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From the Editor

Dear Esteemed Readers,

We are pleased to present you with the second issue of 2024, which contains a variety of articles that we believe will be of interest to healthcare professionals, particularly primary care physicians. Our aim is to provide a useful guide for healthcare professionals, so we have prepared 7 research articles that highlight new developments in important areas of healthcare.

As the leading primary care journal in Turkey, it is both our privilege and responsibility to serve as an indispensable resource for healthcare professionals in our region. We extend our heartfelt gratitude for your continued interest in our journal, reaffirming our commitment to delivering the latest research findings and evidence pertinent to primary care.

We invite you to immerse yourself in the thought-provoking articles contained herein, confident that they will both intrigue and inspire you. Your engagement and support fuel our mission to foster knowledge and innovation in primary care.

Stay tuned for our forthcoming edition, aimed to deliver an equally enlightening and thought-provoking experience.

Prof. Dr. Ahmet Keskin

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Original Researches

THE RELATIONSHIP BETWEEN E-HEALTH LITERACY AND CYBERCHONDRIA SEVERITY WITH PARTICIPATION IN CERVICAL CANCER SCREENING

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Abstract

Objectives: The spread of technology and the internet in society has not only been apparent in the information and communication sectors but has also affected all fields. One of the active areas where the Internet is used is in healthcare. This study aims to investigate the relationship between women's online health information-seeking behavior, e-health literacy levels, and cyberchondria severity levels with cervical cancer screening.

Materials and Methods: This research, conducted using a quantitative correlational screening model and a cross-sectional method, involved face-to-face interviews with 370 women aged 30 to 65, who applied to a gynecology clinic in Ankara City Hospital. A four-part questionnaire was used, which included women's sociodemographic data, questions aimed at understanding online health information-seeking behavior, the e-Health Literacy Scale (eHEALS), and the Short Form Version of the Cyberchondria Severity Scale (CSS-12).

Results: A low positive correlation was found between participants' e-health literacy and cyberchondria scale scores. However, no significant relationship was observed between online health information-seeking behavior, e-health literacy, cyberchondria severity levels, and participation in screenings.

Conclusion: In this study, it was observed that despite high rates of online health information-seeking behavior among women, it is not sufficient to encourage cervical cancer screenings.

Keywords: Cervical cancer screening, e-health literacy, cyberchondria

Introduction

According to data from the World Health Organization (WHO), in 2020 cervical cancer was the fourth most common cancer among women worldwide and 90% of deaths related to cervical cancer occurred in low and middle-income countries.[1] It has been reported that the incidence and mortality of cervical cancer in high-income countries over the last 30 years have decreased by more than half with the use of official screening programs.[2]

Cervical cancer screening programs are of utmost importance in reducing the incidence and mortality rates of cancer. Screening aims to accurately detect and treat intraepithelial precursor lesions of the cervix on time, to prevent cervical cancer. The long pre-invasive period of cervical cancer and the effectiveness of treating pre-invasive lesions increase the importance of cervical cancer screening. The highest rates of cervical cancer incidence and mortality are in low- and middle-income countries. This reflects major inequities driven by a lack of access to national HPV vaccination, cervical screening and treatment services, and social and economic determinants.[1] It is generally observed that countries with a high incidence of cervical cancer also have insufficient screening programs.[1,2]

Individuals need to acquire knowledge about health to preserve personal health, understand disease diagnosis, assess risks and treatment options, and prevent diseases. Health information-seeking behavior (HISB) is defined as "an individual's active or purposeful behavior to obtain objective information related to health".[3] For this purpose, various tools, such as consulting healthcare professionals, printed materials, social surroundings, the internet, and media are used.[4] With the widespread adoption of information and communication technology, the internet has become an important source that individuals use when seeking health information. Searching for online health information has become a frequently preferred method of seeking health information due to the availability and scope of information, ease of searching and access, interaction, and privacy. In many countries over 70% of users use the internet for health knowledge.[5,6] In Turkey, however, according to the Turkish Statistical Institute's (TSI) 2021 data, the rate of searching for health-related information on the Internet was found to be 69.6%.[7] The growth in online the number of health information, telemedicine applications, mobile health services, applications, health information websites, or self-tracking systems has led to the proliferation of internet-based electronic health (e-health) services.

The increase in available health information on the internet and the widespread practice of online health information-seeking behavior do not necessarily imply that individuals are effectively benefiting from health information and services or that they are health-literate. The World Health Organization defines health literacy as "The cognitive and social skills which determine the motivation and ability of individuals to gain access to understand and use information in ways which promote and maintain good health".[8]

While easy and widespread access to health information can lead to increased knowledge and awareness of health-related matters in individuals, along with emotionally, physically, and behaviorally positive contributions, it can also increase anxiety. The term "cyberchondria" is used to describe this condition. Cyberchondria has been defined by Starcevic and Berle as "increased health anxiety or distress associated with excessive or repeated online searches for health-related information.".[9] Research shows that cyberchondria is associated with increased anxiety, general mental health issues such as depressive disorders [10,11] and internet addiction, increased healthcare utilization, functional impairment and a decrease in perceived quality of life.[1,2]

Understanding how women utilize online health information resources, their e-health literacy levels, and their cyberchondria behavior, as well as determining the relationship of these with participation in cancer screenings, is important. This study aims to investigate whether the online health information-seeking behavior, e-health literacy levels, and cyberchondria severity levels of women between the ages of 30-65 are related to participation in cervical cancer screenings.

Materials and Methods

A quantitative correlational screening model was used in this research. The study was carried out using a structured questionnaire consisting of scales and various questions to collect quantitative data in a correlational screening model. The data for this study was collected through participant surveys to determine the relationship between participation in cervical cancer screenings and a few variables, and the study was conducted using a cross-sectional method. The study was approved by Ankara Yıldırım Beyazıt University, Health Sciences Ethics Committee with the date and approval number 13.04.2023-04. Written informed consent was obtained from the participants for the research.

Working group

Our research included women between the ages of 30-65 who applied to the Ankara Bilkent City Hospital's gynecology and obstetrics clinics. In April 2023, a total of 504 women who applied to the Ankara Bilkent City Hospital's Gynecology and Obstetrics clinics participated in the study and 134 women who did not meet the criteria were excluded from the study, resulting in 370 women being included in the study. Patients with language barriers that made scale administration impossible, patients with intellectual disabilities, and patients with cervical pathology who were called in for follow-up were not included in the study.

Data Collection

A survey consisting of 46 questions divided into four parts was given to the participants to complete as the data collection tool to measure all independent variables. The first section of the questionnaire includes 11 questions aimed at collecting demographic information, assessing access to online resources, internet usage frequency, participation in cervical cancer screenings, and determining factors that led to participation.

The second part of the questionnaire includes 13 questions adapted from the National Cancer Institute's Health Information National Trends Survey (HINTS) to assess online health information seeking and internet usage preferences.[13]The questionnaire includes questions measuring general behavioral patterns towards online resources, determining usage frequency, assessing trust in online resources, and understanding whether the information obtained online affects individuals' actual health behaviors. These questions aim to measure health information-seeking behavior or health preferences on social media.

The third and fourth parts of the questionnaire consist of standardized scales. The third part includes the "e-Health Literacy Scale (eHEALS)", developed by Norman and Skinner and adapted into Turkish by Gencer, which consists of 10 items to measure the participants' e-health literacy.[14] This scale aims to determine various sub-skills of e-health literacy, including traditional literacy, health literacy, information retrieval, scientific literacy, media literacy, and computer literacy. The scale consists of 2 items related to internet use and 8 items assessing internet attitudes. The scale items are rated on a 5-point Likert scale. Scores on the scale can range from a minimum of 8 points to a maximum of 40 points.

The fourth part of the questionnaire, the "Short Form Version of the Cyberchondria Severity Scale (CSS-12)" consists of 12 items, which is a short form of the 33-item "Cyberchondria Severity Scale" developed by McElroy and Shevlin and adapted into Turkish by Söyler et al. was used to measure cyberchondria levels. [15] The scale used is a multidimensional measurement tool with a 5-point Likert format and consists of four components (compulsion, excessiveness, distress, and reassurance seeking). Each item can receive a maximum of 5 points, with a total score ranging from a minimum of 12 points to a maximum of 60 points.

Data Analysis

SPSS 23.0 software was used for the statistical analysis of the data. Descriptive statistics include numbers and percentages for qualitative data and mean, standard deviation, and median (minimum; maximum) for quantitative data. The normal distribution suitability of the variables was examined both visually (using histograms and probability plots) and analytically (using Kolmogorov-Smirnov/Shapiro-Wilk tests). In comparing independent groups, categorical comparisons were made using Pearson's chi-squared test and Fisher's Exact Test. For comparisons involving measurement variables, the one-way ANOVA, the Welch ANOVA, and the Student t-test were used. In cases where significant differences were found between groups, pairs of

post-hoc comparisons were conducted using the Bonferroni test and the Tamhane T2 test. The Pearson correlation test was used for correlation analyses. The statistical significance level was accepted as p<0.05.

Results

A total of 370 women participated in the study, and 270 (72.97%) of the participants stated that they had undergone Pap Smear or HPV DNA testing at least once in their lifetime. The mean age of the participants was 43.18 ± 8.23, (30-65). The mean age of those who had undergone Pap Smear or HPV DNA testing at least once in their lifetime was statistically significantly higher than those who had not (40.61 ± 7.52; 44.0 ± 8.01, p=0.001). The distribution of the participants' sociodemographic characteristics and smear screening data is summarized in Table 1.

Table 1: The state of having a pap smear test based on descriptive characteristics of the participants

	Total (n=370) (%)	Status of Pap Smear Testing (n) (%)		
		No (n=100)	Yes (n=270)	P*
Marital Status				
Divorced	72 (19.45)	23 (31.94)	49 (68.05)	0.290
Married	298 (80.54)	77(25.83)	221 (74.16)	
Education level				
Primary School	94 (25.40)	32 (34.04)	62 (65.95)	
High School	109 (29.45)	34 (31.19)	75 (68.80)	**0.029**
Undergraduate /graduate	167(45.13)	34 (20.35)	133 (79.64)	
Income Level				
0-10.000 TL	113 (30.54)	35 (30.97)	78 (69.02)	
10001-20.000 TL	126 (34.05)	20 (15.87)	106 (84.12)	**0.013**
>20.000 TL	52 (14.05)	16 (30.76)	36 (69.23)	
No answer	79 (21.35)			
Chronic Disease				
No	252 (68.10)	80 (31.74)	172 (68.25)	**0.003**
Yes	118 (31.89)	20 (16.94)	98 (83.05)	

(*Pearson chi-square test)

76.29% of the participants who had undergone Pap Smear or HPV DNA testing at least once in their lifetime, knew how often it should be done. While 61.35% of the participants mentioned their previous examinations as their source of information, 6.28% stated that they obtained information from the Internet and social media. The data is summarized in Table 2.

Table 2. Distribution of participants' characteristics of having a pap smear test

	n	(%)
Status of Pap Smear and/or HPV DNA Test (n=370)		
No	100	27.02
Yes	270	72.97
Knowledge frequency of Pap Smear Test (n=270)		
No	64	23.70
Yes	206	76.29
Sources of information (n=207)		
Family Doctor	45	21.73
Previous gynecological examination	127	61.35
Internet and Social Media	13	6.28
Others	22	10.62

There was no statistically significant relationship found between the participants' age and their use of the Internet when making decisions about health (43.52 ± 8.13; 42.81 ± 8.24; $p=0.460$). However, a statistically significant difference was observed between participants' education levels, frequency of internet usage, and their use of the internet when making decisions about health ($p<0.05$). The data is summarized in Table 3.

The participants had an average score of 26.21 ± 7.43; a mean of 27 (8; 40) on the e-Health Literacy Scale, while they obtained an average score of 29.81 ± 8.62; a mean of 30 (12; 56) on the Cyberchondria Severity Scale. A statistically significant difference was found between the participants' education level and the scores they obtained from the e-Health Literacy Scale ($p=0.001$). A statistically significant difference was found between the participants' income levels and the scores they obtained from the e-Health Literacy Scale ($p=0.001$). A statistically significant difference was found between the participants' marital status, frequency of internet usage, and the scores they obtained from the Cyberchondria Severity Scale ($p<0.05$). Correspondingly, those who were widowed or divorced had significantly higher scores on the Cyberchondria Severity Scale. The data is summarized in Table 4.

Table 3: The state of using the Internet when making health decisions based on descriptive characteristics of the participants

	Status of using the internet when making health decisions (n)(%)		
	No	**Yes**	***p**
Marital status			
Divorced / Widow (n=72)	22 (30.55)	50 (69.44)	0.085
Married (n=298)	124 (41.61)	174 (58.38)	
Education Level			
Primary School (n=94)	48 (51.06)	46 (48.93)	
High School (n=109)	42 (38.53)	67 (61.46)	**0.020**
Undergraduate /graduate (n=167)	56 (33.53)	111 (66.46)	
Income Level			
0-10.000 TL (n=113)	42 (37.16)	71 (62.83)	
10.001-20.000 TL (n=126)	43 (34.12)	83 (65.87)	0.717
>20.000 TL (n=52)	21 (40.38)	31 (59.61)	
Chronic Disease			
No (n=252)	98 (38.88)	154 (61.11)	
Yes (n=118)	48 (40.67)	70 (59.32)	0.743
Status of having Pap Smear			
No (n=100)	36 (36.00)	64 (64.00)	
Yes (n=270)	110 (40.74)	160 (59.26)	0.407
Knowledge Frequency of Pap Smear Test			
No (n= 64)	24 (37.50)	40 (62.50)	
Yes (n= 206)	86 (41.74)	120 (58,25)	0.546
Internet usage frequency			
<1 hour /day (n=57)	33 (57.89)	24 (42.10)	
1-2 hour/day (n=94)	40 (42.55)	54 (57.44)	
2-4 hour/day (n=105)	38 (36.19)	67 (63.80)	**0.006**
>4 hour/day (n=114)	35 (30.70)	79 (69.29)	

(*Pearson chi-square test) (In the Bonferroni corrected analyses conducted for education levels it was observed that there was a significant difference between the group of participants with primary school and undergraduate /graduate. The Bonferroni-corrected analysis for internet usage frequency revealed that the difference was observed between the group that used the internet less than 1 hour /day and more than 4 hours/ day).

Tablo 4: e-Health Literacy Scale Score and Cyberchondria Severity Scale Score based on descriptive characteristics of the participants

	e- Health Literacy Scale Score (Average score±SD)	*p	Cyberchondria Severity Scale Score (Average score±SD)	*p
Marital Status				
Divorced / Widow (n=72)	25.81 ± 8.12	0.594	31.74 ± 8.32	**0.046**
Married (n=298)	26.32 ± 7.35		29.46 ± 8.61	
Education Level				
Primary School (n=94)	23.14 ± 7.92		29.41 ± 9.96	
High School (n=109)	26.16 ± 7.05	**0.001ᵃ**	28.65 ± 8.23	0.096 ᵃ
Undergraduate /graduate (n=167)	28.05 ± 6.92		30.95 ± 8.06	
Income Level				
0-10.000 TL (n=113)	24.24 ± 7.81		29.16 ± 8.74	
10.001-20.000 TL (n=126)	26.94 ± 6.75	**0.001ᵃ**	30.82 ± 8.51	0.239 ᵃ
>20.000 TL (n=52)	29.00 ± 7.63		28.96 ± 8.82	
Chronic Disease				
No (n=252)	26.59 ± 7.35		30.26 ± 8.53	
Yes (n=118)	25.60 ± 7.71	0.256	29.15 ± 8.92	0.270
Status of having Pap Smear				
No (n=100)	26.04 ± 7.02	0.735	29.56 ± 8.27	0.630
Yes (n=270)	26.39 ± 7.63		30.05 ± 8.71	
Knowledge Frequency of Pap Smear Test				
No (n=64)	25.83 ± 7.41	0.555	30.25 ± 8.82	0.785
Yes (n=206)	26.43 ± 7.77		29.98 ± 8.84	
Internet usage frequency				
1 hour /day (n=57)	22.91 ± 7.94		24.47 ± 7.33	
1-2 hour/day (n=94)	25.65 ± 6.62		30.37 ± 8.38	**0.001ʷ**
2-4 hour/day (n=105)	27.95 ± 6.06	**0.001ʷ**	31.17 ± 8.52	
>4 hour/day (n=114)	26.81 ± 8.55		31.14 ± 8.63	

(*Student-T test, ᵃOne-way ANOVA test, ʷ Welch ANOVA test, SD: Standard Deviation) (According to the results of the Bonferroni corrected subgroup comparisons, it was observed that there was a significant difference between the group of participants with a primary school and both the group of high school graduates and undergraduate /graduate. According to the results of the Bonferroni corrected subgroup comparisons, the difference was observed only between the group with an income of 10,000 TL or less and the group with an income of 20,001 TL or more. According to the results of the Bonferroni corrected subgroup comparisons for the difference arising from the frequency of internet usage, it was observed that the group using the internet for less than 1 hour per day had significantly lower scores compared to all other groups)

Discussion

Our study was conducted to investigate the relationship between women's e-health literacy levels, cyberchondria severity levels, and their knowledge, attitudes, and behaviors regarding cervical cancer screening.

According to the results of our study, as the educational level of women increased, their knowledge about the Pap smear test and their participation rates in screenings increased. It was also observed that those with higher income levels and those with chronic illnesses had higher rates of undergoing the Pap smear test. In a study that measured knowledge about HPV vaccines and the relationship between HPV and cervical cancer, similar to our study, it was found that as the educational level increased, knowledge and awareness levels also increased. It was also found that an increase in income level had an impact on HPV vaccinations.[16]

Participants with higher levels of education spend more time searching for online health information, and it has been observed that the e-health literacy levels of these individuals are higher. In Turkey, considering that almost 99% of individuals with a university education level or higher use the internet while those with a middle school education or lower have an average internet usage rate of around 60%, this is an expected situation.[17] Previous research has shown that individuals with lower levels of education may have more difficulty understanding health and medical information on the internet compared to those with higher levels of education.[18]

In our study, the average total score obtained from the e-health literacy scale is 26.21 ± 7.43, indicating a moderate level. The average score of our study's e-health literacy scale is similar to the results of other studies conducted in Turkey. The participants' average total score obtained from the Cyberchondria scale (CSS-12) is 29.81 ± 8.62. The average score we obtained in our study was lower compared to the results of other studies.[19,20]

In our study, unmarried women were found to spend more time searching for health information on the internet and have a higher level of cyberchondria severity. No significant difference was observed between e-health literacy and marital status. Similar to Zhang et al. study with cancer patients, no relationship was observed between e-health literacy and marital status.[21] Some studies have found a higher frequency of online health information-seeking behavior and cyberchondria severity in individuals who are married or in a stable relationship.[19,22] In a study conducted on diabetes patients, similar to our research, it was observed that unmarried individuals had a higher frequency of searching for health information on the Internet.[23] Additionally, there are studies indicating that in Turkey, unmarried individuals aged 18 and above have a higher level of cyberchondria severity compared to those who are married.[19,20] The increased amount of time

spent searching for health information on the internet and the significant relationship between internet usage frequency and cyberchondria severity in unmarried individuals may lead to these results.

