower in those living in nuclear families, decreases with higher family income,[8,19,20] and is less likely in women with adequate social support.[8] Variations in findings across studies may be attributed to differences in cultural contexts and study variables. These results highlight the multifactorial nature of anxiety during pregnancy.

This study found that 49% of pregnant women were at risk for depression. Patel et al.[19] reported moderate, mild, and severe depression in 68.46%, 27.69%, and 3.85% of pregnant women, respectively, while Khan et al.[20] identified a 52.94% prevalence. Studies in India[21] and Poland[17] found depression rates of 25.6% and 22%, respectively. A systematic review and meta-analysis reported pooled prevalence rates of 20.7% for any prenatal depression and 15% for major prenatal depression.[22] In this study, lower depression levels were observed in women with a university degree, a working spouse, living in a nuclear family, without kin marriage, satisfied with their marriage, experiencing their first pregnancy, and in weeks 28–40 of gestation.

Dahiya et al.[23] found no association between factors such as the number of pregnancies, gestational week, age, occupation, family income, or type of household and the likelihood of depression. Similarly, Meireles et al.[16] reported no variation in depressive symptoms across trimesters. Prabhu et al.[24] noted a

higher risk of depression in younger pregnant women. At the same time, Patel et al.[19] identified increased depression levels in women over 35 with lower education and employment but lower levels in those with higher income or living in nuclear families. The literature highlights numerous factors associated with prenatal depression, including low education, urban residence, poor social support, unplanned pregnancy, history of depression, fear of childbirth, and experience of violence.[21,22,25] Variability in findings may stem from differences in study populations, cultural contexts, and screening tools.[23]

This study identified marital satisfaction and the number of pregnancies as key predictors of body image during pregnancy. Anxiety about weight gain, physical discomfort, and dissatisfaction with body appearance were significant predictors of prenatal anxiety and depression, with lower body image satisfaction correlating with higher anxiety and depression levels. Similarly, Cevik and Yanikkerem[25] found a strong relationship between body image and depression scores in women whose husbands viewed their weight gain negatively. At the same time, Przybyła-Basista et al.[17] highlighted body dissatisfaction as a major factor in prenatal depression. These findings underscore the critical impact of body image dissatisfaction on psychological well-being during pregnancy and the need for adequate social and psychological support.

In conclusion, the study found a significant positive correlation between BUMPs and both HAD-A and HAD-D. Integrating screening and diagnostic tools for anxiety and depression into prenatal care is essential to provide timely support and protect maternal and infant health. This study has limitations, including the use of self-report measures, regional focus, and cross-sectional design, which limits causal conclusions. Additionally, clinical assessments for depression and anxiety were not conducted. However, its strengths include being the first study to examine the impact of body image on anxiety and depression in pregnancy, using the Body Sense in Pregnancy Measure, and being a public health focus on prenatal mental health.

Ethics Committee Approval: Ethics committee approval (Date: 25.11.2022 Decision no: 292/12) from Bayburt University and institutional permission from Bayburt Provincial Health Directorate were obtained before the study. The Declaration of Helsinki informed participants about the investigation, and their consent was obtained with an Informed Consent Form. Volunteer participants were included in the study. Informed consent was obtained from the legal representatives of the illiterate and underage participants in the study.

Conflict of Interest: No conflict of interest was declared by the authors.

Author Contributions: Concept-ZÖK, EOA; Supervision- ZÖK, EOA, HÖ; Materials- ZÖK, EOA; Data Collection and/or Processing- ZÖK, EOA, HÖ; Analysis and/or Interpretation- ZÖK, EOA; Writing-ZÖK, EOA, HÖ.

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REFERENCES

1. Grogan S. Body image: Understanding body dissatisfaction in men, women, and children. London: Routledge. 2016. doi:10.4324/9781315681528
2. Yilmaz Kot B. Investigation of the relationship between body image and pain levels in vaginismus patients Master's thesis, Istanbul Gelisim University Graduate Education Institute. 2023.
3. Taşpinar A, Karabudak SS, Çoban A, Adana F. The effect of exposure to domestic violence during pregnancy on postpartum depression and maternal attachment. Adıyaman University Journal of Health Sciences. 2021;(7)2:94-102. doi:10.30569/adiyamansaglik.806662
4. Taşkın L. Doğum ve Kadın Sağlığı Hemşireliği. 17. Baskı, Ankara. Sistem Ofset Matbaacılık, 2021;67-76.
5. Roomruangwong C, Kanchanatawan B, Sirivichayakul S, Maes M. High incidence of body image dissatisfaction in pregnancy and the postnatal period: Associations with depression, anxiety, body mass index and weight gain during pregnancy. Sex Reprod Healthc. 2017;13:103-109. doi:10.1016/j.srhc.2017.08.002
6. Creanga AA, Catalano PM, Bateman BT. Obesity in pregnancy. New England Journal of Medicine. 2022;387(3):248-259. doi:10.1056/NEJMra1801040
7. JP NA, Minami M, Eitoku M, Maeda N, Fujieda M, Suganuma N. Lack of concern about body image and health during pregnancy linked to excessive gestational weight gain and small-for-gestational-age deliveries: The Japan environment and children's study. BMC Pregnancy and Childbirth. 2021;21(1):396. doi:10.1186/s12884-021-03827-0
8. Cena L, Gigantesco A, Mirabella F, Palumbo G, Camoni L, Trainini A, Stefana A. Prevalence of comorbid anxiety and depressive symptomatology in the third trimester of pregnancy: Analysing its association with sociodemographic, obstetric, and mental health features. Journal of Affective Disorders. 2021;295:1398-1406. doi:10.1016/j.jad.2021.09.015

9. Urbanová E, Škodová Z, Bašková M. The association between birth satisfaction and the risk of postpartum depression. International Journal of Environmental Research and Public Health. 2021;18(19):10458. doi:10.3390/ijerph181910458
10. Gulec Satir D, Hazar S. Validity and reliability of the Turkish version of the Body Understanding Measure for Pregnancy scale (BUMPs). Perspect Psychiatr Care. 2022;58(2):456-463. doi:10.1111/ppc.12822
11. Kirk E, Preston C. Development and validation of the Body Understanding Measure for Pregnancy Scale (BUMPS) and its role in antenatal attachment. Psychol Assess. 2019;31(9):1092-1106. doi:10.1037/pas0000736
12. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. Acta Psychiatr Scand. 1983;67(6):361-370. doi:10.1111/j.1600-0447.1983.tb09716.x
13. Aydemir O, Güvenir T, Küey L, Kültür S. The validity and reliability study of the Turkish version of the hospital anxiety and depression scale. Turkish Journal of Psychiatry. 1997;8(4):280-287.
14. Matsudaira T, Igarashi H, Kikuchi H, et al. Factor structure of the Hospital Anxiety and Depression Scale in Japanese psychiatric outpatient and student populations. Health Qual Life Outcomes. 2009;7:42. doi:10.1186/1477-7525-7-42
15. Uysal I, Kilic AF. Normal distribution dilemma. Anadolu Journal of Educational Sciences International. 2022;12(1):220-248. doi:10.18039/ajesi.962653
16. Meireles JFF, Neves CM, Amaral ACS, Morgado FFDR, Ferreira MEC. Body appreciation, depressive symptoms, and self-esteem in pregnant and postpartum Brazilian women. Front Glob Womens Health. 2022;3:834040. doi:10.3389/fgwh.2022.834040
17. Przybyła-Basista H, Kwiecińska E, Ilska M. Body acceptance by pregnant women and their attitudes toward pregnancy and maternity as predictors of prenatal depression. Int J Environ Res Public Health. 2020;17(24):9436. doi:10.3390/ijerph17249436
18. Şeker S, Canbay FÇ, Cesur C, Firouz N. Investigation of the effect of body image on weight gain during pregnancy: An analytical cross-sectional study. Journal of İnönü University Vocational School of Health Services. 2021;9(1):206-218. doi:10.33715/inonusaglik.812225
19. Patel R, Verma R, Singh R, Yadav R, Verma R, Verma R, Saeed S, Vajpayee S, Shubham A, Sumanlata M. A descriptive study to assess the level of anxiety and depression among antenatal mothers. International Journal of Research Publication and Reviews. 2022;3(1):542-545.
20. Khan MM, Fatıma Amına N, Khan N, Afrıdı S, Gul E. Examine the frequency of depressive disorders in antenatal women. Pakistan Journal of Medical & Health Sciences. 2020;14(2):654-656.
21. Nisarga V, Anupama M, Madhu KN. Social and obstetric risk factors of antenatal depression: A cross-sectional study from South-India. Asian J Psychiatr. 2022;72:103063. doi:10.1016/j.ajp.2022.103063
22. Yin X, Sun N, Jiang N, Xu X, Gan Y, Zhang J, Gong Y. Prevalence and associated factors of antenatal depression: Systematic reviews and meta-analyses. Clinical Psychology Review. 2021;83:101932. doi:10.1016/j.cpr.2020.101932
23. Dahiya N, Aggarwal K, Kumar R. Prevalence and correlates of antenatal depression among women registered at antenatal clinic in North India. Tzu Chi Med J. 2020;32(3):267-271. doi:10.4103/tcmj.tcmj_97_19
24. Prabhu S, Guruvare S, George LS, Nayak BS, Mayya S. Prevalence and associated risk factors of antenatal depression among pregnant women attending Tertiary Care Hospitals in South India. Depress Res Treat. 2022;2022:9127358. doi:10.1155/2022/9127358
25. Cevik E, Yanikkerem E. The factors affecting self-esteem, depression and body image of pregnant women in a state hospital in Turkey. J Pak Med Assoc. 2020;70(7):1159-1164. doi:10.5455/JPMA.19892

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Comparison of the Effects of the Ketogenic Diet and Western Diet on the Retina in Rats with Diabetes

Diyabetik Ratlarda Ketojenik Diyet ve Western Diyetin Retina Üzerine Etkilerinin Karşılaştırılması

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ABSTRACT

Objective: This study aimed to investigate the effects of different diets on the retina in rats with diabetes mellitus (DM).

Materials and Methods: In our study, a total of 4 groups were formed: healthy and regular diet (Group 1), DM-induced and regular diet (Group 2), DM-induced and ketogenic diet (KD) (Group 3), DM-induced and western diet (WD) (Group 4). Tissue sections were histo-scored using Vascular endothelial growth factor (VEGF) and Caspase-3 immunohistochemical staining method. The thicknesses of the retinal layers stained with hematoxylin-eosin were compared.

Results: Retinal staining with VEGF revealed a greater incidence of low-intensity staining in Group 3 (p: 0.018). There was no notable disparity observed across the groups in the staining of the retinas with Caspase-3 (p: 0.65). When the thicknesses of the retinal layers were compared, it was observed that the inner-outer nuclear, inner plexiform and ganglion layers were significantly thicker in the WD group than the other groups (p values <0.001, 0.013, 0.006, 0.017, respectively). There was no significant difference between the groups regarding choroidal thickness (p: 0.118).

Conclusions: The KD can be considered advantageous or less detrimental compared to the WD. Nevertheless, while the ketogenic diet has shown beneficial outcomes in the short term, its long-term impact remains uncertain.

Keywords: Caspase-3, diabetic retinopathy, ketogenic diet, VEGF, western diet

ÖZ

Amaç: Bu çalışmanın amacı, DM oluşturulmuş ratlarda farklı beslenme tarzlarının retina üzerindeki etkilerini araştırmak.

Materyal ve Metot: Çalışmamızda sağlıklı ve normal beslenme uygulanmış (Grup 1), DM oluşturularak normal beslenme uygulanmış (Grup 2), DM oluşturularak KD uygulanmış (Grup 3), DM oluşturularak WD uygulanmış (Grup 4) olmak üzere toplam 4 grup oluşturuldu. Doku kesitlerinden VEGF ve Caspase-3 immünohistokimyasal boyama yöntemi kullanılarak histoskorlama yapıldı. Hematoksilen-eozin ile boyanan retina tabakalarının kalınlıkları karşılaştırıldı.

Bulgular: Retinaların VEGF ile boyanmasında Grup 3'te az yoğun boyanma daha yüksek oranda bulundu (p: 0.018). Caspase-3 ile retinaların boyanmasında gruplar arasında anlamlı fark görülmedi (p: 0.65). Retina tabakalarının kalınlıkları karşılaştırıldığında; iç nükleer, iç pleksiform, dış nükleer ve ganglion tabakalarının Grup 4'te diğer gruplardan anlamlı olarak kalın olduğu görüldü (Sırasıyla p değerleri <0.001, 0.013, 0.006, 0.017). Koroid kalınlıkları açısından gruplar arasında anlamlı fark görülmedi (p: 0.118).

Sonuç: Ketojenik diyetin western tipi diyete göre faydalı veya daha az zararlı olduğu söylenebilir. Ancak ketojenik diyetle ilgili kısa vadede olumlu sonuçlar bildirilmesine karşın uzun vadede etkisi bilinmemektedir.

Anahtar Kelimeler: Caspase-3, diyabetik retinopati, ketojenik diyet, VEGF, western diyet

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INTRODUCTION

Diabetic retinopathy (DRP) is a prevalent and specific microvascular complication of DM, recognized as the leading cause of preventable blindness among working-aged individuals globally.[1,2] The pathophysiology of DRP involves complex, interrelated mechanisms, including genetic and epigenetic factors, oxidative stress, inflammation, and the production of advanced glycation end products and VEGF.[1,3,4]

Nutrition therapy plays an essential role in the managing of DM.[5] Nutrition-based interventions show great promise as supplementary therapy for preventing or slowing down the development of diabetic retinopathy (DR) in its early stages. These interventions can be a non-invasive and cost-effective therapeutic option accessible to individuals of all socioeconomic backgrounds.[6]

The KD, characterized by a high-fat content (90%) and low levels of protein and carbohydrates, has been used as a therapeutic approach for intractable epilepsy since the 1920s.[7] These diets are believed to enhance lipid metabolism and reduce inflammatory disorders. These diets induce ketosis, which leads to the immune system adjusting to low glucose levels and a change in metabolism towards the oxidation of fatty acids in the mitochondria, resulting in ketogenesis and ketosis. This metabolic shift helps to reduce inflammation[8]. Due to the significant role of inflammation in the development of DRP, it is believed that a KD may positively affect the management and treatment of DM and, consequently, DRP.

The WD is characterized by a high consumption of saturated fats, sweets, and processed carbs. There is scientific evidence indicating that highly processed foods have detrimental effects on human health. The global excessive consumption of diets rich in saturated fats, sugars, and refined carbohydrates is a significant factor in the widespread occurrence of obesity and type 2 DM.[9]

This study aims to investigate the effects of diet on eye tissues such as retinas in streptozotocin-induced DM and fed with different diet types.

MATERIALS AND METHODS

Ethics Committee Approval: This study was prepared with the approval of the Ethics Committee of Sakarya University (Date: 07/08/2019 Decision no: 26). It complies with a Guide for the care and use of laboratory animals

Study Design: In the study, 8-10 weeks old, those with similar weight(150-200gr) 28 Long Evans male rats were randomly selected and divided into four groups. For the study, a total of four groups were formed: the control group consisting of 7 healthy, DM-free rats fed with normal rat feed (Group 1), the normal group consisting of 7 DM formed rats fed with normal rat feed (Group 2), the ketogenic group consisting of 7 DM formed rats fed with a KD (Group 3) and the western group consisting of 7 DM formed rats fed with a WD (Group 4). In order to produce DM in rats, a solution of streptozotocin (Cayman®) at a dosage of 60 mg/kg was dissolved in PBS and delivered by the intraperitoneal route[10]. Individuals with a fasting glucose level exceeding 200 mg/dl in the blood sample collected from the tail vein after 72 hours were classified as DM. Streptozotocin was re-administered in the same dose to the animals that did not meet the criteria for DM. Rats diagnosed with DM were not treated. The animals were put in group feeding and fed ad libitum. Clean water was always available in manual drinkers.

At the end of 10 weeks, after exsanguination under anesthesia, eyes were enucleated and fixed in a 10% neutral buffered formaldehyde solution. After histological tissue follow-up, 5 µm thick tissue sections were taken along the optic nerve in a randomized, double-blind manner from tissue sections embedded in paraffin blocks for histological staining methods.

Staining Methods: Before staining, the sections were incubated in an oven at 60 ^{0}C for 2 hours, deparaffinized and rehydrated in xylol for 3 times 5 minutes, in absolute alcohol for 3 minutes, in 96% alcohol for 3 minutes, in 80% alcohol for 3 minutes, in 70% alcohol for 3 minutes and in distilled water for 3 minutes.

Immunostaining and hematoxylin eosin staining methods were applied to the sections that were deparaffinized and prepared for staining with the following steps.

Immunohistochemical Staining Protocol: Deparaffinized and rehydrated sections were first subjected to antigen retrieval. For this, the pH was adjusted to 6 with HCl. Trisodium citrate (dihydrate) 2.94 g (10 mM), 1 liter distilled water, 0.5 ml tween 20 were added and mixed. The mixture was kept in an oven at 40 ^{0}C for 1 night and washed twice for 5 minutes with Tris Buffered Saline (TBS+0.025% Triton X-100) at room temperature. Blocking was performed with 10% normal goat serum diluted with TBS containing 1% BSA for 2 hours at room temperature. The area around the slides was dried without touching the tissue and scratched with pappen. Primary antibody diluted in TBS with 1% BSA was applied (+4 0C, 1 night). For caspase 3: CASP3 Polyclonal Antibody E-AB-63602 (Elabscience®), for VEGF-A: VEGF-A Polyclonal Antibody E-AB-40004 (Elabscience®) was used. TBS washing was performed 2 times for 5 minutes at room temperature. A secondary antibody diluted with 1% BSA in TBS was applied (1 hour at room temperature). It was

washed with TBS for 5 minutes. Goat anti-rabbit HRP was applied for 15 minutes at room temperature and, washed 3 times for 3 minutes with TBS and soaked in DAB substrate mixture for 7 minutes. Washed with TBS 3 times for 3 minutes at room temperature and washed in distilled water for 5 minutes. Contrast staining was performed with hematoxylin for 1 minute and, washed with distilled water and sealed with mounting medium. The extent and severity of Caspase-3 and VEGF immunohistochemical staining were visually assessed and histologically scored semiquantitatively[11]. Immunohistochemical reactions were graded as low intensity, moderately intense, and very intense based on the extent and severity of immunoreactivity in staining.

Statistical Analysis: The study used descriptive statistics for categorical and numerical variables, with the Pearson chi-square test for categorical data and One-way ANOVA for numerical data. Tukey and Tamhane T2, pairwise comparison tests, were used for significant differences. Kruskal Wallis and Dunn's tests were used for non-normal distribution data. The Shapiro-Wilk test assessed normality. The analysis was conducted using SPSS v20.0 software, with a p-value of less than 0.05.

RESULTS

The degrees of retinal staining with Caspase-3 and the number of rats in the groups are shown in Table 1. There was no significant difference between the groups (p: 0.65).

Figure 1 displays immunohistochemistry staining of the retina of diabetic rats that were given a Western diet including Caspase-3. The black arrow indicates positively stained ganglion cells (x400 magnification).

Figure 2 shows moderately intense staining with Caspase-3. Positively stained cells are indicated by the black arrow, and negatively stained cells are indicated by the white arrow (x400 magnification).

Table1. Retinal staining with Caspase-3.

		Low intense staining	Moderately intense staining	Very intense staining	p-value
Group 1 (Control) (n=7)	n	3	0	4	0.65
	%	42.9	0	57.1	
Group 2 (Normal) (n=7)	n	2	2	3	
	%	28.6	28.6	42.9	
Group 3 (Ketogenic) (n=7)	n	0	6	1	
	%	0	85.7	14.3	
Group 4 (Western) (n=7)	n	1	3	3	
	%	14.3	42.9	42.9	

n: Indicates the number of animals in the group.

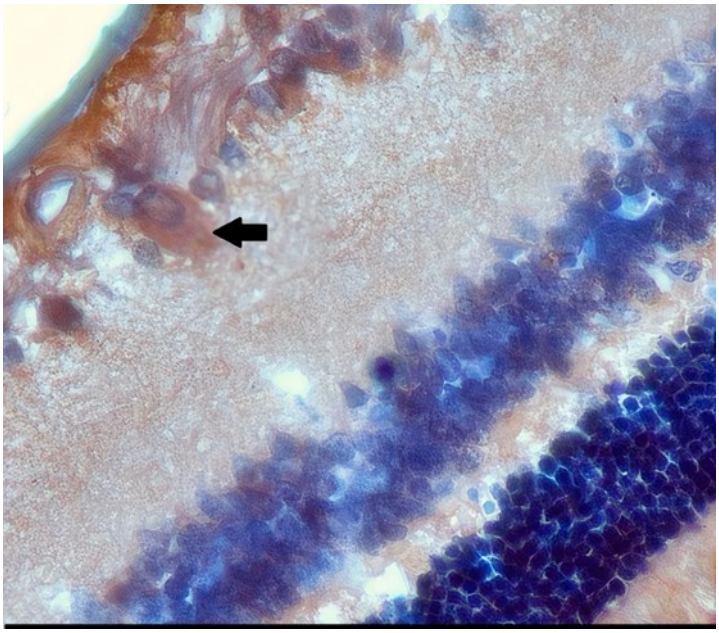

Figure 1. Immunohistochemical staining of the retina of diabetic rats fed a WD with Caspase-3. Positively stained ganglion cells are indicated by the black arrow (x400magnification).

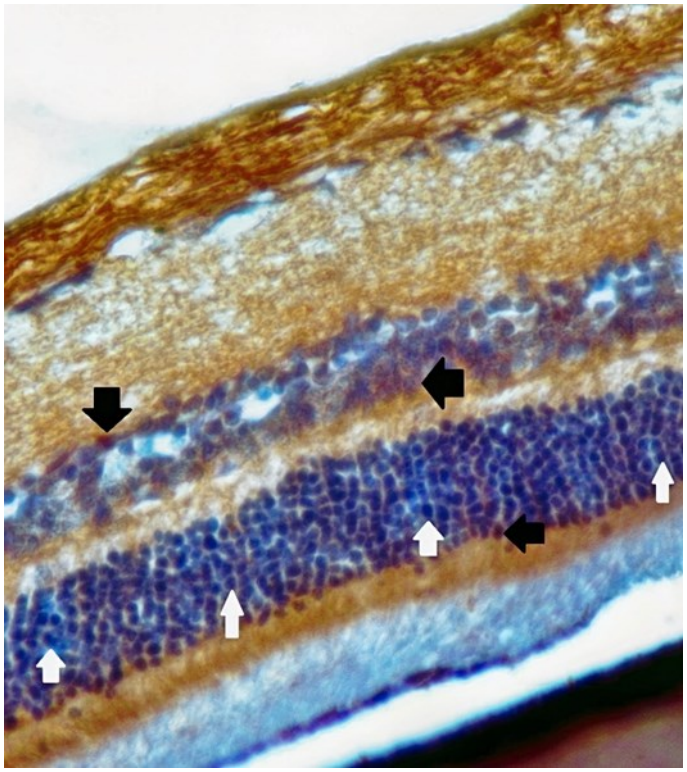

Figure 2. Moderately intense staining with Caspase-3. Positively stained cells are indicated by the black arrow, and negatively stained cells are indicated by the white arrow (x400 magnification).

The degrees of retinal staining with VEGF and the number of rats are shown in Table 2. There was a significant difference between the groups (p: 0.018). In Group 3, low-intense staining is noted at a higher rate (85.7%) than in the other groups.

The thicknesses of the retinal layers are shown in Table 3. In the comparison of the thicknesses of the retinal layers, there was a significant difference between the groups in inner nuclear, inner plexiform, ganglion and outer nuclear layer thicknesses. Significant thickening was noted in Group 4 compared to the other groups in all of these groups. The P value was <0.01 in the comparison of the inner nuclear layer, 0.006 in the comparison of the outer nuclear layer, 0.013 in the comparison of the inner plexiform layer, and 0.017 in the comparison of the ganglion layer. No statistically significant difference was seen between the groups after comparing the choroidal thicknesses (p: 0.118).

Table 2. Retinal staining with VEGF.

		Low intense staining	Moderately intense staining	Very intense staining	p-value
Group 1 (Control) (n=7)	n	2	2	3	
	%	28.6	28.6	42.9	
Group 2 (Normal) (n=7)	n	3	4	0	
	%	42.9	57.1	0	
Group 3 (Ketogenic) (n=7)	n	6	1	0	**0.018**
	%	85.7	14.3	0	
Group 4 (Western) (n=7)	n	0	4	3	
	%	0	57.1	42.9	

VEGF: Vascular endothelial growth factor; n: Indicates the number of animals in the group.

Table 3. The comparison of the thicknesses of the retinal layers.

		Group 1 (n:7)	Group 2 (n:7)	Group 3 (n:7)	Group 4 (n:7)	p-value
Choroid	Mean±SD	20.14±5.79	19.29±4.61	17.43±3.31	23.57±4.43	0.118[a]
	SV-medium-GV	12.00-19.00-29.00	12.0-21.0-24.0	14.0-16.0-23.0	17.0-24.0-29.0	
Outer nuclear	Mean ±SD	25.57±7.63	20.43±4.61	19.86±4.18	29.71±2.06	**0.006**[b]
	SV-medium-GV	19.00-23.00-40.00	14.0-22.0-27.0	13.0-22.0-23.0	26.0-30.0-33.0	4>3 (0.013) 4>2 (0.018)
Inner nuclear	Mean ±SD	13.29±4.31	12.29±4.79	9.86±2.34	21.71±5.74	**<0.001**[a]
	SV-medium-GV	7.00-14.00-20.00	7.0-13.0-19.0	7.0-9.0-14.0	13.0-23.0-27.0	4>1 (0.009) 4>3 (>0.001) 4>2 (0.003)
Inner plexi-form	Mean ±SD	18.14±11.05	17.57±7.81	14.71±5.38	40.57±15.15	**0,013**[b]
	SV-medium-GV	7.00-15.00-37.00	9.0-16.0-29.0	9.0-13.0-23.0	17.0-44.0-53.0	4>3 (0.018)
Gangli-on	Mean ±SD	9.86±4.02	8.29±1.98	8.00±2.71	14.43±3.15	**0.017**[b]
	SV-medium-GV	6.00-8.00-17.00	6.0-9.0-11.0	5.0-7.0-13.0	8.0-15.0-17.0	4>3 (0.019)

n: Indicates the number of animals in the group; SD: Standard deviation; SV: Smallest value; GV: Greatest value; a: One-way ANOVA; [b]: Kruskal Wallis Test.

DISCUSSION AND CONCLUSION

The KD has been shown to improve glycemic control, reduce weight, and enhance lipid profiles in patients with type 2 DM, which may indirectly benefit DRP by improving overall metabolic health.[12-14] The KD is effective in managing DM by regulating glucose and insulin levels, which could potentially help in controlling DRP by stabilizing blood sugar levels.[12,15,16] In diabetic mice, the KD reduced pain, improved sensory thresholds, and normalized epidermal innervation, suggesting potential benefits for diabetic neuropathy, which shares some pathophysiological mechanisms with DRP.[17]

To the best of our knowledge, our study is the first study on the effects of KD and WD on DRP in rats. For this reason, there is no study that we can compare directly. However, the study published by A.Al -Khalifa et al. in 2010, in which they investigated the effects of KD in rats, stated that there was no difference in diabetes in the KD group compared to the control group, and they concluded that the KD-protected from diabetes.[18] Similarly, the control group and KD group showed similar findings in our study. In addition to this, in our study, negative effects of WD were observed. In the study published by Barakat A. et al. in 2019, a plant-based, high-fat, low-sugar diet, in contrast to the WD, does not exacerbate retinal endothelial damage in streptozotocin-induced diabetes.[19]

Increased inflammatory mediators in those with DRP may be tissue edema, particularly as a result of increased vascular permeability due to VEGF. When the retinal thicknesses were compared in our study, it was observed that the inner nuclear layer, inner plexiform layer and ganglion layer thicknesses were significantly thicker in Group 4 than in the other groups. Based on this finding, we can say that WD worsens DRP. In addition, in retinal tissue staining, staining with VEGF was more intense in Group 4. This also supports the increase in thickness mentioned above.

When the choroidal thicknesses were compared, no significant difference was observed between the groups. Although there is no animal study that we can compare directly in this way, some clinical studies yielded different results from our study. Some studies suggest choroidal thickness increases in the early stages of DRP and with advanced retinopathy, while other studies suggest it decreases with progression and in cases of diabetic macular edema or proliferative diabetic retinopathy (PDRP).[20,21]

It is known that there may be regional differences in choroidal thickness. In this case, it can be concluded that there is no choroidal involvement. However, since histological sections were evaluated in our study, the anatomical region through which the section passed may not have been standardized between the groups.

The absence of a significant difference in choroidal thicknesses in our study may be coincidental. Moreover, reasons such as the inability to standardize the tissue through which the sections pass, the comparison of living tissue and dead tissue, the differences between the human eye and the eye of the experimental animal, and the choroidal structure may also have contributed to this.

There are some limitations of this study; we could not use additional methods to confirm VEGF and Caspase-3 staining due to limitations in our capabilities. Our photo quality may be a bit low due to our low capacity to photograph histological sections. We did not count cells during histo-scoring, so our scoring results may not be quantitative.

In conclusion, since the rate of low-intensity dye

uptake was found to be high in Group 3 and the rate of intense staining was found to be high in Group 4 in retinal staining with VEGF, it can be concluded that the KD affects the intraocular structures less than the destructive effect of diabetes compared to the WD. All these situations are valid within the current period of our study, and how they will result in the long term should be evaluated in longer-term experimental and clinical studies.

Ethics Committee Approval: Our study was approved by Sakarya University (Date: 07/08/2019 Number: 26). Complies with Guide for the care and use of laboratory animals. The study was carried out following the international declaration, guidelines.

Conflict of Interest: No conflict of interest was declared by the authors.

Author Contributions: Concept – HIS, IY, NC; Supervision – IY, EÇ, NC; Materials – HIS, NC; Data Collection and/or Processing –HIS, NC; Analysis and/or Interpretation – GO; Writing –HIS, IY, NC, BGS.

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REFERENCES

1. Vujosevic S, Aldington SJ, Silva P, Hernández C, Scanlon P, Peto T, Simó R. Screening for diabetic retinopathy: New perspectives and challenges. Lancet Diabetes Endocrinol. 2020;4:337-347. doi: 10.1016/S2213-8587(19)30411-5.
2. Stitt AW, Curtis TM, Chen M, et al. The progress in understanding and treatment of diabetic retinopathy. Prog Retin Eye Res. 2016;51:156-186. doi:10.1016/j.preteyeres.2015.08.001
3. Bunch KL, Abdelrahman AA, Caldwell RB, Caldwell RW. Novel Therapeutics for Diabetic Retinopathy and Diabetic Macular Edema: A Pathophysiologic Perspective. Front Physiol. 2022;13:831616. doi:10.3389/fphys.2022.831616.
4. Rübsam A, Parikh S, Fort PE. Role of inflammation in diabetic retinopathy. Int J Mol Sci. 2018;19(4):942. doi:10.3390/ijms19040942
5. American Diabetes Association. 4. Lifestyle Management: Standards of Medical Care in Diabetes -2018. Diabetes Care. 2018;41(Suppl 1):38-50. doi:10.2337/dc18-S004
6. Sharma Y, Saxena S, Mishra A, Saxena A, Natu SM. Nutrition for diabetic retinopathy: Plummeting the inevitable threat of diabetic vision loss. Eur J Nutr. 2017;56(6):2013-2027. doi:10.1007/s00394-017-1406-2
7. D'Andrea Meira I, Romão TT, Pires do Prado HJ, Krüger LT, Pires MEP, da Conceição PO. Ketogenic Diet and Epilepsy: What We Know So Far. Frontiers in neuroscience. 2019;13:5. doi:10.3389/fnins.2019.00005
8. Dupuis N, Curatolo N, Benoist JF, Auvin S. Ketogenic diet exhibits anti-inflammatory properties. Epilepsia. 2015;56(7):95-98. doi:10.1111/epi.13038
9. Zinöcker MK, Lindseth IA. The Western Diet-Microbiome-Host Interaction and Its Role in Metabolic Disease. Nutrients. 2018;10(3). doi:10.3390/nu10030365
10. Widowati W, Darsono L, Utomo HS, et al. Antidiabetic and hepatoprotection effect of butterfly pea flower (Clitoria ternatea L.) through antioxidant, anti-inflammatory, lower LDH, ACP, AST, and ALT on diabetes mellitus and dyslipidemia rat. Heliyon. 2024;10(8):29812. doi:10.1016/j.heliyon.2024.e29812
11. Crowe AR, Yue W. Semi-quantitative determination of protein expression using immunohistochemistry staining and analysis: An integrated protocol. Bio Protoc. 2019;9(24):3465-3465. doi:10.21769/BioProtoc.3465
12. Kumar S, Behl T, Sachdeva M, et al. Implicating the effect of ketogenic diet as a preventive measure to obesity and diabetes mellitus. Life Sci. 2021;264:118661. doi:10.1016/j.lfs.2020.118661
13. Choi YJ, Jeon S-M, Shin S. Impact of a ketogenic diet on metabolic parameters in patients with obesity or overweight and with or without type 2 diabetes: A meta-analysis of randomized controlled trials. Nutrients. 2020;12(7):2005. doi:10.3390/nu12072005
14. Zhang Q, Xu L, Xia J, Wang D, Qian M, Ding S. Treatment of diabetic mice with a combination of ketogenic diet and aerobic exercise via modulations of PPARs gene programs. PPAR Res. 2018;2018(1):4827643. doi:10.1155/2018/4827643
15. Blagosklonny M. The mystery of the ketogenic diet: benevolent pseudo-diabetes. Cell Cycle.2019;18(18):2157-2163. doi:10.1080/15384101.2019.1644765
16. Augustin K, Khabbush A, Williams S, et al. Mechanisms of action for the medium-chain triglyceride ketogenic diet in neurological and metabolic disorders. Lancet Neurol. 2018;17(1):84-93. doi:10.1016/S1474-4422(17)30408-8
17. Enders J, Swanson MT, Ryals J, Wright D. A ketogenic diet reduces mechanical allodynia and improves epidermal innervation in diabetic mice. Pain. 2022;163(4):682-689. doi: 10.1097/j.pain.0000000000002401
18. Al-Khalifa A, Mathew TC, Al-Zaid NS, Mathew E, Dashti H. Low carbohydrate ketogenic diet prevents the induction of diabetes using strepto-

zotocin in rats. Exp Toxicol Pathol. 2011;63(7-8):663-9. doi:10.1016/j.etp.2010.05.008
19. Barakat A, Nakao S, Zandi S, et al. In contrast to Western diet, a plant-based, high-fat, low-sugar diet does not exacerbate retinal endothelial injury in streptozotocin-induced diabetes. FASEB journal : Official publication of the Federation of American Societies for Experimental Biology. 2019;33(9):10327-10338. doi:10.1096/fj.201900462R
20. Endo H, Kase S, Saito M, et al. Choroidal thickness in diabetic patients without diabetic retinopathy: A meta-analysis. American Journal of Ophthalmology. 2020;218:68-77. doi:10.1016/j.ajo.2020.05.036
21. Wang W, Liu S, Qiu Z, et al. Choroidal thickness in diabetes and diabetic retinopathy: A swept source OCT study. İnvest Ophthalmol Vis Sci. 2020;61(4):29-29. doi:10.1167/iovs.61.4.29

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Investigation of the Effects of Postgraduate Education for HIV/AIDS on Physician Awareness

HIV/AIDS için Verilen Mezuniyet Sonrası Eğitimin Hekim Farkındalığı Üzerine Etkilerinin Araştırılması

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ABSTRACT

Objective: Postgraduate education (PE) designed to improve health professionals' knowledge and awareness of HIV/AIDS has a positive impact on the provision of health services for people living with HIV. This study aimed to examine the effects of HIV/AIDS education on physician behavior.