In our study, it was found that women with a high income had higher e-health literacy scores and there was no relationship between cyberchondria levels and online health information-seeking behavior. Other studies in this regard have shown that individuals with a higher socioeconomic status tend to engage in online health information-seeking behavior more frequently.[6,18,23] The differences in the findings of our study may be attributed to the fact that in other studies, socioeconomic status encompasses a combination of various variables such as income, employment status, language proficiency, occupation, and education levels.

In our study, women with chronic illnesses did not show significant differences in their online health information-seeking behavior and e-health literacy scores. However, they exhibited higher levels of knowledge and positive attitudes towards smear screenings. There are studies in the literature that suggest individuals with chronic illnesses, who frequently access healthcare services, may have less need for online health information-seeking behavior.[5,24] Although there was no significant difference between the health literacy scale scores of our study population, regular health visits and controls positively affect attitudes towards cervical cancer screening in the patient population with chronic diseases.

In our study, we observed that online health information-seeking behavior did not lead to differences in knowledge, attitudes, and behaviors related to cervical cancer screening. These results may be related to the quality of information obtained on the internet and the level of trust in the information source. Similarly, in another study, there was no relationship found between online health information-seeking behavior and HPV awareness, HPV vaccination, and cervical cancer.[16] Moreover, in another research examining the relationship between social media usage and knowledge, awareness, and behaviors related to cervical cancer, it was observed that social media slightly increased awareness of cervical cancer and HPV but did not lead to changes in preventative behaviors.[25] It is known that information available on the internet, which is not prepared by expert teams, not proven for accuracy, not subjected to medical examination, and presented by non-professionals reduces the quality of health information that is obtained from the internet and hinders trust in the information source.

In a study investigating the relationship between e-health literacy and colorectal cancer screening participation, it was shown that low e-health literacy is associated with weaker cancer prevention knowledge and behaviors.[26] In another study, low e-health literacy was found to be associated with less attention to health and poor health outcomes [27]. In our study, no relationship was found between internet health information-seeking behavior and the time spent on it with participation in screenings. There are studies in the literature, consistent with our findings, that did not find a significant relationship between e-health literacy and previous

cancer screening experiences and receiving the HPV vaccination.[13,28] This result may be related to the fact that e-health literacy is not the sole factor affecting individuals' motivation for cancer prevention or that the acquired knowledge may not effectively motivate behavior. Individuals' knowledge and attitudes about cancer and cancer screenings, as well as various factors such as demographic factors and a family history of cancer, influence the decision to undergo cancer screening.[29,30] The results of our research have shown that despite high rates of online health information-seeking behavior, one of the most important factors influencing individuals' health decisions is doctor recommendation. The fact that our study was conducted on patients attending the gynecology outpatient clinic of a tertiary hospital may also explain the high participation rates in cervical cancer screening, regardless of e-health literacy levels.

Our study has some limitations. One of them is the small sample size, which restricts the generalizability of the results. Another limitation is that despite investigating how and how often individuals access general health-related information online, there is limited information about what specific information individuals search for on the internet, which has been criticized by some researchers. However, since participants cannot provide a clear answer about how much information they specifically look for on the internet for any particular health topic (in our study, cervical cancer and screenings), and because the OHISB questions are related to general health information-seeking, this limitation remains.

Conclusion

According to the results of our study, it can be said that the time spent on the internet and health information-seeking behavior did not translate into a positive attitude towards cervical cancer. It is still evident that the most influential factor in transforming health information into attitudes remains to be healthcare providers, especially doctors. Therefore, being informed by the family physician has an important role in ensuring patient participation in cancer screening programs. Considering the widespread use of the internet and the amount of time women spend online, it has become imperative to improve the quality and usability of the health information available on the internet to enhance its positive contributions to health**.**

Ethical Considerations: The study was approved by Ankara Yıldırım Beyazıt University, Health Sciences Ethics Committee with the date and approval number 13.04.2023-04.

Conflict of Interest: The authors declare no conflict of interest.

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CHALLENGES AND OPPORTUNITIES OF ONLINE FOCUS GROUP DISCUSSIONS IN REFUGEE STUDIES WITH SYRIAN MOTHERS: HOW CAN WE OVERCOME THE BARRIERS?

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Abstract

Objectives: Refugee studies require extra attention due to ethical concerns and language-cultural differences. We aimed to compare the challenges and opportunities of online focus group discussions (FGDs) conducted with Syrian refugee mothers.

Materials and Methods: We used data from face-to-face and online FGDs of a study investigating the breastfeeding characteristics of Syrian mothers. FGDs were carried out with Syrian mothers and grandmothers (Group I-II), and Syrian healthcare workers (Group III) in Turkey. A total of 7 focus group discussions (FGDs) were performed face to face. 47 Syrian mothers and grandmothers and 16 Syrian HCWs attended these meetings. In two different provinces, a total of 7 FGDs were conducted online with 30 Syrian refugees, and 15 Syrian HCWs. All face-to-face FGDs were performed in Refugee Health Centres (RHCs). Online FGDs with Group I-II were performed using the technical equipment-facilities of RHCs. Group III attended the FGDs with their own devices from wherever they wanted. Thematic analysis of the transcripts in a deductive-inductive fashion was carried out with MAXQDA 11.

Results: Online FGDs were more favorable than face-to-face FGDs in terms of planning, selection of participants, cost, moderation, providing a heterogeneous group, equal participation, ease of recording and transcribing, privacy and anonymity, and comfort of participating. On the other hand, internet interruption and not focusing on the meeting were disadvantages of online FGDs with Group III.

Conclusion: Providing technological and technical support and utilizing facilitators and interpreters of the same nationality as the refugees at every stage of the study eliminated many disadvantages of online FGDs.

Keywords: Qualitative studies, online focus groups, face-to-face focus groups, refugees.

Introduction

Due to the COVID-19 pandemic, options other than face-to-face interviews have become more preferred as a data collection method in many qualitative studies.[1-5] Online FGD is not a new method, and some advantages of this method have been reported in advance.[6-8] The advantages are online meetings provide a comfortable environment, participants can join from their homes, and they do not have to travel anywhere.[6,7] The participants can turn off the video and use pseudonyms so they can feel more comfortable talking about sensitive topics.[8,9] Online meetings provide access to participants from different geographical regions.[7] However, this method requires technology and literacy for technology.[3,7,10-12] So, online methods cannot represent the whole population of socioeconomically disadvantaged groups such as refugees.[13] One predicted advantage of face-to-face FGDs is that they provide interpersonal interaction and a better discussion environment.[6,12] Refugee studies have additional challenges as they require interpreters and specific ethical considerations.[14-16] Salam et al. recently published a study about the methodological and ethical challenges of refugee studies in the Covid-19 era. However, those who could not access the technology and did not speak English were not included in that study.[17] Language barriers and limited access to technology are common problems for all refugees, leading to selection bias for the most disadvantaged group and a reduced validity of qualitative research.

We used L´evesque et al.'s conceptualization of access to health care as a theoretical input to support the research design.[18] This conceptualization framework takes into account the characteristics of both participants and researchers. The dimensions of investigators are approachability, acceptability, availability, affordability, and relevance. The dimensions of the participants, such as refugees, are the ability to perceive, the ability to search, the ability to reach, the ability to pay, and the ability to connect.

We aimed to determine the challenges and opportunities of online FGDs by using face-to-face and online pilot FGD applications of a study conducted with Syrian refugees (mothers, grandmothers, and healthcare workers). The online FGD model, which we carried out through an interpreter by providing technology, could be adapted for further studies, including vulnerable populations and other refugee populations.

Materials and Methods

Before the COVID-19 pandemic, face-to-face synchronous structured FGDs were planned with Syrian mothers, grandmothers, and healthcare workers (HCWs) to estimate the breastfeeding practices of Syrian immigrants. Pilot implementations were initiated to make face-to-face meetings. However, due to the Covid-19 pandemic, it was not possible to maintain face-to-face meetings. The procedure was changed, and pilot FGDs were included; all meetings were implemented online. Even though we didn't plan this way at the beginning, we have

performed both face-to-face and online pilot implementations of the same study. In this study, we compared face-to-face pilot implementations and online meetings of the qualitative study.[19]

Participants were Syrian mothers (Group I), Syrian grandmothers (Group II), and Syrian HCWs working in refugee health centers (RHCs) (Group III). In both methods, participants were selected by purposive sampling. Selection of participants and meetings were held through RHCs. The method is detailed in Table 1.

The study was approved by the Ethical Board of Hacettepe University, the MoH Turkish Public Health Institution. All participants gave written informed consent for FGDs.

Table 1. The methods of face-to-face and online focus group discussions.

	Face-to-face FGDs		Online FGDs	
	Group I and II	**Group III**	**Group I and II**	**Group III**
Organization of meetings	A volunteer Syrian HCW from each RHC was assigned. The HCW formed participant groups of 8-14 people using purposive sampling and informed these participants about the meeting content and schedule. One moderator one notetaker, and one interpreter working in Provincial Health Directors of the selected provinces went to the RHCs for FGD meetings. Also, one interpreter from each RHC took part in the organization of the meetings and the FGDs. The personal information and informed consent were obtained by the interpreters before the interview.	A volunteer Syrian HCW from each RHC was assigned. This HCW selected all the participants and organized the meetings at the RHC where she/he was working. One moderator one notetaker, and one interpreter working in Provincial Health Directors of the selected provinces went to the RHCs for FGD meetings. Also, one interpreter from each RHC took part in the organization of the meetings and the FGDs. The personal information and informed consent were obtained by the interpreters before the interview.	A volunteer Syrian HCW from each RHC was assigned. This HCW selected one participant and one substitute participant for each FGD and informed the participants about the meeting content and schedule. Before the meeting, the responsible HCW obtained informed consent and then started the meeting by clicking the Zoom link that was sent. After that, the HCW showed the participant how to turn the audio and video on and off. After the meeting started, the HCW went to another room and told the participant to call if there was any technical problem. There was only one participant in each room.	The participants were selected voluntarily by the Provincial Health Directors of the selected provinces. Informed consent was obtained online.
Selection of participants	Purposive sampling method	Purposive sampling method	Purposive sampling method	Purposive sampling method
Privacy and anonymity	Each participant was given a pseudonym	Each participant was given a pseudonym	Each participant was given a pseudonym	Each participant was given a pseudonym
Where meetings were held	Meeting rooms in RHCs	Meeting rooms in RHCs	Each participant participated in online meetings using a room with a computer and wireless internet from different RHCs.	Participants were connected to the meetings from anywhere (home, work, etc.) with their own devices and their internet.
Moderation	By principal researcher	By principal researcher	By principal researcher	By principal researcher
Interpretation	RHC's interpreter	RHC's interpreter	By the same interpreter who attended online.	By the same interpreter who attended online.
Training of interpreters	All interpreters were trained individually	All interpreters were trained individually	An interpreter was trained	An interpreter was trained
Number of FGDs	4 mother FGDs, 1 grandmother FGD	2 FGDs	4 mother FGDs, 1 grandmother FGD	2 FGDs
Number of participants	41 mothers (14+11+8+8), 6 grandmothers	16 HCws (9+7)	24 mothers (6+6+6+6), 6 grandmothers	15 HCWs (8+7)
Providence where FGDs held	Ankara	İstanbul	Gaziantep and İstanbul	Gaziantep
Number of RHCs	3 RHCs	2 RHCs	6 RHCs from İstanbul and 6 RHCs from Gaziantep	5 RHCs
Way of obtaining data	Audio recording	Audio recording	Audio recording	Audio recording
Analysis of data	Thematic analysis	Thematic analysis	Thematic analysis	Thematic analysis

Results

In both methods, the same people were responsible for moderating the FGDs and collecting and analyzing the data. Based on our experience and concrete examples, the differences between the two methods can be listed as follows (Table 2).

Table 2. Comparison of face-to-face and online FGDs

	Face-to-face FGDs	Online FGDs
Planning	• A limited number of FGDs can be held in one	• A great number of FGDs can be held in one day
Cost and logistics	• Travel and accommodation expenses of the work team • A meeting room for FGD and a waiting room for their companions in the RHC.	• No need for travel and accommodation. • A room with a computer was available in each RHC for Group I-II. • Group III: HCW-FGDs attended the meetings with their own devices and where they wanted.
Selection of Participants:	• Difficult to find many participants for Group I-II via the same RHC • Almost all HCWs from the RHC participated	• One participant for group I-II was taken from each RHC. • Group III: 1-2 HCW from one RHC participated to FGDs
Moderation and interpretation	• Difficult to moderate. • Sometimes interpreters interacted with participants	• Easier to moderate. • Interpreters had little interaction with participants
Participant characteristics	• A homogeneous group from the same RHC for group I-II.	• A heterogeneous group from different RHCs for groups I-II; Since one participant was selected from one RHC, people with different characteristics living in that region could be reached.
Equal participation and interaction	• Dominance of some participants • Useless interaction	• Equal participation • Less interaction
Taking recordings and transcribing audio recordings	• Ambient noise and interruptions of talking participants by others	• No ambient noise interruptions due to connection problems*
Duration of FGDs	• Similar durations • Waste of time before and after	• Similar durations • No extra time wasted
Privacy and anonymity	• Pseudonyms used • Audio recordings were taken, and the security of recordings was ensured • All personal information was collected in a meeting room where all the participants were; anonymity could not be fully ensured	• Pseudonyms used • Audio recordings were taken, and the security of recordings was ensured • The personal information was collected one by one; anonymity was ensured
Comfort of participating	• Went out to breastfeed • Only interested in meeting	• They were able to turn off the screen and breastfeed • Some were interested in other things and could not focus on the meeting*

FGD: Focus group discussion; RHC: Refugee Health Centre; HCW: Health Care Worker; Group I-II: Mother and grandmother as a participant; Group III: HCWs as a participant; * This situation is valid only for online FGDs of Group III.

Planning: One HCW was responsible for face-to-face meetings. We just had to communicate with him/her. However, this person was insufficient to organize two meetings on the same day. Also, a crowded group with their companions had to be in the RHC at the same time, and the health service of the RHC was disrupted. In online FGDs, we had to reach numerous "contact persons," but we made it easier by creating WhatsApp groups. In addition, since the responsible HCWs assisted the participants one-on-one and there was a participant and a companion at the RHC at the same time, there was no chaos or disruption of service in the RHC.

Cost and logistics: Interviews were conducted in various provinces using both methods. In the face-to-face FGDs, the transportation and accommodation expenses of the team were incurred. In RHCs, a meeting room and a waiting room for companions were required.

In online FGDs with Group I-II, the participants participated in the meeting in a room in RHC and used the computer and internet of the RHC.

In the HCW-online-FGDs (Group III), participants used their own devices and internet and attended meetings alone where they wanted. The study team attended the meetings from their home or workplace. There was no need for them to travel and stay elsewhere, nor to allocate funds for them.

Selection of Participants: In both methods, the RHCs were selected by the coordination of the provincial health directorates and the Ministry of Health (MoH). A volunteer Syrian HCW from each RHC was assigned to select the participants and organize the meetings.

In the face-to-face FGDs of Group I-II, it was necessary to find approximately 16-24 participants for two meetings on the same day. It has been difficult to find this number of participants through RHC. Many participants gave up attending the FGDs even though they had been accepted before. In online FGDs, it was easy to find participants since only one refugee from each RHC attended. In case of a problem, we could reach a reservist immediately, or we could find a new one among those who came to RHC for healthcare service.

Moderation and interpretation: Most of the participants and responsible HCWs could not speak Turkish or English. Therefore, bilingual (Arabic and Turkish) Syrian interpreters were used. An interpreter from an enrolled RHC participated in face-to-face FGDs. One interpreter working in the MoH was utilized in the online FGDs. All interpreters were trained before the FGDs not to direct the participants during the meeting, not to add their own opinions to the translations, and not to judge the participants. In face-to-face FGDs, it was necessary to train each interpreter before each FGD. Since one interpreter was utilized in online FGDs, it was enough to give training once. In addition, the interpreter who attended many meetings gained experience, and standardization was achieved in the online FGDs. Unfortunately, this standardization could not be achieved in

face-to-face FGDs due to the attendance of a different interpreter at each meeting. In the face-to-face FGDs, some interpreters guided the participants while others presented their opinions.

"Ladies, you are no longer in Syria; this is Turkey, and you will live accordingly (Ankara, mothers' FGD, interpreter)."

"... they (mothers) are sitting on the stairs and breastfeeding in front of the eyes (with judging and shaming) (Istanbul HCW FGD, interpreter. He made his comment on the question about breastfeeding asked to the HCWs)."

Participant characteristics and impact on getting information: In the face-to-face FGDs, participants formed a homogeneous group of refugees using the same RHC (Group I-II). Some participants were neighbors, friends, or relatives. Because of this acquaintance, they may have hesitated to answer some issues or have similar experiences. They had conversations among themselves, and these conversations were not related to the topic; it did not help to have more information on the subject by providing interaction. In the online FGDs, a heterogeneous group was formed, and one refugee from each RHC participated (Group I-II). Participants were not acquainted. More information was obtained, especially on different regional practices. In online FGDs of HCWs (Group III), participants were working in different RHCs. But this time, the most knowledgeable HCWs in the RHC volunteered to attend the meeting as participants. In face-to-face HCW-FGDs, most of the health workers of the same RHC attended the meetings and formed a very heterogeneous group in terms of knowledge.

"I don't have a child yet; I don't have much experience; it would be better if you ask those who have children (Istanbul, female nurse, face-to-face FGD, in response to the question of "How children under the age of 2 should be fed?")."

"Our most important duty here is to follow up pregnant women and children. Frankly, we do not interfere much whether they breastfeed or not (Istanbul, male doctor, face-to-face FGD, in response to the question of "How is the breastfeeding status of the community you currently serve?")."

"Until the age of 1.5 (Istanbul, male doctor, face-to-face FGD, in response to the question of "How much do you recommend breastfeeding?")."

Equal participation and interaction: Although all participants were supposed to speak in the order in face-to-face meetings, some people were very dominant, and they got more voice by intervening. Although it seems to be an interaction between participants, it did not contribute to obtaining further information. The presence of such dominant characters caused some participants to be less involved. In the online FGDs of Group I-II, there

was more equal participation since everyone talked in order and then turned off the device's voice. In online HCW-FGDs (group III), some participants were less involved because of connection problems.

Taking records and transcribing audio records: In both methods, an audio recording was taken. In face-to-face FGDs of all groups, due to ambient noise and interruptions of talking participants, we had difficulties with the transcription of the audio records. In online FGDs for groups I and II, there was no ambient noise or interruptions because only the speaking participant turned on the computer's voice. However, in online FGDs of HCWs, the statements of some participants could not be understood when transcribing due to connection problems. Some even had to leave the FGDs earlier. In both methods, Syrian translators were consulted while transcribing audio recordings.

Duration of FGDs: In both methods, FGD durations were similar. However, in face-to-face FGDs, it took a long time to get into the room, settle down at the tables, ensure order, and end the interpersonal conversations. In the online FGDs, there was no need to maintain order and this process took less time as there was an attendant to assist each participant.

Privacy and anonymity: Pseudonyms were used to identify individuals in all FGDs. In both methods, audio recordings were taken instead of video recordings, and it was explained to the participants when obtaining informed consent, also the security of these recordings was ensured. Some people who participated in face-to-face FGDs had been acquainted before the meetings. For this reason, anonymity and privacy could not be fully ensured.

The comfort of participating: In online FGDs (Group I-II), participants attended the meetings in private rooms, so they were more comfortable. There were breastfeeding mothers among the participants. They were able to turn off the video and breastfeed comfortably during online FGDs. In face-to-face FGDs, they had to go out to breastfeed. In the online HCW-FGDs, the participants were connected from wherever they wanted. This was a great comfort for the participants. However, this comfort reduced the participants' attention to the meetings. Some of them attended the meetings from the workplace, some from the home, and some in a cafe. When it was not their turn, some participants turned off their screens and paid attention to their things. This reduced the quality of the FGDs.

Discussion

In this study, we can summarize the advantages of online meetings held for Syrian mothers and grandmothers via RHCs as follows: planning and performing were easier, no fee was required for the transfer and accommodation of the study team, equal participation was achieved, there was no ambient noise, there were

participants from various regions, more privacy was provided, and also a more comfortable and baby-friendly environment provided. These results were similar to previous studies.[6-12]

Our second sample for online FGDs was Syrian HCWs. HCWs had sufficient knowledge and technology for internet communication. It is a great convenience for online meetings not to require transport and to ensure participation in the comfort of a home environment. In HCW FGDs, there were both internet interruptions and situations that reduced the quality of the FGDs (such as doing other things or chatting with friends) due to the HCWs' participation in meetings from anywhere with their own devices and internet.

In the study, refugees had to go to RHCs, but it was not difficult because the RHCs were close to their place of residence. Although they were not in a home environment, it was comfortable to be alone in the room. In addition, there were no obstacles, such as the bell ringing, dealing with housework, or being interrupted by other family members, which reduced the quality of online FGDs.[20] Internet interruption is a common disadvantage in online FGDs. Wired internet is recommended for preventing interruptions and for a higher-quality connection.[21]

It is recommended that the participants of Group I-II be informed about Zoom before the meeting and trained on how to use it.[21] Since our target population has a low level of education, only turning on and off the audio and video were shown. All other procedures were done by a volunteer Syrian HCW, but participants attended meetings alone. They asked for help when needed, and after solving the technical problem, the responsible HWC left the room. Although geographical diversity is an advantage in online meetings, this may not provide data saturation in that region.[22] This saturation can be achieved by performing a large number of FGDs.[19,22]

Refugees are one of the most vulnerable groups who have experienced numerous traumas and have language barriers. Therefore, studies with these groups require much more ethical sensitivity.[23] It is necessary to provide adequate information while obtaining informed consent from the participants. Because of power imbalance, they may feel compelled to volunteer, or they may not be able to leave the study whenever they want.[13,14,23,24] To overcome these ethical challenges, it is important to utilize professionals from their language and culture. Syrian HCWs/interpreters were assigned or consulted at all stages of the study, from the planning to the data analysis. In cross-cultural studies, it is recommended to involve individuals from the community of interest in each step of the study. Thus, better communication is achieved, the power imbalance is reduced, and prejudiced or false findings about their culture are prevented.[24] Of course, it is also important to utilize trained interpreters.[25]

The number of refugees is increasing all over the world, and there is a need for qualitative studies to determine and improve their health status. A limited number of qualitative health studies have been conducted with Syrian refugees in Turkey, and they used a face-to-face approach.[26-29] In this study, we presented an online FGD

model that was conducted with refugees by using the technical capabilities of RHCs. We also compared this model with face-to-face FGDs and online FGDs that were conducted without using the technical possibilities of RHCs, and we demonstrated its advantages in many ways. This study can contribute to many future refugee health studies and guide them. On the other hand, the most important limitation is that the health system of each country may not be suitable for this model. However, researchers can modify it according to their country's health systems.

In conclusion, in our experience, online FGD with refugees is more favorable than the face-to-face method in many ways. Our recommendations for performing a quality FGD with refugees are the following: a) Primary health care centers serving refugees can be used for the selection of participants and meetings, b) participants should be provided with a room and a computer with a wired internet connection, c) An HCW or interpreter from the same nationality as the refugees should take part in all steps of the study, d) Interpreters must be well trained in the principles of FGDs and ethical issues. If possible, experienced interpreters should be appointed, e) Participants should be given basic information about the technology to be used, such as turning the audio or video on and off. An HCW as a contact person and interpreter should be available to initiate the meeting and provide technical support if necessary. A greater number of FGDs could be performed to ensure data saturation as well as geographical diversity with this method.

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ARE DIABETIC PATIENTS AWARE OF THEIR RESPONSIBILITIES IN PREVENTING DIABETIC FOOT DISEASE?

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Abstract

Objectives: Identifying the risk factors that lead to diabetic foot disease and taking precautions is associated with a reduction in the occurrence of diabetic foot ulcers and the rate of amputation. The patient plays the most important role in that regard. This study aimed to investigate the knowledge, attitudes, and behaviors of diabetic patients, who underwent follow-up at a tertiary health center, about foot care and diabetic foot disease.

Materials and Methods: The study included 327 patients aged over 18 years, who presented to the Endocrinology and Metabolic Diseases clinic and outpatient clinic of a tertiary health center. The data were obtained using socio-demographic information and laboratory results of the subjects, information about diabetes, and responses to the diabetic foot disease awareness scale in this descriptive study.

Results: The patients were grouped based on diabetic foot behaviors as follows: 79 (24.15%) patients as low-score, 144 (44.03%) patients as medium-score, and 104 (31.80%) patients as high-score. There were significant differences between the groups by education and employment status, body weight, body mass index (BMI), waist circumference, type of diabetes mellitus (DM), duration (years), diabetes education, foot care education, treatment, exercise, and diabetic foot examination statuses.

Conclusion: Diabetic foot awareness was low in our patient group. The most important factor to increase awareness of diabetic foot disease and to prevent diabetic foot ulcers is to ensure that individuals with diabetes receive education on general diabetes and foot care and to incorporate their learnings into their behaviors.

Keywords: Diabetes mellitus, diabetic foot disease, awareness, education.

Introduction

Diabetic foot disease is a clinical condition, characterized by coexisting neuropathy and vascular disease of varying severity in diabetic patients, which can include a range of complications, including lower extremity infection, ulcer formation, and/or deep tissue damage. Epidemiologic studies reported the prevalence and incidence of diabetic foot ulcers as 5-10% and 6.3%, respectively, with an annual incidence of 1-4%.[1] Neuropathy (approximately 55%), arterial (10%), and neuro ischemic causes (approximately 35%) predispose to the development of the condition. Structural disorders of the foot, including inappropriate mechanical loading on the tissues, foot deformities, and limitation of joint movements are also considered among the risk factors for diabetic foot disease.[2,3]

Diabetic foot ulcers may lead to impaired quality of life, lower extremity amputations, and increased rate of mortality. The cure rate of diabetic foot disease upon 12 weeks of treatment was reported as 24-82%, with a recurrence rate of 60%.[4,5] The other extremity in more than half of the patients is amputated within 3-5 years after the first amputation. It is well-established that the risk of mortality increases 2.5-fold in individuals with DM, who have new foot ulcers.[2] Diabetic foot is also considered the most common cause of hospitalization associated with diabetes.[1] Given that the duration of hospital stay in diabetic patients is longer and more expensive compared to individuals without diabetes, diabetic foot disease is also associated with increased economic burden.[6,7]

Despite all these adverse outcomes, diabetic foot disease is considered a preventable condition. Identifying the risk factors, that pave the way for diabetic foot disease, and taking precautions can lower the rate of disease and amputation.[2] The most important point in this regard is the assessment of patients' foot care behaviors and correct them as necessary. Patient education on foot care should be started immediately upon diagnosis of diabetes and this education should be repeated periodically. Diabetes and foot care education was shown to have reduced wound occurrence and amputation rate and decreased morbidity by 50%.[8]

This study investigated the knowledge levels, attitudes, and behaviors about foot care and diabetic foot disease in diabetic patients, who underwent follow-up at a tertiary health center.

Materials and Methods

The study included 327 patients aged over 18 years, who presented to Ankara Bilkent City Hospital Endocrinology and Metabolic Diseases Clinic and Outpatient Clinic between 20.02.2021 and 20.07.2021. Required approval as obtained from the Ethics Committee of Ankara Yıldırım Beyazıt University (AYBU) (Date: 16.02.2021, No: 13) before the onset of the study.

A three-part questionnaire was administered to patients, who volunteered to participate in this descriptive study. The first section included socio-demographic information and laboratory results of the subjects, whereas the second and third sections included information about diabetes, and items about diabetic foot knowledge level, respectively.

Height, weight, body mass index (BMI), and waist circumference were measured in all the patients, who participated in the study. A calibrated classical scale was used for weight measurement, a stadiometer was used for height measurement, and finally, BMI was calculated using the following formula: "weight (kg)/height (m^2)".[9] Waist circumferences were measured with a tape measure.

Laboratory results, including fasting plasma glucose (FPG), HbA1c, creatinine, triglycerides, total cholesterol, LDL (low-density lipoprotein) cholesterol, and HDL (high-density lipoprotein) cholesterol were retrieved from the hospital information system.

During the study, informed consent forms were collected from the participants and the questionnaire was administered utilizing face-to-face interviews held with the patients.

Diabetic Foot Disease Awareness Scale

There is no generally accepted scale used to determine diabetic foot awareness in the literature. The present study "Diabetic Foot Disease Awareness Scale" developed by the researchers consists of 32 items, each related to a different variable, and was prepared as a semi-structured scale to directly collect information.[10] For diabetic foot evaluation, positive behaviors are scored as '2', negative behaviors are scored as '1', and inadequate and unknown behaviors are scored as '0'. The reverse items (2, 8, 11, 13, 14, 15, 21, 24, 28, 29, 30, and 31) were scored as Yes=1, No=2, Don't know=0. The sum of the scores ranged between 0 and 64 (minimum-maximum). It was predicted that as the score increases, diabetic foot awareness increases and decreases as the score decreases. As a result of the research, the scores were divided into 3 segments based on median values for statistical evaluation to facilitate calculation. In this way, the findings obtained from the measurement tool were concretized by enabling item analysis. Accordingly, the total score obtained was grouped as "Low score"

if it was between 0-28; "Medium score" if it was between 29-50; and "High score" if it was between 51-64. An increase in the scores indicated an increased level of knowledge about diabetic foot disease, while a decrease indicated a low level of knowledge.

Statistical Analysis

The study data was analyzed using the Statistical Package for the Social Sciences (SPSS) Version 20 software program. The normal distribution hypothesis for the numerical data was tested by the Kolmogorov-Smirnov test. Normally distributed numerical data was expressed in mean ± standard deviation and non-normally distributed data was given in median (minimum-maximum). Categorical data were expressed in numbers and %. Student's t-test was used for numerical variables and Chi-squared test was used for categorical variables for the group comparisons. A P value below 0.05 was considered statistically significant.

Results

Of the 327 patients included in the study, 196 (59.93%) were female, 131 (40.06%) were male, and the median age was 57.00 years (minimum 19- maximum 91). 41(12.53%) of the patients had Type 1 DM and 286(87.46%) had Type 2 DM. According to their behaviors regarding diabetic foot disease, 79 (24.15%) patients were grouped as low-score, 144 (44.03%) as medium-score, and 104 (31.80%) as high-score. Socio-demographic characteristics of all the patients and separate groups are given in Table 1.

Table 1. Socio-demographic characteristics of all the patients and separate groups as points.

	All Patients n=327 (100%)	GROUPS by SCORE Low (0-28) n=79 (24.15%)	Medium (29-50) n=144 (44.03%)	High (51-64) n=104 (31.80%)	P
Gender					
Female	196 (59.93%)	47 (59.49%)	88 (61.11%)	61 (58.65%)	0.923
Male	131 (40.06%)	32 (40.50%)	56 (%38.88%)	43 (41.34%)	
Social Security					
Yes	316 (96.63%)	77 (97.46%)	137 (95.13%)	102 (98.07%)	0.401
No	11 (3.36%)	2 (2.53%)	7 (4.86%)	2 (1.92%)	
Place					
Urban	304 (92.96%)	74 (93.67%)	134 (93.05%)	96 (92.30%)	
Town	15 (4.58%)	3 (3.79%)	4 (2.77%)	8 (7.69%)	0.107
Village	8 (%2.44)	2 (2.53%)	6 (4.16%)	0 (0.00%)	
Education					
İlliterate	23 (7.03%)	9 (11.39%)	10 (6.94%)	4 (3.84%)	
Primary	177 (54.12%)	45 (56.96%)	92 (63.88%)	40 (38.46%)	**<0.001**
High School	68 (20.79%)	16 (20.35%)	26 (18.05%)	26 (25.00%)	
Faculty	59 (18.04%)	9 (11.39%)	16 (11.11%)	34 (32.69%)	
Marital Status					
Married	258 (78.89%)	65 (82.27%)	115 (79.86%)	78 (75.00%)	
Single	39 (11.92%)	8 (10.12%)	15 (10.41%)	16 (15.38%)	0.709
Others	30 (9.17%)	6 (7.59%)	14 (9.72%)	10 (9.61%)	
Working Status					
Employee	29 (8.86%)	6 (7.59%)	10 (6.94%)	13 (12.50%)	
Officer	22 (6.72%)	2 (2.53%)	6 (4.16%)	14 (13.46%)	
Self-employment	19 (5.81%)	6 (7.59%)	7 (4.86%)	6 (5.76%)	
Retired	97 (29.66%)	20 (25.31%)	48 (33.33%)	29 (27.88%)	**0.035**
Housewife	140 (42.81%)	40 (50.63%)	66 (45.83%)	34 (32.69%)	
Others	20 (6.11%)	5 (6.32%)	7 (2.14%)	8 (7.69%)	
Economic Status					
Bad	25 (7.64%)	3 (3.79%%)	10 (6.94%)	12 (11.53%)	
Normal	185 (56.57%)	41 (51.89%)	82 (56.94%)	62 (59.61%)	0.127
Well	117 (35.77%)	35 (44.30%)	52 (36.11%)	30 (28.84%)	
Smoking					
Yes	74 (22.62%)	16 (20.25%)	31 (21.52%)	27 (25.96%)	0.602
No	253 (77.37%)	63 (79.74%)	113 (78.47%)	77 (74.03%)	
Alcohol					
Yes	15 (4.58%)	4 (%5.06)	3 (2.08%)	8 (7.69%)	0.111
No	362 (95.41%)	75 (%94.93)	141 (97.91%)	96 (92.30%)	
DM in Family					
Yes	184 (56.26%)	42 (53.16%)	81 (56.25%)	61 (58.65%)	
No	143 (43.73%)	37 (46.83%)	63 (43.75%)	43 (41.34%)	0.760
Chronic Diseases					
No	108 (33.02%)	25 (31.64%)	47 (32.63%)	36 (34.61%)	
CVD	40 (12.23%)	9 (11.39%)	21 (14.58%)	10 (9.61%)	
Hyperlipidemia	18 (5.50%)	6 (7.59%)	7 (4.86%)	5 (4.80%)	
Hypertension	79 (24.15%)	21 (26.58%)	37 (25.69%)	21 (20.19%)	
COPD	10 (3.05%)	3 (3.79%)	4 (2.77%)	3 (2.88%)	
Asthma	20 (6.11%)	6 (7.59%)	10 (6.94%)	4 (3.84%)	
CRD	20 (6.11%)	2 (2.53%)	5 (3.47%)	13 (12.50%)	
Liver Diseases	6 (1.83%)	2 (2.53%)	3 (2.08%)	1 (0.96%)	
Stroke	1 (0.30%)	0 (0.00%)	0 (0.00%)	1 (0.96%)	0,332
Rheumatohlogic D.	4 (1.22%)	1 (1.26%)	0 (0.00%)	3 (2.88%)	
Cancer	5 (1.52%)	0 (0.00%)	5 (3.47%)	0 (0.00%)	
Others	16 (4.89%)	4 (5.06%)	5 (3.47%)	7 (6.73%)	
Drugs					
Yes	157 (48.01%)	38 (48.10%)	70 (48.61%)	49 (47.11%)	0.973
No	170 (51.98%)	41 (51.89%)	74 (51.38%)	55 (52.88%)	

In a comparison of the patient groups by scores, there was no difference by age, gender, social security status, place of residence, marital status, income status, smoking and alcohol use, family history of DM, chronic disease status, and medications in use. There was a significant intergroup difference by educational status and employment status (p<0.001, p=0.035, respectively). Accordingly, as the educational level of the patients increased, their level of knowledge about diabetic foot also increased. Furthermore, the rate of actively employed patients was higher in the group with a higher level of knowledge.

Upon comparison of anthropometric measurements, the body weight, BMI, and waist circumference were highest in the low-score group and lowest in the high-score group (p=0.053, respectively, p=0.007, p=0.003). There were no significant intergroup differences by arterial blood gas (ABG), HbA1c, creatinine, triglycerides, total cholesterol, LDL-cholesterol, and HDL-cholesterol (Table 2). Upon comparison of the patient groups by score based on diabetes-related characteristics, there was no intergroup difference by self-measurement of blood glucose, occurrence of known microvascular complications, medical nutrition therapy, and occurrence of diabetic foot ulcer and amputation.

There was a significant intergroup difference by the type of diabetes (p=0.003). The rate of patients diagnosed with Type 1 DM was highest in the high-score group and the rate of patients diagnosed with Type 2 DM was highest in the medium-score group (21.15% and 78.84%, respectively). There was a significant intergroup difference by DM duration (years) (p=0.004). Patients with a longer duration of diabetes were mostly included in the high-scoring group.

The difference between the groups by diabetes education was significant (p=0.009). The rate of patients, who received diabetes education was highest in the high-scoring group (75.96%) and the rate of patients, who did not receive diabetes education was highest in the low-scoring group (45.56%). There was a significant intergroup difference by foot care education status (p=0.003). The rate of patients, who received foot care education was highest in the high-score group and the rate of patients, who did not receive foot care education, was highest in the low-score group (30.76% and 89.87%, respectively).

There was a significant intergroup difference in the treatment the patients were receiving (p=0.009). The rate of patients, who took only oral anti-diabetics (OAD) was highest in the low-scoring group (58.22%), the rate of patients using OAD plus insulin was highest in the medium-score group (24.30%), and the rate of patients using insulin was highest in the high-scoring group (47.11%).