Materials and Methods: All doctors at Sakarya Training and Research Hospital invited to a one-day HIV/AIDS training on March 22, 2023. The training, which began with a pretest, lasted approximately 70 minutes, and after the training, a posttest was administered to the participants.

Results: In total, 81 physicians participated in our research, showing that short-term training has positive effects on the knowledge level of healthcare professionals about HIV/AIDS. Regarding recognizing signs and symptoms of HIV infection, the mean score before training was 6.02±1.94, while the mean score after training was 8.65±1.26 ($p < 0.05$). The mean level of knowledge regarding treatment success and life expectancy before and after training were 7.79±2, and 9.38±1.17, respectively ($p < 0.05$).

Conclusions: PE can bring about positive changes in the attitudes and behaviors of healthcare professionals. The effectiveness of these trainings in raising HIV awareness is essential in breaking down false beliefs, developing positive communication skills, and providing healthcare services to patients.

Keywords: Awareness, HIV, postgraduate education

ÖZ

Amaç HIV/AIDS konusunda sağlık çalışanlarının bilgi ve farkındalık düzeyini artırmak amacıyla verilen mezuniyet sonrası eğitimler (MSE), HIV ile yaşayan bireylere sağlık hizmet sunumunu olumlu etkilemektedir. Bu çalışmada HIV/AIDS konusunda verilen eğitimin hekim davranışlarına etkisinin araştırılması amaçlanmıştır.

Materyal ve Metot: Sakarya Eğitim ve Araştırma Hastanesi'nde çalışan tüm hekimler 22 Mart 2023 tarihinde bir günlük HIV/AIDS eğitimine davet edildi. Ön test ile başlayan eğitim, yaklaşık 70 dakika sürmüş ve eğitim sonrası katılımcılara son test uygulanmıştır.

Bulgular: Araştırmamıza toplam 81 hekim katılmış olup, kısa süreli eğitimlerin sağlık çalışanlarının HIV/AIDS konusundaki bilgi düzeyinde olumlu etkiler sağladığını göstermektedir. HIV enfeksiyonu belirti ve bulgularını tanıma açısından eğitim öncesi ortalama puan 6,02±1,94 iken eğitim sonrası ortalama 8,65±1,26 ($p < 0,05$) idi. Tedavi başarısı ve beklenen yaşam süresi ile ilgili bilgi puan ortalaması eğitim öncesi ve sonrası sırasıyla 7,79±2 ve 9,38±1,17 ($p < 0,05$) idi.

Sonuç: MSE sağlık çalışanlarının tutum ve davranışlarında olumlu değişikliklere neden olabilmektedir. Bu eğitimlerin HIV bilincini artırma konusundaki etkinliği, yanlış inançların azaltılması, olumlu iletişim becerilerinin geliştirilmesi ve hastalara sağlık hizmeti sunumu için önem arz etmektedir.

Anahtar Kelimeler: Farkındalık, HIV, mezuniyet sonrası eğitim

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INTRODUCTION

The human immunodeficiency virus / acquired immunodeficiency syndrome (HIV/AIDS) pandemic is a major health problem worldwide.[1] Healthcare professionals providing healthcare to these patients must update information and awareness about the disease to protect the health of the patient and the community.[2] The prejudice against the disease among healthcare professionals involved in the management of HIV/AIDS is a significant problem. Discriminatory behavior in service delivery is a significant barrier to individuals with HIV/AIDS accessing treatment.[3] Concern about being discriminated against reduces the likelihood of individuals living with HIV applying to treatment institutions and negatively affects the patient's self-confidence.[4] Healthcare professionals need to have accurate information about HIV/AIDS.

Various studies conducted in our country have revealed that healthcare professionals generally need postgraduate education (PE) on HIV/AIDS.[5-7]

There is evidence that postgraduate short-term HIV/AIDS training can be very useful in dealing with this problem. Short-term training provides healthcare professionals with the basic knowledge they need about HIV/AIDS, helping patients to receive the proper counselling. These trainings make healthcare professionals more aware of HIV/AIDS by explaining how it is transmitted, how it should be prevented, and how it is treated. In addition, there have been significant developments regarding the disease in the last 10 years. For example, the use of pre-exposure prophylaxis (PREP), which has been implemented since 2015, is of great importance in preventing the disease. However, it is natural that physicians who graduated before 2015 and work in different disciplines are unaware of these developments. New developments that emerge in the field and are critically important in preventing disease can be conveyed to healthcare professionals through PE.

Prejudice and discriminatory attitudes among healthcare professionals may lead to treatment rejection among individuals with HIV/AIDS.[3] The risk of transmission for patients receiving adequate treatment is reduced to deficient levels. Today, it is well known that " undetectable = untransmutable" is very valuable for public health in individuals with HIV/AIDS receiving appropriate treatment.

In the absence of such information, stigma and discrimination against individuals with HIV/AIDS may persist, which may limit patients' access to healthcare services and negatively affect treatments. Therefore, appropriate measures to educate and raise awareness of healthcare professionals play a critical role in reducing the effects of the disease and protecting and promoting health. The focus of this study is to examine the benefits of short-term HIV/AIDS PE for physicians working in tertiary hospitals.

MATERIALS AND METHODS

Ethics Approval: Ethical approval for the study was obtained from the Sakarya University Medical Faculty Non-Interventional Ethics Committee. (31.10.2023 date, and E-71522473-050.01.04-300108-316 number)

Participants: All physicians working at the Sakarya University Training and Research Hospital (SAUTRH) are invited to the study.

Educational Intervention: The research is an educational intervention study in which participant scores are compared before and after the education on HIV / AIDS. On March 22, 2023, a PE conference titled “Approach to Individuals Living with HIV and Recognizing Infection” was organized in the central conference hall of the SAUTRH. A pretest was conducted by researchers before the training. The participants were provided with training that included current basic information about HIV/AIDS. In this training, HIV/AIDS transmission routes, monitoring and treatment methods, and U=U (Undetectable=Untransmutable) information were conveyed. The training duration was 70 minutes.

Survey: Before and after the conference, a five-stage Likert-type scale was applied to all participants to evaluate HIV awareness and approach and to measure participant knowledge and attitudes. All questions were asked to the participants in a way that they could fill out from their mobile phones, and the participants filled out the survey anonymously without specifying their name, surname, phone number, and e-mail address.

Pre- and Post-tests: The pretest and posttest results were recorded online for easy data analysis and comparison. The pretest was administered before the conference and measured the participants' initial knowledge and attitudes. The posttest was administered after the conference to assess the participants' post-conference knowledge and attitudes.

Statistical Analysis: Likert-type scores provided by participants has been used as statistical values. Descriptive statistics were presented as frequency tables, mean ± STD-Standard Deviation values. Student t-test was used for the comparative analysis of the scores before and after the training; the statistical significance value was determined as $p<0.05$, and the statistical study was carried out with statistical modules in MS Office 365 Excel program version 2407 / 16.0.17830.20166.

RESULTS

A total of 81 physicians participated in our research. When pre- and post-training scores were analyzed, a

statistically significant increase in recognizing signs and symptoms associated with HIV infection was observed. Regarding recognizing the signs and symptoms of HIV infection, the mean before the training was 6.02±1.94, while after the training the mean was 8.65±1.26 ($p < 0.05$). The mean knowledge of treatment success and life expectancy was 7.79±2.00 before the training and 9.38±1.17 after the training ($p < 0.05$).

There was no significant change in the patient's willingness to consult an Infectious Diseases specialist for testing when HIV infection was suspected. In the case of wanting to take the individual initiative in requesting HIV-related testing, no statistically significant difference was found before and after the training. A significant statistical increase has been observed in the knowledge of "individuals living with HIV to achieve a healthy life span with current treatments." After the training, a significant positive change was observed in providing healthcare to people living with HIV who used their treatment regularly and who have undetectable virus levels. This reflects a safer attitude towards the possible risk of HIV transmission.

The t-test analysis results applied to the data set are shown in Table 1. According to the table data, there is a statistically significant positive increase for four statements and a statistically significant positive decrease for one statement. The differences for the other six statements are not statistically significant.

How the Likert mean scores of the participant statements change with the training is shown in Figure 1.

Table 1. Changes in Likert score averages of different expressions before and after the training and statistical significance values.

Expression	Before training Mean±SD	After training Mean±SD	t-Test	p-value
I recognize most of the signs and symptoms associated with HIV infection.	6.02 ± 1.94	8.65 ± 1.26	-8.88	0.05*
When I suspect HIV infection, I would like the patient to be referred to an infectious disease specialist for testing.	7.82 ± 2.81	7.55 ± 3.34	0.16	0.05
When I suspect HIV infection, I ask the patient for an HIV test myself.	9.13 ± 1.74	9.13 ± 1.74	0.00	0.05
With current treatments, individuals living with HIV can achieve almost the same life expectancy and quality as healthy individuals.	7.79 ± 2.00	9.38 ± 1.17	-5.39	0.05*
A patient living with HIV and using their treatment regularly and whose blood level of the virus is undetectable is considered to be practically untransmutable	6.40 ± 2.84	9.55 ± 1.02	-8.19	0.05*
I do not hesitate to provide any healthcare services/interventional procedures to patients living with HIV and whose virus is undetectable in the blood with treatment.	5.84 ± 2.92	8.58 ± 2.09	-6.00	0.05*
Would you be worried about touching the sheets on which a person living with HIV is sleeping?	4.53 ± 3.15	2.63 ± 2.42	3.74	0.05*
Do you concern about receiving blood from someone living with HIV?	7.74 ± 2.59	5.50 ± 3.24	1.45	0.05
Would you concerned about performing dressing changes/minor surgery on someone living with HIV?	7.24 ± 2.86	5.22 ± 3.07	1.27	0.05
Would you be concerned about performing diagnostic or therapeutic interventions on someone living with HIV?	7.56 ± 2.6	5.50 ± 2.94	1.48	0.05
Do you worry about performing surgery on someone living with HIV?	7.97 ± 2.55	5.82 ± 2.97	1.55	0.05

*: In the analysis, the p-significance value was accepted as 0.05, and the difference in these expressions is statistically significant.

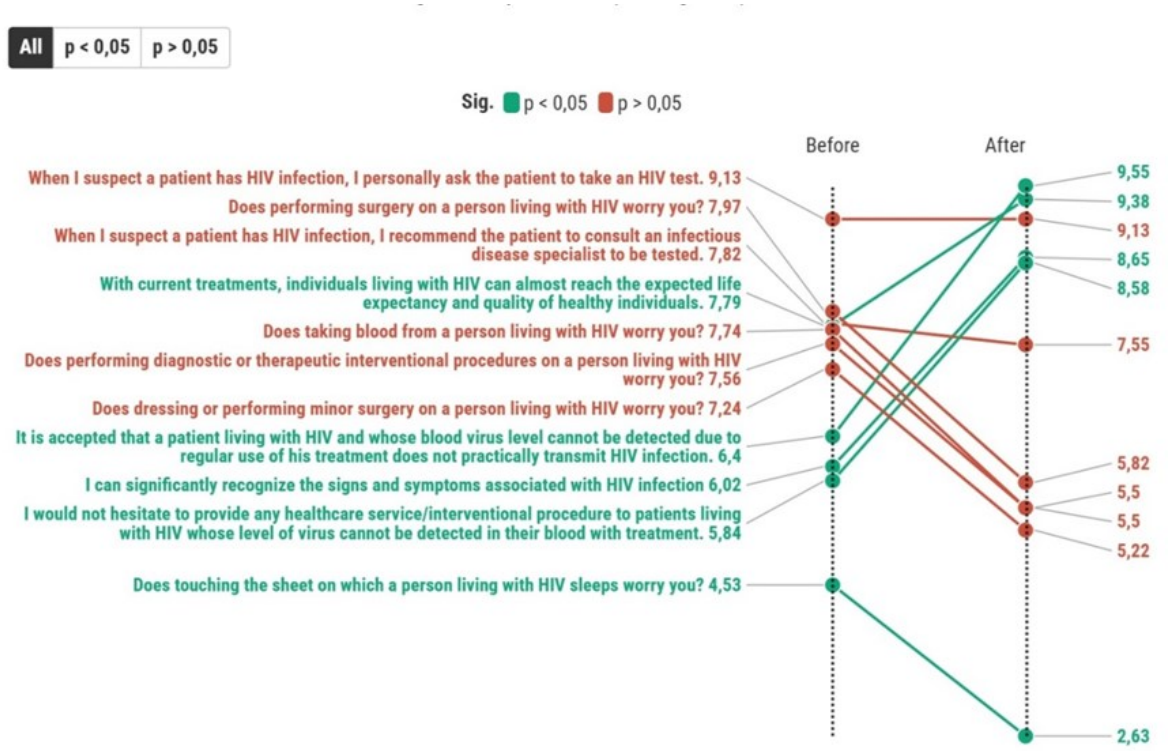

Figure 1. The change in the average Likert scores of the expressions with a statistically significant difference before and after the training given. (Likert min - max score: 1-10).

DISCUSSION AND CONCLUSION

In this study, a significant increase in the ability to recognize signs and symptoms associated with HIV infection was found after training. The fact that the mean score after PE was significantly higher than the pre-training score is significant for the early diagnosis and proper management of HIV infection.[9] Early diagnosis of HIV infection can increase the patient's chances of having better health and reduce the risk of infecting others.[8] There are many studies in the literature showing that similar training programs are effective in increasing the knowledge, attitudes and skills of health workers about HIV/AIDS.[10] It has been suggested that such PE may increase the capacity of health workers to provide better service to their patients and help control HIV infection more effectively in the community.

Our results show that the training program has increased the participants' knowledge level in recognizing the signs and symptoms associated with HIV infection. The participants began to identify better the signs and symptoms associated with HIV infection. PE may help health professionals assess patients' conditions and make accurate diagnoses more effectively. The training has increased the participants' awareness of HIV infection. This allows them to communicate more empathetically and consciously with patients. It shows that the training program increased knowledge and understanding about HIV infection and increased the participants' competence in this area.

The knowledge that individuals living with HIV can achieve the same life expectancy and quality as healthy individuals with current treatments can lead to several positive outcomes for healthcare professionals. Healthcare professionals with a higher level of knowledge can provide their patients with more hope and motivation and increase patients' hopes for a positive future. Physicians with increased knowledge can provide better patient-physician communication.[11]

Healthcare professionals should be aware that patients with HIV who consistently take their medication and have undetectable virus levels do not transmit the infection.[12] Correct counselling is one of the contributions of this information to the provision of health services. Healthcare professionals can reassure HIV-positive patients by providing them with accurate information. Patients can have healthier sexual relationships knowing that the risk of infecting their partners during sexual intercourse is low.

Providing patients with up-to-date and accurate information increases treatment adherence. When they keep their viral load under control with regular treat-

ment, they remain loyal to their treatment, knowing that they do not pose a risk to society. With the reduction in the risk of HIV infection transmission, preventing new infections in society reduces health expenditures. In addition, healthcare professionals who learn that the treatment is not contagious exhibit a more positive attitude toward stigmatization.[13]

As a result of PE, people's anxiety towards people living with HIV decreases. This also develops more empathy and understanding towards HIV-positive individuals.[14] Proper understanding of HIV transmission routes and raising public awareness are essential parts of supporting people living with HIV. The dissemination of such educational programs increases public support and cooperation.[15]

The most important limitation of our study is that it was conducted in a single center with few participants. If it could be done in a multicenter manner, our data would be stronger.

In conclusion, having up-to-date treatment information among healthcare professionals contributes to the positive interaction between individuals and society in the fight against HIV/AIDS. These results support the importance of training programs that can increase the ability of healthcare professionals to recognize HIV-related symptoms better. Such training should be implemented and updated for many healthcare professionals.

Ethics Committee Approval: Our study was approved by the Sakarya University Medical Faculty Non-Interventional Ethics Committee. (Date: 31.10.2023 date, decision no: E-71522473-050.01.04-300108-316)

Conflict of Interest: This study was conducted with the support of Gilead Sciences Türkiye.

Author Contributions: Concept – OK, AU, EG; Supervision – OK, AU; Materials – AU; Data Collection and/or Processing – OK, AU, EG; Analysis and/or Interpretation – OK, AU; Writing – OK, EG

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Other Information: The research data was presented as a poster abstract at the 2023 HIV/AIDS Congress.

REFERENCES

1. Smith RA. Global HIV/AIDS Politics, Policy and Activism: Persistent Challenges and Emerging Issues [3 volumes]. 1st Edition: Praeger; 2013.
2. Mwaniki SW, Kaberia PM, Mugo PM, Palanee-Phillips T. "We must help them despite who they are…": healthcare providers' attitudes and perspectives on care for young gay, bisexual and other men who have sex with men in Nairobi, Kenya. BMC Health Serv Res. 2023;23:1055. doi:10.1186/s12913-023-10026-4
3. Paul A. HIV/AIDS in Bangladesh: Stigmatized People, Policy and Place. 1st Edition. Springer; 2021.
4. Mohammad Bellal Hossain, Kippax S. Stigmatized attitudes toward people living with HIV in Bangladesh: health care workers' perspectives. Asia Pac J Public Health. 2011;23:171–182.
5. Keser G, Göcüncü N, Pekiner FN. Assessment of knowledge level about acquired immune deficiency syndrome and patient approaches of dental students. Niger J Clin Pract. 2019;22:1259–1265.
6. Koseoglu Ornek O, Tabak F, Mete B. Stigma in Hospital: an examination of beliefs and attitudes towards HIV/AIDS patients, Istanbul. AIDS Care. 2020;32:1045–1051.
7. Ceylan E, Koç A, İnkaya AÇ, Ünal S. Determination of medication adherence and related factors among people living with HIV/AIDS in a Turkish university hospital. Turk J Med Sci. 2019;49:198–205.
8. Ehlers V. Teaching Aspects of Health Care. 2nd Edition: Juta Ltd; 2002.
9. Oluwalana MO, Awolude OA, Gao Z, Daley PK. The epidemiology of delayed HIV diagnosis in Ibadan, Nigeria. Int J STD AIDS. 2022;33(9):829-836.
10. Morris LA, Ulmer C, Chimnani J. A role for Community Health Corps members in youth HIV/AIDS prevention education. J Sch Health. 2003;73:138–142.
11. Landes M, Thompson C, Mwinjiwa E, et al. Task shifting of triage to peer expert informal care providers at a tertiary referral HIV clinic in Malawi: a cross-sectional operational evaluation. BMC Health Serv Res. 2017;17:341. doi:10.1186/s12913-017-2291-3
12. Forrester S. Efficacy of the Patient Advocate Component in a Behavioral Intervention to Improve Treatment Adherence in the HIV Positive Population: A Systematic Review. 2011. School of Physician Assistant Studies. 253. https://commons.pacificu.edu/pa/253. Accessed; June 01, 2024
13. Elghazaly A, AlSaeed N, Islam S, et al. Assessing the knowledge and attitude towards HIV/AIDS among the general population and health care professionals in MENA region. PLoS One. 2023;18:e0288838. doi:10.1371/journal.pone.0288838
14. Li H, Mu GM, Theron L. Editorial: Social and Physical Ecologies for Child Resilience: Wisdom from Asia and Africa. Frontiers in Psychology. 2023;14, 1312299. doi:10.3389/fpsyg.2023.1312299
15. Ajisegiri WS, Abubakar AA, Gobir AA, Balogun MS, Sabitu K. Palliative care for people living

with HIV/AIDS: Factors influencing healthcare workers' knowledge, attitude and practice in public health facilities, Abuja, Nigeria. PLoS One. 2019;14:e0207499. doi:10.1371/journal.pone.0207499

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Gallic Acid Attenuates Cisplatin-Induced Apoptosis, Oxidative Stress, and Inflammation in Cardiomyocytes

Gallik Asit Kardiyomiyositlerde Sisplatin ile İndüklenen Apoptoz, Oksidatif Stres ve İnflamasyonu Azaltıyor

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ABSTRACT

Objective: Cisplatin (CIS) is a powerful chemotherapeutic agent that has long been used alone or in combination in the treatment of various cancers. However, the toxicity of CIS in various tissues limits its use. Gallic acid (GAL) has anti-microbial, anti-inflammatory, and anti-tumor properties. Since GAL has broad biological properties and exhibits antioxidant activity, this study aimed to investigate the effect of GAL on CIS-induced cardiotoxicity in H9c2 cardiomyocyte cell lines.

Materials and Methods: H9c2 cardiomyocyte cells as control (CON), CIS, and GAL25, GAL50 in combination along with CIS were used. In the analyses made, glutathione (GSH) and glutathione peroxidase (GSH-Px) enzyme activity, lipid peroxidation levels, inflammation markers IL1β, IL 6, and TNF α, Total Oxidant/ Antioxidant (TOS and TAS) status, reactive oxygen species (ROS) and caspase (Casp 3-9) activity in the cells were determined.

Results: CIS treatment caused cardiomyocyte cell toxicity and increased Casp 3-9, ROS, IL 1β, TNF α, IL 6, TOS, and MDA levels while decreasing GSH-Px, GSH, and TAS levels. Increased inflammation and impaired oxidant/ antioxidant balance in cardiomyocyte cells after CIS treatment were regulated by GAL treatment.

Conclusions: GAL treatment was found to have a protective effect on CIS-induced cardiotoxicity in cardiomyocyte cells.

Keywords: Cardiotoxicity, cisplatin, gallic acid, H9c2 cardiomyocyte, oxidative stress

ÖZ

Amaç: Sisplatin (CIS), çeşitli kanserlerin tedavisinde uzun süredir tek başına veya kombinasyon halinde kullanılan güçlü bir kemoterapötik ajandır. Bununla birlikte, CIS'in çeşitli dokulardaki toksisitesi kullanımını sınırlamaktadır. Gallik asit (GAL) anti-enflamatuar, anti-mikrobiyal ve anti -tümör gibi özelliklere sahiptir. GAL'in geniş biyolojik özelliklere sahip olması ve antioksidan aktivite sergilemesi sebebiyle bu çalışmada GAL'in H9c2 kardiyomiyosit hücre hatlarında CIS kaynaklı kardiyotoksite üzerindeki etkisinin araştırılması amaçlanmıştır.

Materyal ve Metot: Kontrol (CON) olarak H9c2 kardiyomiyosit hücreleri, CIS ve CIS ile birlikte GAL25, GAL50 kombinasyonları kullanılmıştır. Çalışmada yapılan analizlerde kardiyomiyosit hücrelerinde Total Antioksidan/ Oksidan (TAS ve TOS) durumu, inflamasyon belirteçleri TNF α, IL 1β ve IL 6, lipid peroksidasyon düzeyleri, glutatyon (GSH) ve glutatyon peroksidaz (GSH-Px) enzim aktivitesi, reaktif oksijen türleri (ROS) ve kaspaz aktivitesi (Casp 3-9) belirlenmiştir.

Bulgular: Sonuçlar, CIS tedavisinin kardiyomiyosit hücresinde toksisiteye neden olduğunu ve Casp 3-9, ROS, IL 1β, TNF α, IL 6, MDA ve TOS seviyelerini artırırken GSH-Px, GSH ve TAS seviyelerini azalttığını gösterdi. CIS tedavisi sonrasında kardiyomiyosit hücrelerinde artan inflamasyon ve bozulan oksidan/antioksidan dengesi GAL tedavisi ile düzenlenmiştir.

Sonuç: GAL tedavisinin kardiyomiyosit hücrelerinde CIS kaynaklı kardiyotoksisite üzerinde koruyucu bir etkiye sahip olduğu bulunmuştur.

Anahtar Kelimeler: Gallik asit, H9c2 kardiyomiyosit, kardiyotoksisite, oksidatif stres, sisplatin

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INTRODUCTION

Cisplatin (CIS) is a powerful chemotherapeutic agent that has long been used in the treatment of various cancers.[1] However, the toxicity of CIS in various tissues limits its use.[2] Although the anticancer effects of CIS are well understood, the mechanisms of toxicity in non-cancerous tissues are poorly understood. There is evidence that oxidative stress (OS)[3] and inflammation[4] are essential factors in CIS toxicity. CIS exerts its anticancer activity by inducing reactive oxygen species (ROS) that trigger cell death and DNA damage.[5] However, in addition to these desired effects on cancer cells, CIS causes toxicity by inducing the same effects on other cells in the body, including the myocardium.[2] Mitochondrial dysfunction due to increased ROS and subsequent activation of the apoptotic pathway has been reported as another essential mechanism involved in the pathogenesis of CIS toxicity.[6] In addition, existing reports indicate that inflammation markers play an essential role in CIS toxicity.[7]

By clarifying the multifactorial physiopathological mechanisms underlying the cardiotoxic effects of CIS, it may be able to reduce its side effects during treatment. Although various mechanisms related to the cardiotoxic effects of CIS, including increased OS and inflammation, have been suggested, no clear conclusion has been reached, and research on this issue continues.[8,9] The effects of adding antioxidant and anti-inflammatory compounds to CIS chemotherapy to slow CIS-induced myocyte damage have been studied, but the results are uncertain. Therefore, in vitro and in vivo preclinical studies should be continued.

Many plants, such as sumac, thuja, and green tea, contain Gallic acid (GAL), a flavinoid, as part of their structure.[5] GAL has a wide range of biological activities, including anti-microbial, antioxidant, and anti-inflammatory properties.[10] Recent studies have shown that GAL is effective in preventing CIS-induced damage in many tissues.[11,12] On the other hand, we were not able to find any studies on the regulatory effect of GAL on the cardiotoxicity induced by CIS.

This study aimed to investigate CIS-induced cardiotoxicity and the regulatory effect of GAL in the H9c2 cell. For this purpose, H9c2 cells, which are widely preferred in experimental myocardial injury in vitro models, were used. Caspase activation (Casp 3 and 9), markers of total antioxidant and oxidant status (TAS and TOS) levels, GSH, GSH-Px, and lipid peroxidation and markers of inflammation levels (TNF α, IL 1β, and IL 6) were analyzed to determine the damage caused by CIS in H9c2 cells.

MATERIALS AND METHODS

Ethics Committee Approval: This research was carried out using cells propagated through commercially available cell culture. Ethics committee approval is not required in this study. The study was conducted following the international declaration, guidelines, etc.

Cell Culture: The growth medium for the cells used in the study, Dulbecco's modified Eagle's medium (DMEM), was supplemented with 10% fetal bovine serum (FBS) and 1% antibiotics. The cells were passaged and divided into four groups after reaching 80 -85% confluence, and then this process was repeated (6 repetitions for each group). Cells in T25 culture flasks were cultured in an incubator (95% air, 5% CO_2, and 37 ºC). At the end of the incubation period, trypsin-EDTA-(0.25%) was used to detach the cells from the bottom of the flask.

Experimental Groups: The H9c2 cell line was divided into four groups.

CON (n;6), H9c2 cells in this group were not treated with any treatment, and were incubated (24 h).

CIS (n;6), H9c2 cells in this group were treated with 40 µM CIS, and were incubated (24 h).[2,9]

GAL25 (n;6), H9c2 cells in this group were pretreated with 25 µM GAL[13] 3 hours before 40 µM CIS treatment, followed by 40 µM CIS treatment, and were incubated (24 h).

GAL50 (n;6), H9c2 cells in this group were pretreated with 50 µM GAL[13] 3 hours before 40 µM CIS treatment, followed by 40 µM CIS treatment, and were incubated (24 h).

Cell Homogenate Preparation Steps: Following the kit instructions, the cells for each group were added to separate Eppendorf tubes and centrifuged (1000 rpm, 20 min). The following steps were followed: Using a pipette, the supernatants were removed from the top of the Eppendorf tubes, and the cell pellets underneath were diluted in PBS to a concentration of $1x10^6$ cells/ml. The cardiomyocyte cell structure was lysed by freeze-thaw repetition, and the mixture was centrifuged at 4°C (3000 rpm, 10 min.) after removing the cytoplasmic components. Any supernatants were removed by automated pipetting and transferred to new sterile tubes for further analysis.

Caspase, Reactive Oxygen Species, and Inflammation Markers Levels: Caspase, ROS, and inflammation marker levels in cardiomyocyte cell supernatants were determined (ELISA kit). According to the kit protocol and the manufacturer's instructions, the following steps were followed: supernatants were incubated (37°C, 60 min) according to the specified protocols, the supernatant and standard samples were transferred into 96-well plates, and incubated, washing steps were applied and staining solutions were added and incubated at 37°C temperature for

15 min. At the end of all these procedures, a stop solution was added, and an ELISA spectrophotometer was used to read the absorbance values (Bio Tek EL808™).[14,15]

Total Antioxidant/Oxidant Status Levels: Supernatants of the samples were used for TAS and TOS analyses, and the following steps were followed for TAS and TOS level measurement according to the kit protocol and the manufacturer's instructions. Sample supernatants were mixed with Reagent 1 buffer, and the absorbance was measured by an ELISA reader (TAS 660 nm, TOS 530 nm after incubation). Then Reagent-2 buffer was added, and absorbance was measured by ELISA reader (TAS 660 nm, TOS 530 nm after incubation) (second absorbance value).[14] For TAS analysis, each sample data was calculated using the kit's standard (equivalent to 1 mmol/L of Trolox). For TOS analysis, the assay was calibrated with hydrogen peroxide, and the results are expressed in micromolar hydrogen peroxide equivalents per litre (µmol H_2O_2 equivalents/L). The percentage ratio of the TOS to the TAS was accepted as the oxidative stress index (OSI), an indicator of the degree of oxidative stress. For calculations, the resulting unit of TAS, mmol Trolox eq/L, was converted to µmol Trolox eq/L, and the OSI value was calculated using the following formula: OSI = [TOS (µM H_2O_2 eq/L) / TAS (µmol Trolox eq /L)] × 100.

Glutathione, Glutathione Peroxidase, and Lipid Peroxidation Levels: Cardiomyocyte cell GSH, GSH-Px, and Lipid peroxidation (malondialdehyde, MDA) levels were measured with a V-730 UV spectrophotometer (Japan).

In the experiment (MDA), cell groups were diluted 1/9 (2,25 ml) with thiobarbituric acid (TBARS) solution. A mixture of 1/9 of TBARS and 0.25 ml phosphate buffer was used as a blind. Samples and blinds were placed in boiling water, cooled, and centrifuged at 3500 RPM. The top pink-coloured liquid was taken and read against the blind in a spectrophotometer at 532 nm wavelength in a cuvette with 1 cm light transmission. The solutions required for GSH determination were 10% trichloroacetic acid (TCA) solution and Tris-II buffer. 0.1 ml of cell homogenate and 0.4 ml of TCA were transferred to an Eppendorf tube, mixed, and centrifuged. Then 0.4 ml supernatant was taken into a glass tube, and 2.0 ml Tris-II and 0.1 ml DTNB were added. It was read at 412 nm wavelength with a spectrophotometer. Solutions required for GSH-Px determination: Tris-I buffer solution, GSH solution, CHPO (cumene-hydroperoxide) solution, 10% TCA solution, Tris-II buffer, DTNB [5,5 dithiobis (2 nitrobenzoic acid)] solution. 0.5 ml cell homogenate, 0.3 ml Tris-I HCl, 0.1 ml CHPO were mixed, and 0.1 ml GSH was added. It was kept at room temperature for 10 minutes, and 1.0 ml TCA was added and centrifuged. Then 0.1 ml supernatant was taken into a glass tube, and 2 ml Tris-II and 0.1 ml DTNB were added. It was read with a spectrophotometer at a wavelength of 412 nm.[14,15]

Statistical Analysis: Data analyses were performed with SPSS (ver. 17.0, software, USA) software, and all data were expressed as mean ± standard deviation (SD). A one-way ANOVA, Post-hoc Tukey test was used to evaluate all data showing statistically significant differences between groups. A value of $p \leq 0.05$ was considered statistically significant.

RESULTS

GAL treatment modulated the increase in ROS, and Casp 3-9 levels in CIS-treated cardiomyocyte cells (Figure 1). A significant increase in ROS (Figure 1A), Casp 3 (Figure 1B), and Casp 9 (Figure 1C) levels was observed in the CIS-treated group compared to CON, GAL25, and GAL50 groups ($p \leq 0.001$). Significant reductions were obtained in both H9c2 embryonic cardiomyocytes pre-treated with 25 and 50 µM GAL for ROS, and Casp 3-9 levels. However, the CIS-induced and disturbed oxidant/antioxidant balance was further regulated by 50 µM GAL.