The difference between the groups was significant by exercise in the patients included in the study (p=0.003). The rate of patients, who did not exercise was highest in the medium-score group, the rate of patients, who exercised was highest in the high-score group, and the rate of patients, who exercised irregularly was highest in the medium-score group (29.16%, 45.13%, and 42.30%, respectively).

Table 2. According to the diabetic foot disease awareness scale score distribution in diabetic patients age, anthropometric measurements and laboratory data

	All Patients n=327 (100%)	GROUPS by SCORE			P
		Low (0-28) n=79 (24.15%)	Medium (29-50) n=144 (44.03%)	High (51-64) n=104 (31.80%)	
Age (Year)	57.00 (19-91)	57.00 (19-78)	59.00 (21-91)	55.00 (20-78)	0.109
Height (cm)	165.00 (145-186)	164.00 (145-186)	165.00 (148-185)	165.00 (148-185)	0.235
Weight (kg)	81.00 (40-168)	85.00 (42-130)	80.00 (40-140)	80.00 (42-168)	**0.053**
BMI (kg/m²)	29.96 (13.84-65.83)	31.64 (15.06-50.78)[a]	29.73 (13.84-52.05)	29.00 (16.71-65.63)	**0.007**
Waist (cm)	102.00 (36-160)	108.00 (36-160)[a]	103.00 (60-154)[b]	100.00 (42-142)	**0.003**
FPG (mg/dL)	139.00 (25-586)	131.00 (81-266)	142.50 (36-586)	141.00 (25-399)	0.461
HbA1c (%)	7.60 (2.10-18.90)	7.00 (2.90-14.30)	7.60 (2.10-18.90)	7.85 (3.60-17.80)	0.168
Creatinine (mg/dL)	0.80 (0.00-63.00)	0.78 (0.00-3.80)	0.77 (0.19-6.30)	0.83 (0.46-63.00)	0.483
Triglyceride (mg/dL)	144.00 (50.00-659.00)	146.00 (71.00-659.00)	141.50 (50.00-529.00)	145.00 (56.00-633.00)	0.842
Total Cholesterol (mg/dL)	175.00 (53.00-401.00)	179.00 (60.00-291.00)	171.00 (97.00-401.00)	174.00 (53.00-343.00)	0.895
LDL Cholesterol (mg/dL)	101.00 (11.20-420.00)	96.00 (16.40-207.00)	105.00 (11.20-395.00)	99.50 (22.20-420.00)	0.550
HDL Cholesterol (mg/dL)	55.00 (3.19-247.00)	65.00 (5.10-247.00)	53.00 (3.19-246.00)	53.00 (3.25-236.00)	0.374

BMI: Body Mass Index, FPG: Fasting plasma glucose a. It indicates that there is a statistical difference between patients with high scores and patients with low scores. b. It indicates that there is a statistical difference between patients with medium scores and low scores.

There was a significant intergroup difference by diabetic foot examination status (p<0.001). The rate of diabetic foot examination was highest in the high-score group (25.96%) and the rate of non-performance was highest in the low-score group (94.93%).

The numbers and percentages of the responses given to the diabetic foot disease awareness scale in the present study are shown in Table 3.

The diabetic foot disease awareness scale and scores by groups are shown in Table 4.

Table 3. Disease-related findings according to diabetic foot awareness scale distribution in patients diagnosed with diabetes

	All Patients n=327 (100%)	Low (0-28) n=79 (24.15%)	Medium (29-50) n=144 (44.03%)	High (51-64) n=104 (31.80%)	P
Type of DM					
Type 1 DM	41 (12.53%)	4 (5.06%)	15 (10.41%)	22 (21.15%)	**0.003**
Type 2 DM	286 (87.46%)	75 (26.22%)	129 (89.58%)	82 (78.84%)	
Duration of DM (Year)	10.00 (1-47)	7.00 (1-30)[a]	10.00 (1-47)[b]	10.00 (1-35%)	**0.004**
Education of DM					
Yes	217 (66.36%)	43 (54.43%)	95 (65.97%)	79 (75.96%)	**0.009**
No	110 (33.63%)	36 (45.56%)	49 (34.02%)	25 (24.03%)	
Treatment					
OAD	136 (41.59%)	46 (58.22%)	57 (39.59%)	33 (31.73%)	
OAD+Insulin	70 (21.40%)	13 (16.45%)	35 (24.30%)	22 (21.15%)	**0.004**
Insulin	121 (37.00%)	20 (25.31%)	52 (36.11%)	49 (47.11%)	
Self-monitoring					
Yes	279 (85.32%)	65 (82.27%)	120 (83.33%)	94 (90.38%)	0.205
No	48 (14.67%)	14 (17.72%)	24 (16.66%)	10 (9.61%)	
Microvascular complications					
No	280 (85.62%)	72 (91.13%)	118 (81.94%)	90 (86.53%)	
Retinopathy	12 (3.66%)	3 (3.79%)	6 (4.16%)	3 (2.88%)	
Nephropathy	10 (3.05%)	0 (0.00%)	7 (4.86%)	3 (2.88%)	
Neuropathy	14 (4.28%)	4 (5.06%)	6 (4.16%)	4 (3.84%)	0.575
Nephropathy+Neuropathy	5 (1.52%)	0 (0.00%)	3 (2.08%)	2 (1.92%)	
Retinopathy+ Nephropathy	4 (1.22%)	0 (0.00%)	2 (1.38%)	2 (1.92%)	
Retinopathy+ Nephropathy +Neuropathy	2 (0.61%)	0 (0.00%)	2 (1.38%)	0 (0.00%)	
Nutrition therapy					
No	82 (25.07%)	20 (25.31%)	42 (29.16%)	20 (19.23%)	0.257
Yes	114 (34.86%)	24 (30.37%)	46 (31.94%)	44 (42.30%)	
Irregular	131 (40.06%)	35 (40.30%)	56 (38.88%)	40 (38.46%)	
Physical activity					
No	113 (34.55%)	30 (37.97%)	55 (38.19%)	28 (26.92%)	
Yes	86 (26.29%)	22 (27.84%)	24 (16.66%)	40 (38.46%)	**0.003**
Irregular	128 (39.14%)	27 (34.17%)	65 (45.13%)	36 (34.61%)	
Foot care training					
Yes	69 (21.10%)	8 (10.12%)	29 (20.13%)	32 (30.76%)	**0.003**
No	258 (78.89%)	71 (89.87%)	115 (79.86%)	72 (69.23%)	
Foot examination					
Yes	48 (14.67%)	4 (5.06%)	17 (11.80%)	27 (25.96%)	**<0.001**
No	279 (85.32%)	75 (94.93%)	127 (88.19%)	77 (74.03%)	
Diabetic foot disease					
Yes	32 (9.78%)	5 (6.32%)	14 (9.72%)	91 (12.50%)	0.380
No	295 (90.21%)	74 (93.67%)	130 (90.27%)	13 (87.50%)	
Amputation					
Yes	8 (25.00%)	1 (20.00%)	2 (14.28%)	5 (38.46%)	0.336
No	24 (75.00%)	4 (80.00%)	12 (85.71%)	8 (61.53%)	

a. It indicates that there is a statistical difference between patients with high scores and patients with low scores. b. It indicates that there is a statistical difference between patients with medium scores and low scores.

Table 4. The diabetic foot disease awareness scale and scores by groups

	All Patients n=327 (100%)		
	Yes n/Percent	**No n/Percent**	**No idea n/Percent**
1. Ulcers or wounds that occur on the feet of diabetic patients are defined as diabetic feet.	169 (51.68%)	44 (13.45%)	114(34.86%)
2. *Small wounds on the feet of diabetic patients are not important and should not be taken into consideration.	60 (18.34%)	202 (61.77%)	65 (19.87%)
3. Diabetic foot occurs due to diabetes	201 (61.46%)	36 (11.00%)	90 (27.52%)
4. Long-term diabetes is an important factor in the development of diabetic foot.	212 (64.83%)	30 (9.17%)	85 (25.99%)
5. High blood sugar levels are effective in the formation of diabetic foot.	200 (61.16%)	25 (7.64%)	102 (31.19%)
6. Numbness, tingling, and loss of sensation in the feet of diabetic patients are effective in the formation of diabetic feet.	212 (64.83%)	30 (9.17%)	85 (25.99%)
7. Irregular and uncontrolled blood sugar for a long time disrupts the structure of the capillaries in the feet.	200 (61.16%)	28 (8.56%)	99 (30.27%)
8. *Dry feet in diabetic patients do not pose a risk for diabetic feet.	68 (20.79%)	129 (39.44%)	130 (39.75%)
9. Sweating of the feet in diabetic patients may cause diabetic foot.	123 (37.61%)	50 (15.29%)	154 (47.09%)
10. When diabetes is not controlled, toes, feet, or legs may have to be amputated.	222 (67.88%)	26 (7.95%)	79 (24.15%)
11. *After amputation of a toe, foot, or leg due to uncontrolled diabetes, there is no risk for the other foot.	56 (17.12%)	142 (43.42%)	129 (39.44%)
12. Hyperbaric oxygen therapy can be applied to wounds in diabetic patients.	82 (25.07%)	34 (10.39%)	211 (64.52%)
13. *Deformity of the feet in diabetic patients is not important in the formation of diabetic feet.	53 (16.20%)	110 (33.63%)	164 (50.15%)
14. *Clogging in the leg veins of diabetic patients does not affect the formation of diabetic foot.	54 (16.51%)	125 (38.22%)	148 (45.25%)
15. *In diabetic patients, a small scratch, cut, sting, or shoe bump on the foot does not cause diabetic foot.	69 (21.10%)	126 (38.53%)	132 (40.36%)
16. Feet and between the toes should be checked every day for redness, swelling, cuts, and calluses.	205 (62.69%)	36 (11.00%)	86 (26.29%)
17. If necessary, a mirror can be used to see the sole of the foot.	207 (63.30%)	27 (8.25%)	93 (28.44%)
18. Feet should be washed with warm water every day and dried thoroughly.	231 (70.64%)	19 (5.81%)	77 (23.54%)
19. The temperature of the water must be controlled to protect the feet of diabetic patients from burns.	212 (64.83%)	25 (7.64%)	90 (27.52%)
20. It is important to dry the feet, especially between the toes.	230 (70.33%)	27 (8.25%)	70 (21.40%)
21. *Calluses on the feet of diabetic patients can be treated at home. Callus medicine can be used. There is no need to go to the doctor.	76 (23.24%)	155 (47.40%)	96 (29.35%)
22. Toenails should be cut straight across.	196 (59.93%)	38 (11.62%)	93 (28.44%)
23. Diabetic patients should not cut their toenails deeply and should not have a pedicure.	175 (53.51%)	43 (13.14%)	109 (33.33%)
24. *Walking barefoot prevents diabetic foot formation. Therefore, there is no need to constantly use slippers at home.	86 (26.29%)	112 (34.25%)	129 (39.44%)
25. To avoid foot sores, durable shoes that are easy to put on, not tight, with soft leather, thick soles, and wide toes should be chosen.	212 (64.83%)	24 (7.33%)	91 (27.82%)
26. Before wearing the shoes, the shoes should be turned inside out and shaken to see if there is a foreign object inside.	228 (69.72%)	19 (5.81%)	80 (24.46%)
27. Seamless, cotton, or woolen socks should be preferred in diabetic patients to avoid wounds on their feet.	206 (62.99%)	33 (10.09%)	88 (29.91%)
28. *Socks do not need to be changed every day. It can be changed every two or three days.	76 (23.24%)	178 (54.43%)	73 (22.32%)
29. *Diabetics should rest their feet in a warm place to warm them. (Heating, stove, foot warmer, pad, etc.)	65 (19.87%)	162 (49.54%)	100 (30.58%)
30. *Diabetic patients with visual impairment do not need to have their feet checked by a relative.	50 (15.29%)	182 (55.65%)	95 (29.05%)
31. *It does not matter if there is fungus on the feet or nails. It does not need to be treated.	45 (13.76%)	191 (58.40%)	91 (27.82%)
32. To increase the blood flow in the feet, it is necessary to sit and raise the feet every two or three hours.	176 (53.82%)	28 (8.56%)	123 (37.61%)

* It indicates distracting substances.

Discussion

Diabetic foot disease, one of the important complications of DM, decreases the patient's quality of life, increases the likelihood of amputation and mortality, and increases treatment costs.[11] This study aimed to investigate the level of knowledge and behaviors of patients about diabetic foot, 24.15% of the patients had low, 44.03% had medium, and 31.80% had high scores. Therefore, the patients with low and moderate levels of knowledge about diabetic foot constituted 68.18% of the study group.

A study by Kalaycı et al investigated the knowledge, attitudes, and behaviors of patients with diabetes about foot care and diabetic foot and reported that half of the patients thought that foot care was important.[8] A study by Goie et al. found that awareness of diabetic foot very quite low.[12] A study by Singh et al. from India reported that there was a great lack of awareness about diabetic foot among the general population in and around Wardha.[13] In a study by Dhandapani et al. from South India, which investigated the practices and associated factors related to foot care of patients with diabetes, 64.2% of the participants had a satisfactory knowledge level and 63.6% maintained satisfactory practices about diabetic foot. The knowledge and practice levels of patients with diabetes regarding foot care were assessed as low and it was emphasized that educational plans should be implemented.[14] In a study by Çolak et al., which measured the knowledge levels of patients about diabetic foot care and diabetic foot ulcers, it was reported that 58.5% of the patients gave correct answers to the questionnaire items, but they were undecided about some distracting questions, including the use of vaseline and cream in foot care, cutting the nails straight, and choosing a shoe model. In daily practice, 61.4% of the patients performed correct applications.[15] The results of the present study are consistent with those reported by previous studies in the relevant literature.

In this study, a comparison of patients with low, medium, and high scores by diabetic foot behaviors, it was seen that there was no intergroup difference by age, gender, social security status, place of residence, marital status, income status, smoking and alcohol use, family history of DM, chronic disease status, and medications in use. A study by Yücel et al., which investigated the knowledge, attitudes, and behaviors of diabetic patients about diabetic foot and foot care, did not find any effect of gender, education, DM education, and treatment type on knowledge, attitudes, and behaviors. The same study reported that the duration of diagnosis, frequency of control, and risk status for diabetic foot did not affect the level of knowledge, while attitude and behavior scores were higher in the participants, who were followed up for 10-20 years, who had regular control visits, and who were at high risk for diabetic foot.[16]

In the present study, upon a comparison of patients with low, medium, and high scores, there was a significant difference between the groups by educational status and employment status. A study by Alharbi et al. found a statistically significant relationship between a good level of knowledge and patients' age, education level,

monthly family income, duration of diabetic disease, and prior knowledge about foot care.[17] A study by Ergözen et al. suggested that there might be a positive correlation between educational status and patients' awareness of diabetic foot and the importance they attached to the subject.[18] In a study by Alshammari et al., it was found that patients with higher education levels had better awareness of diabetic foot care.[19] A study by Çelik et al. reported that the education level and treatment type of individuals were the factors that significantly affected foot care behaviors and these factors explained 7% of the total variance at the level of foot care behavior.[20] Another study emphasized that patients with secondary education and above had good practice scores as in many other previous studies.[21] Upon a review of the above studies, it is seen that the level of education increased diabetic foot awareness consistent with the present study.

As regards the employment status in this study, the rate of workers and civil servants was higher in the high-scoring group. This may be attributed to the high level of education and income among workers and civil servants. The reason why the rate of self-employed and housewives was higher in the low-score group and the rate of retired people was highest in the middle-score group might again be associated with the level of education and lifestyle. In other similar studies, low income and low educational status were suggested to have increased the risk of diabetic foot disease.[22-25]

In the present study, body weight, BMI, and waist circumference levels were highest in the low-score group and lowest in the high-score group. There were no significant intergroup differences by FPG, HbA1c, creatinine, triglycerides, total cholesterol, LDL-cholesterol, and HDL-cholesterol. This may be because the majority of our study group consists of patients who are under treatment and regularly followed up. A study by Vibha et al. found that anthropometric measurements, including BMI, waist circumference, clinical parameters such as HbA1c, and presence of comorbidities such as hypercholesterolemia were not significant for diabetic foot awareness as in the present study.[26] However, in this study, HbA1c and cholesterol levels could not be measured in all patients, and this was reported as a limitation of the study.

In this study, upon a comparison of disease-related results by diabetic foot behavior score distribution in patients diagnosed with diabetes, it was seen that there was no intergroup difference by blood glucose self-measurement status, known microvascular complications, medical nutrition therapy, and occurrence of diabetic foot and amputation, which was consistent with the previous studies in the relevant literature.[16] There was a significant intergroup difference by the type of diabetes. The rate of patients diagnosed with Type 1 DM was highest in the high-score group and the rate of patients diagnosed with Type 2 DM was highest in the medium-score group. The high level of awareness in patients diagnosed with type 1 DM may be explained by the long duration of diabetes, younger age, and higher educational level.[19] There was a significant intergroup difference by duration of diabetes. As the duration of diabetes increases, awareness of diabetic foot increases and this is consistent with the literature.[16,17]

There was a significant intergroup difference in diabetes education. The rate of patients, who received diabetes education, was highest in the high-score group (75.96%), while the rate of patients, who did not receive DM education was highest in the low-scoring group (45.56%). Previous studies suggested that patients, who received good education about diabetes and diabetic foot care, were more knowledgeable and adopted more positive attitudes towards diabetic foot care.[13,17,19,27]

In the present study, there was a significant intergroup difference in treatment received by the patients. The rate of patients, who took OAD was highest in the low-score group, the rate of patients on OAD+insulin was highest in the medium-score group, and the rate of patients on insulin was highest in the high-score group. A study by Shaki et al. reported that there was a significant relationship between patients on insulin and combination therapy and peripheral neuropathy and the occurrence of foot ulcers.[27] There is a similarity between our study and the previous studies in the relevant literature.

In this study, there was a significant intergroup difference in participants' exercise status. The rate of patients, who did not exercise was highest in the medium-score group, the rate of patients, who exercised was highest in the high-score group, and the rate of patients, who exercised irregularly was highest in the medium-score group. This result confirmed that patients, who exercised, were more aware of diabetic foot.

Education is an important tool to improve foot care awareness in individuals with DM. In the present study, there was a significant intergroup difference by foot care education status. The rate of patients who received foot care education was highest in the high-score group and the rate of patients who did not receive foot care education was highest in the low-score group, and this result was consistent with those of the previous studies in the relevant literature.[28] There was also a significant intergroup difference by status of foot examination. The rate of performing diabetic foot examination was the highest in the high-score group (25.96%), and the rate of not performing diabetic foot examination was the highest in the low-score group (94.93%).[13,17] As in the literature, performing foot examinations during visits is a factor that increases disease awareness.[16,17]

The most important limitation of the present study is that the data were obtained based on patient declarations based on responses to questionnaire items. The foot care behaviors of the individuals were not observed by the researchers. Another limitation is that the study was single-centered. Future studies that would include the general population can help with obtaining detailed information and ensure that public awareness is better measured. In addition, if awareness of some issues is not sufficient even in patients diagnosed with diabetes who present to endocrine clinics and outpatient clinics, it can be expected that awareness would be much lower in a study to be conducted in the general population. Another limitation of our study is that although a comprehensive assessment was made, the scale in use was not standardized.

In conclusion, diabetic foot disease, which is the most common cause of hospitalization and prolonged hospital stay in patients with DM, decreases the quality of life of the patients, increases treatment costs, and leads to an increase in the likelihood of amputation and mortality. In light of the results of the present study, diabetic foot awareness is inadequate in the patient group included in the study. The most important point in the prevention of diabetic foot disease is to improve foot care behaviors. Accordingly, it is necessary to raise awareness of patients, especially in the risk group, utilizing diabetes and foot care education and to repeat these trainings periodically before the occurrence of diabetic foot.

Ethical Considerations: Ankara Bilkent City Hospital Endocrinology and Metabolic Diseases Clinic and Outpatient Clinic between 20.02.2021 and 20.07.2021. Required approval as obtained from the Ethics Committee of Ankara Yıldırım Beyazıt University (AYBU) (Date: 16.02.2021, No: 13)

Conflict of Interest: The authors declare no conflict of interest.

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QUALITY OF LIFE AND DIGITAL GAME ADDICTION IN ADOLESCENTS DURING COVID-19 PANDEMIC: A WEB-BASED CROSS-SECTIONAL STUDY

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Abstract

Objectives: This study aimed to investigate the effect of digital game addiction on the health-related quality of life of adolescents.

Materials and Methods: The sample of this descriptive and cross-sectional study consisted of 300 adolescents between the ages of 10 and 14. The study was carried out in Konya, located in the center of Turkey, between February and June 2021, when there were pandemic restrictions. Participants were recruited through the snowball sampling method using an online web-based platform. Data were collected with the Personal Information Form, Digital Game Addiction Scale for Children, and KIDSCREEN-27 Health-related Quality of Life Questionnaire.

Results: The study revealed that the mean digital game addiction score of the adolescents was 53.32±20.84 and the majority (39.7%) were in the low-risk group for digital game addiction. A weak and moderate relationship was found between digital game addiction and the factors of the KIDSCREEN-27 Questionnaire and the time spent on digital gaming during the COVID-19 pandemic. Low psychological well-being, a bad school environment, young age, being a male, and spending higher amounts of time playing digital games during the pandemic were determined to be the predictors of digital game addiction (p<0.05). It was revealed that predictors explained 32% of digital game addiction.

Conclusion: It was revealed that digital game addiction affects health-related quality of life, and digital game addiction is affected by some demographic characteristics, psychological well-being, and school environment.

Keywords: Adolescent, children, digital game addiction, nursing, quality of life.

Introduction

The period of adolescence includes many biopsychosocial changes and challenges such as gaining independence, discovering identity areas, and learning to cope with difficulties in daily life and school.[1] Restrictions such as the closure of schools and continuing education online from home were introduced throughout the world during the COVID-19 pandemic to stop and limit the spread of the virus.[2] In addition to coping with the challenges of adolescence, children and adolescents had to comply with the restrictions imposed by the pandemic, which has been particularly challenging for them.[1] The pandemic has caused a significant change in the quality of life (QoL) of adolescents.[3]

Health-related quality of life (HRQoL) is characterized as the overall sense of well-being derived from one's assessment of the various areas of his or her life by considering their impact on health status.[3] QoL refers to the physical, psychological, social, mental, and functional health status of individuals.[4] Lack of physical activity and increased levels of stress due to the pandemic have affected the HRQoL of adolescents. The study conducted by Ravens-Sieberer et al. (2022)[1] revealed a significant decrease in the HRQoL among adolescents during the pandemic when compared to the pre-pandemic period.

With the pandemic, children's screen time at home has increased due to the restrictions on social gatherings and playing outside.[3,5] Digital technologies are important for online education; however, there is also an increase in the rate of playing digital games.[6,7] Digital games can affect adolescents positively or negatively depending on the content of the games and when and how much they are played. Especially, children in the developmental period are more easily exposed to the negative effects of digital games cognitively, emotionally, socially, and physically.[8] Xu et al. (2020)[9] investigated adolescents' Internet addiction and found that long-term Internet use decreases physical activities and leads to physical problems such as obesity, and physical discomfort, including pain in areas such as the neck, shoulders, and back. Furthermore, extended screen time may lead to hearing and visual impairments. The heightened risk of accidents, such as falls, slips, or hits, is also a concern. Other potential repercussions encompass disruptions in circadian rhythm and a decline in overall sleep quality. In addition, since the screen-related activities of children increased during the pandemic, it is thought that their frequency of playing online games also increased, which in turn affected the HRQoL of children.[10]

It is noteworthy that studies mostly focused on reduced QoL during the pandemic[1,3,9] or focused only on Internet and game addiction.[2,6,11] The literature review undertaken indicated a gap in research, with no existing studies exploring the association between adolescents' QoL and digital game addiction (DGA) specifically during the COVID-19 pandemic. Consequently, the current study was designed to fill this void by investigating the impact of QoL on adolescents' DGA in the context of the pandemic.

The study aimed to address the following research questions:

1. What are the mean scores for the quality of life and digital game addiction among adolescents during the COVID-19 pandemic?

2. Is there a relationship between the demographic characteristics of the adolescents and their quality of life and digital game addiction mean scores?

3. What factors contribute to the digital game addiction of adolescents during the COVID-19 pandemic?

Materials and Methods

Study design

The study is a descriptive and cross-sectional study. This study was reported according to the STROBE checklist.

Participants and Sample

The research took place from February to June 2021, amidst pandemic restrictions, involving individuals aged 10 to 14 in Konya, situated in the central region of Turkey. The age group of the study was determined according to the age group to which the measurement tools used in the study were administered. Using the snowball sampling method, one of the improbable sampling methods, adolescents who used computers, tablets, or smartphones, who attended school, and who volunteered to take part in the research took the online survey. Adolescents (a) who were not between the ages of 10-14, and (b) who were complete in the survey data incompletely were excluded from the study.

The sample size was determined using a single sample t-test through apriori power analysis in the G-power 3.1.9.2 program. Taking into account the mean scale score and standard deviation (83.67±13.50) from Buctot et al.'s (2020) study, a minimum sample size of 300 was calculated, maintaining 95% power, a significance level of 0.05, and an effect size of 0.2.

Measures

Data were collected using the Participant Information Form, the Digital Game Addiction (DGA) Scale for Children, and the KIDSCREEN-27 Health-Related Quality of Life (HRQoL) Questionnaire.

Participant Information Form: The questionnaire was created by the researchers by existing literature.[2,12,13] It includes questions on the sociodemographic characteristics of the adolescents (age, gender, educational status, perceived family income, number of siblings, family type, place of residence, chronic illnesses, whether the child has his room, perceived academic success) and on parent characteristics (age, education level, employment status of parents, etc.). In addition, our literature review showed that games played on computers, smartphones, or tablets are considered digital games.[14] For this reason, the second part of the questionnaire includes questions regarding the participants' possession of a computer and smartphone, their Internet use, and the time they spent playing digital games.

Digital Game Addiction Scale for Children: Hazar and Hazar (2017) developed a 24-item scale aimed at assessing levels of DGA in children aged 10-14. Respondents rate items on a five-point Likert scale. The scale encompasses four factors: excessive focus on and conflict over digital gaming, tolerance development during playtime and the value attributed to play, delaying individual and social tasks/homework, and psychological-physiological reflection of deprivation of and immersion in play. Scores on the scale can range from 24 to 120. The scale categorizes scores into five ranges: 1-24 (Normal), 25-48 (Low-risk), 49-72 (Risk), 73-96 (Addicted), and 97-120 (Highly addicted). The original scale has a Cronbach's alpha (α) of 0.90, while in this study, α the scale was determined to be 0.95.

KIDSCREEN-27 HRQoL *Questionnaire:* The questionnaire, developed by Robitail et al. (2007) to assess the QoL in children aged 8-18, was subjected to a Turkish validity and reliability study conducted by Baydur et al. (2016).[15] Comprising 27 items rated on a five-point Likert-type scale, the questionnaire categorizes items into five factors: physical well-being, psychological well-being, autonomy and relationships with parents, social support and peers, and school environment. Unlike the original scale, a total QoL score cannot be computed. Higher scores on the questionnaire indicate a better QoL. The score for each factor is calculated based on the T value, which is called the Rasch score. The mean T value is converted into 50 and the standard deviation of the T value is converted into 10. The α value of the original questionnaire is in the range of 0.80-0.841.[16] The α was found to be 0.86 in this study.

Data Collection

Data were gathered in two steps. First, after obtaining the necessary permissions, the online survey link created via a web-based platform (http://www.surveey.com/survey/) was sent to the parents and their consent was

obtained. Parents received the survey links via e-mail or WhatsApp. In the second step, the children individually completed the questionnaires online under parental control. Later, the parents shared the survey link with other parents in Konya who met the research criteria via WhatsApp.

Statistical analysis

The SPSS 22 (IBM Corporation, New York, NY) program was used to analyze the data. There were no missing values in the data. To assess the normal distribution of the data, the Kolmogorov-Smirnov test was employed. Descriptive statistics, including number, percentage, mean, and standard deviation, were utilized to present the data. The Pearson correlation analysis was conducted to explore relationships between variables. Multiple linear regression analysis, employing the enter method, was performed to predict the impact of sociodemographic variables and factors from the KIDSCREEN-27 HRQoL Questionnaire on DGA. All dichotomous variables were recoded as dummy variables (e.g., 0 or 1). The outcomes of the analyzed model were presented, including B (95% CI), standard error (SE), estimated β, adjusted R^2, F-test, and p-value for each variable. The statistical significance threshold for tests was established at $p < 0.05$.

Ethical considerations

The study adhered to ethical standards, as evidenced by obtaining approval from the ethics committee (IRB: 2021/14) before initiation. The principles outlined in the Helsinki Declaration were followed. An informed consent form, detailing the research's purpose, was provided on the first page of the online questionnaire to ensure participants were well-informed before participating. The participants were allowed to fill out the questionnaire after giving consent. Necessary permissions were obtained from the authors regarding the use of the scales.

Results

Of the 300 participants, 33% were male, 20.7% were 14 years old, and 76% had a nuclear family. 59.3% of the adolescents perceived their family income as medium; 74% lived in the city center, and 78.7% had two or more siblings. It was found that 18.3% had a chronic disease; 25.7% contracted the COVID-19 disease, and 66.3% evaluated their academic success as good. The average age of mothers was 39.36±5.99 years, and for fathers, it was 42.71±6.35 years. The education level of most parents was primary school (mothers 39%; fathers 28%). 20.3% of the mothers and 89% of the fathers worked in an income-generating job (Table 1). When the adolescents' use of digital tools was examined, it was seen that 74.7% had their computer, smartphone, and/or tablet; 74% played games with digital tools, and 92.7% had Internet access. The time spent on digital games during the pandemic was 5.72 (7.07) hours (Table 1).

Table 1. Demographic characteristics of the participants (n= 300)

Variables	n (%)	Variables	n (%)
Gender		**Mother's Education**	
Male	99 (33)	Bachelor	58 (19.3)
Female	201 (67)	High School	64 (21.3)
Age		Middle School	47 (15.7)
10	39 (13)	Elementary	117 (39)
11	50 (16.6)	Never studied	14 (4.7)
12	56 (18.7)	**Father's Education**	
13	93 (31)	Bachelor	81 (27)
14	62 (20.7)	High School	78 (26)
Family type		Middle School	50 (16.7)
Nuclear	228 (76)	Elementary	84 (28)
Extended	58 (19.3)	Never studied	7 (2.3)
Separated	14 (4.7)	**Mother's working status**	
Family Income Type		Working	61 (20.3)
Good	105 (35)	Not working	239 (79.7)
Moderate	178 (59.3)	**Father's working status**	
Poor	17 (5.7)	Working	267 (89)
Place of Residence		Not working	33 (11)
City	222 (74)	**Has his/her own computer/smartphone/tablet computer**	
Town	58 (19.3)	Yes	224 (74.7)
Village	20 (6.7)	No	76 (25.3)
Number of siblings		**Playing games on the computer/smartphone/tablet computer**	
Only child	64 (21.3)	Yes	222 (74)
2 +	236 (78.7)	No	78 (26)
Chronic disease		**Has Internet connection**	
Yes	55 (18.3)	Yes	278 (92.7)
No	245 (81.7)	No	22 (7.3)
Contracted COVID-19		**Time spent on digital games during the COVID-19 pandemic, hours, Mean ± SD**	5.72 ±7.07
Yes	77 (25.7)		
No	223 (74.3)		
Academic achievement			
Good	199 (66.3)		
Average	92 (30.7)		
Poor	9 (3)		

The Relationship between the HRQoL and DGA Mean Scores of Adolescents

The mean DGA Scale score of the adolescents was found to be 53.32±20.84. 7% (n=21) of the adolescents were found to have normal levels of DGA, while 39.7% (n=119) were in the low-risk and 31.7% (n=95) were in the risk group. 20.3% (n=61) were found to be addicted and 1.3% (n=4) were found to be highly addicted to digital games. The adolescents obtained the lowest mean score on the factor of psychological well-being (42.82±11.44) and the highest mean score on the factor of school environment (51.72±12.24) in the KIDSCREEN-27 HRQoL Questionnaire. A significant negative and moderate correlation was identified between DGA and mean scores on physical well-being, psychological well-being, and school environment factors (r= -0.250, r=- 0.276, r= -0.430; p<.001, respectively). Additionally, a significant negative and weak correlation was observed between DGA and mean scores on autonomy and parent relations, as well as social support and peer factors (r=-0.196, r=-0.192; p<.001, respectively). Conversely, a significant positive and moderate correlation was found between DGA and the time spent on digital gaming during the COVID-19 pandemic (r=-0.457, p<.001). Notably, age was determined to have no significant effect on DGA (p>0.05; Table 2).

Table 2. Correlation between digital gaming addiction, quality of life, time spent on digital games during the pandemic, and adolescent age (n= 300)

	Mean	SD	1	2	3	4	5	6	7	8
Digital Game Addiction Scale	53.32	20.84	---							
HRQoL (KIDSCREEN-27 T-Score)										
Physical wellbeing	46.3	10.51	-0.250***	---						
Psychological wellbeing	42.82	11.44	-0.276***	0.618***	---					
Autonomy &Parent relations	44.48	11.65	-0.196***	0.479***	0.578***	---				
Peers & Social support	44.77	12.86	-0.192***	0.387***	0.292***	0.385***	---			
School environment	51.72	12.24	-0.430***	0.454***	0.479***	0.484***	0.285***	---		
Time spent on digital games (hours) during the pandemic	5.72	7.07	0.457***	-0.194***	-0.143*	-0.069	-0.102	-0.339***	---	
Age	12.3	1.32	-0.067	-0.245***	-0.282***	-0.123**	0.032	-0.191***	-0.094	---

*p<.05;**p<.01;***p<.001.

Multiple Regression Analysis of the Factors Affecting DGA

A multiple regression analysis was conducted using the enter method to explore the influence of adolescents' QoL, age, gender, and the time spent on digital games during the pandemic on the levels of DGA. The variance inflation factors (VIF) were examined, and their values were found to be within an acceptable range, indicating the absence of multicollinearity issues in the data. The multiple regression analysis model, constructed based on the factors of the KIDSCREEN-27 HRQoL Questionnaire and certain participant characteristics, was found to have a significant effect on DGA (F (8.299)=18.487, p<0.001).

Psychological well-being of the child (β=-0.145 p=0.035), school environment (β=-0.246 p<0.001), age (β=-0.123 p=0.018), male gender (β=-0.140 p=0.006), and the time spent playing digital games during the pandemic (β=0.305 p<0.001) were found to affect DGA (p<0.05). These factors explain 32% of the variance in DGA (Adjusted R^2= 0.319) (Table 3).

Table 3. Factors affecting digital game addiction in the COVID-19 pandemic

Variables	Unstandardized Coefficients (B) (95% CI)	SE	Standardized Coefficients (β)	t	p	VIF
HRQoL (KIDSCREEN-27 T-Score)						
Physical wellbeing	-0.055 (-0.311 - 0.202)	0.13	-0.028	-0.419	0.676	1.899
Psychological wellbeing	-0.265 (-0.51 - -0.019)	0.125	-0.145	-2.119	**0.035**	2.063
Autonomy &Parent relation	0.078 (-0.147 - 0.303)	0.114	0.043	0.679	0.498	1.796
Peers & Social support	-0.088 (-0.261 - 0.085)	0.088	-0.054	-1.002	0.317	1.289
School environment	-0.419 (-0.629 - -0.208)	0.107	-0.246	-3.908	**p<0.001**	1.739
Age	-1.941 (-3.548 - -0.333)	0.817	-0.123	-2.376	**0.018**	1.174
Gender[a]	-6.186 (-10.561 - -1.811)	2.223	-0.14	-2.783	**0.006**	1.108
Time spent on digital games (hours) during the pandemic	0.898 (0.592 - 1.205)	0.156	0.305	5.768	**p<0.001**	1.226
R^2	0.337					
Adjusted R^2	0.319					
F	18.487					
Sig. (ANOVA)	p<0.001					
Durbin-Watson	1.902					

Abbreviation: VIF, variance inflation factor. [a] Dummy variable (reference): gender (male)

Discussion

The primary objective of this study was to examine how the QoL among adolescents influences DGA during the COVID-19 pandemic. The DGA Scale mean score revealed that almost one-third of the participants (31.7%) were in the risk group. In their study conducted before the pandemic, Irmak and Erdoğan (2019)[13] found the

DGA rate of adolescents as 28.8%. In addition, it has been stated that digital games have the potential to be addictive, as they strongly attract the attention of adolescents due to the enjoyment derived from playing games or constant social comparison with others, and increase psychophysiological arousal.[17] Adolescents who had to cope with many restrictions brought by the pandemic may have preferred digital games as a coping tool in this period.

The study relates adolescents' QoL and their DGA and highlights that adolescents' DGA was affected by different predictors during the pandemic. The results of the study revealed that low scores on the psychological well-being factor of the KIDSCREEN-27, bad school environment, young adolescent age, being a male, and higher amounts of time spent on digital games were significant predictors of DGA in the COVID-19 pandemic ($p < 0.05$).

Regarding HRQoL, there is an observed association indicating that lower levels of psychological well-being and an unfavorable school environment contribute to an elevated risk of DGA among adolescents. Studies have found that there is a significant relationship between online game addiction and quality of life in adolescents, and as the level of game addiction increases, the quality of life of adolescents decreases.[18,19] In a meta-analysis, it was emphasized that people's lifestyles changed due to the COVID-19 pandemic and that these changing lifestyles increased game addiction and internet addiction.[20] Consistent with the study findings, a negative relationship was revealed between internet addiction and quality of life in adolescents.[21] These results are consistent with the study findings.