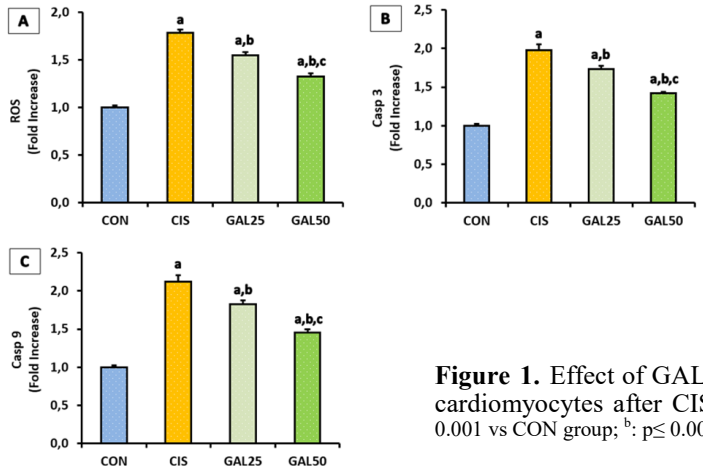

Figure 1. Effect of GAL on ROS (A), Casp 3 (B), and 9 (C) levels in cardiomyocytes after CIS-induced cardiomyotoxicity. (mean ± SD); ([a]: $p \leq 0.001$ vs CON group; [b]: $p \leq 0.001$ vs CIS group; [c]: $p \leq 0.001$ vs GAL25 group).

GAL treatment modulated the increase in inflammation marker levels in CIS-treated cardiomyocyte cells (Figure 2). A significant increase in IL 1β (Figure 2A), IL 6 (Figure 2B), and TNF α (Figure 2C) levels was observed in the CIS-treated group compared to CON, GAL25, and GAL50 groups (p≤0.001). Significant reductions were obtained in both H9c2 embryonic cardiomyocytes pre-treated with 25 and 50 µM GAL for TNF α, IL 1β, and IL 6 levels. However, the CIS-induced and disturbed inflammatory cytokines balance was further regulated by 50 µM GAL.

GAL therapy regulated the increase in lipid peroxidation (MDA) and disturbance of the antioxidant balance (GSH, GSH-Px, and TAS) levels in CIS-treated cardiomyocyte cells (Figure 3 and 4). A significant decrease in GSH (Figure 3A), GSH-Px (Figure 3B), and TAS (Figure 4B) levels was observed in the CIS-treated group compared to CON, GAL25, and GAL50 groups (p≤ 0.001). A significant increase in MDA (Figure 3C), TOS (Figure 4A), and OSI (Figure 4C) levels was observed in the CIS-treated group compared to CON, GAL25, and GAL50 groups (p≤0.001). Elevated MDA, TOS, and OSI levels and reduced GSH, GSH-Px, and TAS levels following CIS therapy in cardiomyocytes were regulated by GAL therapy. However, the CIS-induced and disturbed oxidant/antioxidant balance was further regulated by 50 µM GAL.

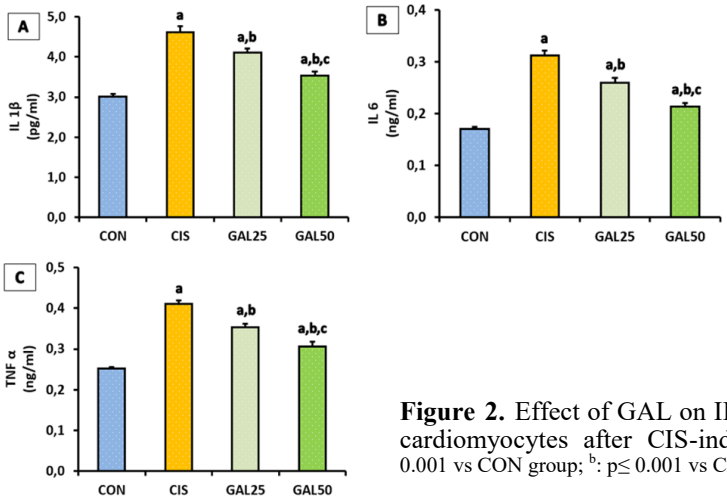

Figure 2. Effect of GAL on IL 1β (A), IL 6 (B), and TNF α (C) levels in cardiomyocytes after CIS-induced cardiomyotoxicity. (mean ± SD); ([a]: p≤ 0.001 vs CON group; [b]: p≤ 0.001 vs CIS group; [c]: p≤ 0.001 vs GAL25 group).

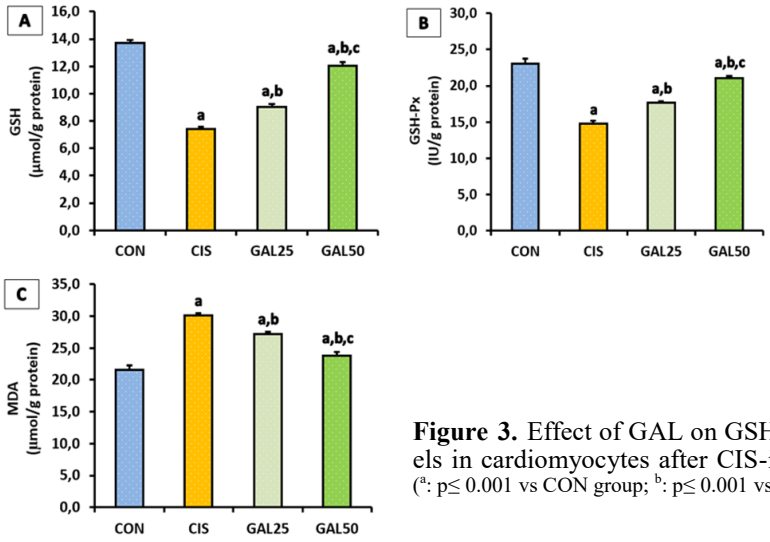

Figure 3. Effect of GAL on GSH (A), GSH-Px (B), and MDA (C) levels in cardiomyocytes after CIS-induced cardiomyotoxicity. (mean ± SD); ([a]: p≤ 0.001 vs CON group; [b]: p≤ 0.001 vs CIS group; [c]: p≤ 0.001 vs GAL25 group).

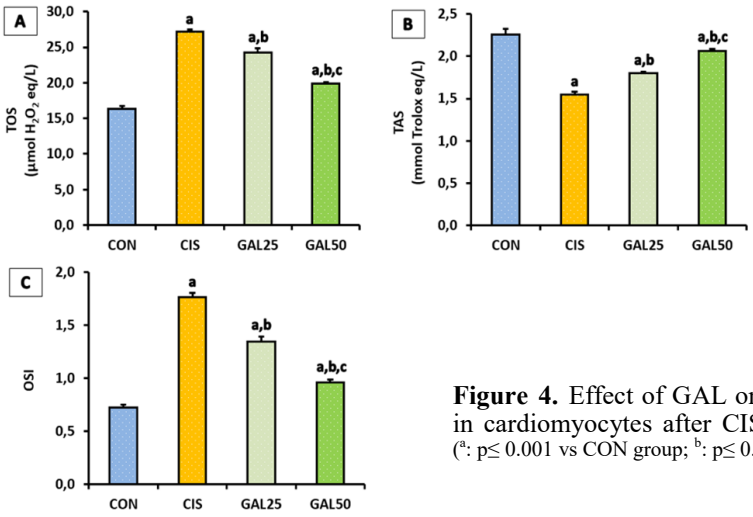

Figure 4. Effect of GAL on TOS (A), TAS (B), and OSI (C) levels in cardiomyocytes after CIS-induced cardiomyotoxicity. (mean ± SD); ([a]: p≤ 0.001 vs CON group; [b]: p≤ 0.001 vs CIS group; [c]: p≤ 0.001 vs GAL25 group).

DISCUSSION AND CONCLUSION

In this study, we planned to understand the mechanisms underlying CIS-induced cardiotoxicity and to determine new therapeutic strategies using GAL to prevent cardiotoxicity, we treated H9c2 cells with CIS. To investigate the efficacy of GAL in the prevention of cardiotoxicity, we applied GAL at two different doses. Our results showed that CIS treatment caused a substantial increase in inflammation indices, apoptosis, and OS, as well as a decrease in antioxidant capacity. However, different doses of GAL pre-treatment decreased cardiomyocytes damage.

Many studies have suggested that CIS increases ROS levels and lipid peroxidation while decreasing the activity of antioxidant enzymes.[16-18] In this context, several antioxidant molecules have been tested in studies predicting that they may prevent toxicity by reducing CIS-induced OS.[19,20] It has been reported that CIS causes OS, inflammation and mitochondrial dysfunction in rat kidney and testis tissues, while GAL has a protective role against CIS toxicity.[5,11,12] On the other hand, there are no reports on the effect of GAL on CIS cardiotoxicity. This study demonstrated that in myocyte cells, MDA levels increased in the CIS-treated groups compared to the CON group. Simultaneously, GSH and GSH-Px enzyme activities decreased. With the observed decrease in cardiac GSH values and increase in MDA values, the reduction in GSH-Px enzyme activity may be evidence of OS caused by CIS therapy. Indeed, similar studies have reported a marked decrease in antioxidant capacity with a marked increase in MDA levels in the heart and other tissues following CIS therapy.[16,19] In our study, we observed a significant improvement in the CIS groups with two different doses of GAL pre-treatment. The ROS, MDA, TOS, and OSI increase with CIS treatment was significantly reduced in both the GAL25/GAL50 groups. This significant improvement was more pronounced in the GAL50 group. Furthermore, we found that although TAS, GSH levels, and GSH-Px activities decreased in the CIS group compared to the CON group, these values increased substantially in the GAL groups compared to the CIS group.

CIS has been reported to increase the expression of pro-inflammatory signalling molecules through stimulation of certain signalling pathways.[21] Most previous publications have found that the increase in CIS toxicity is significantly paralleled by an increase in TNF α, IL 1β, and IL 6 values.[22,23] Kim et al. found that $STAT6^{-/-}$ mice, which produce much less TNF α, IL 1β, and IL 6 are protected from CIS-induced ototoxicity.[23] The literature suggests that activation of pro-inflammatory cytokines in cardiomyocytes may be involved in the physiopathological process of CIS-induced cardiotoxicity. To this end, we analysed the levels of inflammatory markers after the administration of CIS to cardiomyocytes, and we found a significant increase in TNF α, IL 1β, and IL6 values in the CIS treatment groups compared to the CON group. A role for GAL in reducing inflammation-related damage in various tissues has been reported in some studies.[24] There are also studies reporting the therapeutic effects of GAL on cardiotoxicity by suppressing inflammatory signalling pathways.[25] In this study, we have shown that GAL can protect cardiomyocytes from inflammatory damage. We observed that TNF α, IL 1β, and IL6 values were markedly decreased in pretreated GAL25 and GAL50 groups compared to the CIS group. We also found that a dose of 50 µM GAL was more effective. These results suggest that the cardiotoxic effects of CIS chemotherapy may be reduced by GAL treatment.

It has been reported in the literature that it supports cell apoptosis through activation of various pro-apoptotic pathways.[18] Previous studies have shown

that mitochondrial dysfunction due to increased ROS and consequent activation of the apoptotic pathway is involved in the pathogenesis of CIS toxicity.[6] Casp 3-9 are frequently used in studies to evaluate apoptosis, as activation of these caspases is an irreversible step that induces apoptosis.[15] Inflammatory responses, OS and apoptosis were observed after CIS treatment in this study. We examined Casp 3-9 levels after CIS treatment of cardiomyocyte cells. We found a substantial upregulation in Casp 3-9 in the CIS groups compared to the CON group. Previous studies have suggested that CIS causes upregulation of Casp 3 and down-regulation of Bcl-2.[5,21] Qian et al. determined that the activity of Casp 9 and Casp 3 increased significantly after CIS application in H9c2 cells.[26] GAL has been shown to have pharmacological potential in the regulation of various cellular and molecular processes, such as apoptosis and autophagy.[27] Tanaka et al. found that GAL suppressed Casp 3 activity and apoptosis-related gene expression and increased cell viability in human and mouse hepatoma cells.[28] Ahlatci reported that GAL treatment against glutamate-induced cytotoxicity in C6 cells increased cell viability and decreased Casp 3 activity.[29] In our study, we observed an essential improvement in the CIS groups with GAL pre-treatment. Casp 3-9 levels were substantially reduced in the GAL25 and GAL50 groups compared to the CIS group. The improvement was more pronounced in the GAL50 group. Thus, using the H9c2 cell, we showed that GAL prevented a CIS -induced increase in OS and inflammation in cardiac tissue and also prevented the induction of caspases.

In conclusion, the results of this in vitro study suggest that CIS is cardiotoxic, and GAL may be a potential candidate to ameliorate CIS-induced cardiotoxicity. Based on the physio-pathological mechanisms of CIS cardiotoxicity, it is essential to find treatments that reduce the side effects of the drug. Therefore, it would be beneficial to investigate further the effects of GAL treatment in cancer patients treated with CIS in the hope of reducing CIS-induced cardiotoxicity.

Ethics Committee Approval: This research was carried out using cells propagated through commercially available cell culture. Ethics committee approval is not required in this study. The study was conducted following the international declaration, guidelines, etc.

Conflict of Interest: No conflict of interest was declared by the authors.

Author Contributions: Supervision-BY; Materials-BY, YY; Data Collection and/orna Processing- BY, YY; Analysis and/or Interpretation- BY, YY; Writing- BY, YY .

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REFERENCES

1. Domingo IK, Latif A, Bhavsar AP. Pro-inflammatory signalling PRRopels cisplatin-induced toxicity. Int J Mol Sci. 2022;29 (13):7227. doi:10.3390/ijms23137227
2. Wang SH, Tsai KL, Chou WC, et al. Quercetin mitigates cisplatin-induced oxidative damage and apoptosis in cardiomyocytes through Nrf2/HO-1 signaling pathway. Am J Chin Med. 2022;50 (5):1281-1298. doi:10.1142/ S0192415X22500537
3. Ayazoglu DE, Mentese A, Livaoglu A, Turkmen AN, Demir S. Ameliorative effect of gallic acid on cisplatin-induced ovarian toxicity in rats. Drug Chem Toxicol. 2023;46(1):97-103. doi:10.1080/01480545.2021.2011312
4. Li S, Lin Q, Shao X, et al. NLRP3 inflammasome inhibition attenuates cisplatin-induced renal fibrosis by decreasing oxidative stress and inflammation. Exp. Cell Res. 2019;383:111488. doi:10.1016/j.yexcr.2019.07.001
5. Altındağ F, Meydan I. Evaluation of protective effects of gallic acid on cisplatin-induced testicular and epididymal damage. Andrologia. 2021;53 (10):e14189. doi:10.1111/and.14189
6. Gentilin E, Simoni E, Candito M, Cazzador D, Astolfi L. Cisplatin-induced ototoxicity: updates on molecular targets. Trends Mol. Med. 2019;25:1123–1132. doi:10.1016/ j.molmed.2019.08.002
7. Tang C, Livingston MJ, Safirstein R, Dong Z. Cisplatin nephrotoxicity: new insights and therapeutic implications. Nat Rev Nephrol. 2023;19 (1):53-72. doi:10.1038/s41581-022-00631-7
8. Xu J, Zhang B, Chu Z, Jiang F, Han J. Wogonin alleviates cisplatin-induced cardiotoxicity in mice via inhibiting gasdermin D-mediated pyroptosis. J Cardiovasc Pharmacol. 2021;78(4):597-603. doi:10.1097/FJC.0000000000001085
9. Xia J, Hu JN, Zhang RB, et al. Icariin exhibits protective effects on cisplatin-induced cardiotoxicity via ROS-mediated oxidative stress injury in vivo and in vitro. Phytomedicine. 2022;104:154331. doi:10.1016/ j.phymed.2022.154331
10. Kahkeshani N, Farzaei F, Fotouhi M, et al. Pharmacological effects of gallic acid in health and diseases: A mechanistic review. Iranian journal of basic medical sciences. 2019;22(3):225–237. doi:10.22038/ijbms.2019.32806.7897
11. Doğan D, Meydan İ, Kömüroğlu AU. Protective effect of silymarin and gallic acid against cisplatin-induced nephrotoxicity and hepatotoxicity. Int J Clin Pract. 2022;16:6541026. doi:10.1155/2022/6541026
12. Dehghani MA, Shakiba MN, Moghimipour E, Khorsandi L, Atefi KM, Mahdavinia M. Protecti-

ve effect of gallic acid and gallic acid-loaded Eudragit-RS 100 nanoparticles on cisplatin-induced mitochondrial dysfunction and inflammation in rat kidney. Biochim Biophys Acta Mol Basis Dis. 2020;1866(12):165911. doi:10.1016/j.bbadis.2020.165911

13. Han S, Bao L, Li W, et al. Gallic acid inhibits mesaconitine-activated TRPV1-channel-induced cardiotoxicity. Evid Based Complement Alternat Med. 2022;13:5731372. doi:10.1155/2022/5731372
14. Yazğan Y. Effect of gallic acid on PTZ-induced neurotoxıcıty, oxidative stress and inflammation in SH-SY5Y neuroblastoma cells. Acta Med. Alanya. 2024;8(1):10-17. doi:10.30565/medalanya.1415132
15. Yazğan B, Yazğan Y. Potent antioxidant alpha lipoic acid reduces STZ-induced oxidative stress and apoptosis levels in the erythrocytes and brain cells of diabetic rats. Journal of Cellular Neuroscience and Oxidative Stress. 2022;14(2):1085-1094. doi:10.37212/jcnos.1245152
16. Jia Y, Guo H, Cheng X, et al. Hesperidin protects against cisplatin-induced cardiotoxicity in mice by regulating the p62-Keap1-Nrf2 pathway. Food Funct. 2022;13(7):4205-4215. doi:10.1039/d2fo00298a
17. Qi L, Luo Q, Zhang Y, Jia F, Zhao Y, Wang F. Advances in toxicological research of the anticancer drug cisplatin. Chem Res Toxicol. 2019;32(8):1469-1486. doi:10.1021/acs.chemrestox.9b00204
18. Kohsaka T, Minagawa I, Morimoto M, et al. Efficacy of relaxin for cisplatininduced testicular dysfunction and epididymal spermatotoxicity. Basic and Clinical Andrology. 2020;30(1):3. doi:101186/s12610-020-0101-y
19. Xia J, Hu JN, Zhang RB, et al. Icariin exhibits protective effects on cisplatin-induced cardiotoxicity via ROS-mediated oxidative stress injury in vivo and in vitro. Phytomedicine. 2022;104:154331. doi:10.1016/j.phymed.2022.154331
20. Abbasalipour H, Hajizadeh MA, Ranjbar M. Sumac and gallic acid-loaded nanophytosomes ameliorate hippocampal oxidative stress via regulation of Nrf2/Keap1 pathway in autistic rats. J Biochem Mol Toxicol. 2022;36(6):e23035. doi:10.1002/jbt.23035
21. Ibrahim MA, Albahlol IA, Wani FA, et al. Resveratrol protects against cisplatin-induced ovarian and uterine toxicity in female rats by attenuating oxidative stress, inflammation and apoptosis. Chem Biol Interact. 2021;338:109402. doi:10.1016/j.cbi.2021.109402
22. So H, Kim H, Lee JH, et al. Cisplatin cytotoxicity of auditory cells requires secretions of proinflammatory cytokines via activation of ERK and NF-κB. JARO-J. Assoc. Res. Otolaryngol. 2007;8:338–355. doi:10.1007/s10162-007-0084-9
23. Kim HJ, Oh GS, Lee JH, et al. Cisplatin ototoxicity involves cy-tokines and STAT6 signaling network. Cell Res. 2011;21:944–956. doi:10.1038/cr.2011.27
24. Bai J, Zhang Y, Tang C, et al. Gallic acid: Pharmacological activities and molecular mechanisms involved in inflammation-related diseases. Biomed Pharmacother. 2021;133:110985. doi:10.1016/j.biopha.2020.110985
25. Ramezani AF, Badavi M, Dianat M, Mard SA, Ahangarpour A. Effects of gallic acid on hemodynamic parameters and infarct size after ischemia-reperfusion in isolated rat hearts with alloxan-induced diabetes. Biomed Pharmacother. 2017;96:612-618. doi:10.1016/j.biopha.2017.10.014
26. Qian P, Yan LJ, Li YQ, et al. Cyanidin ameliorates cisplatin-induced cardiotoxicity via inhibition of ROS-mediated apoptosis. Exp Ther Med. 2018;15(2):1959-1965. doi:10.3892/etm.2017.5617
27. Momeni Z, Danesh S, Ahmadpour M, et al. Protective roles and therapeutic effects of gallic acid in the treatment of cardiovascular diseases: current trends and future directions. Curr Med Chem, 2024;31(24):3733-3751. doi:10.2174/0109298673259299230921150030
28. Tanaka M, Sato A, Kishimoto Y, Mabashi AH, Kondo K, Iida K. Gallic acid inhibits lipid accumulation via AMPK pathway and suppresses apoptosis and macrophage-mediated inflammation in hepatocytes. Nutrients. 2020;12(5):1479. doi:10.3390/nu12051479
29. Ahlatci A. Investıgatıon of the amelıoratıve effects of gallic acid agaınst neurotoxicity caused by glutamate in C6 cells. Neuro-Cell Mol Res. 2024;1(1):7-13. doi:10.5281/zenodo.11471554

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Barriers Faced by Healthcare Service Users Based on Disability Levels: A Comparison between a Private Hospital and a Public Hospital

Sağlık Hizmet Kullanıcılarının Engellilik Düzeylerine Göre Karşılaştıkları Problemler: Bir Özel Hastane ve Kamu Hastanesi Karşılaştırması

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ABSTRACT

Objective: The study aims to classify healthcare users by disability level and identify service-related issues while also comparing private and public hospitals.

Materials and Methods: The scope of this descriptive, cross-sectional study includes patients visiting the outpatient services of one private and one public hospital. A face-to-face questionnaire was conducted with 181 outpatients from private hospitals and 180 from public hospitals. Data meeting normality were analyzed using descriptive statistics, factor analysis, correlation, and variance analysis.

Results: 51.2% of healthcare service users reported experiencing at least minor difficulties in one or more areas of disability. Among the scale factors according to institution type, there is a significant difference only in the social security dimension (t=9.20, p<0.000). Significant differences were found in the social security dimension (F = 4.50, p < 0.05) and the auxiliary factors dimension (F = 3.26, p < 0.01) between the groups based on their level of disability. There was a statistically significant negative relationship between the institution variable and the social security dimension (r=-0.437, p<0.000) and the access (r= -0.215, p<0.000). On the other hand, significant positive relationships were determined between the institution variable and the psychological (r=0.294, p<0.000) and the physical/environmental dimensions (r=0.138, p<0.000).

Conclusions: Disability-related problems in private and public hospitals relate to social security and auxiliary factors. State hospitals should improve physical and environmental conditions, such as ramps, seating quality, and signage. Additionally, private hospitals need to address social security coverage and ensure that all types of healthcare services are included.

Keywords: Disability level, disabled health service users, polyclinic service.

ÖZ

Amaç: Bu çalışma, sağlık hizmeti kullanıcılarını engellilik seviyelerine göre sınıflandırmayı ve hizmetle ilgili sorunları belirlemeyi, ayrıca özel ve kamu hastanelerini karşılaştırmayı amaçlamaktadır.

Materyal ve Metot: Tanımlayıcı ve kesitsel türdeki bu çalışmanın kapsamı, bir özel ve bir kamu hastanesinin poliklinik hizmetlerine başvuran hastaları içermektedir. 181 özel hastane ve 180 kamu hastanesinden hasta ile yüz yüze anket yapılmıştır. Normallik şartlarını sağlayan veriler tanımlayıcı istatistikler, faktör analizi, korelasyon ve varyans analizi ile analiz edilmiştir.

Bulgular: Sağlık hizmeti kullanıcılarının %51,2'si bir veya daha fazla engellilik alanında en azından küçük zorluklar yaşadığını bildirdi. Kurum türüne göre ölçek faktörlerinden sadece sosyal güvenlik boyutunda anlamlı farklılık bulunmaktadır (t=9,20, p<0,000). Engellilik düzeyine göre gruplar arasında sosyal güvenlik boyutunda (F = 4,50, p < 0,05) ve yardımcı faktörler boyutunda (F = 3,26, p < 0,01) anlamlı farklılıklar bulunmuştur. Kurum değişkeni ile sosyal güvenlik boyutu (r=-0,437, p<0,000) ve erişim (r=-0,215, p<0,000) arasında istatistiksel olarak anlamlı negatif ilişki vardı. Diğer taraftan kurum değişkeni ile psikolojik (r=0,294, p<0,000) ve fiziksel/çevresel boyutlar (r=0,138, p<0,000) arasında pozitif yönde anlamlı ilişkiler saptanmıştır.

Sonuç: Engellilikle ilgili sorunlar, özel ve kamu hastanelerinde sosyal güvenlik ve yardımcı faktörlerle ilişkilidir. Kamu hastaneleri, rampalar, oturma kalitesi ve işaretleme gibi fiziksel ve çevresel koşulları iyileştirmelidir. Ayrıca, özel hastaneler sosyal güvenlik kapsamını gözden geçirmeli ve tüm sağlık hizmetlerinin dahil edilmesini sağlamalıdır.

Anahtar Kelimeler: Engellilik düzeyi, engellilik sağlık hizmeti kullanıcıları, poliklinik hizmeti.

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INTRODUCTION

People with disabilities are among the disadvantaged groups in terms of social inclusion and access to public services. It is stated that approximately 15% of the world's population is disabled.[1] According to the 2023 report by TÜİK[2] (Turkish Statistical Institute), which uses the Washington group scale,[3,4] the total percentage of the population with any disability in Türkiye was found to be 12.6%. The proportion of disabled individuals among those utilizing health services is relatively high. According to a study by Dejong et al.,[5] disabled individuals (among adults of the same age range) constitute 34% of those who visit a doctor, 41% of those who are prescribed medication, and nearly 50% of those who are treated and discharged from a health facility.

Disability is defined as a limitation that prevents individuals from performing vital activities due to the loss of mental, emotional, and social abilities for various reasons, whether congenital or acquired.[6] This definition reflects a medical perspective. However, disability definitions can vary depending on the viewpoint. From the social model point of view, disability is not a medical issue but a political and, consequently, a social one. Therefore, the main barrier is not the physical impairments, but the societal mindset imposed on the individual. In summary, it is not the disabilities that hinder individuals but the society that fails to provide quality services and consider the needs of disabled individuals.[7]

Today, a disabled person is defined as someone who, due to congenital or postnatal factors affecting their appearance, function, mobility, cognition, and personal care, is restricted in many aspects of life due to societal or administrative decisions and preferences.[8] When evaluated from the perspective of the social model, the problems faced by individuals due to any physical impairment are caused by societal or administrative decisions and preferences. In this regard, managers at all levels should prioritize designs suitable for people with different levels of abilities and various human conditions with a holistic and inclusive philosophy of universal design when designing programs, services, products, and systems. The situation is no different in the provision of health services.

In this context, this study aims to classify health service users according to their level of disability from the broadest perspective and to identify the problems they encounter during the service.

MATERIALS AND METHODS

Ethics Committee Approval

Approval for this research was obtained from the Scientific Studies and Ethics Committee of Istanbul Sabahattin Zaim University (Date: 28.02.2023, decision no: 2023/02). The study was conducted in both a public hospital and a private hospital. Institutional permission was obtained from both hospitals for the research. Additionally, participants completed an informed consent form prior to the administration of the survey.

Study Design and Sample: This study was descriptive and cross-sectional in nature. The population of the research consisted of patients who applied for outpatient services at two hospitals, one public and one private. According to information obtained from the statistical units of the hospitals, the total average monthly number of outpatients is 77,069. The sample size from this known population was calculated using the sample calculation formula with a 95% confidence interval, a 5% margin of error, and a 0.50 probability of occurrence, as shown in the formula below.

$$n = \frac{Nt^2pq}{d^2(N-1) + t^2pq}$$

The sample size was determined to be 383. Since comparisons between the two hospitals and equalizing the representation of both groups were intended, quota sampling was used as the sampling method. Analyses were conducted with data from 361 participants.

Data Collection Tools: In line with the aim of the study, the following questions are sought to be answered:

- What are the problems encountered by health service users while receiving health services?
- Do these problems vary depending on the disability levels of the health service users?
- Do the problems encountered by disabled individuals using health services differ depending on the type of hospital (private/public)?

The data to answer these questions were collected using the following scales. In the first part of the research, a questionnaire consisting of seven questions created by the researchers was used to obtain the demographic information of the participants. In the second part of the research, the Washington Group's disability question set, designed to determine the level of disability from the broadest perspective, was employed to assess the functionality levels of individuals. These functionalities are measured using a 4-point Likert-type question set that evaluates the degrees of difficulty in vision, communication, hearing, cognitive abilities, personal care, and mobility. This question set, prepared by the Washington Group, is also utilized by the Ministry of Family and Social Services.[2-4]

In the third and final part, a 21-question, 5-point Likert-type scale titled "Problems Faced by Disabled Individuals in Accessing Health Care," developed by

Kördeve[9] was used. The scale consists of four sub-dimensions addressing the issues encountered by disabled individuals in accessing healthcare.[10] The first dimension, termed service access, refers to the availability of disabled parking at the healthcare facility, ease of appointment scheduling, and priority in the queue. The second dimension encompasses psychological factors, defining the relationship between healthcare personnel and disabled patients. The third dimension pertains to social security coverage and whether all types of healthcare services are covered by social security. Lastly, the auxiliary factors dimension includes aspects such as the presence of light and sound stimuli and the stress conditions of disabled individuals.

The overall Cronbach's alpha value of the scale was determined to be 0.795. The reliability coefficients of the dimensions ranged from 0.892 to 0.527. The total explanatory power of the scale was found to be 58.7%.

Statistical Analysis: The data were analyzed using the IBM SPSS 24 program. After the data were entered into the program, percentage and frequency distributions were used to determine the participants' descriptive characteristics and healthcare preferences. To validate the scale's construct and validity with current data, exploratory factor analysis and reliability analyses were conducted, followed by normality tests before proceeding with further analyses.

First of all, the disability level among the participants was determined by evaluating the Washington scale. Then, an independent samples t-test was conducted to determine whether the problems encountered by participants in accessing services varied based on whether the institution was private or public. An ANOVA test was conducted to assess whether the problems experienced by participants in accessing healthcare varied according to their level of disability. Lastly, correlation analysis was applied to reveal the relationships between the corporate variable and the scale dimensions of health care. Statistical significance accepted $p<0.05$.

RESULTS

Table 1 provides a summary of the participants' demographic characteristics and healthcare preferences. The majority of participants were male (57.1%) and aged 26–35 (30.7%). A significant portion of the sample held a bachelor's degree (39.9%) and earned between 0–8500 Turkish lira monthly (43.5%). In terms of institutional preference, there was a near-equal distribution between public (50.1%) and private (49.9%) institutions. Notably, 60.1% of participants preferred to receive healthcare services alone, and 37.1% preferred state hospitals for their medical care, followed by Private Hospitals (25.5%) and Education Research Hospitals (18.6%). A notable portion also prefers to visit a Family Physician (16.1%), while a small fraction chooses other institutions (2.7%).

Table 1. Distribution of patients' descriptive characteristics.

Characteristics		**n (%)**
Gender	Male	206 (57.1)
	Female	155 (42.9)
Age	18-25	90 (24.9)
	26-35	111 (30.7)
	36-45	80 (22.2)
	46 and older	80(22.2)
Education	Associate degree	78 (21.6)
	Bachelor's degree	144 (39.9)
	Master's degree	120 (33.2)
	Doctorate degree	19 (5.3)
Income Level (Monthly)	0-8500	157 (43.5)
	8501-20000	133 (36.8)
	Over 20001	71 (19.7)
Institution	Public	181 (50.1)
	Private	180 (49.9)
Which one do you prefer to receive health care?	I go alone	217 (60.1)
	I go with the companion	144(39.9)
What is your preferred healthcare institution for receiving medical services?	State Hospital	134 (37.1)
	Private Hospital	92 (25.5)
	Education Research Hospital	67 (18.6)
	Family Physician	58 (16.1)
	Another	10 (2.7)
Total		361 (100)

The results of the Washington Scale, administered to determine the level of disability among participants, are presented in Table 2. According to the data, the majority of participants (48.8%) did not experience any difficulties, while the smallest group (3.6%) were disabled in at least one area. Furthermore, 51.2% of healthcare service users reported experiencing at least minor difficulties in one or more areas of disability.

An independent samples t-test was conducted to determine whether the problems encountered by participants in accessing services varied based on whether the institution was private or public. The results of the test are presented in Table 3. The analysis revealed a significant difference only in the social security dimension ($t = 9.20$, $p < 0.000$) among the scale factors based on institutional type. No significant differences were found in the dimensions of access, psychological support, assistance, and physical and environmental factors. Specifically, the average score for the social security dimension was found to be significantly higher in public hospitals compared to private hospitals.

An ANOVA test was conducted to assess whether the problems experienced by participants in accessing healthcare varied according to their level of disability. The test results are presented in Table 4. Significant differences were found in the social security dimension ($F = 4.50$, $p < 0.05$) and the auxiliary factors dimension ($F = 3.26$, $p < 0.01$) between the groups based on their level of disability.

To further investigate these differences, a Tukey Honestly Significant Difference test was performed. The analysis revealed that the average score for the social security dimension was significantly higher for participants experiencing severe difficulty in at least one area compared to those with minor difficulty. Additionally, participants with moderate difficulty in at least one area had a higher average score in the social security dimension compared to those without any difficulty. In the auxiliary factors dimension, it was found that individuals experiencing some difficulty in at least one area had a significantly higher average score compared to those who reported no difficulty. This difference was statistically significant.

Table 2. Disability level in the research sample.

Disability level	n (%)
Those who never have difficulty	176 (48.8)
Have difficulties in at least one area	143 (39.6)
Challenged in at least one area	29 (8.0)
Disabled in at least one area	13 (3.6)
Total	361 (100)

Table 3. Independent samples t-test analysis according to Institution variable.

Institution	**Public** n= 180 Mean±SD	**Private** n=181 Mean±SD	t-test
Social Security	3.49±1.18	2.37±1.14	9.20***
Access	2.95±0.84	2.58±0.83	4.18
Psychological	3.46±0.74	3.91±0.73	-5.82
Auxiliary	2.99±0.80	2.94±0.85	0.57
Physical and Environmental	3.25±0.83	3.48±0.85	-2.63

***: $p < 0.001$.

Table 4. Results of variance analysis according to obstacle level variable.

	1. Those who never have difficulty n=176 Mean±SD	**2. Have difficulties in at least one area** n=143 Mean±SD	**3. Challenged in at least one area** n=29 Mean±SD	**4. Disabled in at least one area** n=13 Mean±SD	**F**	**Differ.**
Social Security	3.05±1.30	2.73±1.26	3.46±1.17	2.31±1.13	4.50*	3>2 3>4
Access	2.77±0.83	2.78±0.87	2.51±0.87	3.15±0.71	1.81	-
Psychological	3.65±0.69	3.81±0.80	3.53±0.92	3.31±0.96	2.79	-
Auxiliary	2.88±0.81	3.13±0.78	2.81±0.84	2.75±1.20	3.26**	2>1
Physical and Environmental	3.39±0.82	3.33±0.88	3.49±0.80	3.09±0.91	0.78	-

*: $p < 0.05$; **: $p < 0.01$.

Finally, correlation analysis was applied to reveal the relationships between the corporate variable and the scale dimensions of health care. The results indicated that there was a nearly consistent relationship between the type of hospital (private or public) and the issues encountered, highlighting both the direction and strength of these associations. The test results are summarized in Table 5 as follows: There was a statistically significant negative relationship between the institution variable and the social security dimension (r=-0.437, p<0.000) and the access (r=-0.215, p<0.000). On the other hand, significant positive relationships were determined between the institution variable and the psychological (r=0.294, p<0.000) and the physical/environmental dimensions (r=0.138, p<0.000). The social security dimension showed significant positive relationships with the access (r=0.103, p<0.05), the auxiliary factors (r=0.173, p<0.01), and the physical/environmental dimensions (r=0.248, p<0.01). However, there was no statistically significant relationship between the social security variable and psychological sub-dimension. The access dimension with the psychological variable (r=0.131, p<0.01), auxiliary (r=0.185, p<0.01), and physical and environmental dimension (r=0.102, p<0.05) was concluded to have a statistically significant relationship with positive direction.

A statistically significant positive relationship was determined between the psychological variable and the auxiliary dimension (r=0.323, p<0.01) and the environmental dimension (r=0.512, p<0.01). A statistically significant positive relationship was determined between the auxiliary variable and only the physical/environmental dimension (r=0.399, p<0.01).

Table 5. Correlation test results.

	Institution Type	Social Security	Access	Psychological	Auxiliary	Physical and Environmental
Institution Type (Private-Public)	1					
Social Security	-0.437**	1				
Access	-0.215**	0.103*	1			
Psychological	0.294**	-0.007	0.131**	1		
Auxiliary	-0.030	0.173**	0.185**	0.323**	1	
Physical and Environmental	0.138**	0.248**	0.102*	0.512**	0.399**	1

*: p <0.05; **: p <0.01.

DISCUSSION AND CONCLUSION

This study aimed to determine the impact of disability levels on the challenges faced by healthcare users, particularly focusing on whether the type of service provider (private or public) and the level of disability influence these challenges. The findings revealed that 51.2% of healthcare users experience at least minor difficulties in one or more areas of disability. This prevalence aligns with previous studies, including those by Dejong et al.[5] and Danayiyen et al.,[8] which reported similar rates of disability among healthcare users. In a study conducted in Australia, 26.9% (90/334) of participants reported a disability in at least one area.[11] This rate is higher than the studies mentioned above.

The study sought to address the question, “What are the problems healthcare users face when receiving healthcare?” To answer this, the research analyzed various sub-dimensions related to the challenges faced by disabled individuals in healthcare settings. Statistically significant correlations were found between social security, access, utility, physical, and environmental dimensions, indicating that these factors are interrelated and impact healthcare experiences.

The study also found significant relationships between access variables and psychological, auxiliary, physical, and environmental dimensions. De Klerk et al.[12] noted that travel distance affects access to physiotherapy and occupational therapy, emphasizing the need for hospitals to be accessible and equipped with appropriate signage and support for disabled individuals. Some studies highlighted barriers faced by economically disadvantaged populations in accessing healthcare, such as service development failures, lack of prioritization, and insufficient resources.[7,10,13] These barriers are exacerbated for disabled individuals, affecting their access to care.

A key finding of this study was that individuals receiving services from public hospitals experience fewer difficulties related to social security compared to those using private hospitals. This difference may be attributed to the economic situation of disabled individuals.[14,15] The results suggest that social security issues significantly influence the choice of healthcare provider, with higher social security scores observed among those with severe disabilities

compared to those with less difficulty. It was observed that disabled individuals experience difficulties in accessing many healthcare services, including basic health services.[16,17] For example, the study, conducted with 270 participants aged 15 years and older, each with at least 40% disability, investigated the challenges faced by individuals with disabilities in accessing healthcare across various hospitals in Northern India. Specifically, there were no appropriate ramps, accessible stairways, or specially designed toilets, which are essential for facilitating mobility and ensuring a comfortable and safe experience for disabled patients.[14] These findings underscore the critical need for improvements in hospital infrastructure to make healthcare facilities more accessible and inclusive for individuals with disabilities. Notably, the study revealed that problems encountered by disabled individuals in public versus private hospitals primarily relate to social security and auxiliary factors. This suggests a need for public hospitals to improve physical and environmental accessibility. For instance, evaluating and enhancing ramp and stair conditions, the quality of seating in waiting areas, and the presence of directional signage could be crucial for better accommodating disabled patients.[9,17,14] Health administrators are required to facilitate the receipt of health services by disabled individuals by making necessary arrangements at all stages of the service process, starting from the construction and location selection of health institution buildings and by taking necessary preventive measures.

In conclusion, as Türkiye continues to develop a care-oriented social policy that integrates medical and social models, it is crucial for healthcare managers and designers to adopt a holistic and inclusive approach to service design. This approach should accommodate various levels of disability and ensure accessibility. The study has limitations, including the focus on just two hospitals and the reliance on self-reported data, which may be affected by social factors. An additional limitation is the selection of a non-probability sampling method; furthermore, this situation may prevent us from reaching the desired sample size. Future research should address these limitations by including a broader range of healthcare settings and inpatients and using diverse methodologies. Despite these limitations, the study provides valuable insights into the challenges faced by disabled individuals in healthcare settings. It highlights the need for targeted improvements in both public and private healthcare facilities.

Ethics Committee Approval: Approval for this research was obtained from the Scientific Studies and Ethics Committee of Istanbul Sabahattin Zaim University (Date: 28.02.2023, decision no: 2023/02)

Conflict of Interest: No conflict of interest was declared by the authors.

Concept – ŞK, AD; Supervision – GE, AD; Materials – ŞK; AD; Data Collection and/or Processing – ŞK, AD; Analysis and/or Interpretation – EE, AD; Writing – EE, AD.

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REFERENCES

1. World Health Organization. World Report on Disability, WHO Library Cataloguing in Publication Data, Malta 2011. https://www.who.int/teams/noncommunicable-diseases/sensory-functions-disability-and-rehabilitation/world-report-on-disability. Accessed September 13, 2023.
2. TÜİK. Engelli ve Yaşlı İstatistik Bülteni, 2023. https://data.tuik.gov.tr. Accessed December 10, 2023.
3. United Nations Washington Group on Disability Statistics. Washington Group Extended Question Set on Functioning (Proposal endorsed at the joint Washington Group/ Budapest Task Force Meeting 3-5 November 2010, Luxembourg), Washington 2011. http://www.cdc.gov/nchs/data/washington_group/WG_Extended_Question_Set_on_ Functioning.pdf. Accessed September 23, 2023.
4. Ekenci MT. Regarding disabled individual's official data collection tools at national level use in prevalence estimates. T.C. Ministry of Family and Social Policies, General Directorate of Disabled and Elderly Services. Specialist Thesis, Ankara, Türkiye. 2014.
5. Dejong G, Palsbo SE, Beatty PW, Jones GC, Knoll T, Neri MT. The organization and financing of health services for persons with disabilities. Milbank Q. 2002;80(2):261-301.
6. Afacan MI. Disability and sports sociology. Mediterranean J Sport Sci. 2023;6(ÖS1):1112-1122.
7. Aköğretmen M. A brief history of disabled labor in the West: An evaluation in the context of disability models. Hak İş Int Labor Soc J. 2023;12 (32):129-144. doi:10.31199/hakisderg.1209599
8. Danayiyen A, Kılıç CH, Kavsur Z. Evaluation of service quality in a tertiary hospital based on the SERVQUAL model according to patients' disability status. 2nd International 12th National Health and Hospital Administration Congress; October

11-13, 2018; Muğla, Turkey.
9. Kördeve MK. Problems encountered by individuals with disabilities in accessing healthcare services. Int J Health Manag Strat Res. 2017;3(2):14-24.
10. Kılıç CH. Measuring the perceived quality of healthcare services for individuals with disabilities and developing hospital service design using quality function deployment matrix. Marmara University, Institute of Health Sciences, Department of Health Management, Doctorate Thesis. Istanbul, Turkey. 2020.
11. Shiner CT, Li I, Millard M, Mahoney AE. Chronic health conditions and disability are prevalent among community users of a digital mental health service: a scoping survey. Disabil Rehabil Assist Technol. 2024;1-10.
12. De Klerk S, Eloff L, Naudé Z, et. al. Non-attendance of occupational and physiotherapy appointments at Western Cape Rehabilitation Centre: A description of associated factors. SA-JOT. 2019;49(3):54-63.
13. Sotelo-Daza J, Jaramillo YE, Chacón MV. Nurses' perception about their role in reducing health inequalities in community contexts. Rev Lat Am Enfermagem, 2024;32:e4299. doi:10.1590/1518-8345.7245.4299
14. Sharma R, Kumar A, Suri V, Kaur S, Singh A. Physical access related user-friendliness of sexual and reproductive health services for women with disabilities in various hospitals in a city in North India: An Integrated qualitative and quantitative Study. Cureus, 2023; 15(1): e34276. doi:10.7759/cureus.34276
15. Ünal V. Evaluation of approaches to disability in Turkey from a social policy perspective. Cumhuriyet Univ Fac Sci Lett J Soc Sci. 2021;45(2):235-258.
16. Üngör I. A Sociological perspective on the perception of disability in Turkey. Marmara University, Institute of Middle Eastern and Islamic Studies, Department of Middle Eastern Sociology and Anthropology, Master's Thesis. İstanbul, Turkey. 2019.
17. Jia WY. Survey & quantitative design strategies on hospital accessible signs. Appl Mech Mater. 2014;507:31-35.

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Growth-Inhibitory Effects of Traditional Chemotherapeutic Combinations (FOLFOX, FOLFIRI) on Colon Cancer Cells: An in vitro Study

Geleneksel Kemoterapötik Kombinasyonların (FOLFOX, FOLFIRI) Kolon Kanseri Hücreleri Üzerindeki Büyüme-Engelleyici Etkileri: Bir in vitro Çalışma

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ABSTRACT

Objective: To compare the *in vitro* growth-inhibitory effects of the commonly used chemotherapeutic combinations folinic acid, 5-fluorouracil, and oxaliplatin (FOLFOX) and folinic acid, 5-fluorouracil, and irinotecan (FOLFIRI) on colon cancer cells (HT29 and CaCo-2 cells).

Materials and Methods: The viability of HT29 and CaCo-2 cells treated with different concentrations of the FOLFOX and FOLFIRI combinations was evaluated using the MTT (3-(4,5-dimethylthiazolyl-2)-2,5-diphenyltetrazolium bromide) assay.

Results: FOLFOX and FOLFIRI combinations exhibited varying effects on the colon cancer cell lines, with HT29 cells showing sensitivity, while CaCo-2 cells demonstrated resistance to these treatments.

Conclusions: The results of this preliminary study will contribute to the development of effective and targeted clinical treatment strategies for colon cancer.

Keywords: Colon cancer, drug combination, FOLFOX, FOLFIRI, growth-inhibitory effect

ÖZ

Amaç: Yaygın olarak kullanılan kemoterapötik kombinasyonlar olan folinik asit, 5-florourasil ve oksaliplatin (FOLFOX) ile folinik asit, 5-florourasil ve irinotekanın (FOLFIRI) kolon kanseri hücreleri (HT29 ve CaCo-2 hücreleri) üzerindeki in vitro büyümeyi inhibe edici etkilerini karşılaştırmak.

Materyal ve Metot: FOLFOX ve FOLFIRI kombinasyonlarının farklı konsantrasyonlarıyla tedavi edilen HT29 ve CaCo-2 hücrelerinin canlılığı MTT (3-(4,5-dimetiltiazolil-2)-2,5-difeniltetrazolium bromür) testi kullanılarak değerlendirildi.

Bulgular: FOLFOX ve FOLFIRI kombinasyonları kolon kanseri hücre hatları üzerinde farklı etkiler gösterdi, HT29 hücreleri duyarlılık gösterirken, CaCo-2 hücreleri bu tedavilere direnç gösterdi.

Sonuç: Bu ön çalışmanın sonuçları, kolon kanseri için etkili ve hedefli klinik tedavi stratejilerinin geliştirilmesine katkıda bulunacaktır.

Anahtar Kelimeler: Antiproliferatif etki, FOLFIRI, FOLFOX, ilaç kombinasyonu, kolon kanseri

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INTRODUCTION

Cancer, which is one of the leading causes of death worldwide, is characterized by aberrant cell growth and spread. Colorectal cancer is the most common malignant tumor of the gastrointestinal tract and accounts for approximately 10%–15% of all cancer types.[1] The etiology of colorectal cancer involves the accumulation of tumor suppressor gene mutations in epithelial cells of the large intestine (also called the colon) or the rectum (the terminal part between the anus and intestine).[2] However, traditional therapeutic methods, such as chemotherapy, radiotherapy, and surgical resection, have some limitations, including low treatment compliance, low accuracy, high toxicity, and drug resistance.[3] The application of the combination of traditional chemotherapeutic drugs is a promising strategy to increase treatment efficacy and mitigate side effects.[4] For example, combinatorial therapies, such as the folinic acid (FA), 5-fluorouracil (5-FU), and oxaliplatin (OX) (FOLFOX) combination and the FA, 5-FU, and irinotecan (IRI) (FOLFIRI) combination are usually used for cancer treatment. These drug combinations target cancer cells through interaction with cancer cell components and mitigate drug resistance development.[5]

FOLFOX, which is a widely used therapeutic combination for colon cancer, comprises FA, 5-FU, and OX. OX, a platinum-based compound, inhibits DNA replication and transcription by cross-linking with DNA and consequently induces cellular apoptosis.[6] Meanwhile, 5-FU, a pyrimidine analog, inhibits the proliferation of cancer cells by interfering with nucleic acid metabolism, which has critical roles in various stages of the cell cycle.[7] Folinic acid potentiates the efficacy of 5-FU.[8,9] The second most commonly preferred chemotherapeutic combination for colon cancer is FOLFIRI, which comprises FA, 5-FU, and IRI.[10] IRI inhibits topoisomerase I, which unwinds the DNA helix during DNA replication, resulting in the induction of DNA breaks and cell death.[11] Thus, FOLFOX and FOLFIRI combinations are effective therapeutics for colon cancer.[12]

This study was carried out to evaluate the effectiveness of various chemotherapy drugs used in clinical settings through a polychemotherapeutic approach. This preliminary research lays the groundwork for advanced preclinical studies and potential clinical applications at the cellular and molecular levels. The main objective is to examine the cellular effects of each drug combination (FOLFOX and FOLFIRI) to optimize treatment strategies.

MATERIALS AND METHODS

Ethics Committee Approval: This research utilized commercially available cell lines. As such, no ethics committee approval was necessary for this study. The research adhered to international declarations and guidelines.

Preparation of Chemicals: IRI (I-4122, LC Laboratories, Woburn, MA, USA) and 5-FU (F6627, Sigma Aldrich, USA) were dissolved in dimethyl sulfoxide (DMSO, Sigma Aldrich), aliquoted, and stored at −80 °C. To mitigate the cytotoxic effect of DMSO, the concentration of DMSO in the culture medium was maintained at <0.1%. FA (PHR1541, Sigma Aldrich) and OX (O-7111, LC Laboratories, Woburn, MA, USA) were dissolved in distilled water and stored at −80 °C. As FA is light-sensitive and labile, it was freshly prepared before the experiment.

Cell Culture Studies: The colon cancer cell lines (HT29 and CaCo-2 cells) were obtained from the stocks of XXX, Faculty of Pharmacy, Animal Cell and Tissue Culture Laboratory. Cells were cultured in culture flasks with a medium (RPMI 1640 for HT29, EMEM for CaCo-2) containing 10% inactivated fetal bovine serum (F0926, Sigma-Aldrich, USA), 1% L-glutamine (25030024, Gibco, USA), and 0.1% gentamicin (G1337, Sigma Aldrich) at 37 °C and 5% CO_2 in an incubator. Cultured HT29 and CaCo-2 cells were trypsinized using a trypsin-EDTA solution (T4049, Sigma Aldrich). The cells were transferred to 96-well culture plates (initial cell concentration = 5×10^4 cells/mL) in four replicates and cultured for 24 h in a humidified incubator at 37 °C and 5% CO_2.

Cell Viability Analysis: HT29 and CaCo-2 colon cancer cell lines were treated with 5-FU, FA, OX, and IRI, as well as their combinations (FOLFOX and FOLFIRI). An initial concentration of 100 µM was used, followed by serial dilution to create 7 different concentrations (1.56, 3.125, 6.25, 12.5, 25, 50, 100 µM). Cells were incubated with the chemotherapeutic agents for 72 hours, and viability was assessed using the MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide, Sigma Aldrich, USA) assay at 24-hour intervals. After the incubation period, absorbance was measured at 570 nm using an ELISA reader. The data of the treatment groups were compared with those of the control group to obtain the half-maximal inhibitory concentration (IC_{50}) values using GraphPad Prism® version 9.0.0 software. The cell viability percentage graphs were generated by comparing the growth-inhibitory effects of chemotherapy drugs and their combinations on HT29 and CaCo-2 cell lines with those of the negative control. The cell viability percentage was calculated as follows: (% viability = ¼ A samples / A negative control x 100).[13]

Statistical Analysis: The data are presented as the mean ± standard deviation (SD). Statistical analysis was performed using GraphPad Prism® version

9.0.0. Means were compared using a two-way analysis of variance, followed by multiple comparison post-hoc tests.

RESULTS

The responses of the groups treated with chemotherapeutic drugs and their combinations were compared with those of the negative control group. Percentage viability graphs were generated for each group. All values are presented as mean ± SD. The values of the treatment groups were normalized to those of the negative control group.

As seen in Table 1, it was determined that IC_{50} values decreased with time in both HT29 and CaCo-2 cell lines. This reveals that the drugs we use show increasing effectiveness over time and can inhibit cell viability at lower doses. There is a significant decrease, especially when the IC_{50} values at the 72nd hour are compared to the 24th hour. Additionally, the table shows that the IC_{50} value of FA cannot be calculated. FA is an agent used together with 5-FU in chemotherapy and increases the effectiveness of 5 -FU, and it does not have a cytotoxic effect on its own.

Table 1. Half-maximal inhibitory concentration (IC_{50}) values.

	CaCo-2			HT-29		
Drug (µM)	**24 h**	**48 h**	**72 h**	**24 h**	**48 h**	**72 h**
5-Fluoroucil (5-FU)	129.2 ± 5.65	71.49 ± 3.54	45.43 ± 2.43	120.4 ± 7.81	50.25 ± 3.12	12.35 ± 1.01
Folinic Acid (FA)	*	*	*	*	*	*
5-FU+FA (FF)	76.37 ± 1.42	52.46 ± 1.99	29.58 ± 0.09	109.1 ± 2.04	27.59 ±2.01	5.767 ± 0.84
Oxaliplatin (OX)	141.2 ± 3.78	11.46 ± 0.87	3.846 ± 1.05	46.02 ± 1.80	4.886 ± 1.044	2.058 ± 0.02
Irinotecan (IRI)	131.1 ± 7.60	53.81 ± 2.56	12.6 ± 1.22	63.71 ± 1.93	14.32 ± 2.06	5.974 ± 1.04
FOLFIRI (FF+IRI)	111.9 ± 7.53	21.01 ± 1.03	6.192 ± 0.78	60.66 ± 0.29	10.59 ± 1.021	3.763 ± 0.42
FOLFOX (FF+OX)	106.2 ± 3.41	7.196 ± 1.17	2.434 ± 0.19	42.21 ± 2.61	3.386 ± 1.90	1.036 ± 0.03

*: The viability of cells in the treatment groups marked with is higher than in the negative control, so the inhibition value could not be calculated; h: hour.

In the first step of the study, dose-response curves were generated for each chemotherapeutic agent in the HT29 and CaCo-2 colon cancer cell lines, as seen in Figure 1(a). In order to evaluate the potential antiproliferative effects of the chemotherapeutic agents on cancer cells, HT29 and Caco-2 cells were exposed to various concentrations of the test compounds. An initial concentration of 100 µM was used for each drug, followed by serial dilutions.[14] After 72 hours of incubation, cell viability was then evaluated using the MTT assay, as described above. It was observed that the two cell lines responded differently to the treatments due to inherent biological variability. Specifically, FA alone did not significantly affect cell viability across the tested concentrations, as seen in the flat dose-response curve. In contrast, 5-FU, OX, and IRI reduced cell viability in a dose-dependent manner, with HT29 cells generally showing greater sensitivity than Caco-2 cells.

Figure 1(b) shows the effect of FA and 5-FU on cell viability at the 72nd hour IC_{50} concentration in HT29 and CaCo-2 cell lines. As seen in the figure, using 5-FU together with FA increased the chemotherapeutic effect of 5-FU. Statistical analysis confirmed that the decrease in cell viability with the FF combination was significantly greater than the reduction observed with 5-FU or FA alone. Therefore, in this study, FA and 5-FU were evaluated together as a monochemotherapy agent, FF.

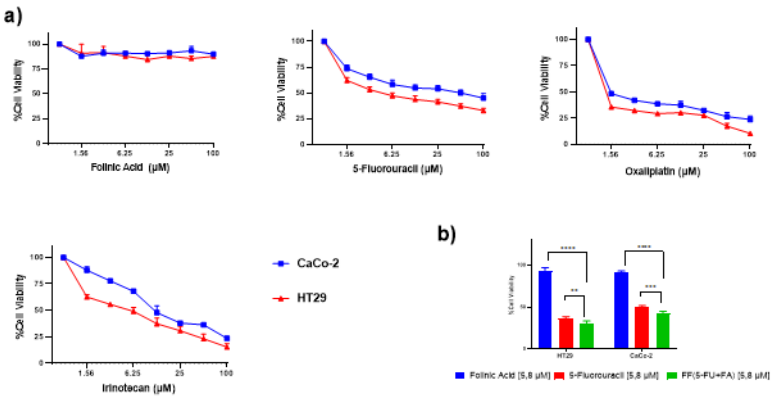

Figure 1. Optimization of Folinic Acid and 5-Fluorouracil Combination and Dose-Response Curves. a: Dose-response curves for folinic acid, 5-fluorouracil, irinotecan, and oxaliplatin in CaCo-2 and HT29 cells after 72 hours of treatment; b: Effect of IC50 values of folinic acid and 5-fluorouracil on cell viability after 72 hours; Results were analyzed using a two-way ANOVA test; ****: $p \leq 0.0001$; ***: $p \leq 0.0005$; **: $p \leq 0.01$; *: $p \leq 0.05$ vs. FA.

Figure 2 and Figure 3 present the percentage viability graphs of HT29 and CaCo-2 cell lines, respectively, following treatment with FOLFOX and FOLFIRI combinations at various time points (24, 48, and 72 hours) and doses determined under laboratory conditions. The data indicate that combining chemotherapy drugs is significantly more effective than using them separately, particularly in HT29 cells, allowing for lower doses and reduced toxicity. While a significant decrease in cell viability was observed even during the 24-hour treatment period, it was determined that this decrease became more pronounced after 48 and 72 hours. This enhanced effect allows for the use of lower drug doses while maintaining therapeutic efficacy, which can help minimize the toxic side effects typically associated with higher doses. When Figure 3 was examined, it was seen that the effectiveness of both chemotherapy combinations was more limited in CaCo-2 cells. Despite prolonged treatment times, it was determined that the viability rates of CaCo-2 cells remained higher compared to HT29 cells. These findings reinforce the importance of considering both drug combination and cell line variability when designing chemotherapeutic regimens.[15]

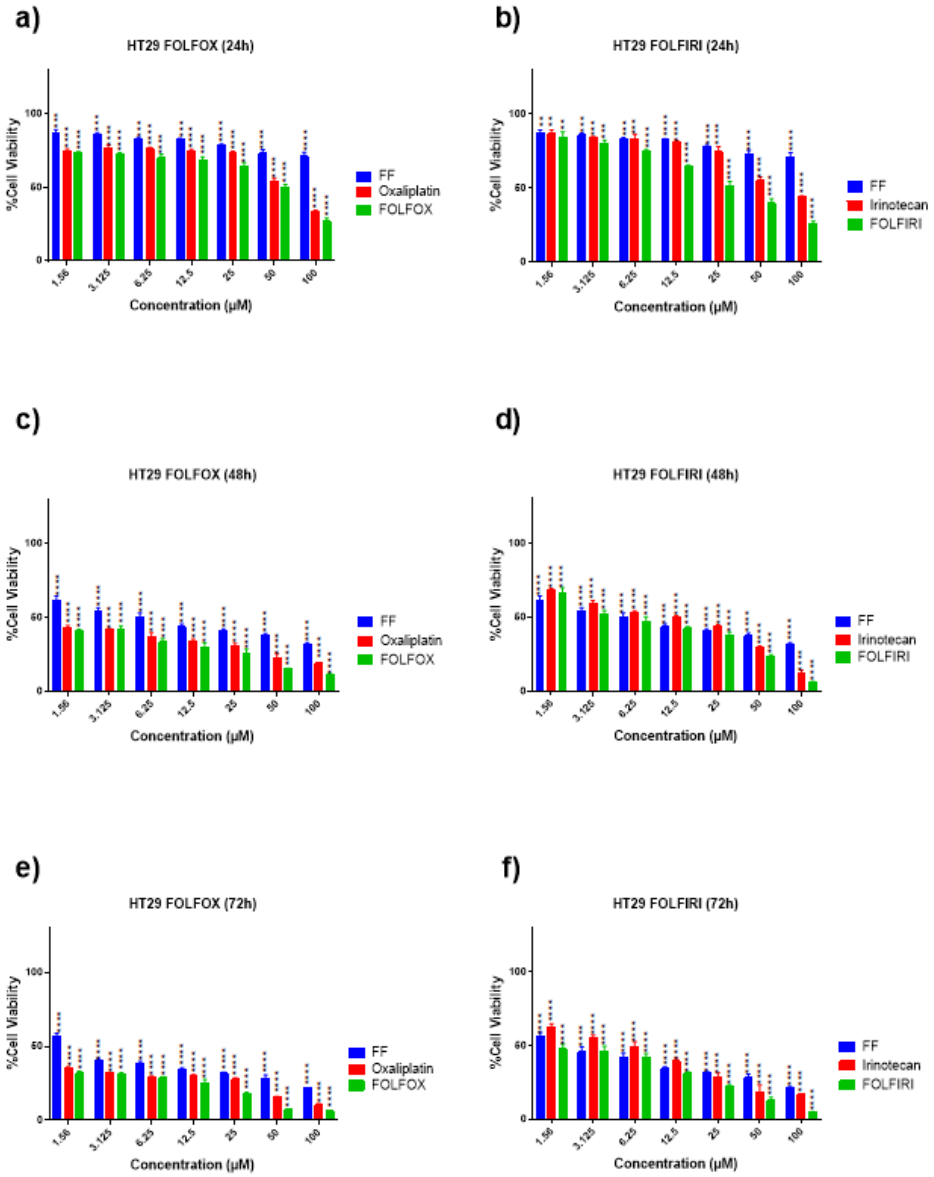

Figure 2. Percentage viability of HT29 cells after treatment with 5-fluorouracil + folinic acid (FF), oxaliplatin, irinotecan, (FF + oxaliplatin (FOLFOX)), and (FF + irinotecan (FOLFIRI)). a and b: 24 hours; c and d: 48 hours; e and f: 72 hours; Results were analyzed using a two-way ANOVA test; ****: $p \leq 0.0001$; ***: $p \leq 0.0005$; **: $p \leq 0.01$; *: $p \leq 0.05$ vs. Negative Control.

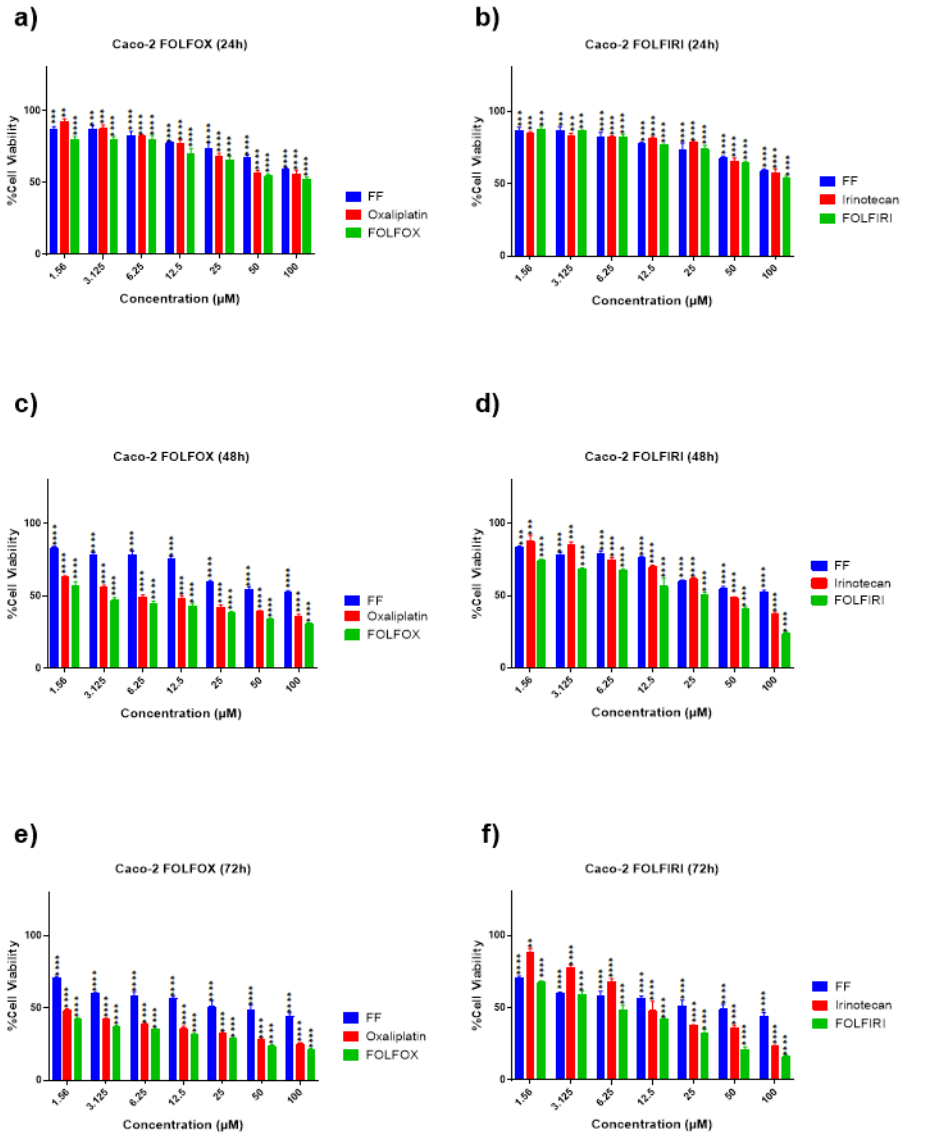

Figure 3. Percentage viability of CaCo-2 cancer cells treated with 5-fluorouracil (FF), oxaliplatin, irinotecan, (FF + oxaliplatin (FOLFOX)), and (FF + irinotecan (FOLFIRI)). a and b: 24 hours; c and d: 48 hours; e and f: 72 hours; Results were analyzed using a two-way ANOVA test; ****: $p \leq 0.0001$; ***: $p \leq 0.0005$; **: $p \leq 0.01$; *: $p \leq 0.05$ vs. Negative Control.

DISCUSSION AND CONCLUSION

The most common therapeutic modality for cancer is chemotherapy, which involves the usage of one or more cytotoxic drugs. As cancer cells divide faster than healthy cells, they are highly sensitive to cytotoxic compounds. However, rapidly multiplying healthy cells, such as bone marrow and hair follicle cells, are also sensitive to cytotoxic compounds. Thus, the common side effects of chemotherapeutic drugs include decreased red blood cell count and hair loss.