It has been stated that the quality of life of children and adolescents decreased significantly during the pandemic.[3] The QoL of adolescents was adversely affected by factors such as COVID-19 restrictions, closure of schools, increased responsibilities at home, limited peer communication, prolonged stay at home, limited social activities, and physical mobility.[3] With the pandemic, digital tools and games have become an integral part of adolescents' lives as tools of communication with peers, social relations, and education.[22] Online games can be a coping method for adolescents. Those who spend more time in online games can distance themselves from real life. This can cause emotional and psychological distress in adolescents.[18,23]

The findings of the study indicated that being male was associated with a reduced risk of DGA. Another study suggested that female adolescents may be more susceptible to DGA, particularly in the context of a negative family environment and low academic achievement.[13] However, some studies have reported that males are more likely to experience DGA.[14,24] Karaca et al. (2020)[25] stated that while there is a significant increase in DGA scores among male adolescents, being a male is not a risk factor for DGA. Due to the complex nature of addiction, it may be difficult to say that gender alone is a risk factor for DGA.[25]

The study demonstrated that the risk of DGA tends to increase as the age of adolescents decreases. Additionally, a separate study examining the effects of the COVID-19 pandemic on QoL reported that younger children were

more adversely affected than their older counterparts.[1] Another study revealed that compared to the younger age group, adolescents may be in the high-risk group in terms of DGA due to weaker impulse control, active participation in risky behaviors in terms of health, and being more vulnerable.[26] Our findings show that children in different age groups were affected at different levels during the pandemic, and further studies are needed to obtain more comprehensive data on different age groups.

The increase in time spent playing digital games during the pandemic was determined as an important predictor variable that increases the risk of DGA. Several studies have revealed that the time adolescents spend on digital tools increased during the pandemic to meet the need for socialization.[27-29] Due to the restrictions on social areas, online education from home, and adolescents' efforts to become independent from their households, the duration of exposure to digital tools increased, which has posed a risk for DGA.

The study includes some limitations. First, the study could not reveal the cause-effect relationship due to the cross-sectional design. Secondly, the study is based solely on participants' online responses, which were assumed to be correct. Finally, the study was conducted in a single province, which imposes limitations on the generalizability of the findings to broader populations or different geographical areas.

In conclusion, the results highlighted that a majority of adolescents fell into the risk group for DGA during the pandemic. It was further observed that game addiction constitutes a variable influencing the QoL, and DGA is influenced by certain demographic characteristics, psychological well-being, and the school environment. To improve the HRQoL of adolescents and to protect them from risky behaviors, their awareness should be raised using a holistic approach including the collaboration of parents, pediatric nurses, and educators. It is recommended to develop community-based interventions through this collaboration. Conducting longitudinal studies that evaluate adolescents' QoL and DGA together may make a significant contribution to the field.

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THE SPECIALITY CHOICES OF FUTURE PHYSICIANS – A STATE UNIVERSITY SAMPLE

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Abstract

Objectives: Our study aims to examine the thoughts of final-year (intern) medical students about their specialty choices and the reasons underlying these thoughts.

Materials and Methods: Our study is a descriptive cross-sectional study. Intern students studying in 2022 and 2023 were asked questions about their sociodemographic characteristics and specialty choice plans. In the study, logistic regression models were created for significant variables after univariate analysis. For statistical significance, a significance level of $p < 0.05$ was accepted.

Results: The most common reason for those who did not want to specialize was the difficulty of the assistantship process, while those who wanted to specialize most commonly cited the desire to work in a specific branch that would provide professional satisfaction. It was determined that being male increases the choices for surgical sciences by 1.6 times. When socioeconomic status was examined, those with low status were found to prefer surgical sciences 4.6 times more than those with moderate status and 2.5 times more than those with high status. Choosing a surgical medical sciences increases high financial returns by 2.5 times, the desire to spend time for oneself/family by 1.8 times, the low malpractice risk in the specialty branch by 4.5 times, the difficulty of the education process by 1.8 times, and the influence of lessons/internships/instructors by 2.1 times for internal-basic medical sciences.

Conclusion: Improving the economic conditions of physicians, minimizing malpractice risks, and achieving work/life balance are the most important topics that need to be developed for the successful delivery of health services to the public.

Keywords: Medical education, specialty selection, medical student.

Introduction

The distribution of specialties chosen by physicians after completing medical school is a crucial determinant in planning and distributing the workforce in the healthcare sector.[1] Various studies have yielded different results regarding the reasons for physicians' career choices.[2,3] Factors such as financial concerns, physicians' interests, the perception of prestige, working conditions, career expectations, societal perspectives, family influence, and educational conditions are among the reasons that physicians consider effective in determining their branch.

The selection of medical specialization is a complex, dynamic, and not fully understood process influenced by various factors such as gender, economic status, personality, personal interests, clinical experience during internships, expected income level, family influence, and lifestyle.[4,5]

The career choices of medical students are a fundamental issue for public health services and medical education policies. It varies over the years and plays a crucial role in planning and developing the healthcare sector.[6]

According to the 2022 data in Türkiye, the total number of physicians is 194,688, with a ratio of 228 physicians per hundred thousand people. This ratio is 370 per hundred thousand people in Organisation for Economic Co-operation and Development (OECD) member countries. Türkiye is in an insufficient situation compared to developed countries in terms of the number of physicians per population. In Türkiye, 49.1% of physicians are specialists, 23.3% are assistant physicians, and the remaining work as general practitioners.[7,8]

A study in the United States investigated the specialization preferences of final-year medical students, revealing a significant shift in recent years.[9] The controllable perception of lifestyle was identified as the predominant factor explaining the variability in specialization preferences.[10] The variability in Türkiye is believed to be influenced by long working hours and lower-than-expected salaries. Another study found that prestige, money, and personal development are significant factors in career planning among medical students in Türkiye.[11] The state of working conditions, physicians' thoughts on income, and incidents of violence against doctors in the media are thought to lead to changes in specialty choices. Therefore, it is necessary to investigate these preferences and reasons currently. When developing health policies and making regulations related to human resources, the results of academic studies evaluating physicians' specialization areas should be taken into account.

Given the current economic conditions, increasing integration with foreign countries, changes in value perceptions, and news about violence against healthcare workers, it is essential to examine the thoughts of medical students currently enrolled in medical faculties about their future specialization areas and the reasons behind these thoughts. The tendency to specialize has decreased due to the need for a doctorate diploma to

work internationally and the lack of integration of our country's specialization education. Therefore, our study aims to examine the thoughts of final-year (intern) students at a state university faculty of medicine about their choice of specialization and the reasons underlying these thoughts.

Materials and Methods

This descriptive study is a cross-sectional study conducted on intern students actively participating in education at a state university faculty of medicine during the academic years 2021-2022 and 2022-2023. The study was conducted voluntarily, and similar studies were considered by reviewing national and international literature to form survey questions. After informing the students about the study and obtaining verbal consent, the surveys were conducted online. The study did not involve sample selection; it aimed to reach all intern students in both periods. In the academic year 2021-2022, a total of 348 interns, and in the academic year 2022-2023, a total of 325 interns received education. Intern students in the final year of medical school in the academic year 2021-2022 graduate as of July, while intern students in 2022-2023 start their internship training as of July. Within this scope, our study aimed to reach all interns in the 2021-2022 and 2022-2023 periods, thus examining the impact of problems and difficulties during the internship training period on the choice of specialization. Personal information such as the participant's full name and ID number was not requested.

The data collection tools in our study included questions about participants' socio-demographic characteristics such as age, sex, marital status, socioeconomic status, parents' professions, parents' education levels, citizenship status, the language of education, grade point average, and post-graduation plans. In the second stage of the survey, participants were asked about their reasons for wanting or not wanting to specialize, the scores they expected to receive in the specialization exam if they intended to take it, their thoughts on specialization preferences, and the reasons behind these thoughts.

The data were evaluated using the IBM-SPSS statistical software program (Version 25.0). Descriptive statistics such as number, percentage, mean ± standard deviation (SD), median, minimum (min), maximum (max), and 25-75 quartiles were used for descriptive statistics. The chi-square test was used for the comparison of categorical data. The Shapiro-Wilk test was conducted for the comparison of continuous data, and according to the normality test results, parametric and non-parametric tests were selected. After univariate analysis in the study, logistic regression models were created for significant variables. For statistical significance, a significance level of $p < 0.05$ was accepted.

In our study, the number of participants who plan to choose basic science is very limited. For this reason, basic and internal sciences were combined to interpret the study statistically. In this way, it is aimed to determine the difference between surgical science from other sciences.

Results

A total of 372 (55.3%) intern doctors participated in the study. Three students were excluded because they provided incomplete answers from the study. Of the remaining 369 students, 216 (58.5%) were female, and 153 (41.5%) were male, with an average age of 24.26 ± 1.70 (min-max 22–37) years. While 340 (92.1%) of the students were Turkish citizens, 29 (7.9%) were foreign nationals. Looking at the semester, 147 (39.8%) were interns in the 2021-2022 period, and 222 (60.2%) were interns in the 2022-2023 period. Of the participants, 46 (12.5%) stated that their financial situation was poor, 286 (77.5%) moderate, and 37 (10.0%) good.

When asked about post-graduation plans, the responses in Table 1 were obtained.

Table 1. Post-graduation plans of participants*

	n (%)
I am thinking of getting specialist training immediately.	257 (69.6%)
I am thinking of getting specialist training after working as a general practitioner for a while.	87 (23.6%)
I am thinking of attending doctoral and master's programs and improving myself academically.	10 (2.7%)
I do not plan to work as a doctor.	9 (2.5%)
I do not plan to receive specialist training.	6 (1.6%)

*The 5 most common answers are listed

Table 2. Reasons for wanting or not wanting to specialize*

Reason	n (%)
For those who do not want to specialize (n:25)	
Difficulty of the specialty training process	19 (76.0%)
Insufficient financial satisfaction in specialization	18 (72.0%)
Difficulty working conditions in specialization	16 (64.0%)
Mandatory post-specialization service obligation	16 (64.0%)
Greater patient responsibility in the specialization	13 (52.0%)
Existence of the Medical Specialty Exam	11 (44.0%)
For those who want to specialize (n:344)	
Desire to work in a specific branch that would provide professional satisfaction	311 (90.4%)
Better financial means	291 (84.6%)
Status and career expectations	288 (83.7%)
Perception of worthlessness toward a general practitioner	256 (74.4%)
Perception of specialization training as a success indicator	228 (66.3%)
Desire to work in the private sector	172 (50%)
Family, environmental, and/or societal pressure	105 (30.5%)

* More than one option could be chosen

According to Table 1, 25 participants who did not want specialized training were excluded from subsequent analyses, and the specialization preferences of 344 participants were evaluated. Participants were asked about their reasons for wanting or not wanting to specialize, and they were allowed to select multiple options. Table 2 shows the reasons of the participants in order of frequency. The most common reason for those who didn't want to specialize was the difficulty of the assistantship process, while those who wanted to specialize most commonly cited the desire to work in a specific branch that would provide professional satisfaction.

Participants were asked which department they planned to enter after the Medical Specialty Exam if they scored 65 or higher. The top five most desired departments were psychiatry (n:31, 9%), cardiology (n:26, 7.6%), orthopedics (n:23, 6.7%), plastic surgery (n:22, 6.4%), and internal medicine (n:21, 6.1%).

When asked which department they would prefer if they scored 65 or higher, the top three responses were plastic and reconstructive surgery (n:40, 11.6%), dermatology (n:38, 11.0%), and psychiatry/ophthalmology (n:32, 9.3%). In the score range of 45-49.9, the responses were preparing for the exam again (n:269, 78.2%), emergency service (n:28, 8.1%), and obstetrics and gynecology (n:11, 3.2%).

When examined by specialization, it was observed that male participants wanted to prefer surgical medical sciences more than females (p=0.020), those with lower socioeconomic levels wanted to prefer surgical medical sciences more than those with higher levels (p=0.006), and those with a father's education level below 8 years wanted to prefer surgical medical sciences more than those with a father's education level above 8 years (p=0.008). It was observed that academic success, being a Turkish or other country citizen, receiving education in Turkish or English, the education year, the mother's education level, and the presence of a specialist doctor in the immediate vicinity did not affect participants' specialization preferences (Table 3).

In the logistic regression model created, it was determined that being male increases the preference for surgical sciences by 1.6 times. When socioeconomic status was examined, those with low status were found to prefer surgical sciences 4.6 times more than those with moderate status and 2.5 times more than those with high status (Table 4).

Predictive factors for specialization choice were calculated with logistic regression analysis, presented in Table 5. According to the model created, choosing a surgical medical science increases high financial returns by 2.5 times, the desire to spend time for oneself/family by 1.8 times, the low malpractice risk in the specialty branch by 4.5 times, the difficulty of the education process by 1.8 times, and the influence of lessons/internships/instructors by 2.1 times for internal-basic science.

Table 3. Distribution of participants' specialization preferences according to sociodemographic characteristics

Sociodemographic Characteristics		Basic-Internal Medical Sciences*	Surgical Medical Sciences*	p
Gender	Male	68 (48.6%)	72 (51.4%)	**0.020**
	Female	125 (61.3%)	79 (38.7%)	
Academic success	<80	113 (56.2%)	88 (43.8%)	0.960
	≥80	80 (55.9%)	63 (44.1%)	
Language of education	Turkish	113 (58.5%)	80 (41.5%)	0.302
	English	80 (53.0%)	71 (47.0%)	
Socioeconomic status	Low	16 (39.0%)	25 (61.0%)	**0.006**
	Medium	150 (56.2%)	117 (43.8%)	
	High	27 (75.0%)	9 (25.0%)	
Country	Türkiye	180 (56.8%)	137 (43.2%)	0.505
	Other	13 (48.1%)	14 (51.9%)	
Mother's education level	<8 years	49 (51.6%)	46 (48.4%)	0.296
	≥8 years	144 (57.8%)	105 (42.2%)	
Father's education level	<8 years	19 (38.0%)	31 (62.0%)	**0.008**
	≥8 years	174 (59.2%)	120 (40.8%)	
The year of education	2022	76 (53.5%)	66 (46.5%)	0.418
	2023	117 (57.9%)	85 (41.2%)	
Do you know any specialist?	No	116 (55.8%)	92 (44.2%)	0.877
	Yes	77 (56.6%)	59 (43.4%)	
Total (n:344)		193(56.1%)	151 (43.9%)	

*In analyses, internal medicine sciences included: emergency medicine, forensic medicine, family medicine, child and adolescent psychiatry, pediatrics, dermatology, physical medicine and rehabilitation, infectious diseases, pulmonary diseases, public health, internal medicine, cardiology, neurology, nuclear medicine, radiation oncology, radiology, psychiatry, sports medicine and medical genetics. Surgical medical sciences included; anesthesiology and reanimation, neurosurgery, pediatric surgery, general surgery, thoracic surgery, ophthalmology, gynecology and obstetrics, otorhinolaryngology head and neck surgery, cardiovascular surgery, orthopedics and traumatology, plastic, reconstructive and aesthetic surgery, urology, medical pathology. Basic medical sciences included; anatomy, biochemistry, histology and embryology, pharmacology, physiology, and microbiology.

Table 4. Adjusted OR and 95% CI values for the preference of basic vs. internal medicine/surgical sciences according to participants' sociodemographic characteristics

Variable	Coefficients	B.	p	OR	95% C.I.	
					Lower	Upper
The year of education	Ref=[2021-2022] 2022-2023	-0.113	0.624	0.893	0.569	1.402
Gender	Ref=[Female] Male	0.479	0.037	1.615	1.030	2.531
Language of education	Ref=[Turkish] English	0.182	0.422	1.200	0.769	1.871
Socioeconomic status	Ref=[Low]		0.010			
	Medium	-0.602	0.003	4.675	1.717	12.727
	High	-1.542	0.022	2.561	1.144	5.731
Country	Ref=[Türkiye] Other	0.421	0.318	1.523	0.667	3.476
Grade point average	Ref=[≥80] <80	-0.127	0.581	0.881	0.561	1.382

Binary Logistic Regression test, B.: Coefficient, OR: Odds Ratio, CI: Confidence Interval, Ref: Reference Value

Table 5. Adjusted OR and 95% CI values for participants' specialization preferences based on reasons for choosing the branch

Variable	B	p	OR	95% C.I.	
				Lower	Upper
High financial return	-0.952	**0.001**	2.592	1.460	4.602
Desire for self/family time	0.607	**0.047**	1.836	1.008	3.344
Higher patient load	-0.189	0.543	0.827	0.450	1.523
Low malpractice risk in the specialty	1.524	**<0.001**	4.592	2.314	9.115
Incidents of violence against physicians	-0.452	0.200	0.636	0.319	1.270
Difficulty of the education process	0.612	**0.047**	1.845	1.009	3.373
Duration of assistant education in the specialty	-0.381	0.263	0.683	0.351	1.331
Influence of lessons/internships/instructors	0.784	**0.002**	2.190	1.320	3.631

Binary Logistic Regression test, OR: Odds Ratio, CI: Confidence Interval, B: Coefficient

Discussion

In our country, graduates of medical faculties are defined as general practitioners. General practitioners work in primary health services such as emergency services, family health centers, community health centers, and health directorates due to the flexibility in their job descriptions. Due to the flexibility in the job descriptions of general practitioners in our country, reassignments and changes of location can frequently occur. Physicians who wish to do so can specialize in a certain branch by taking the Medical Specialty Exam according to their preferences.

Expectations and desires of those undergoing education in the medical branch vary according to the changing conditions of our country and the world. Trends towards different preferences have been observed in the literature at different times. However, in many studies conducted in our country, it has been observed that the majority of students mostly want to specialize in a specific branch. In our study, the most common reason for those who don't want to specialize is found to be the difficulty of specialization training. Conversely, in line with the literature, in our study, 93.2% of the students want to specialize in a branch. In a study conducted in Istanbul in 2021, 96.7% of the students wanted to specialize, while in another similar study conducted at Akdeniz University in 2017, this rate was found to be 92.9%.[5,12] When asked about the reasons for the preferences of students who want to specialize, different answers have been given. In a study conducted by Dikici et al. in 2008, material gain and prestige were prominent in choosing a specialized branch. In a study conducted by Tekin et al. in 2013, material gain and career opportunities were prominent, while in a study conducted by Açıkgöz et al. in 2019, the desire to work in a specific branch that would provide professional satisfaction was found to be effective.[4,11,13] In our study, in line with the literature, the desire to work in a branch that would provide professional satisfaction was the most preferred answer among the reasons for wanting to specialize. It is estimated that the desire of physicians to specialize in a branch is due to the perceived inadequacy of general practitioner work in terms of prestige. Preventive health services, the most important step in health services, fall within the scope of primary health services.[14] The preference of the majority of physicians to specialize may lead to a disruption in primary health services over time.