Chemotherapy is the mainstay treatment option for cancer despite side effects and the potential development of drug resistance, especially in advanced stages of cancer. Thus, efforts are ongoing to develop effective and tolerable anticancer drugs to mitigate drug resistance and side effects associated with chemotherapy.[16] Combinatorial therapy, which involves the application of a combination of chemotherapeutic drugs, is a promising treatment modality to suppress drug resistance and side effects, enhancing the therapeutic effect. This study aimed to provide evidence for developing new targeted treatments by comparing the effects of chemotherapeutic combinations on HT29 and CaCo-2 colon cancer cells. The IC_{50} values of drugs against HT29 cells were lower than those against CaCo-2 cells, indicating increased sensitivity of HT29 cells to chemo-

therapeutic drugs.[17] Consistent with previous findings, this study demonstrated that combination therapy was effective at low doses of drugs, which can prevent high-dose-induced toxicity.[18] Additionally, the drugs used in combination therapy prevent the division and proliferation of cancer cells through different mechanisms.[19] FOLFOX and FOLFIRI exert synergistic effects by combining the DNA synthesis-inhibiting property of 5-FU with the DNA-damaging properties of OX and IRI. FA potentiates the efficacy of 5-FU, upregulating malignant cell death. This broad mechanism of action suppresses chemotherapy resistance.[20] FOLFOX and FOLFIRI combinations time-dependently exerted antiproliferative on HT29 cells, significantly decreasing cell viability from 24 to 72 h of treatment. However, the viability rates of CaCo-2 cells were higher than those of HT29 cells even after prolonged treatment duration. As HT29 cells exhibit rapid division, they are highly sensitive to chemotherapeutic drugs that target cell division.[21] The incidence of multidrug resistance, which prevents the cellular entry of chemotherapeutic agents, in CaCo-2 cells was higher than that in HT29 cells. Drug resistance, a major limiting factor for cancer treatment, often develops in patients with colorectal cancer during advanced cancer treatment.[22] To overcome drug resistance, the application of a combination of chemotherapeutic agents has been proposed. The elucidation of the mechanisms of known chemotherapeutic drugs and their combinations and the factors related to chemotherapy resistance will aid in the selection of optimal treatment strategies.[23] In this preliminary study, the effects of chemotherapeutic drugs on cells with different biological activities were examined. HT29 and CaCo-2 cells isolated from patients with colon cancer are widely used *in vitro* models to evaluate the effects of potential therapeutics on colon cancer. In this study, FOLFOX and FOLFIRI combinations exerted differential growth-inhibitory effects on HT29 and CaCo-2 cells.[24] This can be attributed to the differential biological properties and resistance mechanisms of cancer cells. Consistent with the findings of this study, previous studies have demonstrated that oxaliplatin exerts growth-inhibitory effects against colon cancer cells by inducing cell death. HT29 cells were sensitive, whereas CaCo-2 cells were resistant to oxaliplatin.[25] One study reported that CaCo-2 cells developed resistance to combination treatment and that the migration ability of CaCo-2 cells was higher than that of HT29 cells after combination treatment.[26] Thus, the efficacies of FOLFOX and FOLFIRI combinations on HT29 and CaCo-2 cell lines varied depending on the biological properties of the cells.[27] In addition to FOLFOX and FOLFIRI combinations, the FOLFOXIRI combination, which is effective against metastatic colorectal cancers, has been used in various clinics worldwide. However, the application of FOLFOXIRI is limited owing to its serious side effects.[17] Hence, this study selected FOLFOX and FOLFIRI combinations due to their safety and tolerability profiles. The effects of the FOLFOXIRI combination will be evaluated in the future. In clinical practice, optimizing treatment durations and doses is critical for increasing treatment effectiveness and minimizing side effects.[28]

In conclusion, the findings of this study provide useful insights for the development of effective and targeted strategies for colon cancer. Additionally, the elucidation of the effects of drug combinations used in clinical chemotherapy will improve our understanding of the complex colorectal cancer pathogenesis and aid in developing effective targeted treatments. In addition to known chemotherapy combinations, combinatorial therapies involving targeted agents can potentially increase treatment success. Future studies must investigate the effectiveness of these combination strategies to improve the clinical outcomes of patients with colon cancer.

Ethics Committee Approval: This research utilized commercially available cell lines. As such, no ethics committee approval was necessary for this study. The research adhered to international declarations and guidelines.

Conflict of Interest: No conflict of interest was declared by the authors.

Author Contributions: Concept – AYK, SET; Supervision – SET; Materials – AYK, SET; Data Collection and/or Processing – AYK; Analysis and/or Interpretation – AYK, SET; Writing –AYK, SET.

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REFERENCES

1. Gach-Janczak K, Drogosz-Stachowicz J, Janecka A, Wtorek K, Mirowski M. Historical Perspective and Current Trends in Anticancer Drug Development. Cancers. 2024;16(10):1878. doi:10.3390/CANCERS16101878
2. Azwar S, Seow HF, Abdullah M, Jabar MF, Mohtarrudin N. Recent Updates on Mechanisms of Resistance to 5-Fluorouracil and Reversal Strategies in Colon Cancer Treatment. Biology. 2021;10(9):854. doi:10.3390/BIOLOGY10090854
3. Xie YH, Chen YX, Fang JY. Comprehensive review of targeted therapy for colorectal cancer. Signal Transduct Target Ther. 2020;5(1):1-30. doi:10.1038/s41392-020-0116-z
4. Liu X, Ou K, Ma X, et al. Safety and efficacy of irinotecan, oxaliplatin, and capecitabine (XELOXIRI) regimen with or without targeted drugs in patients with metastatic colorectal cancer: a retrospective cohort study. BMC Cancer.

2022;22(1):807. doi:10.1186/S12885-022-09889-3
5. Ashique S, Bhowmick M, Pal R, et al. Multi drug resistance in Colorectal Cancer- approaches to overcome, advancements and future success. Adv Cancer Biol - Metastasis. 2024;10:100114. doi:10.1016/J.ADCANC.2024.100114
6. Narayan S, Raza A, Mahmud I, et al. Sensitization of FOLFOX-resistant colorectal cancer cells via the modulation of a novel pathway involving protein phosphatase 2A. iScience. 2022;25(7). doi:10.1016/J.ISCI.2022.104518
7. Sethy C, Kundu CN. 5-Fluorouracil (5-FU) resistance and the new strategy to enhance the sensitivity against cancer: Implication of DNA repair inhibition. Biomed Pharmacother. 2021;137:111285. doi:10.1016/J.BIOPHA.2021.111285
8. Glimelius B, Stintzing S, Marshall J, Yoshino T, de Gramont A. Metastatic colorectal cancer: Advances in the folate-fluoropyrimidine chemotherapy backbone. Cancer Treat Rev. 2021;98:102218. doi:10.1016/J.CTRV.2021.102218
9. Vodenkova S, Buchler T, Cervena K, Veskrnova V, Vodicka P, Vymetalkova V. 5-fluorouracil and other fluoropyrimidines in colorectal cancer: Past, present and future. Pharmacol Ther. 2020;206:107447. doi:10.1016/J.PHARMTHERA.2019.107447
10. Chai Y, Liu JL, Zhang S, et al. The effective combination therapies with irinotecan for colorectal cancer. Front Pharmacol. 2024;15:1356708. doi:10.3389/FPHAR.2024.1356708/BIBTEX
11. Kumar S, Sherman MY. Resistance to TOP-1 Inhibitors: Good Old Drugs Still Can Surprise Us. Int J Mol Sci. 2023;24(8):7233. doi:10.3390/IJMS24087233
12. Amniouel S, Jafri MS. High-accuracy prediction of colorectal cancer chemotherapy efficacy using machine learning applied to gene expression data. Front Physiol. 2023;14:1272206. doi:10.3389/FPHYS.2023.1272206
13. Bilgin S, Erden Tayhan S, Yıldırım A, Koç E. Investigation of the effects of isoeugenol-based phenolic compounds on migration and proliferation of HT29 colon cancer cells at cellular and molecular level. Bioorg Chem. 2023;130:106230. doi:10.1016/J.BIOORG.2022.106230
14. Galateanu B, Hudita A, Negrei C, et al. Impact of multicellular tumor spheroids as an in vivo-like tumor model on anticancer drug response. Int J Oncol. 2016;48(6):2295. doi:10.3892/IJO.2016.3467
15. Biller LH, Schrag D. Diagnosis and Treatment of Metastatic Colorectal Cancer: A Review. JAMA. 2021;325(7):669-685. doi:10.1001/JAMA.2021.0106
16. Pathak PS, Chan G, Deming DA, Chee CE. State-of-the-Art Management of Colorectal Cancer: Treatment Advances and Innovation. https://doi.org/101200/EDBK_438466. 2024;44(3). doi:10.1200/EDBK_438466
17. Wanes D, Naim HY, Dengler F. Proliferation and Differentiation of Intestinal Caco-2 Cells Are Maintained in Culture with Human Platelet Lysate Instead of Fetal Calf Serum. Cells. 2021;10(11):3038. doi:10.3390/CELLS10113038
18. Zoetemelk M, Ramzy GM, Rausch M, Nowak-Sliwinska P. Drug-Drug Interactions of Irinotecan, 5-Fluorouracil, Folinic Acid and Oxaliplatin and Its Activity in Colorectal Carcinoma Treatment. Molecules. 2020;25(11):2614. doi:10.3390/MOLECULES25112614
19. Machover D, Almohamad W, Castagné V, Desterke C, Gomez L, Goldschmidt E. Treatment of patients with carcinomas in advanced stages with 5-fluorouracil, folinic acid and pyridoxine in tandem. Sci Rep. 2024;14(1):12054. doi:10.1038/S41598-024-62860-Z
20. Budithi A, Su S, Kirshtein A, Shahriyari L. Data Driven Mathematical Model of FOLFIRI Treatment for Colon Cancer. Cancers. 2021;13(11):2632. doi:10.3390/CANCERS13112632
21. Gagnon M, Zihler Berner A, Chervet N, Chassard C, Lacroix C. Comparison of the Caco-2, HT-29 and the mucus-secreting HT29-MTX intestinal cell models to investigate Salmonella adhesion and invasion. J Microbiol Methods. 2013;94(3):274-279. doi:10.1016/J.MIMET.2013.06.027
22. Gmeiner WH. Recent Advances in Therapeutic Strategies to Improve Colorectal Cancer Treatment. Cancers (Basel). 2024;16(5):1029. doi:10.3390/CANCERS16051029
23. Gu J, Li Z, Zhou J, Sun Z, Bai C. Response prediction to oxaliplatin plus 5-fluorouracil chemotherapy in patients with colorectal cancer using a four-protein immunohistochemical model. Oncology Letters. 2019;18(2):2091-2101. doi:10.3892/OL.2019.10474
24. Lenaerts K, Bouwman FK, Lamers WH, Renes J, Mariman EC. Comparative proteomic analysis of cell lines and scrapings of the human intestinal epithelium. BMC Genomics. 2007;8:1-14. doi:10.1186/1471-2164-8-91
25. Haddad MJ, Sztupecki W, Delayre-Orthez C, et al. Complexification of In Vitro Models of Intestinal Barriers, A True Challenge for a More Accurate Alternative Approach. International Journal of Molecular Sciences. 2023;24(4):3595. doi:10.3390/IJMS24043595
26. Slaninová V, Heron-Milhavet L, Robin M, et al. The Hippo pathway terminal effector TAZ/WWTR1 mediates oxaliplatin sensitivity in p53 proficient colon cancer cells. BMC Cancer.

2024;24(1):1-18. doi:10.1186/S12885-024-12316-4/FIGURES/6

27.Cerbone A, Toaldo C, Minelli R, et al. Rosiglitazone and AS601245 Decrease Cell Adhesion and Migration through Modulation of Specific Gene Expression in Human Colon Cancer Cells. PLoS One. 2012;7(6):e40149. doi:10.1371/JOURNAL.PONE.0040149

28.Ramzy GM, Boschung L, Koessler T, et al. FOLFOXIRI Resistance Induction and Characterization in Human Colorectal Cancer Cells. Cancers. 2022;14(19):4812. doi:10.3390/CANCERS14194812

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Difficulties Experienced by Palliative Care Nurses in Emergency Care Practices: A Qualitative Study

Palyatif Bakım Hemşirelerinin Acil Bakım Uygulamalarında Yaşadığı Zorluklar: Nitel Bir Araştırma

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ABSTRACT

Objective: This study aimed to determine the difficulties experienced by palliative care nurses during emergency care practice.

Materials and Methods: This study reports the experiences of 10 nurses working in the palliative care unit of a public hospital between February 2023 and May 2023 regarding emergency care practices. A qualitative research design was used with semi-structured interviews and content analysis.

Results: Four themes were identified from the analysis of the interview documents: 1) feelings in the face of emergency, 2) factors that support emergency care practices, 3) factors that hinder emergency care practices, and 4) the development of emergency care practices.

Conclusions: The most important factor preventing emergency nursing practice in the palliative care service was insufficient staffing, especially during night shifts. The number of nurses was low, there was no support staff, and in case of possible cardiopulmonary resuscitation requirements, the treatment of other patients was interrupted. Identifying the factors that support and hinder emergency nursing practices will allow the development of strategies that will positively affect holistic care delivery by palliative care nurses.

Keywords: Difficulties of palliative care, emergency care, nursing, qualitative research

ÖZ

Amaç: Bu çalışmanın amacı, palyatif bakım hemşirelerinin acil bakım uygulamalarında yaşadığı zorlukların belirlenmesidir.

Materyal ve Metot: Bu çalışma, Şubat 2023 ile Mayıs 2023 tarihleri arasında bir kamu hastanesinin palyatif bakım ünitesinde çalışan 10 hemşirenin acil bakım uygulamalarına ilişkin deneyimlerini aktarmaktadır. Yarı yapılandırılmış görüşmeler ve içerik analizi ile nitel bir araştırma deseni kullanılmıştır.

Bulgular: Görüşme dokümanlarının analizi sonucunda: 1) acil durum karşısında hissedilenler, 2) acil hemşirelik uygulamalarını destekleyici faktörler, 3) acil hemşirelik uygulamalarını engelleyici faktörler, 4) acil bakım uygulamalarının geliştirilmesi olmak üzere dört tema belirlendi.

Sonuç: Palyatif bakım servisinde acil hemşirelik uygulamalarına engel olan en önemli faktörün personel yetersizliği olduğu, özellikle gece mesailerinde hemşire sayısının az olduğu, destek personelinin bulunmadığı ve olası kardiyopulmoner resüsitasyon gerekliliği durumunda diğer hastaların tedavisinin aksadığı belirlendi. Acil hemşirelik uygulamalarını destekleyen ve engelleyen faktörlerin belirlenmesi, palyatif bakım hemşirelerinin bütüncül bakım sunumunu olumlu yönde etkileyecek stratejilerin geliştirilmesine olanak sağlayacaktır.

Anahtar Kelimeler: Acil bakım, hemşirelik, nitel araştırma, palyatif bakımın zorlukları

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INTRODUCTION

Palliative care is a type of medical care provided by a specialized team in combination with curative treatment for patients of all ages with serious illnesses. It is a holistic approach that focuses on relieving symptoms and distress associated with the illness, with the ultimate goal of improving the quality of life of the patient and their family.[1] Palliative care is not confined to a particular ailment; instead, it can be administered at any stage of progression of an illness. It is provided concurrently with curative treatments, with the objective of assisting individuals afflicted with life-limiting illnesses in coping and enhancing their quality of life.[2]

The palliative care process requires a multidisciplinary team approach, and nurses are at the center of this field.[3] Palliative care nurses (PCN) face many challenges, both physical and psychological while trying to provide emergency care to patients in the terminal phase of their lives. The reasons for these difficulties often include difficult symptom management, professional burnout, and high workload. In addition, facing death and lack of education about the emergency care process were also shown to be important challenges.[4]

The palliative care unit is an environment that requires special understanding and has a high ethical sensitivity rate.[5] Studies in the literature report that nurses working in palliative care clinics sometimes feel helpless and state that they have a stressful job.[6] However, in a qualitative study conducted with palliative care nurses, 63.6% of patients experienced symptoms requiring emergency care, such as respiratory distress, and 90.9% were in pain. In the same study, it was reported that 54.5% of nurses had difficulty performing CPR, and 54.5% had difficulty reaching a physician.[5]

Accordingly, this study aimed to determine the difficulties encountered by palliative care nurses during emergency care practices.

MATERIALS AND METHODS

Ethics Committee Approval: Ethics committee approval was obtained from the Social and Humanities Ethics Committee of a university (Date: 27.01.2023, decision no: 2023-1216), and official approval was obtained from the hospital where the study was performed. The study was conducted in accordance with the principles set forth in the Declaration of Helsinki. Written informed consent was obtained before each interview, including consent for audio recording.

Design and Theoretical Framework: The principal objective of qualitative research is to elucidate perceptions and experiences.[7] In this research, the phenomenological approach, one of the qualitative research methods, was chosen. The phenomenological hermeneutic approach attempts to understand a phenomenon from the perspective of those who experience it and encompasses both the processes of understanding and interpretation.[8] This study will provide insight into the difficulties and feelings faced by palliative care nurses during emergency care practices.

Study Setting and Sample: The population comprised 12 nurses employed in the palliative care unit (PCU) of a state hospital in Türkiye, including the nurse who conducted the interviews. The inclusion criteria were as follows: participants were required to be willing to take part in the study, to be over the age of 18, and to have at least one year's experience working as a PCN in a PCU. An interview with one nurse was included in the pilot study, and data saturation was reached by interviewing a total of 10 nurses. To guarantee the rigor of the study, the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist criteria were taken into account in the reporting process.

Data Collection Tools: The data were collected between February 22, 2023, and May 20, 2023. A personal information form and a semi-structured interview form were constructed based on a review of the relevant literature and used to collect the data.[1-4,9] The semi-structured interview form consisted of non-directive and neutral open-ended questions, the objective of which was to ascertain the difficulties encountered by nurses in emergency care practice (Table 1). To ensure the content validity of the interview form, two experts in the field with experience in research were consulted.

Table 1. Semi-structured interview guide.

What is emergency care, in your opinion?
How do you feel when you encounter emergencies in your unit?
What are the factors that support your emergency nursing practices in palliative care? (What are the factors that increase your motivation in this process?)
What are the barriers/limitations you experience when providing emergency care to palliative care patients?
What are your suggestions for improving emergency nursing approaches in palliative care?
How would you relate palliative care to emergency nursing approaches?

The interviews were conducted by the first author, who was previously trained in qualitative interviews, specialized in emergency nursing, and was experienced in palliative care. The interviews were conducted in a quiet and private setting and lasted on average 20-40 minutes. The interviews were recorded with a voice recorder. Participants were encouraged to think deeply about the topic and to speak at length and in detail. At the conclusion of each interview, the researcher provided a summary of the interview to the participant, allowing the participant to supplement or clarify missing aspects of the topic.

Statistical Analysis: Qualitative content analysis was conducted in accordance with the framework proposed by Graneheim and Lundman.[10,11] The interview text was divided into semantic segments, which are sections of text that carry a single meaning relevant to the purpose of the study. As shown in Table 2, the units of meaning were summarized, coded, and finally grouped according to the overall content domain. The groupings formed the basis for interpreting and developing the emerging subthemes. All authors agreed on the conclusions. In addition, we applied Lincoln and Guba's four principles of credibility, transferability, dependability, and confirmability to ensure trustworthiness.[12]

RESULTS

It was determined that 70% of the nurses who participated in the study were between the ages of 36-53 years, 80% had a bachelor's degree, 60% had 16 years or more of work experience, 80% willingly worked in the palliative care service, and 80% received training about emergency nursing practices for palliative care patients. Table 3 shows the sociodemographic and professional characteristics of the participants.

As seen in Table 4, 4 themes and 24 sub-themes were obtained as a result of the analysis of the interview documents. The first theme identified in Table 4 highlights that nurses observe that most palliative care patients have life-threatening illnesses. As a result, they often encounter situations that require emergency intervention, such as severe pain, respiratory failure, airway obstruction, cardiac arrest, hypoglycemia, sudden changes in vital signs, sudden changes in consciousness, and urinary retention. The second theme reveals that the experiences of positive outcomes in care motivate palliative care nurses to provide emergency interventions. Factors such as receiving appreciation from patients' relatives, educating these relatives, and gaining experience through training in palliative care and emergency response support nurses in handling crises effective-

Table 2. Example of analysis process.

Meaning unit	Condensed meaning unit	Interpretation	Sub-theme	Theme
The biggest obstacle is the problem of physical conditions. In cases where basic life support is provided, and advanced life support is required, the location of the ward in the hospital is far from the teams (P2).	The palliative care service is far from the code blue team. This situation is defined as an obstacle for emergency nursing practices in patients requiring advanced life support.	The fact that the code blue team is far from the palliative care service creates an obstacle to emergency care practices for patients who will receive advanced life support.	Location of the unit within the hospital	Factors hindering emergency nursing practices in palliative care patients

Table 3. Distribution of sociodemographic and work-related characteristics of nurses (N=10).

Characteristics		n (%)
Age	21-35 years	3 (30)
	36-53 years	7 (70)
Gender	Female	10 (100)
Education status	Associate degree	2 (20)
	Bachelor's degree	8 (80)
Marital status	Married	9 (90)
	Single	1 (10)
Length of time working as a nurse	1-5 years	1 (10)
	6-15 years	3 (30)
	+16 years	6 (60)
Length of employment in current unit	0-5 years	6 (60)
	5-10 years	4 (40)
Voluntary preference for unit of employment	Yes	8 (80)
	No	2 (20)
Status of receiving training on emergency nursing practices	Yes	8 (80)
	No	2 (20)

ly. The third theme outlines the main barriers preventing nurses from delivering emergency care in the palliative care unit. These barriers include staff shortages, particularly during night shifts, an insufficient number of nurses, a lack of support personnel, and concerns about interrupting the treatment of other patients during a potential emergency. Additionally, the physical location of the palliative care unit, being distant from the emergency department and security units, is frequently cited as a challenge. Other contributing factors include excessive workloads, exclusion of family members from the care process, inadequate physical resources in palliative care, and long shifts. Finally, theme 4, which was the most frequently mentioned, emphasizes the need to increase staffing levels. Related suggestions from participants include providing regular training on emergency nursing practices, improving the physical location and conditions of palliative care services, offering training to family members of patients, recognizing and appreciating the contributions of nurses by management, and providing moral and psychological support to nursing staff.

Table 4. Experiences of palliative care nurses regarding emergency care practices: Themes, sub-themes, quotes.

Theme	Sub-themes	Quotes
1- Feelings when faced with emergencies in palliative care patients	Excitement	*"I mean, when I encounter emergencies, first of all, of course, there is excitement. "(P4).*
	Stress	*"When the patient is uncomfortable, I feel stressed until I see the patient relaxing. I get stressed because I want to get through that moment, I want to comfort the patient, so when I feel inadequate, when I cannot do something for the patient, I get more stressed." (P1)*
	Rush	*"There's a rush to catch up, and there's a rush to inform my friend as soon as possible... If we're going to do a code blue, of course, there's a panic in that waiting period when we're going to do a code blue..." (P4)*
	Sense of inadequacy	*"...I mean these kinds of things. I can sometimes feel inadequate because, after all, our patients may not return. I wonder if there was something else I could have done." (P6)*
	Anxiety	*"Patient relatives usually panic a lot, their aggressive behavior makes me very upset. Sometimes I get angry… When an intervention is made, I wonder if there was anything else I should have done, if I did something wrong. Because our patients are of vital importance. I sometimes wonder if there was anything else I could have done." (P6)*
2-Factors supporting emergency nursing practices in palliative care patients	Experience the positive results of care	*"When we give painkillers to a patient in pain, of course, our motivation increases when the patient is relieved...When our treatment is effective, we are happier, so when the patient is relieved, we are relieved..." (P8)*
	Appreciation by patient relatives	*"...The patient's relatives also see these things; they think that the patient will die, but with your intervention, the patient does not die, and when the patient survives, the patient's relatives thank you. You feel good, too; we often experience such things in palliative care." (P3)*
	Providing training to patient relatives	*"Patients who really need to be cared for by people who have received special care and special training, and those care needs to be taught to relatives." (P4)*
	Training in emergency situations	*"These are the factors that support me to be quick when I give emergency care, to be confident in myself, to be sure that I am doing the right procedure..." (P2)*
	Training on palliative care	*"The first of the factors that support nursing practices is the training I received, the specific training I received for the unit I work in, the certification programs I attended, and the training and experience I received and gained in the service. "(P2).*
	Experiences gained	*"Yes, that's true. In other words, when the education received is combined with previous experiences, both more accurate decisions are made and faster progress is made in emergency nursing care." (P2)*

Table 4. Continue.

3- Factors hindering emergency nursing practices in palliative care patients	Insufficient staff	*"...There are patients who require continuous aspiration, whose saturation is constantly decreasing, who are connected to a mechanical ventilator or a home ventilator, and who we need to follow up continuously. Therefore, we have a lot of patients who require close follow-up. It is very difficult for us to follow up such patients when there is a lack of personnel. Lack of personnel is also one of the obstacles...." (P8)*
	Location of the unit within the hospital,	*"Likewise, if our service was located close to the emergency department since our code blue team usually consists of emergency and intensive care staff, I think our service should have been close to there as well. It would have been easier for the doctor and the emergency team to reach the patient faster and for the patient to be transferred to the intensive care unit faster" (P4).*
	Excessive workload	*"…for example, the excess of our workload, that is, the things that wear us out in these kinds of obstacles. The excess of our workload, for example, that is what affects us the most". (P6)*
	Lack of involvement of relatives in care	*"In other words, it is not the presence of the patient's relatives, but the lack of support from the patient's relatives, not accepting the patient, and not supporting the care, that can be said to be an obstacle. Of course, there will be relatives... We take care of both the patient and their relatives with a multidisciplinary team." (P1)*
	Physical inadequacies	*"...Technical features, for example, aspiration bags change frequently and do not adapt to the device, and these incompatibilities also obstruct us. Because I think speed is one of the most important factors for us. .... We experience obstacles related to such physical conditions" (P3).*
	Prolonged seizures	*"Having a large number of patients with a small staff, frequent shifts, and a very long shift period (24 hours) are major obstacles for us, and these factors wear us out both physically and mentally" (P6)*
4- Development of emergency care practices	Increasing the number of staff	*"...The number of staff can be increased... For example, staff shortage is important for us because we are always faced with emergencies" (P3).*
	Providing regular training about emergency nursing practices	*"My suggestion for the development of emergency nursing approaches in palliative care is that there should be training at least once a year because there are new medical practices. There are changing practices, and I would like to have the training to improve ourselves" (P4).*
	Providing moral support to nurses	*"I would like us to be given moral support once in a while…. (P6).*
	Improving the physical location and physical conditions of the palliative care service	*"…Since terminal period patients require high care, physical conditions should be planned accordingly. Physical conditions and personnel support should be planned based on the experience of nurses working in these wards... " (P2)*
	Providing training to patient relatives	*"After discharge, we witnessed that a patient with a tracheostomy had an arrest due to a lack of regular aspiration. Therefore, it is important to provide regular training to the patient's relatives in a severe way" (P6).*
	Providing psychological support to nurses	*"... There should be studies to increase our motivation; for example, I would like a psychologist to talk to us as they do with relatives and patients" (10).*
	Appreciation by managers	*"I would like motivational activities to be planned... For example, to be appreciated, to receive moral support, I honestly think that we should be supported" (P6).*

DISCUSSION AND CONCLUSION

Nursing in the palliative care setting requires a broad range of skills.[13] Nurses are responsible for recognizing and relieving patients' symptoms, administering medications within their scope of practice, and collaborating with other professionals to optimize patient comfort and family harmony.[14] Emergencies are common in the advanced stages of terminal illness and can be very stressful for the patient, the family, and healthcare professionals.[15] No research was found to investigate the difficulties palliative care nurses experience during emergency nursing practice. Since there is no similar study in the literature, our study will be a reference for research and studies to be conducted in this framework.

Uncontrolled pain is a common cause of patients in palliative care seeking acute care. Nearly one-tenth of emergency department visits by oncology patients in the final months of life are attributable to pain, while nearly 20% of patients who die in hospital are reported to have experienced some degree of pain.[16] The increasing prevalence of end-of-life pain in palliative care suggests that healthcare providers working in this field should be committed to effective, efficient, and safe pain management.[17] The nurses who participated in the study indicated that one of the most important factors that supports and motivates them in providing emergency care is the relief of the patient's pain.

Most palliative care emergencies can be anticipated and managed with preventive elective interventions by understanding the pathophysiology and natural history of the clinical situation. Early discussion with staff, patients, and families about what might happen can help avoid the stress of unexpected developments and the urgent clinical decisions needed.[18] In this study, the necessity for improved communication between physicians, patients, and their relatives about the progression of the disease was identified as a barrier to effective emergency care practices. In support of our study results, the literature reported the need for shared decision-making decreases in acute and critical situations.[19] In contrast, respect for patients and their families and respect for their wishes is an expectation of the World Health Organization (WHO) for palliative care.[20] In this regard, palliative care nurses and physicians should, as a matter of principle, select communication channels that are compatible with the needs and choices of the patient and family, ensure family involvement in palliative care, and respect the needs and choices of the patient and the patient's family.[21]

In a study that examined nurses' opinions about working in a palliative care unit, inadequate staffing increased nurses' workload and created difficulties in providing care.[22] Consistent with the literature, participants in this study reported that inadequate staffing was a barrier to emergency nursing practice and that they experienced problems, mainly when they encountered emergencies during their shifts. In a study that examined the challenges encountered by healthcare professionals in the provision of palliative care, which supports the results of our study, excessive workload and staffing shortages were reported as barriers to practice.[21]

The functional and physical organization of palliative care units should be designed to ensure that the patients cared for can be intensively rehabilitated from medical, psychological, social and spiritual aspects.[20] In this study, participants indicated that the distance of the palliative care service location from the code blue teams was a significant barrier to nursing practice in cases where basic life support is provided and advanced life support is required. In addition, nurses reported that a lack of equipment and inadequate physical conditions negatively impacted the emergency care they provided to palliative care patients. In support of our study findings, the literature indicates that inadequate material and physical conditions are among the barriers that palliative care nurses face in the caregiving process.[22]

Palliative care workers can experience intense death anxiety due to frequent encounters with death and face significant problems such as stress, burnout, compassion fatigue, and decreased job satisfaction due to the difficulties they experience in providing care.[21] In line with the literature, palliative care nurses in this study highlighted the need for spiritual and psychological support for nurses as an important strategy to improve emergency nursing practice.

When examining the training programs for palliative care services in Türkiye, it was reported that there are no postgraduate training programs in the field of nursing, and limited information about the care process of palliative care services is provided in nursing education. However, according to the "Ministry of Health Regulation on Certified Education" issued on February 4, 2014, the palliative care nursing certificate program is considered a field of education and a certified education program was launched.[23] In contrast, a study conducted in one palliative care service reported that only 27.5% of healthcare workers had palliative care certification.[24] Palliative care nurses stated that regular training in emergency care practices would improve palliative care practices.

In conclusion, the following recommendations can be made: to prepare and implement in-service training programs about emergency interventions frequently encountered in palliative care wards, to include emergency nursing approaches in palliative care services within the course content of basic and advanced training programs, to increase the participation of nurses in certificate training programs in the field of palliative care nursing with the support

of the management, to identify the gaps in knowledge, attitude and practice related to emergency interventions in palliative care, and to follow current guidelines in the field of emergency nursing practice. Furthermore, when determining the location of palliative care services within the hospital, taking into account the opinions of experienced health care professionals in the field and locating them close to priority units such as emergency and intensive care services is a strategy that will improve the emergency care practices offered to palliative care patients. No research was found in our country that identifies the difficulties experienced by palliative care nurses in emergency care practices. It is thought that with this study, appropriate recommendations and strategies for emergency care practices in palliative care services can be developed, and the quality of nursing care provided can be increased. It is not possible to generalize our findings without conducting comparable studies in palliative care units in different parts of our country.

Ethics Committee Approval: Our study was approved by the Social and Humanities Ethics Committee of a university (Date: 27.01.2023, decision no: 2023-1216).

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REFERENCES

1. Center to Advance Palliative Care. What is palliative care? https://www.capc.org/about/ palliative-care/. Accessed May 20, 2023.
2. Australian Institute of Health and Welfare. Palliative care services in Australia. https://www.aihw.gov.au/reports/palliative-care-services/palliative-care-services-in-australia/ contents/summary. Accessed May 25, 2023.
3. Sekse RJT, Hunskår I, Ellingsen S. The nurse's role in palliative care: A qualitative meta-synthesis. Journal of Clinical Nursing. 2018;27(1-2):e21-e38. doi:10.1111/jocn.13912
4. Üzen Cura Ş, Ateş E. The difficulties that palliative care unit nurses have while caring the dying patients. Journal of Academic Research in Nursing. 2020;6(3):483-490. doi:10.5222/jaren.2020.43760
5. Güngördü ND, Akbal Y, Üstün Ç, Başaran A. Palyatif bakım ünitesinde ölüm sürecindeki müdahale ve bakımda hemşireleri etkileyen faktörler: Fenomenolojik çalışma. Ege Tıp Dergisi. 2024;63(2):282-291. doi:10.19161/etd.1360184
6. Tertemiz OF, Tüylüoğlu E. Are signs of burnout and stress in palliative care workers different from other clinic workers? Ağrı. 2020;32(2):79-84. doi:10.14744/agri.2019.14880
7. Tekindal M, Uğuz Arsu Ş. Nitel araştırma yöntemi olarak fenomenolojik yaklaşımın kapsamı ve sürecine yönelik bir derleme. Ufkun Ötesi Bilim Dergisi. 2020;20(1):153-172.
8. Lindseth A, Norberg A. Elucidating the meaning of life world phenomena. A phenomenological hermeneutical method for re searching lived experience. Scandinavian Journal of Caring Sciences. 2022;36(3):883–890. doi:10.1111/scs.13039
9. Zeilinger EL, Gabal A, Adamidis F, et al. Challenges in palliative care nursing at a university hospital: A qualitative interview study. Journal of Hospice & Palliative Nursing. 2022;24(5):E219–E225. doi:10.1097/NJH.000000000000886
10. Graneheim UH, Lindgren BM, Lundman B. Methodological challenges in qualitative content analysis: A discussion paper. Nurse Education Today. 2017;56:29-34. doi:10.1016/j.nedt.2017.06.002
11. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. Nurse Education Today. 2004;24(2):105–112. doi:10.1016/j.nedt.2003.10.001.
12. Lincoln YS, Guba EG. Naturalistic inquiry. Beverley Hills: Sage Publications; 1985.
13. Hussain FA. Psychological challenges for nurses working in palliative care and recommendations for self-care. British Journal of Nursing. 2021;30(8):484-489. doi:10.12968/bjon.2021.30.8.484
14. American Nurses Association. Position statement: Nurses' roles and responsibilities in providing care and support at the end of life. https://www.nursingworld.org/~4af078/ globalassets/docs/ana/ethics/endoflife-positionstatement.pdf. Accessed Nov 10, 2023.
15. Forrest J, Napier M. Emergencies in palliative care. In: Cooper J, ed. Stepping Into Palliative Care 2: Care And Practice. 2nd ed. Seattle: Radcliffe Publishing; 2006:130-148.
16. Hagarty AM, Bush SH, Talarico R, Lapenskie J, Tanuseputro P. Severe pain at the end of life: A population-level observational study. BMC Palliative Care. 2020;19(1):1-13. doi:10.1186/s12904-020-00569-2
17. Coyne P, Mulvenon C, Paice JA. American soci-

ety for pain management nursing and hospice and palliative nurses association position statement: Pain management at the end of life. Pain Management Nursing. 2018;19(1):3-7. doi:10.1016/j.pmn.2017.10.019
18. Noble S. Emergencies in palliative care. Medicine. 2020;48(1):33-36.
19. Landstad BJ, Kvangarsnes M. Physicians' narratives of communication with patients and their relatives in different phases of the palliative pathway. BMJ Open. 2023;13(6):e065681. doi:10.1136/bmjopen-2022-065681
20. Tanrıverdi Ö, Kömürcü Ş. Palyatif bakım ünitelerinde yapılanma. İçinde: Gülhan M, Yılmaz Ü, eds. Akciğer Kanserinde Destek Tedavisi. İstanbul: TUSAD yayıncılık; 2016:391-407.
21. Menekli T. Problems experienced by healthcare professionals caring for palliative care patients and solution suggestions. Journal of Health Profession Research. 2023;5(1):81-88. doi:10.57224/jhpr.1073872
22. Kıyak S, Altuntuğ K, Ege E. Views of nurses on working in the palliative care unit: Qualitative study. Ordu University Journal of Nursing Studies. 2022;5(2):191-199. doi:10.38108/ouhcd.896557
23. Arslanoğlu A. Sağlık hizmetlerinde kalite yönetimi: Hastane-yoğun bakımlar ve palyatif bakım kliniklerinde kalite yönetimi. Ankara: Nobel Akademik Yayıncılık; 2021.
24. Sarıhan M, Öztürk D, Yurdakoş K. Scale development for evaluation of palliative care services in terms of healthcare employees. Journal of Health Sciences. 2022;31(2):219-228. doi:10.34108/eujhs.944146

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Determining the Views of Service Responsible Nurses on Postgraduate Education: A Qualitative Study

Servis Sorumlusu Hemşirelerin Lisansüstü Eğitime İlişkin Görüşlerinin Belirlenmesi: Nitel Bir Çalışma

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ABSTRACT

Objective: The increasing population and changing demographic structure, scientific advancements, and the growing expectations and need for healthcare specialists are enhancing the importance of higher education in the nursing profession. Understanding the perspectives of service-responsible nurses on postgraduate education is crucial for improving healthcare outcomes. This study aims to determine the views of service-responsible nurses on postgraduate education.

Materials and Methods: The research was designed as a phenomenological qualitative study and was conducted with 13 service charge nurses. Data were collected through in-depth individual interviews using a semi-structured interview form and were analyzed using Colaizzi's seven-stage analysis.

Results: Four main themes with eight categories were identified as follows: (i) "necessity of postgraduate education," (ii) "effects of postgraduate education," (iii) "contributions of postgraduate education," and (iv) "barriers to continuing postgraduate education." It was found that service-responsible nurses generally consider postgraduate education necessary, believe that it enhances professionalism and specialization among nurses, increases professional respect, accelerates the integration of practice and academia, and provides quality patient care.

Conclusions: As a result, responsible nurses see not receiving support from senior management as an obstacle during their postgraduate education process. Based on these findings, it is recommended that upper management support nurses who wish to pursue postgraduate education, that responsible nurses collaborate with universities to facilitate postgraduate education and adopt encouraging policies, and that postgraduate education programs in nursing be integrated with clinical practice.

Keywords: Education, nursing responsibility, phenomenology, postgraduate

ÖZ

Amaç: Artan nüfus ve değişen demografik yapı, bilimsel gelişmeler ve sağlık uzmanlarına yönelik artan beklenti ve ihtiyaç, hemşirelik mesleğinde yükseköğretimin önemini artırmaktadır. Sorumlu hemşirelerin lisansüstü eğitime bakış açılarını anlamak, sağlık hizmeti çıktılarını iyileştirmek için çok önemlidir. Bu çalışma, sorumlu hemşirelerin lisansüstü eğitime ilişkin görüşlerini belirlemeyi amaçlamaktadır.

Materyal ve Metot: Araştırma fenomenolojik niteliksel bir çalışma olarak tasarlanmış ve 13 servis sorumlu hemşiresi ile yürütülmüştür. Veriler yarı yapılandırılmış görüşme formu kullanılarak derinlemesine bireysel görüşmeler yoluyla toplanmış ve Colaizzi'nin yedi aşamalı analizi kullanılarak analiz edilmiştir.

Bulgular: Sekiz kategoriden oluşan dört ana tema aşağıdaki gibi belirlenmiştir: (i) "lisansüstü eğitimin gerekliliği", (ii) "lisansüstü eğitimin etkileri", (iii) "lisansüstü eğitimin katkıları" ve (iv) "lisansüstü eğitime devam etmenin önündeki engeller". Sorumlusu hemşirelerin genel olarak lisansüstü eğitimi gerekli gördükleri, hemşireler arasında profesyonelliği ve uzmanlaşmayı geliştirdiğine, mesleki saygınlığı artırdığına, uygulama ve akademi entegrasyonunu hızlandırdığına ve kaliteli hasta bakımı sağladığına inandıkları bulunmuştur.

Sonuç: Sonuç olarak, sorumlu hemşireler lisansüstü eğitim sürecinde üst yönetimden destek alamamayı bir engel olarak görmektedir. Bu bulgulara dayanarak, üst yönetimin lisansüstü eğitim almak isteyen hemşireleri desteklemesi, sorumlu hemşirelerin lisansüstü eğitimi kolaylaştırmak için üniversitelerle iş birliği yapması ve teşvik edici politikalar benimsemesi ve hemşirelikte lisansüstü eğitim programlarının klinik uygulama ile entegre edilmesi önerilmektedir.

Anahtar Kelimeler: Eğitim, fenomenoloji, mezuniyet sonrası, sorumlu hemşire

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INTRODUCTION

The development and growth of a country in terms of science and technology and the training of an educated workforce to achieve this growth significantly depend on higher education institutions. Higher education institutions play an active role in education, science, art, management, research, health service design, and economic development globally.[1] In particular, for professions that involve serving people, such as nursing, individual and professional development can only be achieved through higher education. Formal education is required to obtain the nursing title. Nursing titles vary in different countries, and the criteria for granting these titles also differ. For example, in Turkey, titles include nurse and clinical nurse specialist; in the United States, titles such as RN (Registered Nurse), LPN (Licensed Practical Nurse), and BSN (Bachelor of Science in Nursing) exist, each with different educational requirements.[2-3] The literature indicates that an increase in educational level is associated with improved patient care quality and satisfaction. Aiken et al. found that higher education levels were associated with reductions in patient fall rates, infection rates, and pressure ulcer formation rates.[3] Additionally, Şendir et al. emphasized in their study that a higher educational level contributes to providing high-quality services in clinical settings and developing skilled human resources.[4]

Recent factors such as changing population demographics, scientific advancements, and increased expectations in healthcare have led to a growing need for specialists worldwide, which suggests that there should be an increase in both undergraduate and postgraduate formal education programs in nursing.[5] Furthermore, global events such as the COVID-19 pandemic, natural disasters, wars, and economic crises have intensified the need for trained human resources, particularly experts with specialized knowledge in healthcare and nursing[6]. In this context, institutions and managers need to create the necessary infrastructure and conditions for nurses working in clinical settings to pursue postgraduate education[10]. Mainly, the supportive tendencies of those in managerial positions within institutions are crucial for the quality and reliability of the services provided.[7-8-9] Therefore, the perspectives of managers towards postgraduate education are considered to be of significant importance.[12-13]

Although there are studies investigating the views of nurses working in clinical settings on postgraduate education[10-11-12-13], no study has explicitly focused on service manager nurses, who play a key role in management and contribute to the management of education in clinical settings.

Understanding the opinions of service-responsible nurses on postgraduate education will facilitate collaboration with these key figures and help develop strategies to illuminate new educational models. This research aims to determine the views of service -responsible nurses on postgraduate education.

MATERIALS AND METHODS

Ethics Committee Approval: Ethical approval for the study was obtained before its commencement from the Non-Interventional Ethics Committee of Hatay Mustafa Kemal University (Date: 11/12/2020, decision No: 10). Additionally, approval was obtained from the institution where the study was to be conducted (Number: 14096738-108.99) and from the service-responsible nurses who agreed to participate in the study. They were provided with information about the study's purpose and how the results would be used, and their verbal and written consents (informed consent principle) were obtained. The Good Clinical Practice and Reporting Standards of Qualitative Studies of the Declaration of Helsinki conducted this study.

Study Design: The research was designed as a phenomenological qualitative study.

Limitations of Study: The study was conducted with a relatively small sample size of 13 service charge nurses, which may limit the generalizability of the findings to a larger population. The phenomenological qualitative design relies heavily on subjective data from in-depth interviews, which can introduce bias based on personal experiences and perceptions of the participants.

The research questions based on the aim of the study are as follows:

Q1: What are your views on service-responsible nurses pursuing postgraduate education?

Q2: Do you believe there are advantages or disadvantages to service-responsible nurses obtaining postgraduate education? Why?

Research Design and Participants: The sample of the study consisted of 13 nurses working as service-responsible nurses in a public hospital in Turkey's Mediterranean Region between January 10 and March 20, 2021. As a phenomenological qualitative study, there is no fixed rule regarding sample size; qualitative studies with in-depth interviews typically involve 5 to 25 participants. However, the data collection process is usually terminated when participant responses begin to become repetitive, indicating data saturation.[14] In this study, interviews were concluded after reaching data saturation with 13 individual interviews. The inclusion criteria for the study were: (a) having worked as a service-responsible nurse for at least 1 year and (b) consenting to participate in the study.

Data Collection: Data were collected using a semi-

structured interview form (Table 1) and a descriptive information form, both prepared by the researchers based on relevant literature.[14-15-16-17-18] The interview form included 10 questions about the sociodemographic characteristics of the participants and 6 open-ended non-directive questions (Table 1) to gather opinions on postgraduate education.

Information about the purpose and content of the study was provided to the nurses. The interviews were conducted in meeting rooms in the service areas, ensuring that they did not interfere with the working hours of the service-responsible nurses. Each interview was conducted individually and lasted approximately 30-35 minutes. The nurses' consent was obtained during the interviews, and their responses were recorded using a voice recorder. Notes were taken where necessary. Afterwards, the written interview reports recorded by the researchers were reviewed to verify the accuracy of the responses provided by the nurses. The data collection process was terminated if no additional information was provided by the next nurse during the interview.

Validity and Reliability Studies: Various validity and reliability studies were conducted regarding data analysis. To ensure reliability in qualitative research, participants were asked to read the transcripts of the interviews and confirm that their views were accurately represented. This approach, referred to by Lincoln and Guba as member checking, aims to ensure internal validity and reliability. Additionally, two academics experienced in qualitative research were asked to analyze the data transcribed by the researchers (coding and theme assignment). This peer debriefing process, as described by Miles and Huberman, was also conducted to enhance reliability.[21]

Statistical Analysis: Colaizzi's seven-stage descriptive phenomenological method was used to ensure a systematic analysis of the quantitative data obtained from face-to-face interviews with participants[20]. In the first stage of data analysis, audio recordings were listened to individually by the researchers, transferred to a computer, and transcribed verbatim. To ensure the accuracy of the transcriptions, the original audio recordings were reviewed again and compared with the transcriptions to finalize them. Each transcription was then imported into the MAXQDA 11 software and read again by the researchers. In the second stage, significant and relevant statements were highlighted. In the third stage, the highlighted statements were reviewed to explore their true meanings. In the fourth stage, these meanings were classified under specific theme clusters. In the fifth stage, the findings were consolidated to provide a comprehensive description of the phenomena and a detailed explanation of the findings and real-life experiences was written. In the sixth stage, the researchers condensed the detailed explanations into concise statements that they believed captured the essential aspects. In the final stage, the researchers revisited the participants to validate whether the written statements reflected their actual experiences and collected their feedback. As a result of the research, 3 themes and 8 sub-themes were identified.

RESULTS

Descriptive results are presented in Table 1.

Table 1. Sociodemographic characteristics of nurses.

Code	Age	Gender	Unit Worked	Total Years of Work	Years Worked as Responsible	Education Level
1	35	F	Internal Unit	16	10	Bachelor's
2	38	F	Surgical Unit	14	8	Bachelor's
3	40	F	Surgical Unit	17	7	Bachelor's
4	33	F	Internal Unit	12	6	Bachelor's
5	33	M	Surgical Unit	11	6	Bachelor's
6	38	M	Surgical Unit	14	2	Bachelor's
7	31	M	Internal Unit	8	3	Bachelor's
8	37	F	Internal Unit	14	3	Master's
9	35	F	Surgical Unit	10	4	Bachelor's
10	30	M	Surgical Unit	8	1	Master's
11	39	F	Internal Unit	16	9	Bachelor's
12	40	F	Surgical Unit	15	9	Bachelor's
13	45	F	Internal Unit	20	12	Bachelor's

Table 2. Themes, sub-themes, and frequencies.

Theme	Sub-Themes/Frequencies
The Necessity of Postgraduate Education	
Effects of Postgraduate Education	-Positive Effects
	- Negative Effects
Contributions to Postgraduate Education	- Individual Contributions
	-Professional Contributions
	- Institutional Contributions
Barriers to Continuing Postgraduate Education	- Individual Barriers
	- Professional Barriers
	- Institutional Barriers

As a result, four main themes with eight categories were identified as follows: (i) "The Necessity of Postgraduate Education", (ii) "Effects of Postgraduate Education", (iii) "Contributions of Postgraduate Education", and (iv) "Barriers to Continuing Postgraduate Education" Table 2.

Theme 1: The Necessity of Postgraduate Education

Most service-responsible nurses expressed that postgraduate education is necessary. Those who do not see it as necessary justify their view by believing that education does not contribute to practical application. On the other hand, those who see it as necessary stated that it would contribute to professionalization, increase knowledge level and quality, and bring prestige to the profession.

"No, even if you get a master's degree, the practices in the field remain the same; it will not make a difference." ***(H6)***

"To provide more professional care, postgraduate education and specialization are necessary. Additionally, I believe that as the number of specialists increases, the quality of the profession will improve." ***(H10)***

"I think it is essential for the professionalization of the field and that it increases prestige. Therefore, it is necessary to pursue it." ***(H11)***

Theme 2: Effects of Postgraduate Education

The analysis revealed that some service-responsible nurses believe in the positive effects of postgraduate education, while others pointed out its negative effects.

Theme 2.1. Positive Effects

Service-responsible nurses reported that postgraduate education helps in following research and developments in the field, provides specialization in the profession, increases professional productivity, and boosts personal confidence. Additionally, participants mentioned that postgraduate education contributes to the profession's prestige, offers an opportunity for career advancement, allows for scientific contributions to the development of the profession, and benefits the development of the institution.

"It initially adds prestige to your profession and also allows you to more easily follow professional developments." ***(H3)***

"It provides a professional perspective to your field, develops you and your institution, and helps you view the profession from a broader perspective." ***(H5)***

"It increases your professional capacity, allows you to view diseases and care approaches from a different perspective, and most importantly, I believe that someone who has received postgraduate education gains increased self-confidence." ***(H7)***

"It enhances your knowledge and helps you closely follow current information. If you meet the required conditions, you can also transition to an academic position and find relief." ***(H11)***

Theme 2.2. Negative Effects

Service-responsible nurses indicated that while there are no inherent negative aspects of postgraduate education, negative perceptions from others and experiences of mobbing were mentioned. Additionally, they pointed out that continuing education alongside work causes difficulties in time management, is economically burdensome, and that merely pursuing education can lead to a disconnect from the profession. They also noted that applying the knowledge gained from postgraduate education may depend on the institution's perspective.

"I believe that when you pursue a master's degree, you face mobbing from your manager and colleagues." ***(H9)***

"Managing time becomes difficult because work and study life are separate. It can sometimes cause negative impacts on your work life." ***(H10)***

"Sometimes you may not be accepted by the nurses in the field. They might exclude you because they do not want you to be a postgraduate, but the number of such nurses has decreased." ***(H13)***

Theme 3: Contributions to Postgraduate Education

Service responsible nurses expressed that postgraduate education has contributions on professional, individual, and institutional levels.

Theme 3.1. Individual Contributions

According to service-responsible nurses, the contributions of postgraduate education include enhancing knowledge and vision, providing prestige, increasing

self-confidence, achieving professional satisfaction, contributing to career development, aiding in making appropriate decisions during crises, and offering individual economic benefits.

"It adds prestige, increases your knowledge, and also adds vision." ***(H2)***

"Firstly, it will increase professional satisfaction. Additionally, I think that increasing your professional knowledge will add more prestige to you." ***(H3)***

"It helps you behave more healthily in professional crisis situations and make a difference with a different perspective." ***(H7)***

"I believe it increases self-confidence on an individual level and that a higher education level always brings benefits. I also think it develops you personally." ***(H13)***

Theme 3.2. Professional Contributions

According to service-responsible nurses, the professional contributions of postgraduate education include the integration of practice and research, professionalization or specialization in the field, increasing professional respect or prestige, supporting continuous professional development, and contributing to the scientific advancement of the profession.

"It can contribute to the professionalization of the field. Additionally, since you learn to conduct research during postgraduate education, you also contribute to the scientific aspect of the profession." ***(H2)***

"It contributes to the provision of continuous professional development." ***(H9)***

"An increase in the number of nurses with postgraduate education enhances the scientific knowledge of the profession. It will ensure the rapid adoption of current practices in the field through those with postgraduate education and provide professional expertise." ***(H13)***

Theme 3.3. Institutional Contributions

According to the participants, the institutional contributions of postgraduate education include the use of the knowledge gained in postgraduate education for the benefit of the institution. This, in turn, leads to increased quality in patient care, enhanced quality standards, and even surpassing them. Additionally, it provides the institution with different perspectives through the acquired knowledge.

"When you pursue postgraduate education, you can offer the institution different perspectives and help the institution view patient care from various angles." ***(H3)***

"If the managers are open to innovations, I believe it will contribute significantly. Patient stay durations might decrease, infection rates could drop, in short, developments beneficial to the hospital will occur." ***(H4)***

"Institutionally, it ensures that current knowledge is utilized within the institution and can significantly contribute as a change agent. Furthermore, it promotes the increase of professional approaches within the institution." ***(H13)***

Theme 4: Barriers to Continuing Postgraduate Education

Theme 4.1. Individual Barriers

According to the service charge nurses, individual barriers to continuing postgraduate education include lack of sufficient time to pursue further studies, difficulties in studying due to advanced age, lack of motivation, economic challenges, family responsibilities, and the lack of relevance of exams such as ALES (Academic Personnel and Postgraduate Education Entrance Exam) to the profession.

"Time and advanced age make it difficult to pass exams like ALES. The fact that these exams are not related to the profession is another factor that complicates things." ***(H1)***

"Financial difficulties and family life can be barriers. Age is also one of these barriers." ***(H8)***

"I think it's more beneficial for younger people to pursue it; the biggest barrier for me is my age. I can't imagine being able to allocate time. Such tasks require time, and of course, there are financial reasons too." ***(H13)***

Theme 4.2. Professional Barriers

According to the service charge nurses, professional barriers to continuing postgraduate education include the lack of widespread availability of postgraduate programs, the disconnect between education and work life, and the lack of professional recognition for postgraduate education.

"The separation between the educational process and the working process in the profession, and the lack of widespread availability of master's programs at universities." ***(H2)***

"In our country, there aren't enough master's programs in nursing. If universities don't offer these programs, you can't pursue them." ***(H7)***

"To pursue a master's degree, I need to go out of town. The program I want to pursue is not available here. I want to specialize in surgery, but unfortunately, surgical nursing master's programs are not widespread." ***(H13)***

Theme 4.3. Institutional Barriers

Institutional barriers to postgraduate education include difficulties in obtaining leave from the institution due to overlapping class and work hours, the absence of supportive policies from the institution regarding adjustments in work life, and the lack of contribution from postgraduate education to the institution.

"Doing a master's degree has neither financial nor moral value in the institution. In fact, the institution provides no support in this regard." ***(H3)***

"Issues with staff numbers in the institution, policies that do not support the educational process, and

pressures from colleagues in administrative roles." ***(H8)***
"Upper management's lack of understanding and support regarding working hours and education." ***(H10)***

DISCUSSION AND CONCLUSION

Postgraduate education is increasingly important in the field of nursing, facilitating the integration of scientific knowledge into practical application for high-quality healthcare. The need for scientifically knowledgeable specialists is growing worldwide. Literature reviews indicate that Breimaier et al. emphasized the necessity of scientific education in nursing, as highlighted by new graduate nurses.[15] Another qualitative study found that responsible nurses deemed postgraduate education necessary and supported new graduates in pursuing further education.[16] Devey Burry et al. reported similar findings, underscoring the necessity of postgraduate education in nursing and noting that nurses with postgraduate education provided better mentorship to new graduates.[17] In this study, most of the responsible nurses also consider postgraduate education to be necessary and emphasize its importance in the nursing profession. The study findings are consistent with the existing literature.

In the field of nursing, postgraduate education is known to have positive contributions, particularly in the workplace. According to the literature, Başlı and Metin proposed that postgraduate education and specialization in nursing have positive aspects, such as improving patient care quality, enhancing analytical thinking skills, and developing professional autonomy.[18] Abu-Qamar et al. found that postgraduate education positively impacts patient outcomes.[19] Additionally, Drennan et al. found that postgraduate education in nursing contributes positively to professionalization, knowledge accumulation, and professional respect.[20] Similar findings were observed in this study, indicating consistency with the literature.

It is known that postgraduate education has not only positive aspects but also negative ones. Literature on this topic indicates that, according to Nayeri et al., individuals undergoing postgraduate education experience negative aspects such as workplace mobbing and difficulties in time management, which are considered drawbacks of postgraduate education.[21] Drennan et al. found expressions from nurse managers in a qualitative study indicating that postgraduate education might lead to distancing from the profession.[19] Jeffery et al. conducted another study with nurse managers, which suggested that nurses who undergo postgraduate education are not supported by their institutions and do not advance to any career level in the field.[22] This study also found similar statements from nurse managers, aligning with the literature. It is suggested that institutions need to be more supportive in this regard. Collaboration between managers and nurses who wish to pursue postgraduate education could expedite the development of the profession and the integration of scientific knowledge into practice. Upper management must provide the necessary support to responsible nurses in this matter.

Postgraduate education in nursing is known to provide individual, institutional, and professional contributions. A study conducted by Evrenol et al. examining the contributions of postgraduate education during the COVID-19 period found that education contributes to individuals' academic knowledge and technological skill development.[23] A study by Peloso et al. emphasized that higher education develops individuals professionally and is highly significant in terms of professional prestige.[24] The effort to utilize the knowledge gained during postgraduate education for institutional benefit was also higher. Based on these findings, it can be said that postgraduate education contributes to professionalization in the field, providing quality care, enhancing knowledge and professional vision, scientific development in the profession, and professional satisfaction. Similar results were obtained in this study, which aligns with the literature.

Barriers to postgraduate education in nursing, as reviewed in the literature, include several key factors. A study by Gorczyca identified barriers to postgraduate education among nurses as time management issues, challenges in balancing work and study, overlapping work and class schedules, lack of institutional support, and lack of motivation.[25] Katz et al. evaluated standardized tests such as GMAT and GRE, which are unrelated to the field of nursing, as barriers to transitioning into postgraduate education.[26] In this study, similar statements were found where nurse managers described these entrance exams as a barrier due to their lack of relevance to the profession. Another study showed that both pursuing postgraduate education and concurrently working in an institution were considered barriers. The same study also identified difficulties in time management and the high expectations of institutions, coupled with the constant demands of postgraduate education, as barriers.[27] Similar findings were obtained in this study. As postgraduate education becomes increasingly important, institutional managers and prospective postgraduate students must collaborate. Additionally, institutions should provide flexibility for nurses wishing to pursue postgraduate education and leverage this as an opportunity for institutional goals and vision.

In conclusion, it has been determined that service-responsible nurses find postgraduate education necessary and beneficial on individual, professional,

and institutional levels, but they face various barriers. Based on these results, it is recommended that senior managers support nurses who wish to pursue postgraduate education, collaborate with universities to facilitate the education of service-responsible nurses and implement encouraging policies. Additionally, it is suggested that time management and the application of acquired professional knowledge in institutions should be addressed. To ensure that professional and quality patient care is provided within the framework of scientific knowledge, it is recommended that postgraduate education programs in nursing be integrated with clinical practice, with both theoretical and practical training delivered simultaneously in the clinic. This integration will ensure that nurses can immediately apply what they have learned in real-world settings, thereby enhancing the practical skills and knowledge of nursing staff. Additionally, effective time management strategies must be implemented to enable nurses to balance their educational pursuits with their clinical responsibilities, ensuring that neither area is neglected. These measures will not only enhance the professional development of nurses but also improve patient care outcomes and institutional efficiency.

Ethics Committee Approval: The study was approved by Hatay Mustafa Kemal University Non-Interventional Clinical Research Ethics Committee (Date: 11/12/2020, decision No: 10).

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Author Contributions: Concept − BK, SŞ; Supervision − BK, SŞ; Materials – BK; Data Collection and/or Processing − SŞ, BK; Analysis and/or Interpretation − BK, SŞ; Writing − BK, SŞ.

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REFERENCES

1. Perry AG. Nursing today. In: Potter PA, Perry AG, Stockert PA, Hall A, eds. Fundamentals of Nursing. 9th ed. Canada: Elsevier; 2016:1-15.
2. Karaman M, Karatepe HK. Hemşirelikte gelecek kaygısının kariyer iyimserliği üzerindeki etkisi. Bandırma Onyedi Eylül Üniversitesi Sağlık Bilimleri ve Araştırmaları Dergisi. 2024;6(1):32-42.
3. Aiken LH, Sloane DM, Clarke S, et al. Aungsuroch Y. Importance of work environments on hospital outcomes in nine countries. Int J Qual Health Care. 2011;23:357-364.
4. Şendir M, Çelik S, Dişsiz M, Güney R, et al. A new approach in nursing education and practice: Integration of nursing education and practice. J Adv Res Nurs. 2018;4(2):92-99.
5. Yıldız E, Karagözoğlu Ş. Ağırlıklı olarak uzaktan eğitim alan mezuniyet aşamasındaki hemşirelik öğrencilerinin mesleki hazır oluşluk ve algılanan stres düzeylerinin belirlenmesi: Tanımlayıcı çalışma. Turkiye Klinikleri J Nurs Sci. 2024;16(1): 178-186
6. Özsarı SH. Sağlık yönetimi ve sağlık eğitimi ilişkisi. Yükseköğretim Dergisi. 2013;3(1):9-11.
7. Taşocak G. Hemşirelik ve hemşirelik eğitimine genel bakış. In: Aştı T, Karadağ A, eds. Hemşirelik Esasları Hemşirelik Bilimi ve Sanatı. İstanbul: Akademi Yayıncılık; 2012:18-23.
8. Kocaman G, Arslan YH. Türkiye'de hemşirelik eğitiminin durum analizi. Yükseköğretim ve Bilim Dergisi. 2015;3:255-262. doi:10.5961/jhes.2015.127.
9. Gürsoy E, Şahin BM, Danacı B, Arı S. Hemşirelerin akademik klinik işbirliğine ilişkin görüşleri: Eskişehir örneği. Dokuz Eylül Üniversitesi Hemşirelik Fakültesi Elektronik Dergisi. 2017;10 (3):144-152.
10. Jeffries PR, Rose L, Belcher AE, Dang D, Hochuli JF, Fleischmann D, et al. A clinical academic practice partnership: A clinical education redesign. J Prof Nurs. 2013;29(3):128-136.
11. Yelekçi E, Kutlu AK. Lisansüstü eğitim alan hemşirelerin profesyonel değerlerinin almayanlarla karşılaştırılması. Sağlık ve Hemşirelik Yönetimi Dergisi. 2020;2(7):261-270.
12. Amanak K, Şeker S, Canbay FÇ, Esen E. Ebelik öğrencilerinin lisansüstü eğitim ve kariyer tercihlerinin belirlenmesi: Bir karma yöntem çalışması. Düzce Üniversitesi Sağlık Bilimleri Enstitüsü Dergisi. 2020;10(1):58-67.
13. Erol Ö. Hemşirelik alanında lisansüstü eğitim alan öğrencilerin akademik başarı durumları ve etkileyen faktörler. Yükseköğretim ve Bilim Dergisi. 2020;10(3):608-614.
14. Joseph ML. Innovativeness in nursing: A phenomenological and constructivist study. Capella University, İnstitute Of Health Sciences, Doctoral thesis, Minneapolis, USA. 2007.
15. Breimaier HE, Halfens RJ, Lohrmann C. Nurses' wishes, knowledge, attitudes and perceived barriers on implementing research findings into practice among graduate nurses in Austria. J Clin Nurs. 2011;20(11-12):1744-1756.
16. Karaman S, Bakırcı F. Türkiye'de lisansüstü eğitim: Sorunlar ve çözüm önerileri. Sosyal Bilimler Araştırmaları Dergisi. 2010;5(2):94-114.
17. Devey Burry R, Stacey D, Backman C, Donia MBL, Lalonde M. Exploring pairing of new graduate nurses with mentors: An interpretive descriptive study. J Clin Nurs. 2020;29(15-16):2897-2906. doi:10.1111/jocn.15360
18. Başlı M, Metin T. Hemşirelikte önemli bir kavram: Hemşirelikte uzmanlık ve ülkemizdeki mevcut durumu. Genel Sağlık Bilimleri Dergisi. 2022;4(2):187-196.
19. Abu-Qamar MZ, Vafeas C, Ewens B, Ghosh M,

Sundin D. Postgraduate nurse education and the implications for nurse and patient outcomes: A systematic review. Nurse Education Today. 2020;92:104489. doi:10.1016/j.nedt.2020.104489
20. Drennan J, Hyde A. The fragmented discourse of the 'knowledgeable doer': Nursing academics' and nurse managers' perspectives on a master's education for nurses. Adv Health Sci Educ. 2009;14:173-186. doi:10.1007/s10459-008-9102-x
21. Nayeri ND, Shariat E, Tayebi Z, Ghorbanzadeh M. Challenges of postgraduate critical care nursing program in Iran. Med J Islam Repub Iran. 2017;31:1-7.
22. Jeffery J, Rogers S, Redley B, Searby A. Nurse manager support of graduate nurse development of work readiness: An integrative review. J Clin Nurs. 2023;32:5712-5736. doi:10.1111/jocn.16694
23. Evrenol Öçal S, Akbıyık A, Işık G, Egelioğlu Cetişli N, Tokem Y. COVID-19 pandemisi sürecinde hemşirelik lisans öğrencilerinin uzaktan eğitime yönelik deneyimleri. JOHUFON. 2024;11(1):8-18.
24. Peloso RM, Ferruzzi F, Mori AA, Camacho DP, Franzin LC da S, Margioto Teston AP, et al. Notes from the field: Concerns of health-related higher education students in Brazil pertaining to distance learning during the coronavirus pandemic. Eval Health Prof. 2020;43(3):201-203.
25. Gorczyca C. Factors influencing the pursuit of graduate education in registered nurses: Exploring the motivators and barriers. University of British Columbia, İnstitute Of Health Sciences, Doctoral thesis. Colombia, England. 2013.
26. Katz JY, Chow C, Motzer SA, Susan LW. The Graduate Record Examination: Help or hindrance in nursing graduate school admissions? J Prof Nurs. 2009;25(6):369-372. doi:10.1016/j.profnurs.2009.04.002
27. Morrow R, Rodriguez A, King N. Colaizzi's descriptive phenomenological method. The Psychologist. 2015;28(8):643-644.

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Is the Systemic Immune-Inflammation Index Associated with the Prognosis and Severity of Bell's Palsy?

Sistemik İmmün-İnflamasyon İndeksi, Bell Palsinin Prognozu ve Şiddeti ile İlişkili mi?

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ABSTRACT

Objective: To investigate the effect of newly defined systemic immune-inflammation index levels on the diagnosis, prognosis, and severity of Bell's palsy.

Materials and Methods: The study group was formed from patients diagnosed with Bell's palsy. Calculated ratios with the data obtained from the complete blood count examinations taken before the treatment were statistically investigated for the diagnosis, prognosis, and severity of the disease.

Results: We did not determine any statistically significant correlation between the determined facial paralysis stages and the investigated ratios. Similarly, there was no correlation between the first and sixth-month recovery rates of the study group and the investigated parameters ($p>0.05$). In addition, differences in parameters between the control and study groups were not statistically significant.

Conclusions: The results of the presented study contain differences from the current literature. In addition, it provides new information about the effect of the systemic immune-inflammation index on the prognosis of Bell's palsy. Considering the outcomes of research on hematological parameters is important, as various factors can impact them.