In this study, the most preferred specialization areas were found to be psychiatry, cardiology, and orthopedics. In a study published by Açıkgöz et al. in 2019, the most preferred areas were pediatrics, obstetrics and gynecology, and psychiatry; in a study conducted by Yapalak et al. in Istanbul in 2021, internal medicine, ophthalmology, and pediatrics were found to be the most preferred; and in a study conducted by Kara et al. in 2014, ear, nose, and throat, dermatology, and internal medicine were found to be the most preferred.[4,12,15]

In the conducted study, it was found that the scores expected to be obtained in the Medical Specialty Exam are effective in students' specialization choices.[5,16] In our study, when the scores were categorized and asked, it

was found that the preferred departments differed according to the score obtained. This situation indicates that intern doctors may change their preferences according to their Medical Specialty Exam scores. No other study categorizing scores and questioning the desired department was found in the literature. In addition, it is noteworthy that the majority of responding physicians in our study stated that they wanted to retake the Medical Specialty Exam if they received low scores.

In the literature, it is found that in studies conducted, our results are consistent with the effect of the male gender on choosing a surgical medical science.[17-19] It is estimated that this situation is due to societal gender perceptions and gender roles imposed by society. While the female gender is influenced by gender roles to prefer specialty branches with fewer night shifts, the male gender tends to choose surgical medical sciences with more demanding working conditions and longer hours.

In a study conducted in Brazil, it was found that socioeconomic factors affect specialty branch selection, which supports our study.[20] In two studies conducted in our country in 2011 by Ergin et al. and in 2017 by Tengiz et al., unlike our study, it was found that socioeconomic factors did not affect branch selection.[16,21] It is estimated that this difference in results may be due to the economic difficulties that our country and the world have experienced in recent years.

In our study, it was found that violence against physicians did not affect branch selection. In a study conducted on assistant physicians by Bayrakçı et al., it was found that violence was effective in branch selection.[22] It is thought that this difference is due to changes in ideas as a result of starting professional life and getting to know the environment.

In the study conducted by Açıkgöz et al., it was found that high financial return, spending time for oneself/family, low malpractice risk, and the influence of internships/instructors affect branch selection in a way that supports our study.[4] In a study conducted on assistant physicians, malpractice risk was a leading reason for branch selection.[22] Similarly, in a systematic review conducted by Cansever et al. in 2020, it was found that high financial return, spending time for oneself/family, and malpractice risk were the most effective factors in specialty branch preference, as in our study.[3]

In a thesis study conducted by Arslan in 2019, it was found that the difficulty of the specialization education process increases the preference for internal medicine branches.[23] This result is supportive of our study. The intensive workload and time-consuming education process in surgical branches are seen to affect preferences.

Understanding why medical students choose their specialization areas is important for those determining public health and education policies. The distribution of physicians' specialization areas according to the needs of societies is a fundamental issue for sustainable human resources.

Improving the economic conditions of physicians, minimizing malpractice risks, and improving education conditions while achieving work/life balance are the most important topics that need to be developed for the successful delivery of health services to the public.

Ethical Considerations: For the study, ethics committee approval was received from Ankara Yıldırım Beyazıt University Health Sciences Ethics Committee with decision number 07.04.2022-06 with research code 2022-810.

Conflict of Interest: The authors declare no conflict of interest.

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PREDICTION OF ADDICTION POTENTIAL IN UNIVERSITY STUDENTS BASED ON THE ROLE OF MENTAL HEALTH, SELF-EFFICACY, AND PERCEIVED SOCIAL SUPPORT

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Abstract

Objectives: One of the main areas of investigation about substance use among young people is to predict factors of an individual's vulnerability to it and recognize the variables affecting it. This study aimed to investigate of prediction of addiction potential in university students based on the role of mental health, self-efficacy, and structures of perceived social support.

Materials and Methods: In the current cross-sectional investigation 438 students of Mashhad Universities of Applied Sciences were collected using cluster sampling. The data collection tools were the Iranian version of the addiction potential scale, the general health questionnaire, the perceived social support questionnaire, and the Sherer general self-efficacy questionnaire. Data were analyzed by applying SPSS.

Results: The results of the linear regression analysis showed a significant relationship between addiction potential, perceived social support, self-efficacy, and mental health. Furthermore, self-efficacy was the strongest addiction potential predictor.

Conclusion: Based on the finding that self-efficacy is the strongest predictor of addiction potential, it is recommended to prioritize interventions and training aimed at increasing self-efficacy beliefs. By providing essential training and interventions that focus on increasing self-efficacy beliefs, we can empower young people to make healthier choices and reduce their vulnerability to addiction.

Keywords: Addiction potential, mental health, social support, self-efficacy

Introduction

Addiction is a complex disease that arises from the misuse and excessive consumption of substances such as opium, alcohol, and hashish. It affects individuals psychologically, physiologically, and socially.[1] Globally, approximately 210 million people use substances, resulting in around 200,000 deaths annually.[2] In Iran, substance abuse is particularly prevalent among university students.[3] This can be attributed to factors such as the country's unique geographic location, cultural characteristics, and misconceptions surrounding addiction. Various factors contribute to the tendency of university students to engage in drug use. These include a lack of emotional support from families, inadequate recreational facilities, relationship issues, association with friends who use substances, and economic problems.[1] The consequences of substance abuse among young people are significant and alarming. They include physical and mental injuries, dependence on substances, engagement in illegal behaviors, risky sexual behaviors, poor academic performance, and substantial costs to society.[4] Therefore, it is crucial to investigate the factors that make individuals vulnerable to substance abuse and understand the variables that influence it. It is important to consider both psychological and social aspects when designing treatment plans for individuals struggling with substance abuse.

Mental health is a crucial factor in addiction prevention and treatment. It refers to a state of well-being where individuals recognize their abilities, can function effectively, cope with everyday stressors, and contribute to their communities.[5] Mental health disorders have a significant impact on the mortality rates of young individuals in many societies. Additionally, there is a strong association between poor mental health and various concerns among young people, particularly substance abuse.[6] Research has demonstrated that an individual's mental health plays a significant role in their overall quality of life and resilience against risk factors. Individuals with good mental health are less likely to engage in substance use.[7] Promoting mental well-being through early intervention, access to mental health services, and support systems can help individuals develop healthy coping mechanisms and reduce the likelihood of turning to substances as a means of escape or self-medication.

Self-efficacy is an important determinant related to drug use and has been extensively studied in the field of behavior change, including substance abuse.[8] It refers to an individual's belief in their capabilities to utilize cognitive skills, motivation, and control over a specific event.[9] According to Bandura's social learning theory, drug use can be influenced by individuals imitating others who have positive expectations regarding drug use.[10] Research has shown that low self-efficacy is associated with an increased likelihood of drug use among both adults and adolescents.[11] Enhancing self-efficacy can be a valuable strategy in preventing and addressing substance abuse.[12]

Social support is a crucial factor in coping with stressful situations and is one of the strongest and most effective coping mechanisms for individuals facing challenging circumstances.[8] It helps individuals tolerate problems and navigate through difficult times more easily. Social support can be categorized into two dimensions: perceived support, which refers to an individual's belief that they can turn to others for help, and enacted support, which involves actual supportive actions or behaviors.[8] Numerous studies have demonstrated the significant role of perceived social support in the prevention, treatment, and relapse prevention of substance abuse.[8,13] Having a strong support system can provide individuals with emotional encouragement, practical assistance, and a sense of belonging, all of which contribute to their ability to resist drug use. Conversely, loneliness, social relationship deficits, and social isolation are believed to contribute to an increased risk of substance abuse.[14] Therefore, it is essential to promote social support networks as part of addiction prevention and treatment efforts. This can involve strengthening existing relationships, fostering new connections through support groups or community programs, and providing resources for individuals to access social support when needed.[15]

Due to the high outbreak of substance use and the treatment difficulties, it is essential to recognize the related effective determinants among various populations such as college students. The study aims to explore the predictive factors of addiction potential among university students, specifically focusing on the role of mental health, self-efficacy, and perceived social support.

Materials and Methods

Participants and sampling

In the current cross-sectional investigation 438 students of Mashhad Universities of Applied Sciences were collected using cluster sampling, on December 2022. At the beginning of the research, informed consent was taken from all students. The inclusion criteria included informed consent and a complete questionnaire, and the excluded criteria included incomplete questionnaires and personal unwillingness. The research protocol was approved by the Mashhad University of Medical Sciences.

Tools

Information on demographics such as participants' age, sex, marital status, and education was assessed in the first section of the questionnaire.

To assess the addiction potential, we used the Iranian version of the Addiction Potential Scale (IAPS) which has been approved by Zargar et al.[16] The questionnaire includes 36 items and 5 lie detector questions. Each question is scored from zero (completely true) to three (completely false); so, the total score range is zero to 108. In the current investigation, a reliability of 0.90 was assessed for this scale by Cronbach's alpha.

A General Health Questionnaire (GHQ-12) was used to determine the mental health status. Because of the brevity, this measure is one of the most appropriate applied scales to study psychological disorders.[17] The GHQ-12 consists of 12 questions with a 4-degree scale (0=Not at all to 3=More than usual). Scores are between 0 and 36, with a higher score demonstrating a higher degree of mental disorders. The validity of this scale has been approved by Yaqoubi et al for the Iranian population.[18] Furthermore, a reliability of 0.86 was estimated for this scale by Cronbach's alpha.

Perceived Multidimensional Social Support was applied to assess the perceived support status. This questionnaire includes 12 questions about three domains of perceived support from friends, families, and important others. Individuals demonstrate their agreement with questionnaire items on a 5-point Likert scale (very strongly disagree to very strongly agree). A higher score displays a higher perceived social support level. The validity of this scale has been confirmed by Akbari et al.[19] A reliability of 0.87 was estimated for this scale by Cronbach's alpha.

Sherer questionnaire was applied to assess general self-efficacy.[20] It contains 17 items with a 5-point Likert scale (completely disagree=1, completely agree=5). Scores are between 17 and 85. The validity of this scale was confirmed by Najafi et al.[21] Moreover, a reliability of 0.78 was estimated for this scale by Cronbach's alpha.

Data analysis

Data were analyzed by applying SPSS 21 software via linear regression analysis and Pearson correlation coefficient at the significance level of 0.05. The quantitative data were demonstrated by mean and standard deviation and qualitative variables were displayed by percent and frequency.

Results

Demographic characteristics of students are displayed in Table 1.

Table 1. Demographic characteristics of the participants

	Mean	**Standard Deviation**
Age (Year)	21.53	3.34
Education	**n**	**%**
Associate degree	297	67.8
Bachelor science	141	32.2
Marital status	**n**	**%**
Married	104	23.7
Single	334	76.3
Sex	**n**	**%**
Male	160	36.5
Female	278	63.5

The results displayed in Table 2 are related to the mean and standard deviation of addiction potential, perceived social support, self-efficacy, and mental health.

Table 2. Mean and standard deviation of variables

Variable	**Mean**	**Standard deviation**
Addiction Potential	56.93	15.82
Social Support	43.01	10.13
Self-efficacy	52.33	6.57
Mental Health	18.34	6.67

Table 3. Regression analyses for addiction potential

Independent Variables	**ß standard**	**P**	**R^2**	**Dependent variable**
Social Support	-0.27	0.0001		
Self-efficacy	-0.42	0.0001	0.77	Addiction Potential
Mental Health	0.35	0.0001		

The results of the linear regression analysis (Table 3) showed a significant relationship between addiction potential, perceived social support (ß standard=-0.27, p≤0.001), self-efficacy (ß standard=-0.42, p≤0.001), and

mental health (*ß* standard=0.35, p≤0.001). As shown in the table, self-efficacy was the strongest addiction potential predictor.

Table 4. Correlation matrix among variables

Variables	Addiction Potential	Social Support	Self-efficacy	Mental Health
Addiction Potential	1	-0.68**	-0.79**	0.72**
Social Support		1	0.59**	0.45**
Self-efficacy			1	0.59**
Mental Health				1

** Correlation is significant at the 0.01 level (2-tailed)

The findings showed that there is a significant positive correlation between mental health and addiction potential (P≤0.001). Moreover, perceived social support and self-efficacy had a significant negative correlation with the addiction potential (P≤0.001) (Table 4).

Discussion

Insufficient self-efficacy is identified as a significant factor influencing addiction potential.[22] The study findings reveal a strong relationship between self-efficacy and addiction potential, with a significant negative correlation. Self-efficacy plays a crucial role in preventing negative behaviors and enhancing self-esteem among individuals.[23] When individuals have low self-efficacy, they may perceive substance use as a way to cope with stress, socialize, or fit in with their peers. This can increase their vulnerability to addiction and make it more difficult for them to resist engaging in substance use behaviors.[12] Numerous studies provide evidence that self-efficacy is a key factor in building confidence and resisting drug use, particularly in high-risk situations, while also reducing the risk of relapse.[24,25] High levels of self-efficacy act as a protective factor, enabling individuals to reject offers of alcohol, cigarettes, and other substances, thereby strengthening their self-esteem and shielding them from the detrimental effects of substance abuse.[24] This finding can be explained by the fact that individuals with well-defined and stable self-efficacy exhibit higher levels of psychological well-being. Consequently, they are less likely to engage in unhealthy and risky behaviors such as substance use when faced with obstacles or problems. [26] By providing training and interventions that focus on increasing self-efficacy beliefs, individuals can develop the confidence and skills necessary to resist substance use temptations. These

interventions can include activities that enhance problem-solving skills, decision-making abilities, assertiveness training, and building resilience.

Social support is indeed another significant factor influencing addiction. The study findings reveal a significant relationship between perceived social support and addiction potential. Social support has both direct and indirect effects on health, through coping strategies, cognitive mechanisms, and health behaviors.[19] Having a strong support system can provide individuals with a sense of belonging, connection, and validation. This can help reduce feelings of loneliness, stress, and anxiety, which are often associated with substance use as a coping mechanism. Social support can also provide individuals with alternative sources of enjoyment and fulfillment, reducing the need for substances to fill those voids.[27] Sadri Damirchi et al.'s study also demonstrates a significant negative correlation between perceived social support and addiction potential among soldiers.[8] Sohrabi et al. further highlight the negative relationship between readiness for addiction and social support.[28] Perceived social support serves as a powerful external coping resource that plays a crucial role in psychological well-being and enhances individuals' adjustment. Lack of perceived social support, particularly from friends, family, and society, reduces an individual's resistance to environmental pressures, which can lead to substance use. For example, when there is commitment and solidarity within a family, individuals can rely on their assistance to overcome obstacles and problems, viewing them as a source of comfort that prevents the need for substance use as a short-term solution. Additionally, supportive friends can provide various forms of informational, instrumental, and emotional support to individuals.[7] Further longitudinal interventions focusing on social support are necessary to strengthen the evidence supporting the role of social support in preventing drug use among young individuals.

The findings of this investigation demonstrated a significant relationship between mental health and addiction potential. Considering the importance of mental health in predicting and preventing many disorders, paying more attention to this area is so important. Therefore, facilitating the provision of help for people to achieve mental health is an effective strategy for reducing the risk of addiction. The findings of the investigations related to the field of drug use and mental health status showed that people who lack mental health or in other words have a specific mental disorder are more inclined towards drug use.[5] The finding of the research by Sohrabi et al showed that there is a significant positive relationship between mental health and readiness for addiction.[28] In explaining this finding, it can be acknowledged that mental health plays a fundamental role in all aspects of a person's life, and if people do not have good mental health and in other words have symptoms of anxiety, depression, distress, and worry, to deal with them, they choose the fastest and shortest strategy of opponents, which is often a negative and inappropriate method. In other words, these people use drugs, cigarettes, and alcohol to get rid of these problems, unaware that such strategies are short-term and often lead to mental health problems, including depression and anxiety, sleep problems, worry, and other problems in

life. Accordingly, if people do not have good mental health, they will most likely have more tendency towards addiction and drug use.

The regression analysis results confirm that self-efficacy is the strongest predictor of addiction potential. Rostami et al.'s study demonstrates that general self-efficacy can predict acceptance of addiction and explain up to 30% of the variance in acceptance of addiction among students.[20] Substance abuse is a behavior that is not entirely under an individual's control, as it is influenced by various internal and external factors. Therefore, having constructs such as self-efficacy, which are effective in behavior control, increases the predictive power of behavior.[29] In general, psychological constructs like self-efficacy can help explain a portion of complex issues such as addiction. Based on these findings, it is recommended to prioritize and design educational plans and interventions that focus on increasing self-efficacy beliefs. Providing essential training and interventions related to enhancing self-efficacy can be beneficial in preventing and addressing addiction.

The use of self-report as the data collection method is indeed a limitation of the study. Self-report measures rely on participants accurately and honestly reporting their behaviors and experiences, which can be influenced by social desirability bias or memory recall issues.[30] Therefore, the findings should be interpreted with caution. Another limitation is the use of a cross-sectional design. Cross-sectional studies provide a snapshot of data at a specific point in time, which limits our ability to establish causal relationships or determine the directionality of the observed associations. Longitudinal data would be valuable in providing more robust and accurate findings.

Despite these limitations, the findings of this study offer a valuable framework for understanding addiction behavior among students and can inform the development of more effective strategies for addiction control. Future research should consider using more rigorous study designs and longitudinal data to further investigate these relationships and validate the findings.

In conclusion, to effectively control drug use among young individuals, it is crucial to identify and be aware of the contributing factors. This study has provided valuable insights into the factors related to addiction potential among university students, including perceived social support, self-efficacy, and mental health. The results demonstrate a significant relationship between addiction potential and these factors. Given that self-efficacy emerged as the strongest predictor of addiction potential, it is recommended to prioritize interventions and training aimed at increasing self-efficacy. These interventions can be incorporated into educational plans and given high priority in substance use prevention efforts. Furthermore, utilizing models and theories of health promotion and behavior change can be beneficial in designing and implementing educational intervention programs. These programs can help raise awareness, provide necessary skills, and promote positive behaviors to prevent substance use among young individuals. By addressing these factors and implementing evidence-

based interventions, we can work towards more effective substance use prevention strategies for young people.

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DOES IODINATED CONTRAST AGENT AFFECT OXIDATIVE STRESS? OBSERVATIONAL STUDY

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Abstract

Objectives: Iodine in iodine-based contrast agents (ICM) is known as an antioxidant substance from the past to the present. Although some studies suggest that the use of ICM causes contrast-induced nephropathy (CIN) by causing an increase in reactive oxygen species, this is not yet fully understood.

Materials and Methods: Before scanning and 24 hours after ICA administration, blood samples were taken from 74 patients from a single center who had no known kidney disease, had Computed Tomography using ICA, and did not develop CIN within a 5-day follow-up period.

Results: The mean Total Oxidant Level (TOS) before ICA was 13.72 ± 9.40 and the mean TOS after ICA was 5.20 ± 2.06 ($p<0.001$). The mean TAS before ICA was 2.50 ± 0.27 and the mean Total Antioxidant Level (TAS) after ICA was 2.20 ± 0.24 ($p<0.001$). The mean OSI before ICA was 5.36 ± 3.39 and the mean Oxidative Stress Index (OSI) after ICA was 2.39 ± 0.98 ($p<0.001$).

Conclusion: Even while the pathophysiology of CIN is attributed in part to oxidative stress, we found that, on the contrary, it caused a decrease in oxidative stress in patients who did not develop CIN. We think this decrease in oxidative stress may be due to iodine, which is contained in ICA and known as a potent antioxidant.

Keywords: Contrast-induced nephropathy, iodinated contrast agent, oxidative stress index, total oxidant level, total antioxidant level.

Introduction

After the widespread use of iodinated contrast agents (ICA) in computed tomography for various reasons, the incidence of acute kidney injury due to these agents is increasing.[1] The pathogenesis of contrast-induced nephropathy (CIN) is not known exactly and is thought that it may be due to many factors such as changes in renal hemodynamics, changes in renal parenchymal oxygenation, and direct tubular toxicity. It is thought that the hyperosmolar stress caused by the use of ICA triggers the increase in reactive oxygen species (ROS), and renal hypoxia and increased reactive oxygen species following ICA administration are involved in the development of CIN.[2]

ICA of 200 mL/dose contains approximately 7-10 times the iodine dose required in the daily diet. Iodine is known as an antioxidant from the past to the present. Oxidized iodine can function as an electron donor, hence counteracting reactive oxygen species. Molecular iodine functions as a scavenger of hydroiodic acid (HI) or hypoiodous acid (HIO), forming neutral compounds such as superoxide anions (O_2) or hydroxyl radicals (OH) of ROS.[3] Iodine has a protective effect against free radicals and peroxides. This phenomenon is shown in the decrease of hyaluronic acid depolymerization and the enhancement of the antioxidant status in human serum under laboratory conditions, as well as in the decrease of malondialdehyde and peroxides, which serve as markers for oxidative stress in living organisms.[4]

Oxidative stress refers to the state of imbalance between free radicals and antioxidants and has been observed to elevate in numerous disorders such as chronic renal failure, hypertension, atrial fibrillation, and contrast-induced nephropathy.[5,6] There are many measurement parameters for the assessment of oxidative stress. Since their measurements are variable, Utilizing Total Oxidant Level (TOS) to assess the overall oxidant status and Total Antioxidant Level (TAS) to evaluate the overall antioxidant status is a more pragmatic and beneficial approach. Additionally, the Oxidative Stress Index (OSI) can be determined by dividing TOS by TAS.[7,8]

Although some studies show that the use of ICA causes an elevation in reactive oxygen species levels,[2,5] no studies have evaluated whether there is an elevation in reactive oxygen species levels within the patient group who did not develop nephropathy after ICA exposure. In addition, it has not yet been clarified whether the increase in reactive oxygen species in patients who develop CIN is a factor in the pathogenesis or a result of the development of CIN. Therefore, in our study, we aimed to assess OSI, TOS, and TAS parameters and the oxidative stress within the patient group who received intravenous ICA during computed tomography and did not develop CIN.

Materials and Methods

Study Group and Sampling

Our study is an observational study conducted with a total of 74 patients including men and women over the age of 18. The people enrolled were patients who did not have a known kidney disease, who underwent Computed Tomography using ICA, and who did not develop CIN within 5 days of follow-up. Patients with a history of drug use that would affect oxidative stress (glucocorticoid therapy, iron therapy acetylcysteine, etc.) were not included in the study. Patients' blood samples were collected before they underwent Computed Tomography using ICA. During scanning, all patients were given a single 80 cc of nonionic ICA administered as a bolus (The concentration of iodine is 350 milligrams per milliliter) at a low rate of 4 ml/s using an automatic injector with a dual syringe placed into the antecubital vein, and then a 20 ml saline solution is flushed at a rate of 2.5 ml per second. After 24 hours of ICA administration, the identical group of patients was summoned to the nephrology outpatient clinic and underwent another blood sampling.

The glomerular filtration rates (eGFR) were determined in our investigation by applying the Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) formula both before and after ICA.

Total Oxidant Level and Total Antioxidant Level Measurement

Following an overnight fasting period, blood samples were obtained in the morning and collected into gel tubes. The tubes underwent centrifugation at a speed of 3500 revolutions per minute to collect serum samples. The serum samples were divided into smaller portions and kept at a temperature of -80 degrees Celsius until the day of analysis.

The spectrophotometric measurement of serum TAS level was conducted at a wavelength of 660 nm using a colorimetric approach. A commercially available kit from Rel Assay Diagnostics was used for this purpose. The results were quantified as millimoles of Trolox equivalent per liter (mmol Trolox equivalent/L). TAS levels were measured using commercially available kits (Rel Assay, Turkey).[9]

The spectrophotometric measurement of serum TOS level was conducted at a wavelength of 530 nm using a colorimetric approach. A commercially available kit from Rel Assay Diagnostics was used for this purpose. The results were quantified as micromoles of hydrogen peroxide equivalent per liter of solution. TOS levels were measured using commercially available kits (Rel Assay, Turkey).[10]

Statistical Analysis

Data analysis was conducted using SPSS 20.0 (SPSS Inc., Chicago, IL, USA). The statistical analysis of the study involved the determination of mean, standard deviation, frequency, and percentage data. The distribution of the groups was examined using a one-sample Kolmogorov-Smirnov test. The groups' general features and demographics were assessed by frequency analysis, which is a descriptive method used to analyze a single variable. The Paired Sample t-test was employed to examine a single variable between two different conditions in paired comparisons. The chi-square test was employed to ascertain the association between categorical variables. In the entire investigation, a p-value of < 0.05 was deemed to be statistically significant.

Results

Out of the total number of individuals, 46 were female and 28 were male. The average age was 52.58 ± 13.49 years. The body mass index of the subjects was 29.31 ± 4.57. 11 (14.9%) of the subjects had diabetes mellitus (DM) and 18 (24.3%) had hypertension (HT). The individuals' demographic features are displayed in Table 1.

Table 1. Demographics of the Subjects

		n=74 *
Age	Total	52.58 ± 13.49 (22-81)
	≥65	17 (23.0)
	<65	57 (77.0)
Body Mass Index	Mean±SD	29.31 ± 4.57
Gender	Women	46 (62.2)
	Men	28 (37.8)
Diabetes Mellitus		11 (14.9)
Hypertension		18 (24.3)

 * The values are given as Mean±SD (min-max) or n(%).

The mean eGFR before ICA was 97.15 ± 17.53 ml/min, and the mean eGFR after ICA was 98.82 ± 18.11 ml/min, and before and after eGFR did not show a statistically significant difference (p=0.210) (Table 2).

Table 2. Laboratory Results Before and After ICA

	Before Contrast Agent	After Contrast Agent	p
	Mean±SD	Mean±SD	
Creatinine (mg/dL)	0.76 ± 0.19	0.73 ± 0.19	0.073
Glomerular Filtration Rate (ml/min)	97.15 ± 17.53	98.82 ± 18.11	0.210
Total Oxidant Level (μmol H202 Equiv. /L)	13.72 ± 9.40	5.20 ± 2.06	*<0.001**
Total Antioxidant Level (mmol Trolox Equiv. /L)	2.50 ± 0.27	2.20 ± 0.24	*<0.001**
Oxidative Stress Index	5.36 ± 3.39	2.39 ± 0.97	*<0.001**

Following administration of ICA, TOS decreased in 88.6% of patients and both TAS and OSI were decreased in 78.3%. The mean TOS before ICA was 13.72 ± 9.40 and the mean TOS after ICA was 5.20 ± 2.06 (p<0.001) (Figure 1) (Table 2). The mean TAS before ICA was 2.50 ± 0.27 and the mean TAS after ICA was 2.20 ± 0.24 (p<0.001) (Figure 2) (Table 2). The mean OSI before ICA was 5.36 ± 3.39 and the mean OSI after ICA was 2.39 ± 0.98 (p<0.001) (Figure 3) (Table 2).
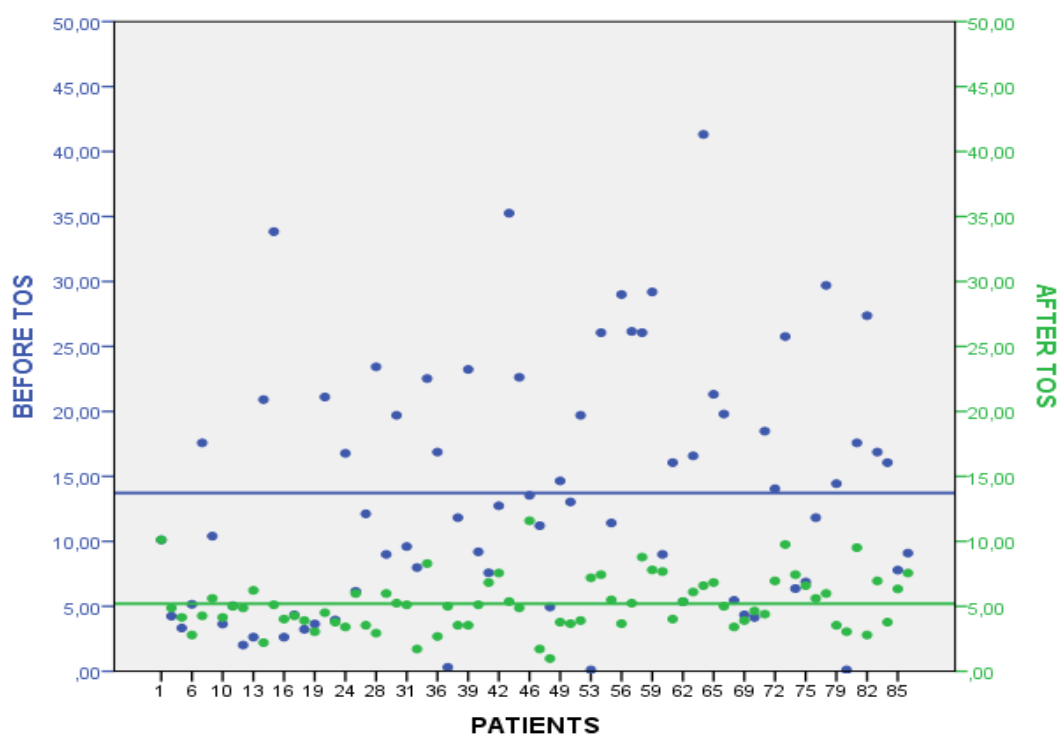

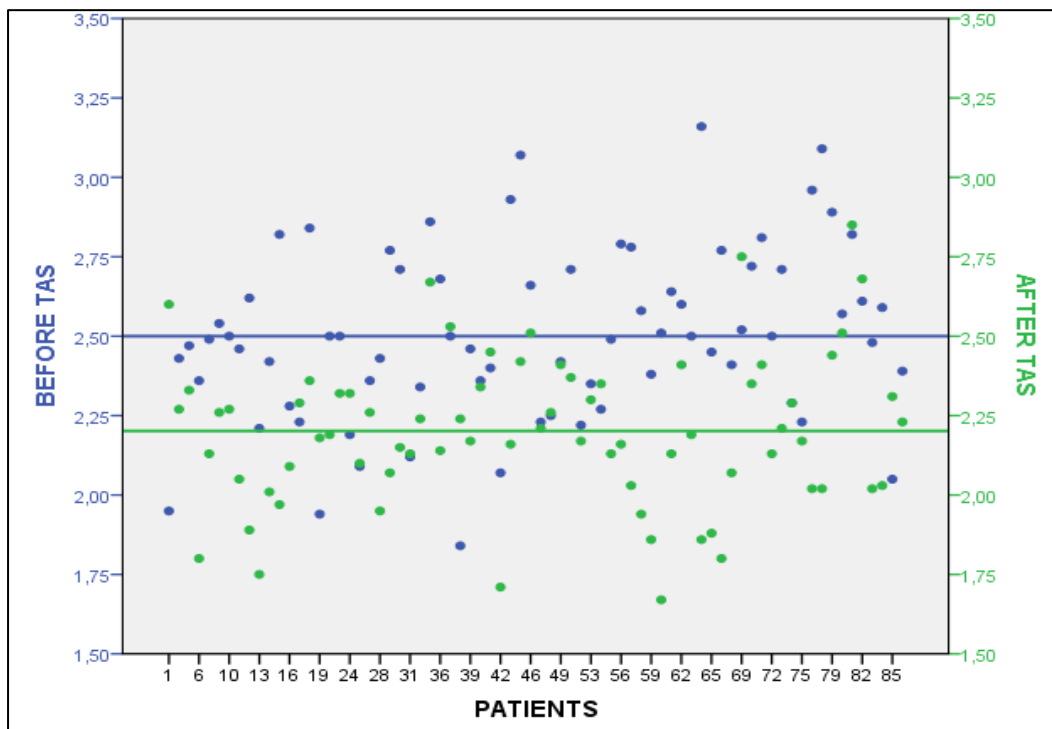**Figure 1.** TOS Values of Patients Before and After ICA

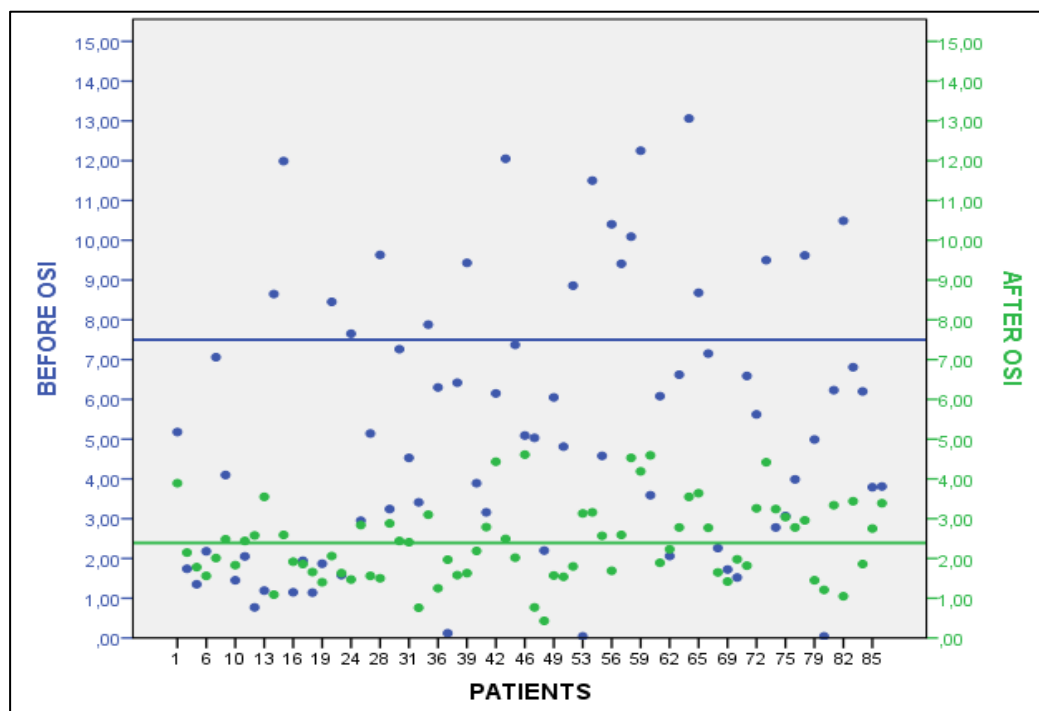**Figure 2.** TAS Values of Patients Before and After ICA

Figure 3. OSI Values of Patients Before and After ICA

Discussion

The objective of this study is to evaluate TOS, TAS, and OSI status in patients who received ICA and did not develop CIN. ICMs are designed to be polar and have high osmolality to provide better imaging and better water solubility. Evidence demonstrates that the elevated osmolality of intravenous contrast agents (ICAs) is a significant factor in the development of contrast-induced nephropathy (CIN), either through direct or indirect mechanisms, by imposing an excessive osmotic burden on the kidneys. CIN is a significant contributor to the development of acute renal injury in patients who are admitted to the hospital. It is also linked to increased morbidity. The etiology of CIN remains incompletely elucidated, with a dearth of information regarding the underlying biological pathways. Oxidative stress is identified as a causative element in the progression of CIN.[11]

In two prospective studies on patients diagnosed with myocardial infarction who received primary percutaneous coronary intervention, including patients with and without CIN development, they found that OSI and the group with CIN exhibited significantly elevated TOS levels and significantly reduced TAS levels compared to the group without CIN. They identified OSI as a risk factor for the development of CIN.[5,12]

However, in another prospective study on patients with normal renal function and with low risk for the development of CIN, there was no statistically significant disparity in the baseline serum levels of antioxidant substances between individuals with and without renal failure following cardiac catheterization.[13]

In a separate study that included individuals diagnosed with Diabetes Mellitus, both with and without nephropathy, there was no notable change in TOS, TAS, and OSI levels between the two groups.[14]

In our study, we evaluated patients who did not develop CIN in the check on the 5th day. Our literature review did not reveal any comparison for TOS, TAS, and OSI before and after the use of ICA for the patient group who did not develop CIN. Oxidative stress is considered a contributing component in the development of CIN but we found that, on the contrary, it caused a decrease in oxidative stress in patients who did not develop CIN. Our study found a significant decrease in TAS, TOS, and OSI values 24 hours after ICM administration, compared to the values before ICM administration. This suggests that nephropathy development may be the cause of oxidative stress, rather than that oxidative stress causes CIN development. Studies are showing that oxidative stress increases in case of acute kidney injury.[15,16] Considering the studies with different results in the literature, more comprehensive studies are needed on this subject.

There are publications of various studies reporting that some minerals and vitamins reduce oxidative stress. One of these minerals is iodine.[17,18] ICAs contain high doses of iodine. 200 mL/dose contains approximately 7-10 times the iodine dose required in the daily diet.[3] In our study, 28 grams of iodine was given to patients using

80 ml of nonionic ICA. Iodine has been known as an antioxidant from the past to the present.[3] In their study assessing pregnant women, Vidal et al. discovered a significant decrease in superoxide dismutase and total antioxidant status activity among women with mild iodine deficiency compared to those with optimal iodine levels. This finding indicates that individuals with iodine deficiency experience significantly higher levels of oxidative stress.[19] In our study, in patients who did not develop CIN, there was a statistically significant decrease in TAS, TOS, and OSI values measured 24 hours after ICM administration, compared to the values before ICM administration. We think that this decrease in oxidative stress may be due to iodine, which is contained in ICM and known as a potent antioxidant[3,4]. The finding of Vidal et al. that oxidative stress levels were elevated in pregnant women with iodine deficiency may support our suggestion on this matter.

In our literature review, the role of oxidative stress in the pathogenesis of CIN has not been fully elucidated. Considering that iodine in ICA is an antioxidant and that patients who develop CIN have increased oxidative stress, more comprehensive further research is required to evaluate The function of oxidative stress in the pathogenesis of CIN or whether it is increased by different mechanisms. Within our research, the decreased OSI, TOS, and TAS after ICA suggest that ICA does not increase oxidative stress.

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