Keywords: Bell's palsy, ınflammation, lymphocytes, neutrophils, platelets

ÖZ

Amaç: Yeni tanımlanan sistemik immün-inflamasyon indeksi seviyelerinin Bell paralizisinin tanı, prognoz ve şiddeti üzerindeki etkisini araştırmak.

Materyal ve Metot: Çalışma grubu, Bell paralizisi tanısı konan hastalardan oluşturuldu. Tedavi öncesi alınan tam kan sayımı verileri ile hesaplanan oranlar, hastalığın tanı, prognoz ve şiddeti açısından istatistiksel olarak incelendi.

Bulgular: Belirlenen fasial paralizi evreleri ile araştırılan oranlar arasında istatistiksel olarak anlamlı bir korelasyon tespit edilmedi. Benzer şekilde, çalışma grubunun birinci ve altıncı ay iyileşme oranları ile incelenen parametreler arasında bir ilişki bulunmadı ($p>0,05$). Ayrıca, kontrol ve çalışma grubu arasındaki parametre farklılıkları da istatistiksel olarak anlamlı değildi.

Sonuç: Sunulan çalışmanın sonuçları mevcut literatürden farklılıklar içermektedir. Ayrıca, sistemik immün-inflamasyon indeksinin Bell paralizisinin prognozu üzerindeki etkisi hakkında yeni bilgiler sağlamaktadır. Bu hematolojik parametreler üzerinde yapılan araştırma sonuçlarının çeşitli faktörlerden etkilenebileceği göz önünde bulundurulmalıdır.

Anahtar Kelimeler: Bell palsi, inflamasyon, lenfositler, nötrofiller, trombositler

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INTRODUCTION

Bell's palsy is the most common type of acute onset peripheral facial paralysis, and the patients' symptoms can vary from mild to severe according to the degree of neural damage and the localization of the lesion. To diagnose Bell's palsy, it's essential to exclude other causes of peripheral facial paralysis. While the exact etiology of the disease remains unclear, it is understood that inflammation plays a crucial role in the physiopathological process. Inflammatory reactions against the myelin sheath of the peripheral nerves are suggested as a pathogenetic reason by many authors.[1] The efficacy of corticosteroids in the treatment also supports this theory.[2]

Parameters derived from complete blood count data, such as neutrophil-lymphocyte ratio (NLR) and platelet lymphocyte ratio (PLR), are commonly studied in the current literature for if they can be used to predict the prognosis of diseases associated with chronic inflammation.[3,4] A new hematologic parameter named systemic Immune-inflammatory Index (SII) calculated with platelet, neutrophil, and lymphocyte counts have also been studied on this subject and concluded that the SII could be beneficial in patients with sudden hearing loss and Bell's palsy.[5,6]

The present study aimed to examine the relationship between the rate of SII and the prognosis of Bell's palsy by evaluating the recovery results after Bell's palsy treatment and investigating the relationship between disease severity and SII. Both of the objectives are investigated for the first time in the literature.

MATERIALS AND METHODS

Ethical Status of the Study: Our study was approved by the Sakarya University Ethical Committee (Date: 12.02.2021; Decision No: 84). The research protocol was created by the ethical principles established by the Declaration of Helsinki and laws and regulations in our country.

Study group: Patients who applied to our clinic with the complaint of peripheral facial paralysis and were diagnosed with Bell's palsy, treated, and followed up between January 2015 and January 2021 were included in the study. A control group was formed from a total of 125 healthy volunteers with demographically similar characteristics. Each participant was informed about the study, and consent forms were duly signed and obtained.

Pathologies in the middle ear, mastoid bone and parotid region, history of otitis media, skin rash, arthralgia, history of trauma, history of surgery and drug use, neurological diseases and serologically detected microbial conditions, high-risk cardiac group (myocardial infarction, valve disease, decompensated heart failure), acute viral or bacterial infection, autoimmune disease, hypertension, diabetes mellitus, hematological malignancy (lymphoproliferative, myeloproliferative diseases, sickle cell anemia, coagulopathies) and patients with malignities were accepted as exclusion criteria. The brain stem, cerebellopontine corner, ear, and parotid lesions were excluded by performing MRI and audiological examinations on each patient participating in the study. The patients' facial palsy grades were staged by using the House-Brackmann classification scale.

Blood Cell Analysis and Clinical Ratios: Peripheral venous blood samples were evaluated by using Cell-Dyn 3700 SL (Abbott Diagnostics, Chicago, Illinois, USA) automated hematology analyzer device before treatment. Neutrophil, lymphocyte, and thrombocyte counts were recorded. By using these data, the SII was calculated by multiplying the platelet count by the neutrophil count and dividing them by the lymphocyte count. NLR and PLR were calculated as described in the literature. The first and sixth-month facial paralysis degrees of the patients treated with systemic methylprednisolone (1mg/kg) were determined. Patients with full recovery were statistically compared with the group of patients with partial or no recovery.

Statistical Method: Statistical evaluation was conducted using the IBM SPSS version 20.0 statistical software program for Windows (IBM Corporation, Armonk, New York, United States of America). Continuous variables were presented as mean ± standard deviation, and categorical variables as percentages. The Kolmogorov-Smirnov test determined normality, guiding the selection of non-parametric tests for other analyses. Mann-Whitney U test and Kruskal Wallis test were used for pairwise comparisons, P values less than 0.05 were considered statistically significant.

RESULTS

Between January 2015 and January 2021, a total of 223 patients with peripheral-type facial paralysis were admitted to our clinic. Twenty-nine of these patients were excluded due to a lack of data. The diagnosis of Bell's palsy was excluded because five patients had an additional neurological disease, and one patient had a cerebellopontine angle tumor. It was decided to exclude from the study sixty patients because of comorbidities and six patients because of pregnancy. At the end of this process, 122 Bell's palsy patients who met the inclusion criteria were included in the study. The mean age of the study group was 37.8±16.2 years, while that of the control group was 38.8±16.3. The male-to-female ratio was 65/57 in the study group and 66/59 in the control group. When the groups were compared in terms of

gender and age with Ki-square and Mann-Whitney U tests, no difference was observed with either analysis for age and gender (p=0.940; p= 0.534). When the patients were classified according to the severity of facial paralysis, 13.9% of them were grade 2, 41% were grade 3, 36.1% were grade 4, 7.4% were grade 5, and 1.6% were grade 6 patients (Figure 1). All of the patients were treated with 1mg/kg/day oral methylprednisolone. This treatment regime was terminated by reducing the dose by halving at 3-day intervals.

At the end of the first month, 71.2% of the patients had a full recovery by decreasing to House-Brackmann grade 1, 26.2% of the patients had partial recovery, and the rest of the patients had no recovery 2.6%. No statistically significant difference was observed in terms of NLR, PLR, and SII rates for the first month's recovery results (p=0.524; 0.388; 0.394) (Table 1).

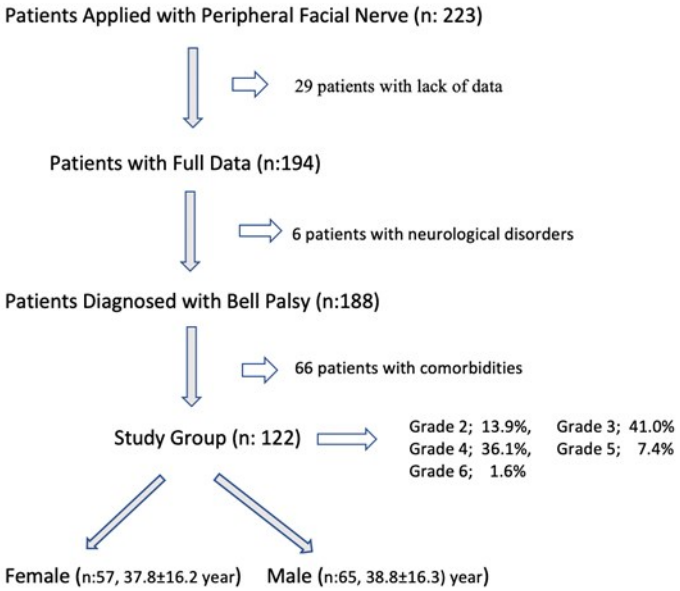

Figure 1. Creation of the study group.

Table 1. Comparison of the parameters in terms of the first month's recovery rates.

	Patients with full recovery (71.2%)			Patients with partial (26.2%) / no recovery (2.6%)			p-value
	25th percentile	Median	75th percentile	25th percentile	Median	75th percentile	
Neutrophil	2.35	4.36	5.29	3.51	5.27	6.57	0.100
Lymphocyte	1.62	2.55	3.24	1.92	2.47	3.38	0.604
Platelet	210	238	295	206	274	314	0.469
NLR	1.19	1.61	2.44	1.2	2.02	2.61	0.524
PLR	73.5	102	147	75.6	92.1	117.1	0.388
SII	273.94	394.56	615.53	316.18	528.30	666.47	0.394

NLR: Neutrophil-to-lymphocyte ratio; PLR: Platelet-to-lymphocyte ratio; SII: Systemic Immune-Inflammatory Index.

In the sixth-month evaluation, 90.2% of the patients had fully recovered, achieving a House-Brackmann grade of 1. While partial improvement was observed in 8.2% of the patients, there was no improvement in 1.6% of them. In the sixth month results, there was no statistically significant difference between the groups formed according to treatment response in the comparison of investigated parameters like the first month's results (p=0.770; 0.288; 0.857) (Table 2).

The study group was subgrouped according to the House-Brackman stages and statistically compared in multiple group comparison tests; no statistically significant difference was observed at any of the parameters (p=0.235; 0.241; 0.351) (Table 3).

Comparing the patients in the control and study groups in terms of PLR, NLR, and SII showed no statistically significant difference in any of the parameters (p=0.248; 0.977; 0.360) (Table 4).

Table 2. Comparison of the parameters in terms of the sixth month's recovery rates.

	Patients with full recovery (90.2%)			**Patients with partial (8.2%) / no recovery (1.6%)**			**p-value**
	25th percentile	**Median**	**75th percentile**	**25th percentile**	**Median**	**75th percentile**	
Neutrophil	3.12	4.47	5.61	3.81	4.97	6.81	0.310
Lymphocyte	1.75	2.43	3.32	1.79	2.89	3.62	0.680
Platelet	206.0	242.0	299.2	213.5	244.5	287.0	0.949
NLR	1.21	1.67	2.58	1.38	1.83	2.39	0.770
PLR	75.27	100.54	414.78	61.43	81.95	130.01	0.288
SII	298.30	414.78	635.39	288.00	410.67	600.39	0.857

NLR: Neutrophil-to-lymphocyte ratio; PLR: Platelet-to-lymphocyte ratio; SII: Systemic Immune-Inflammatory Index.

Table 3. Comparison of the parameters in terms of initial House-Brackmann stages.

	Grade 2 Median (25-75) n:17	**Grade 3 Median (25-75) n:50**	**Grade 4 Median (25-75) n:44**	**Grade 5-6* Median (25-75) n:11**	**p-value**
NLR	1.42 (0.8-3.1)	1.85 (1.3-2.4)	1.78 (1.2-2.7)	1.35 (0.1-1.7)	0.235
PLR	102.3 (71.4-160.7)	100.5 (76.8-152.3)	104.3 (74.1-136.4)	76.7 (69.4-92.0)	0.241
SII	410.6 (216.3-769.7)	441.4 (299.8-610.3)	456.6 (317.1-669.1)	337.7 (38.4-536.8)	0.351

NLR: Neutrophil-to-lymphocyte ratio; PLR: Platelet-to-lymphocyte ratio; SII: Systemic Immune-Inflammatory Index; *: Grades 5 and 6 were combined since grades 6 had only 2 individuals.

Table 4. Comparison of the parameters between the study and control group.

	Study Group			**Control Group**			**p-value**
	25th percentile	Median	75th percentile	25th percentile	Median	75th percentile	
Neutrophil	3.07	3.9	5.35	3.15	4.56	5.68	0.205
Lymphocyte	2.09	2.50	2.85	1.75	2.51	3.33	0.957
Platelet	218.0	254.0	291.0	209.2	242.0	298.2	0.502
NLR	1.25	1.61	2.08	1.24	1.68	2.47	0.248
PLR	81.4	101.9	128.7	74.0	100.4	137.3	0.977
SII	280.33	390.21	554.40	298.30	414.78	621.01	0.360

NLR: Neutrophil-to-lymphocyte ratio; PLR: Platelet-to-lymphocyte ratio; SII: Systemic Immune-Inflammatory Index.

DISCUSSION AND CONCLUSION

Studies examining the etiology of Bell's palsy draw attention to the viral infections, anatomical causes, theories related to ischemia, exposure to cold and immune-inflammatory theories.[7] Regardless of the etiological factors, inflammation, which is the main pathophysiological result, occurs in the facial nerve, and the compression of the nerve in a narrow canal leads to clinical symptoms. So, biomarkers that are related to inflammation have always been a necessity in this regard. A literature review on this subject shows that biological markers that can be associated with both the severity and prognosis of facial paralysis are tried to be determined. In this regard, it has been reported in previous studies that IL-6, IL-8 TNF-a, and CRP levels are higher in Bell's palsy patients than in controls.[8,9]

Another biomarker examined in this regard is the neutrophil-lymphocyte ratio (NLR), which can be easily obtained with complete blood count values, and studied in many diseases with inflammatory etiology, including cardiological and oncological diseases. Similarly, there are many studies examining the relationship between Bell's palsy and NLR. According to a meta-analysis of seven articles, including 791 patients in total, NLR rates were found to be higher in patients with Bell's palsy than in controls.[3] A few studies examining the relationship between NLR rates and prognosis concluded that high NLR values were associated with poor prognosis.[10-12] According to the results of our study, it was observed that there was no difference between the control and Bell's palsy groups in terms of NLR rates. In addition, when the study group was evaluated in terms of recovery rates, no statistically significant difference was observed in the recovery results of both the first month and the sixth month. These results differ from the published literature.

PLR, another indicator of ischemia and inflammation, is among the parameters used to show the inflammation observed in Bell's palsy cases, similar to NLR.[13] When the studies on this subject are examined, in the article written by Atan et al., although PLR was found to be statistically higher in the Bell's palsy group than the control group, no correlation was found with the degree of Bell's palsy.[14] Similarly, in the study of Kim et al., higher PLR values were found when they were compared to the control group, and it was emphasized that high PLR values were associated with poor prognosis. However, there was no correlation between the degree of facial paralysis and PLR.[15] In the study of Kınar et al. and the meta-analysis results of Oya et al., no statistically significant difference was observed between the healthy control group and the Bell's palsy groups in terms of PLR values.[3,6] The results of our study also support the lack of a diagnostic and prognostic correlation between PLR and Bell's palsy.

In recent years, SII has been used as a new biomarker for inflammatory diseases. Most of the studies on this subject have been done with patients diagnosed with malignancies.[16-19] Atasever et al. also examined SII biomarkers in patients diagnosed with laryngeal carcinoma. They reported a statistically significant relationship between SII and lymphovascular invasion.[20] There is only one study in the literature in which Bell's Palsy and SII were studied.[6] In this study, Kınar et al. emphasized that the SII was statistically significantly higher in the Bell's palsy patient group than in the control group, which would make a diagnostic contribution.[6] Similar results were not observed in our study. Although minimally higher values were observed in NLR and SII values compared to the control group, the difference was not statistically significant. In addition, in our study, SII and Bell's palsy severity and treatment response rates were compared statistically for the first time in the literature, and no statistically significant difference was observed.

Considering that many new diseases and conditions can affect the inflammatory parameters mentioned in current studies continue to be identified, many different diseases were determined as exclusion criteria in our study; unfortunately, it is impossible to create groups with completely identical characteristics. This situation constitutes the most critical study limitation, as in similar studies in the literature.

In conclusion, there is no clear consensus on the relationship between the investigated parameters and Bell's palsy. The presented study results also contain differences from the literature both in terms of NLR and PLR and for SII, a new inflammation marker. We think that it will be beneficial to continue to carry out objective studies on this subject.

Ethics Committee Approval: Our study was approved by the Sakarya University Ethics Committee (Date: 12.02.2021, decision no: 84). The study was carried out following the international declaration, guidelines, etc.

Conflict of Interest: No conflict of interest was declared by the authors.

Author Contributions: Concept – AK; Supervision – AK; Materials – AK, HE; Data Collection and/or Processing – AK, HE; Analysis and/or Interpretation – AK, HE; Writing – AK, HE.

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REFERENCES

1. Stjernquist-Desatnik A, Skoog E, Aurelius E. Detection of herpes simplex and varicella-zoster

viruses in patients with Bell's palsy by the polymerase chain reaction technique. Ann Otol Rhinol Laryngol. 2006;115(4):306-311. doi:10.1177/000348940611500410
2. Lagalla G, Logullo F, Di Bella P, Provinciali L, Ceravolo MG. Influence of early high-dose steroid treatment on Bell's palsy evolution. Neurol Sci. 2002;23(3):107-112. doi:10.1007/s100720200035
3. Oya R, Takenaka Y, Imai T, et al. Neutrophil-to-Lymphocyte Ratio and Platelet-to-Lymphocyte Ratio as Prognostic Hematologic Markers of Bell's Palsy: A Meta-analysis. Otol Neurotol. 2019;40(5):681-687. doi:10.1097/MAO.0000000000002166
4. Ulu S, Ulu MS, Bucak A, Ahsen A, Yucedag F, Aycicek A. Neutrophil-to-lymphocyte ratio as a new, quick, and reliable indicator for predicting diagnosis and prognosis of idiopathic sudden sensorineural hearing loss. Otol Neurotol. 2013;34(8):1400-1404. doi:10.1097/MAO.0b013e31829b57df
5. Kumbul YÇ, Yasan H, Tüz M, Okur E, Sivrice ME, Büyükçelik B. Prognostic Evaluation of Systemic Immune Inflammation Index in Sudden Idiopathic Sensorineural Hearing Loss. SDÜ Tıp Fakültesi Dergisi. 2020;27(4):455-461. doi.org/10.17343/sdutfd.742573
6. Kınar A, Ulu Ş, Bucak A, Kazan E. Can the Systemic Immune-Inflammation Index (SII) be a prognostic factor of Bell's palsy patients? Neurol Sci. 2021;42(8):3197-3201. doi:10.1007/s10072-020-04921-5
7. Zhang W, Xu L, Luo T, Wu F, Zhao B, Li X. The etiology of Bell's palsy: a review. J Neurol. 2020;267(7):1896-1905. doi:10.1007/s00415-019-09282-4
8. Yilmaz M, Tarakcioglu M, Bayazit N, Bayazit YA, Namiduru M, Kanlikama M. Serum cytokine levels in Bell's palsy. J Neurol Sci. 2002;197(1-2):69-72. doi:10.1016/s0022-510x(02)00049-7
9. Cayir S, Hizli O, Kayabasi S. Is C-reactive protein to albumin ratio an indicator of poor prognosis in Bell's palsy? Eur Arch Otorhinolaryngol. 2020;277(1):115-119. doi:10.1007/s00405-019-05691-3
10. Bucak A, Ulu S, Oruc S, et al. Neutrophil-to-lymphocyte ratio as a novel-potential marker for predicting prognosis of Bell palsy. Laryngoscope. 2014;124(7):1678-1681. doi:10.1002/lary.24551
11. Kiliçkaya MM, Tuz M, Yariktaş M, Yasan H, Aynalı G, Bagci Ö. The Importance of the Neutrophil-Lymphocyte Ratio in Patients with Idiopathic Peripheral Facial Palsy. Int J Otolaryngol. 2015;2015:981950. doi:10.1155/2015/981950
12. Wasano K, Kawasaki T, Yamamoto S, et al. Pretreatment Hematologic Findings as Novel Predictive Markers for Facial Palsy Prognosis. Otolaryngol Head Neck Surg. 2016;155(4):581-587. doi:10.1177/0194599816646552
13. Sahin C, Varım C. Neutrophil to Lymphocyte Ratio, Platelet to Lymphocyte Ratio, Mean Platelet Volume and Red Cell Distribution Width Measures in Bells Palsy. Open Access Maced J Med Sci. 2017;5(1):14-18. doi:10.3889/oamjms.2017.007
14. Atan D, İkincioğulları A, Köseoğlu S, et al. New Predictive Parameters of Bell's Palsy: Neutrophil to Lymphocyte Ratio and Platelet to Lymphocyte Ratio. Balkan Med J. 2015;32(2):167-170. doi:10.5152/balkanmedj.2015.15456
15. Kim DH, Oh JH, Kim J, Cho CH, Lee JH. Predictive Values of Neutrophil-to-Lymphocyte Ratio, Platelet-to-Lymphocyte Ratio, and Other Prognostic Factors in Pediatric Patients With Bell's Palsy. Ear Nose Throat J. 2021;100(10):720-725. doi:10.1177/0145561320922097
16. Hu B, Yang XR, Xu Y, et al. Systemic immune-inflammation index predicts prognosis of patients after curative resection for hepatocellular carcinoma. Clin Cancer Res. 2014;20(23):6212-6222. doi:10.1158/1078-0432.CCR-14-0442
17. Geng Y, Shao Y, Zhu D, et al. Systemic Immune-Inflammation Index Predicts Prognosis of Patients with Esophageal Squamous Cell Carcinoma: A Propensity Score-matched Analysis. Sci Rep. 2016;6:39482. Published 2016 Dec 21. doi:10.1038/srep39482
18. Jiang W, Chen Y, Huang J, et al. Systemic immune-inflammation index predicts the clinical outcome in patients with nasopharyngeal carcinoma: a propensity score-matched analysis. Oncotarget. 2017;8(39):66075-66086. Published 2017 Aug 2. doi:10.18632/oncotarget.19796
19. Eltohami YI, Kao HK, Lao WW, et al. The Prediction Value of the Systemic Inflammation Score for Oral Cavity Squamous Cell Carcinoma. Otolaryngol Head Neck Surg. 2018;158(6):1042-1050. doi:10.1177/0194599817751678
20. Atasever Akkas E, Yucel B. Prognostic value of systemic ımmune ınflammation ındex in patients with laryngeal cancer. Eur Arch Otorhinolaryngol. 2021;278(6):1945-1955. doi:10.1007/s00405-021-06798-2

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Special Care Dentistry: A Challenge to the Profession

Özel Bakım Diş Hekimliği: Mesleğin Karşılaştığı Zorluklar

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ABSTRACT
Special healthcare needs (SHCN) can be developmental, congenital or acquired through trauma, disease or environmental causes, which may limit activities related to daily self-maintenance. Approximately 1 billion people (15% of the population globally) have some disability or special need. Among the dental diseases, dental caries is the most common issue across various disability groups, having a prevalence rate between 27.55% to 91.90% globally, along with poor periodontal health (23.9% - 97%) and Traumatic dental injuries (12.1%-40%). Due to challenges of limited access, financial constraints, lack of trained dental professionals and insufficient awareness about oral health, children's dental problems go undetected, causing a substantial unmet demand for dental treatment later in adulthood. By increasing access to appropriate healthcare facilities, providing dentists with specialized training, and continually implementing new treatment methods, special children can be empowered to receive the dental care they deserve.
Keywords: Autism spectrum disorder, children with special healthcare needs, dental caries, intellectual and physical disabilities, oral health

ÖZ
Özel sağlık bakımı ihtiyaçları (ÖSBİ) gelişimsel, doğuştan veya travma, hastalık veya çevresel nedenlerle edinilmiş olabilir ve günlük öz bakımla ilgili aktiviteleri sınırlayabilir. Yaklaşık 1 milyar kişi (küresel nüfusun %15'i) bir miktar engelli veya özel ihtiyaç sahibidir. Diş çürükleri, çeşitli engellilik grupları arasında en yaygın sorundur ve küresel olarak %27,55 ile %91,90 arasında bir yaygınlık oranına sahiptir, ayrıca zayıf periodontal sağlık (%23,9- %97) ve travmatik diş yaralanmaları (%12,1- %40) ile birlikte görülür. Sınırlı erişim, finansal kısıtlamalar, eğitimli diş hekimlerinin eksikliği ve ağız sağlığı konusunda yetersiz farkındalık zorlukları nedeniyle çocukların diş sorunları tespit edilememekte ve yetişkinlikte diş tedavisi için önemli bir karşılanmamış talebe neden olmaktadır. Uygun sağlık tesislerine erişimi artırarak, diş hekimlerine özel eğitim sağlayarak ve sürekli yeni tedavi yöntemleri uygulayarak, özel çocuklar hak ettikleri diş bakımını almaları için güçlendirilebilir.
Anahtar Kelimeler: Ağız sağlığı, diş çürükleri, otizm spektrum bozukluğu, özel sağlık bakımına ihtiyaç duyan çocuklar, zihinsel ve fiziksel engelliler

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INTRODUCTION

Special healthcare needs (SHCN) involve "any physical, developmental, mental, sensory, behavioral, cognitive or emotional impairment or limiting condition that requires medical management, healthcare intervention or specialized services or programs.[1] The condition can be developmental, congenital or acquired through trauma, disease or environmental causes, which may limit activities related to daily self-maintenance or a major life activity. [2]Approximately 1 billion people, i.e. 15% of the global population, have some form of disability or special needs.[3] Based on a recent systematic review,[4] the Global Burden of Disease (GBD) estimate for Autism Spectrum Disorder (ASD) is around 0.4 % globally and a prevalence of 0.7% for higher-income countries. In India, the combined prevalence of autism varies from 14/10,000 to 12/10,000 in the rural to the urban population.[5] This is much lower than the figures of the United States (US) and the United Kingdom (UK). Another systematic review of the South Asian region (Bangladesh, India, Sri Lanka) reported prevalence rates of 0.09% to 1.07% for children in the 0- 17 age group.[6] ASD is the most common comorbidity, which is also associated with seizures and intellectual disability. Globally, 8.1 million children under five years old, or 1.2% of that demographic, are impacted by cerebral palsy (CP), while approximately 16.1 million, or 2.4%, experience intellectual disabilities. Most of these children

(about 98%) belong to low-income and middle-income countries (LMICs),[7] whereas the prevalence rate in high-income countries is just 0.6%.[3] The combined cerebral palsy prevalence in India is 2.95 / 1000 children.[8] According to a WHO report,[9] the global incidence of Down's syndrome is 1 in 1000-1100 live births. Based on the literature, 37,000 children with Down's syndrome are born annually in India, with an incidence of 1.4 in 1000 live births.[10] The GBD global estimate for intellectual disabilities is 3.1% and 0.7 % for epilepsy, while for attention-deficit hyperactivity disorder, it is 1.9% for children aged 0- 19 years. The prevalence of epilepsy varies from 3.2 to 5.5 per 1,000 children in developed countries to 3.6 to 44 per 1,000 in developing or underdeveloped countries.[11] Reports also suggest that 4% and 1.3% of the global population suffer from hearing and vision loss, respectively, and 7.1 % of the population suffers from developmental dyslexia.[3] Globally,1.4 million children below the age of 16 years have been reported to be visually impaired, of which about 75% belong to developing countries. Studies estimate the prevalence of blindness in children to be 0.3/1000 in developed countries and 1.5/1000 in developing countries.[12]

Meeting the oral health needs of these groups necessitates tailored interventions and specialized dental care services for this section of the population. Prolonged neglect of these oral issues can escalate into systemic complications. Enhancing dental care accessibility, bolstering awareness initiatives, and providing regular dental check-ups can be pivotal in mitigating and managing dental caries in this vulnerable population. This article reviews the literature on oral health issues in various groups of Special Children and explores the barriers to receiving oral health care. This paper also discusses the need to create a dental healthcare delivery system that is handicapped-inclusive so that individuals with disabilities may receive the dental attention they deserve.

METHODOLOGY

This article is a review study with the editor's invitation. Ethics committee approval is not required. The collection of statistical data is essential for improving oral well-being and quality of life in a population with special needs. Also, such data will aid in spotting vulnerable members in a community, establishing their dental requirements, developing preventive and remedial strategies, and tracking the improvement and fulfilment of their dental needs over time.[13] With this objective, dental literature was searched using databases like Pubmed, Scopus, and Web of Science. Studies related to dental caries, gingival or periodontal diseases, dental trauma, and malocclusion in "Children with Special Healthcare Needs (CSHCN)" were included. The broad-based search was performed individually with keywords: Dental Caries OR Dental trauma OR Early childhood Caries (ECC) OR Gingivitis OR Periodontal diseases OR Malocclusion, with the Boolean tool AND was done with the above keywords individually with the term "Special Healthcare Needs (SHCN)," in different possible combinations. We included epidemiological studies only in the English language till 2021. The prevalence of different oral diseases in various special groups has been summarised in Table 1.

Table 1. Dental issues in children with special healthcare needs.

Author/ Country	Special Health Group	Oral health problems	Prevalence
Brown et al.;[14] Saudi Arabia	Medically compromised	Dental Caries	Prevalence of caries was 91.90%; Mean DMFT Score was 9.91.
Roberts et al.;[15] Johannesburg, South Africa	Cerebral palsy, hearing, mental disabilities, Intellectually disabled	Dental Caries	Prevalence of caries 27.55% and 33.56% in the primary and permanent dentition, respectively; Mean DMFT Score was 3.58 & 3.85 in age groups of 4 -5 and 6 in hearing impairment group.
Ameer et al.;[16] Nalgonda, South India	Visually impaired, deaf and dumb, intellectually disabled, physically challenged	Dental Caries Oral Hygiene Periodontal status	Intellectually disabled group -highest plaque scores. Visually impaired and deaf and dumb -better oral hygiene compared with other disability groups. Individuals with physical disabilities exhibited higher loss of attachment scores and harmful parafunctional habits.
Anaise et al.;[17] Israel	Visually impaired	Periodontal and oral hygiene status	Visually impaired students showed a "*fair-to-poor level*" of oral hygiene (according to Greene & Vermil-

*DMFT: Decayed missing and filled teeth; TDI: Traumatic dental injuries.

Table 1. Continue.

Zahrakhanom Hashemi et al.;[18] Iran	Most frequent group of disability - mentally retarded	Caries experience, oral hygiene status, periodontal health	Mean DMFT score was 5.14. 90% of special children had gingival inflammation. No significant (P = 0.34) difference was found between caries experiences of different disabled groups.
Manish Jain et al.;[19] Udaipur, India	Hearing impairment	Dental Caries	Mean DMFT score was 2.61; High prevalence (83.92%) of decayed teeth
Venugopal K Reddy et al.;[20] Central India	Hearing impaired; visually impaired	Dental Caries Oral Hygiene Status	Mean OHI(S) score for Hearing and impaired group was 1.15 ± 0.72 while it was 1.51 ± 0.93 for the visually impaired children (P < 0.05) Mean DMFT scores among the hearing impaired and visually impaired groups were 1.4 ± 1.95 and 0.94 ± 1.45, respectively.
Singh et al.;[21] Rajasthan, India	hearing impaired visually impaired	Dental Caries Oral hygiene status	Mean DMFT scores in the deaf children and visually impaired children were:2.1 and 2.3, and DMFT values were:1.3 and 1.87 Oral hygiene status scores in visually impaired children and deaf children, respectively, were as follows: Good Category- 0.14 and 0.1; Fair category- 0.04 and 0.02; poor category - 0.22 and 0.33.
L Shaw et al.;[22] Birmingham, UK	Different types of handicapping condition, including mental retardation	Oral hygiene status; Periodontal treatment needs; Dental caries	Poorer levels of oral hygiene in special children (7%) as compared to normal children (3%); DMFT higher (1.85) in special school children in comparison to normal children (1.44);51% of the special children were in need of oral prophylaxis in comparison to 29 % of normal children
Bennadi et al.;[23] Mysore, India	Mentally disabled children	Oral hygiene status	Majority of children (36.73%) reported poor oral hygiene in comparison to normal children (9.18%)
Purohit et al.;[13] South India	SHCN	Dental caries, Malocclusion, Periodontal status	Higher prevalence of caries (89.1%), malocclusion (66.4%) and poorer periodontal status among special children as compared to the healthy control group.
Altun et al.;[24] Turkey	Mental Retardation, Autistic Disorder, Down Syndrome, Cerebral Palsy, Other	Dental Caries	Autistic children were found to maintain the best oral hygiene, and those children with mental retardation (MR) reported the poorest oral hygiene. Overall mean DMFT and DMFT scores: 1.18±2.11 and 1.58±2.72, respectively.
Khursheed et al.;[25] Mathura, India	Deaf and Dumb, Mentally retarded (MR), Down's syndrome, Learning disability, Complex group (Children who have multiple handicapping conditions or disabilities.)	Dental Caries; Oral hygiene status	Down's syndrome: highest prevalence of dental caries and poorest oral hygiene recorded on the Oral Hygiene -Simplified Index (OHI-S) as compared to other groups Mean DMFT Score: highest for Down's syndrome.
Gadiyar et al.;[26] Goa, India	SHCN	Dental Caries	Prevalence of caries - 68.60% DMFT for permanent dentition and primary dentition was 2.83 ± 3.23 and 0.35 ± 1.00, respectively
Prasad et al.;[27] Delhi, India	Visually impaired, Hearing and Speech impaired, and orthopedically physically challenged children	Dental Caries	Prevalence of caries 56.4%, higher in the visually impaired group (63.2%) and lesser in the speech and hearing-impaired group (51.7%)

*DMFT: Decayed missing and filled teeth; TDI: Traumatic dental injuries.

Table 1. Continue.

Schmidt et al.;[28] Germany	Physical or intellectual disabilities	Dental Caries	Prevalence of caries was 56.4% in deciduous teeth and 13.1% in permanent teeth. Mean DMFT Score was 2.11 in deciduous teeth 0.22 in
Pathak et al.;[29] Nepal	Visually impairment (16.5%), hearing and speech impairment (25.3%), and orthopedically challenged (58.2%)	Dental Caries	Overall caries Prevalence: 75.9%; Untreated dental caries was 62% Mean DMFT Score was 3.07
Alkhadra et al.;[30] Saudi Arabia	Autism Disorder; Down's Syndrome	Malocclusion	Higher incidence of class III malocclusion (66%) in DS Higher percentage of class I malocclusion (40-41%) in AD
A K Murthy et al.;[31] India	SHCN	Traumatic dental injuries [TDIs]	Prevalence of TDIs: 12.1 % among disabled children in comparison to 6.9 % among the control group
K Gerreth al.;[32] Poland, Europe	Epilepsy	Traumatic dental injuries [TDIs]	Crown's fracture of permanent teeth reported in 15.9% of all patients
A Dubey et al.;[33] India	Cerebral Palsy	Traumatic dental injuries [TDIs]	Dentinal fracture seen in 40% of cases.
R C H Habibe et al.;[34] Europe	Autism Spectrum Disorder (ASD)	Traumatic dental injuries [TDIs]	TDI prevalence in the ASD group higher (39.3%) than in the control group (26.2%)
Ola B Al-Batayneh et al.;[35] Jordan	Multiple disabilities, intellectual disabilities, cerebral palsy	Traumatic dental injuries [TDIs]	Highest among children with multiple disabilities (14.0%), followed by intellectual disabilities (13.1%), and then cerebral palsy (12.2%)
Munot et al.;[36] Chhattisgarh, India	Visual impairment	Traumatic dental injuries [TDIs]	39% suffered from TDIs.
Jaber et al.;[37] Dubai	Autism	Periodontal Status	Gingivitis was present in 97.00% of the autistic children.
Jnaneswar et al.;[38] Odisha, India	Hearing Loss	Periodontal diseases; Dental caries	23.9% of children had bleeding on probing, and 47.2% had calculus. Bleeding on probing- in 13.3% of female children as compared to 10.6% of male children. Total caries prevalence reported was 19.3%
S. Al-Sehaibany et al.;[39] Pakistan	ASD	Oral Habits	Prevalence of oral habits seen in 87.3% of special children. Bruxism was the most prevalent oral habit among them (54.7%) Prevalence of oral habits seen in 49.3% of the control group

*DMFT: Decayed missing and filled teeth; TDI: Traumatic dental injuries.

DISCUSSION AND CONCLUSION

Based on the published reports in the medical field, dental caries appears to be the most common dental issue across various disability groups, with rates ranging from 27.55% to 91.90% globally. Among individuals with disabilities in India, the prevalence of dental caries stands between 68.60% and 91.90%. While, developed countries report lower prevalence rates, ranging from 27.55% to 56.4%.[13-39] From the table, it can also be summarised those children with Down's syndrome showed the highest prevalence of dental caries and the poorest oral hygiene. They also had the highest mean DMFT scores and experienced significant oral health challenges. Children with Autism Spectrum Disorder (ASD) have a higher prevalence of gingivitis and traumatic dental injuries and also indulge more in oral habits like bruxism. Preschool and Early School Age group of 4-6 years was more frequently studied, mostly showing high DMFT scores and varying levels of oral hygiene. Males and females with disabilities show more or less similar prevalence rates for dental caries and periodontal problems. Few studies highlighted differences in oral health problems like bleeding on probing, which might vary slightly according to gender. Children from lower socioeconomic backgrounds, experienced poorer oral health outcomes as compared to the richer households. The elevated prevalence in India may stem from factors like restricted access to dental services, limited awareness regarding oral health, and socio-economic challenges typical of developing nations. The data also underscores the increased susceptibility to oral health problems within special needs populations, showcasing elevated prevalence rates of dental caries, traumatic dental injuries, periodontal diseases, and mal-

occlusion.[5]

Barriers to Dental care and Health Inequalities

One of the most significant health requirements that go unmet or untreated in children with disabilities is oral hygiene and dental care. Having a child with a Special Health Care Needs (SHCN) can often result in substantial caretaking demands and the burden of high healthcare expenses on the families, particularly on the families at or below the poverty level whose children suffer extensive impact. Due to unfortunate circumstances and insufficient awareness about their oral well-being, children's dental problems go undetected, which creates a substantial unmet demand for dental treatment later in adulthood. Inequalities in Oral health continue to affect CSHCN as they suffer from chronic physical, behavioural, developmental, or emotional ailments seeking healthcare and related services of a type or amount beyond compared to other children.[40] Most children below seven years of age need assistance from adult caregivers to maintain proper dental hygiene. Even after reaching the age of seven, kids with special needs, due to cognitive and physical limitations, often continue to require extra help and may face challenges in following tooth-brushing instructions. Due to the combined effects of poor oral hygiene, limited awareness among parents and children, and a huge financial burden on the family due to their other disabilities, such children show a high incidence of caries and gingival diseases.[41] The dental professionals should be aware of different needs- behavioural, physical, emotional, and cognitive that the patient with SHCN may have.

The proportion of unmet dental treatment demands is higher in children with special needs. There are many reasons the children with special needs have difficulty accessing dental health services. Moderate to severe dental anxiety is observed in patients with intellectual disabilities. Gordon et al.,[42] reported fear/ anxiety regarding dental treatment in 27.9 % of special children, with almost half of them being very nervous or terrified before going for a dental visit. In children with Down's syndrome, "Autism Spectrum Disorder", comorbidity, diminished cognitive functioning, sensory hypersensitivities (olfactory, auditory, visual or gustatory stimuli), and motor skills pose many difficulties in their dental care. Such patients are on certain medicaments that can interfere with local anesthesia or oral antibiotics and can result in adverse oral reactions. They often demonstrate unexpected and atypical reactions with oral or intravenous (IV) sedation, so in 40% of cases, dental treatment is possible under general anesthesia only.[43]

The unmet dental care needs of children with disabilities are also significantly influenced by socioeconomic constraints, with financially disadvantaged groups in society more likely to have unmet dental needs.[44,45] In addition to other challenges, patients with special needs frequently struggle to pay for their dental care, inadvertently raising roadblocks to dental care. In the USA, over 1.5 million individuals who are mentally retarded or developmentally delayed rely on Medicaid for their general health coverage, and this excludes dental treatment.[46,47] In India, we have seen several general health insurance policies in the market, but these do not cover preventive dental treatments. Individuals pay personally for dental services at government-funded and privatized dental centres because of a lack of dental insurance.[48]

There are also reports indicating a shortage of healthcare workers trained in special care dentistry. The dental professionals dealing with such patients lack sufficient knowledge and skills. In a study by Lakshmi Krishnan et al.[49] Also, nearly 84% of practising dentists reported inadequate training as a barrier to managing children with special needs at their private dental clinics. Similarly, according to Adhyanthaya et al.,[50] a similar lack of training was felt by 84.6% of dentists. This underscores the necessity for improved guidelines, recommendations, and training for treating children with special needs. Also, there is a lack of handicap-friendly dental specialised centres, especially in developing countries like India.[49,50]

Regional or geographic disparities have also been found in unmet dental care needs in CSHCN. The inequalities can manifest in various ways, such as differences in access to dental care, prevalence of dental diseases like cavities and gum disease, and disparities in oral health outcomes. These disparities often affect vulnerable and marginalized populations disproportionately. Addressing these oral health inequalities for special children requires comprehensive strategies that aim to improve access to dental care, promote preventive measures such as community-based oral health programs and education, address social determinants of health, and advocate for policies that prioritize oral health equity. By addressing these factors, irrespective of a person's background, disability, or circumstances, we can all strive to improve oral health conditions and lessen inequities. These findings can help in extensive healthcare initiatives at the local and state levels, particularly for individuals who are further marginalised, such as members of marginalised populations. Therefore, public health strategies should aim to overcome the lack of primary and dental healthcare providers in these communities.[44]

Clinical Guidelines and Recommendations for Special Dental Care

The need for specialized dental care for severely affected children with special healthcare needs (CSHCN) is evident from variations in the demand

for unmet dental care.[45] Classification of all CSHCN into one single category also creates problems with the term overlooking the fact that many CSHCN are not much different from healthy children in the context of oral health outcomes and associated behaviours. There is an urgent need to identify individuals with disabilities who have similar oral health needs and caries risks as healthy children to distribute expenditures to those who need them the most. Placing individuals with an intellectual or developmental disability and a well-controlled asthma patient into a single category would consider the same barriers to dental visits and tooth brushing, making it challenging to implement tailored interventions for these two different special needs categories.[51]

Since patients with SHCN are at an increased risk of oral diseases, the American Academy of Pediatric Dentistry (AAPD) has given specific recommendations for the management of the oral health of these children, which include scheduling appointments, thorough patient assessment with a focus on the medical and dental history, physician consultations, patient communication, prior formulation of an appropriate dental treatment plan, taking informed consent, behaviour management or guidance and most importantly, timely referrals if the patient's needs are beyond the practitioner's skills to prevent further health deterioration. Since most of the patients with special needs have poor periodontal health and higher caries incidence as their home-care abilities are compromised, hence basic dental therapies should be aimed at oral prophylaxis and periodontal care. A comprehensive oral hygiene regimen, including brushing, flossing, and gum massage, should be provided to caregivers or trainers of individuals with moderate, severe, and profound disabilities. Dental care should emphasize preventive strategies like brushing twice daily with a fluoridated dentifrice under the caregiver's supervision, fluoridated mouth rinses, electric toothbrushes, flossing, and a diet with low carbohydrates. Professional dental care involves pit and fissure sealants, topical fluorides and regular dental visits every 2 or 3 months.[52] For a more effective anti-caries treatment, the AAPD recommends Silver Diamine Fluoride (SDF) applications to control dental caries in children with special healthcare needs, especially those with compromised oral hygiene.[53] Soft tissue lesions like ulcers, mucoceles, fibromas, and papillomas can also manifest commonly in SHCN children. Frequent examinations in a dental home would enable the dentist to identify and address dental ailments before they become serious health problems.[54]

Preventive strategies should also focus on anticipatory guidance for traumatic injuries regarding the risk of trauma in patients with seizure disorders or motor disabilities, mouthguard fabrication for additional protection, and guidelines on what is to be done in case of dental trauma. Also, children with SHCN are at an increased risk of physical, sexual, or emotional abuse, dental, and general health neglect. So, pediatricians and dentists should be aware of the signs of abuse and the protocol and legalities of reporting such cases.[54]

Children with physical and cognitive disabilities commonly suffer from injuries around the head, face, and mouth. Injuries to primary anterior teeth are seen more frequently in them. When treating dental injuries in children with SHCN, it is crucial to approach the situation with sensitivity and understand their unique needs and circumstances. Pediatricians and dentists ought to provide proactive education to parents regarding the management of childhood injuries, emphasizing the critical timeframe between injury occurrence and seeking care to prevent potentially permanent damage. In cases of tooth avulsion, parents should be instructed to locate the tooth, handle it only by the crown, rinse it under cold water without scrubbing, try to reinsert it into the socket correctly or store it in cold milk or water before seeking immediate dental attention.[54]

Utilization of behaviour management methods like desensitization, effective communication strategies, positive reinforcement, and incorporating supportive devices or aids to ease dental appointments and foster cooperation should be incorporated throughout treatment sessions. For anxious patients, some additional behaviour management techniques include sensory-adapted dental environments, picture exchange communication systems, animal-assisted therapy, breathing exercises to calm the mind, biofeedback and nitrous oxide-oxygen inhalation. Some other advanced and extreme behaviour guidance techniques can include protective stabilization, conscious sedation and general anaesthesia. Healthcare providers must be aware of all alternatives' unique objectives, indications, instructions, and precautions in order to treat special needs children effectively.[55] Additionally, parents should closely supervise infants and children to prevent falls and potential injuries when they are on elevated surfaces such as chairs or furniture.[42]

The clinicians should update themselves with the latest guidelines for managing patients with special needs. They should upgrade their knowledge with appropriate skills and techniques to manage the unique demands of dental patients with disabilities and deliver efficient dental care. Performing a comprehensive evaluation of the child's medical background, oral health condition, cognitive capacity, physical constraints, and any particular requirements or obstacles they might encounter will form an integral part of the treatment approach. There needs to be a greater emphasis on preventive measures such

as oral hygiene education, regular dental examinations, and professional cleanings to minimize the risk of periodontal disease.[54]

In India, creating specific dental care guidelines for CSHCN is crucial. Challenges include limited access, financial constraints, and a lack of trained dental professionals. Addressing these issues will ensure that all children, including CSHCN, have equal access to quality dental care services.[49] As the number of people with disabilities rises, more dentists will face such patients in their routine practice. Proposed solutions include establishing specialized referral centres and revising national survey instruments to assess dental care needs and satisfaction better. Although it may appear initially challenging to provide for the requirements of patients with impairments, regular dentistry practices may readily integrate this type of care. Besides, the incorporation of Inclusive Dental Services can guide policy-making and legislation by ensuring that dental health strategies, legislation, and policies mandate equal access to dental services for all, irrespective of age, gender, or disability; capacity building by strengthening the capacity of individuals with disabilities and organizations supporting them to advocate for and promote inclusive dental services both in clinics and the community.[56]

In conclusion, ensuring that children with SHCNs receive optimal oral care requires a multi-pronged approach and a collaborative effort from various stakeholders, including healthcare providers, dentists, and researchers. By increasing access to appropriate healthcare facilities, providing dentists with specialized training, and continually implementing new treatment methods, special children can be empowered to receive the dental care they deserve.

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REFERENCES

1. American Academy of Pediatric Dentistry. Management of dental patients with special health care needs. The Reference Manual of Pediatric Dentistry. Chicago, Ill.: American Academy of Pediatric Dentistry. 2023:337-44.
2. Alamri H. Oral Care for Children with Special Healthcare Needs in Dentistry: A Literature Review. J Clin Med. 2022;11:1-15.
3. World Report on Disability 2011. Geneva: World Health Organization; 2011. 9-The way forward: recommendations. https://www.ncbi.nlm.nih.gov/books/NBK304067/. Accessed March 12, 2024.
4. Olusanya BO, Smythe T, Ogbo FA, Nair MKC, Scher M, Davis AC. Global prevalence of developmental disabilities in children and adolescents: A systematic umbrella review. Front Public Health. 2023;11:1122009. doi:10.3389/fpubh.2023.1122009
5. Chauhan A, Sahu JK, Jaiswal N, et al. Prevalence of autism spectrum disorder in Indian children: A systematic review and meta-analysis. Neurol India. 2019;67(1):100-104. doi:10.4103/0028-3886.253970.
6. Hossain MD, Ahmed HU, Jalal Uddin MM, et al. Autism spectrum disorders (ASD) in South Asia: A systematic review. BMC Psychiatry. 2017;17 (1):281. doi:10.4103/0028-3886.253970
7. Olusanya BO, Gladstone M, Wright SM, et al. Cerebral palsy and developmental intellectual disability in children younger than 5 years: Findings from the GBD-WHO Rehabilitation Database. Front Pub Health. 2022;10:894546. doi:10.3389/fpubh.2022.894546
8. Chauhan A, Singh M, Jaiswal N, Agarwal A, Sahu JK, Singh M. Prevalence of cerebral palsy in Indian children: a systematic review and meta-analysis. Ind J Pediatr. 2019; 86:1124-30. doi:10.1007/s12098-019-03024-0
9. World Health Organization Health Topics: Genomics. 2024.Available https://www.who.int/health-topics/genomics. Accessed March 12, 2024.
10. Sharma R. Birth defects in India: Hidden truth, need for urgent attention. Indian J Hum Genet. 2013;19(2):125-9. doi:10.4103/0971-6866.116101.
11. Camfield P, Camfield C. Incidence, prevalence and aetiology of seizures and epilepsy in children. Epileptic Disord. 2015;17(2):117-123.
12. Gilbert C, Bowman R, Malik AN. The epidemiology of blindness in children: Changing priorities. Community Eye Health. 2017;30(100):74-77.
13. Purohit BM, Acharya S, Bhat M. Oral health status and treatment needs of children attending special schools in South India: a comparative study. Spec Care Dentist. 2010;30(6):235-41. doi:10.1111/j.1754-4505.2010. 00160.x
14. Brown A. Caries prevalence and treatment needs of healthy and medically compromised children at a tertiary care institution in Saudi Arabia. East Mediterr Health J. 2009;15 (2):378-86.
15. Roberts T, Chetty M, Kimmie-Dhansay F, Stephen LX, Fieggen K. Dental needs of intellectually disabled children attending six special edu-

cational facilities in Cape Town: The new millennium. South African Med J. 2016;106(1):94-7
16. Ameer N, Palaparthi R, Neerudu M, et al. Oral hygiene and periodontal status of teenagers with special needs in the district of Nalgonda, India. J Ind Soc Periodontol. 2012;16(3):421-5.doi:10.4103/0972-124X.100923
17. Anaise JZ. Periodontal disease and oral hygiene in a group of blind and sighted Israeli teenagers 14- 17 years of age. Community Dent Oral Epidemiol. 1979;7(6):353-6.
18. Hashemi Z, Hajizamani A, Bozorgmehr E, Omrani F. Oral health status of a sample of disabled population in Iran. J Oral Health Epidemiol. 2012;1(1):23-8. doi:10.1111/j.1600-0528.1979.tb01247.x
19. Jain M, Mathur A, Kumar S, et al. Dentition status and treatment needs among children with impaired hearing attending a special school for deaf and mute in Udaipur, India. J Oral Sci. 2008;50(2):161-5. doi:10.2334/josnusd.50.161
20. Reddy VK, Chaurasia K, Bhambal A, Moon N, Reddy EK. A comparison of oral hygiene status and dental caries experience among institutionalized visually impaired and hearing-impaired children of age between 7 and 17 years in central India. J Ind Soc Pedod Prev Dent. 2013;31 (3):141-5. doi:10.4103/0970-4388.117963
21. Singh A, Kumar A, Berwal V, Kaur M. Comparative study of oral hygiene status in blind and deaf children of Rajasthan. J Adv Med Dent Sc. 2014;2(1):26-31.
22. Shaw L, Maclaurin ET, Foster TD. Dental study of handicapped children attending special schools in Birmingham, UK. Community Dent Oral Epidemiol. 1986;14(1):24-7. doi:10.1111/j.1600-0528. 1986.tb01488.x
23. Bennadi D, Konekeri V, Maurya M, et al. Oral hygiene negligence among institutionalized mentally disabled children in Mysore city-A call for attention. J Fam Med Prim Care. 2020;9(4):2045-51. doi:10.4103/jfmpc.jfmpc_720_19
24. Altun C, Guven G, Akgun OM, et al. Oral health status of disabled individuals attending special schools. Eur Dent J. 2010; 4(4):361-6.
25. Khursheed O, Gupta S, Singh C, Khursheed I, Bansal T. Assessment of oral hygiene status and prevalence of dental caries among 3-14 years old specially-abled children attending various special schools in Mathura District, India. J Adv Med Dent Sci Res. 2015;3(1):33.
26. Gadiyar A, Gaunkar R, Kamat AK, Tiwari A, Kumar A. Impact of oral health-related behaviors on dental caries among children with special health-care needs in Goa: A cross-sectional study. J Ind Soc Pedod Prev Dent. 2018;36(1):33-7. doi:10.4103/JISPPD.JISPPD_214_17
27. Prasad M, Patthi B, Singla A, et al. Special care with special child - Oral health status of differently abled children attending special schools in Delhi: A cross-sectional study. J Ind Assoc Public Health Dent. 2018;16(2):137-43. doi:10.4103/jiaphd.jiaphd_142_17
28. Schmidt P, Petrakakis P, Schulte AG. Caries prevalence in 6-to 10-year-old German schoolchildren with and without disability. Community Dent Health. 2020;37(4):281-6. doi:10.1922/CDH_4654Schmidt06
29. Pathak B, Srithamrongsawat S, Taechaboonsermsak P, Ngoenwiwatkul Y. Comparison of Oral Health Status Between Special Needs and General Public Schoolchildren Aged 11-13 Years, Nepal 2021 (Preprint version).
30. Alkhadra T. Characteristic of malocclusion among Saudi special need group children. J Contemp Dent Pract. 2017;18(10):959-63. doi:10.5005/jp-journals-110024-2156
31. Murthy AK, Chandrakala B, Pramila M, Ranganath S. Dental trauma in children with disabilities in India: a comparative study. Eur Arch Paediatr Dent. 2013;14:221-5. doi: 10.1007/s40368-013-0051-6
32. Gerreth K, Gerreth P. Occurrence of oral trauma in young epileptic patients. Eur J Paediatr Dent. 2014;15(1):13-6
33. Dubey A, Ghafoor PA, Rafeeq M. Assessment of traumatic dental injuries in patients with cerebral palsy. J Ind Soc Pedod Prev Dent. 2015;33(1):25-7. doi: 10.4103/0970-4388.148969
34. Habibe RC, Ortega AO, Guaré RO, Diniz MB, Santos MT. Risk factors for anterior traumatic dental injury in children and adolescents with autism spectrum disorders: a case-control study. Eur Arch Paediatr Dent. 2016;17:75-80. doi:10.1007/s40368-015-0207-7
35. Al-Batayneh OB, Owais AI, Al-Saydali MO, Waldman HB. Traumatic dental injuries in children with special health care needs. Dent Traumatology.2017;33(4):269-75. doi:10.1111/edt.12334
36. Munot H, Avinash A, Kashyap N, Baranwal R, Kumar B, Sagar MK. Prevalence of traumatic dental injuries among visually impaired children attending special schools of Chhattisgarh. J Indian Soc Pedod Prev Dent. 2017;35(3):209-15. doi:10.4103/JISPPD.JISPPD_115_17
37. Jaber MA. Dental caries experience, oral health status and treatment needs of dental patients with autism. J Appl Oral Sci. 2011;19(3):212-7. doi:10.1590/S1678-77572011000300006
38. Jnaneswar A, Subramaniya GB, Pathi J, Jha K, Suresan V, Kumar G. Assessment of dental caries and periodontal status in institutionalized hearing-impaired children in Khordha District of

Odisha. J Ind Soc Pedod Prev Dent. 2017;35 (3):203-8. doi:10.4103/JISPPD.JISPPD_11_17
39. Al-Sehaibany FS. Occurrence of oral habits among preschool children with Autism Spectrum Disorder. Pak J Med Sci. 2017;33(5):1156-60. doi:10.12669/pjms.335.13554.
40. Chen AY, Newacheck PW. Insurance coverage and financial burden for families of children with special healthcare needs. Ambul Pediatr. 2006;6 (4):204-9. doi:10.1016/j.ambp.2006.04.009
41. American Academy of Pediatric Dentistry. Reference Manual. Guidelines on management of dental patients with special health care needs. Pediatr Dent. 2008;37:166-71
42. Klingberg G, Broberg AG. Dental fear/anxiety and dental behaviour management problems in children and adolescents: a review of prevalence and concomitant psychological factors. Int. J Paediatr Dent. 2007;17(6):391-406. doi:10.1111/ j.1365-263X.2007. 00872.x
43. Sultan A, Juneja A, Bhaskar S. Co-morbidity of Down Syndrome with Autism Spectrum Disorder: Dental implications. J Oral Biol Craniofac Res. 2020;10(2):146-8. doi:10.1016/ j.jobcr.2020.03.014
44. Paschal AM, Wilroy JD, Hawley SR. Unmet needs for dental care in children with special health care needs. Prev Med Reports. 2016;3:62-7. doi:10.1016/j.pmedr.2015.11.013
45. Lewis CW. Dental care and children with special health care needs: A population-based perspective. Acad Paediatr. 2009;9(6):420-6. doi:10.1016/ j.acap.2009.09.005
46. Lawton L. Providing dental care for special patients: tips for the general dentist. J Am Dent Assoc. 2002;133(12):1666-70. doi:10.14219/ jada.archive.2002.0118.
47. Office of the U.S. Surgeon General. Closing the gap: A national blueprint to improve the health of persons with mental retardation. Report of the surgeon general's conference on health disparities and mental retardation, U.S. Department of Health and Human Services, Public Health Service, Office of the Surgeon General, Rockville, Md. (2002), pp. A6-A8.
48. Sultan A, Juneja A, Siddiqui M, Kaur G. Feasibility of community-based silver diamine fluoride (SDF) initiatives for dental caries control: An Indian perspective. Arch Dent Res 2023;13(2):69 -76.
49. Krishnan L, Iyer K, Kumar PD. Barriers in dental care delivery for children with special needs in Chennai, India: a mixed method research. DCIDJ. 2018;29(4):68-82. doi:10.5463/dcid. v29i4.739
50. Adyanthaya A, Sreelakshmi N, Ismail S, Raheema M. Barriers to dental care for children with special needs: General dentists' perception in Kerala, India. J. Ind Soc. Pedod. Prevent. Dent. 2017;35(3):216-22. doi:10.4103/ JISPPD.JISPPD_152_16
51. Chi DL. Oral health for US children with special health care needs. Pediatr Clin. 2018;65(5):981-993.
52. American Academy of Pediatric Dentistry. Guideline on fluoride therapy. Pediatr Dent. 2012;34 (special issue).
53. Uppal S, Sultan A, Juneja A. Silver diamine fluoride use in children with special health-care needs: Breaking the barriers. Arch. Med Health Sci. 2024;10-4103. doi:10.4103/amhs.amhs_293_23
54. Shetty K, Acharya B, Higgins M. Anticipatory guidance in pediatric oral health.Internet J Pediatr Neonatol. 2005;6:1. doi:10.5580/bef
55. American Academy of Pediatric Dentistry. Guideline on behavior guidance for the pediatric dental patient. Pediatr Dent. 2016;38:185–98.
56. Carneiro JD, Frazão P. Social protection models and the right to dental care for people with disabilities. Saúde e Sociedade. 2024;33(2):1-5. doi:0.1590/S0104-12902024230658en

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The Inflammatory Response in Geriatric Patients

Yaşlı Hastalarda İnflamatuar Yanıt

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ABSTRACT
The inflammatory response plays a pivotal role in the pathophysiology of age-related diseases and health outcomes in geriatric patients. Understanding the mechanisms underlying inflammation in older adults and developing targeted interventions to modulate the inflammatory response may offer promising avenues for improving the health and quality of life of geriatric populations.
Keywords: Geriatric, inflammatory response, quality of life

ÖZ
İnflamatuar yanıt, yaşa bağlı hastalıkların patofizyolojisinde ve geriatrik hastalarda sağlık sonuçlarında önemli bir rol oynamaktadır. Yaşlı yetişkinlerde inflamasyonun altında yatan mekanizmaları anlamak ve inflamatuar yanıtı modüle etmek için hedefe yönelik müdahaleler geliştirmek, geriatrik popülasyonların sağlığını ve yaşam kalitesini iyileştirmek için umut verici yollar sunabilir.
Anahtar Kelimeler: İnflamatuar yanıt, yaşlı, yaşam kalitesi

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Dear Editor,

I read the article named “Evaluation of Inflammation Markers in Elderly Patients Undergoing Hip Fracture Surgery”, published in the first issue of the ninth volume of your journal.[1] I would like to thank the authors for the article that evaluated the 30-day mortality and intensive care unit admission after a hip fracture surgery and found no correlation between inflammatory parameters and mortality or intensive care unit admission. To contribute to the discussion of the article, I would like to touch upon a few points about the inflammatory response in geriatric patients.

Geriatric patients, defined as individuals aged 65 and older (the classification based on age is as follows: youngest-old, ages 65 to 74 years; middle-old, 75 to 84 years; and oldest-old, 85 years and older), often present with a variety of health conditions that can trigger an inflammatory response. The inflammatory response is a complex biological process involving the activation of immune cells and the release of inflammatory mediators in response to tissue injury, infection, or other stimuli. While inflammation is a normal and necessary part of the body's immune defence mechanism, dysregulated or chronic inflammation can contribute to the pathogenesis of various age-related diseases and adversely affect the health outcomes of geriatric patients.[2]

In geriatric patients, the inflammatory response may be heightened or dysregulated due to age-related changes in the immune system, a phenomenon commonly referred to as "inflammaging." This term encompasses a chronic low-grade inflammatory state that develops with aging and is characterized by elevated levels of pro-inflammatory cytokines, such as interleukin-6, tumor necrosis factor-alpha, and C-reactive protein. Inflammaging has been implicated in the pathogenesis of many age-related diseases, including cardiovascular disease, neurodegenerative disorders, metabolic syndrome, and frailty.[2,3]

Moreover, geriatric patients often have multiple comorbidities and are more susceptible to infections, which can further exacerbate the inflammatory response. Infections, particularly bacterial and viral infections, stimulate the release of pro-inflammatory cytokines and activate immune cells, leading to systemic inflammation. The presence of chronic diseases, such as diabetes, chronic obstructive pulmonary

disease, and renal insufficiency, can also contribute to a state of chronic inflammation in geriatric patients.[4]

The consequences of heightened or dysregulated inflammation in geriatric patients are manifold. Chronic inflammation has been associated with accelerated aging, increased functional decline, and poor health outcomes in older adults. It can exacerbate existing health conditions, impair wound healing, and increase the risk of complications following surgery or traumatic injury.[5] Additionally, chronic inflammation has been implicated in the pathogenesis of age-related cognitive decline and neurodegenerative diseases, such as Alzheimer's disease and Parkinson's disease.

Given the significant impact of inflammation on the health and well-being of geriatric patients, strategies aimed at modulating the inflammatory response have garnered increasing interest in geriatric medicine. Lifestyle interventions, such as regular exercise, healthy diet, and smoking cessation, have been shown to have anti-inflammatory effects and may help mitigate inflammation in older adults. Pharmacological interventions, including nonsteroidal anti-inflammatory drugs and anti-cytokine therapies, are also being investigated for their potential to modulate inflammation and improve health outcomes in geriatric patients.[2-5]

When evaluating this phenomenon at the cellular level, PANoptosis is a novel regulated cell death mechanism that integrates components of pyroptosis, apoptosis, and necroptosis. This process is triggered by various pathogens and immune stimuli, highlighting significant interactions between these cell death pathways. Understanding PANoptosis is essential for clarifying the link between inflammatory responses and chronic infections, as factors such as infections, injuries, and cellular defects can promote its activation through the assembly of the PANoptosome. In elderly individuals, PANoptosis may further aggravate inadequate inflammatory responses and complicate age-related health issues, emphasizing the need to recognize these mechanisms for potential therapeutic approaches targeting chronic inflammation.[6]

Aging is driven by the progressive dysregulation of various molecular pathways, particularly the mTOR and AMPK signaling pathways, which are involved in cellular senescence. Immunosenescence, characterized by the gradual deterioration of the immune system due to aging or pathological conditions, can be countered through various pharmacological and nutraceutical interventions. On the other hand, it is not surprising that several reviews highlight the anti-inflammatory effects of chronic disease medications in elderly adults, such as metformin. Research has particularly noted the efficacy of natural and synthetic compounds like resveratrol, rapamycin, and metformin in addressing conditions related to immunosenescence and aging, showcasing their similarities in mechanisms of action, which are crucial for maintaining immune responses throughout life.[7]

In conclusion, the inflammatory response plays a pivotal role in the pathophysiology of age-related diseases and health outcomes in geriatric patients. Understanding the mechanisms underlying inflammation in older adults and developing targeted interventions to modulate the inflammatory response may offer promising avenues for improving the health and quality of life of geriatric populations.

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REFERENCES

1. Şahin F, Tekeci MH, Kocayigit H, Palabıyık O, Kochai A. Evaluation of inflammation markers in elderly patients undergoing hip fracture surgery. OTHJS. 2024;9(1):61-65. doi:10.26453/otjhs.1401020
2. Li X, Li C, Zhang W, Wang Y, Qian P, Huang H. Inflammation and aging: Signaling pathways and intervention therapies. Signal Transduct Target Ther. 2023;8(1):239. doi:10.1038/s41392-023-01502-8
3. Özdemir S. Inflammation: Complexity and significance of cellular and molecular responses. J Acute Dis. 2024;13(1):3-7. doi:10.4103/jad.jad_129_23
4. Nidadavolu LS, Walston JD. Underlying vulnerabilities to the sytokine storm and adverse COVID-19 outcomes in the aging immune system. J Gerontol A Biol Sci Med Sci. 2021;76(3):e13-e18. doi:10.1093/gerona/glaa209
5. Kale SS, Yende S. Effects of aging on inflammation and hemostasis through the continuum of critical illness. Aging Dis. 2011;2(6):501-511.
6. Zhu P, Ke ZR, Chen JX, Li SJ, Ma TL, Fan XL. Advances in mechanism and regulation of PANoptosis: Prospects in disease treatment. Front Immunol. 2023;14:1120034. doi:10.3389/fimmu.2023.1120034
7. Sorrenti V, Benedetti F, Buriani A, et al. Immunomodulatory and antiaging mechanisms of resveratrol, rapamycin, and metformin: Focus on mTOR and AMPK signaling networks. Pharma-

ceuticals. 2022;15(8):912. doi:10.3390/ph15080912

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The article to be corrected

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The author has submitted a correction request for article number 8, published in the June 2024 issue (Volume 9, Issue 2) of the Online Türk Sağlık Bilimleri Dergisi / Online Turkish Journal of Health Sciences. It has come to our attention that references following the 24th citation in the References section were inadvertently omitted from the published version. The missing references are as follows:

25-Shiferaw KB, Tilahun BC, Endehabtu BF, Gullslett MK, Mengiste SA. E-health literacy and associated factors among chronic patients in a low-income country: a cross-sectional survey. BMC Medical Informatics and Decision Making. 2020;20:1-9. doi:10.1186/S12911- 020-01202-1.

26-Kurtoğlu İ, Yılmaz N, Taş MA. Kronik hastaların e-sağlık okuryazarlık düzeyleri üzerine bir araştırma. MAKU SOBED. 2022;35:126-136. doi:10.20875/makusobed.1009918

27-Tümer A, Sümen A. E-health literacy levels of high school students in Turkey: results of a cross-sectional study. Health Promotion International. 2022;37(2):1-8. doi:10.1093/heapro/daab174

After incorporating references 25, 26, and 27 mentioned above into the article, the necessary corrections were made, and it was published in its current form in Volume 9, Issue 4 of 2024.

We sincerely apologize to the author of the article, Altuğ Çağatay, and to our valued readers for this situation that occurred inadvertently during the publication process.

On behalf of the Editorial Board,

Prof. Dr. Süleyman KALELİ

Publication Editor