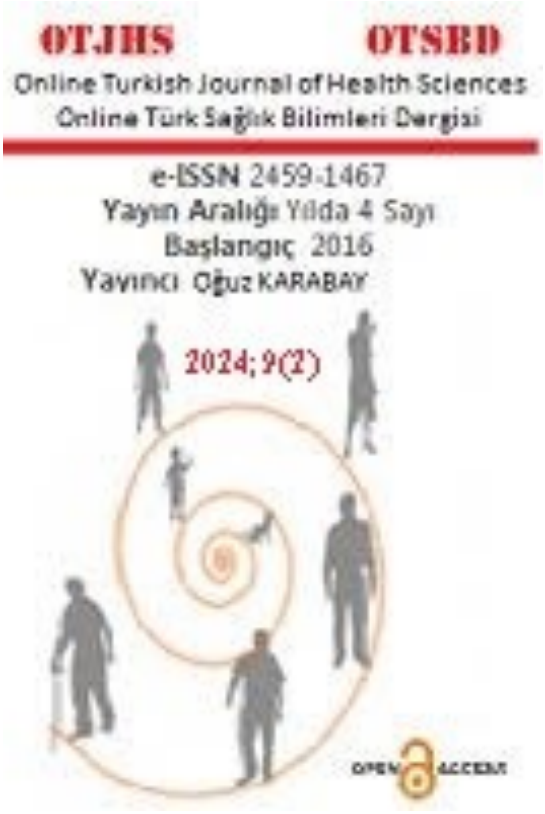

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Analysis of Nurses' Pain Assessment Records in Colorectal Surgery: A Retrospective Study

Kolorektal Cerrahide Hemşirelerin Ağrı Değerlendirme Kayıtlarının İncelenmesi: Retrospektif Çalışma

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ABSTRACT

Objective: The study aims to evaluate the effectiveness of pain management, establish a pain profile, and reveal the current state of pain assessment after colorectal surgery.

Materials and Methods: A retrospective and descriptive design was used. The research population included the records of patients hospitalized in the general surgery ICU of a hospital between November 2020 and November 2021 after colorectal surgery. The measures were a Descriptive Information Form and a Pain Evaluation Follow-up Form.

Results: Patients' mean age was 61.32±14.21 years. Males were 64.2%. Colon (65.9%) and rectal (34.1%) surgeries had been performed. Postoperative mean pain values were 2.84±1.79 at the 0th-2nd hours and 1.68±1.44 (0-4) at the 37th-48th hours. The values were significantly higher in patients without chronic diseases. Of the nurses, 94.7% used scales with proven validity and reliability, but there were no records about the pain's location, character, duration, and factors that increased or decreased.

Conclusions: Nurses' records about pain management after colorectal surgery were missing. The records analyzed were not enough to determine the pain profile after colorectal surgery. The role of pain and analgesia records in effective pain management should be considered, and the management of the electronic record system should be supported.

Keywords: Colorectal surgery, pain assessment, pain recording, nurse

ÖZ

Amaç: Çalışmanın amacı kolorektal cerrahi sonrası ağrı yönetiminin etkinliğini değerlendirmek, ağrı profili oluşturmak ve ağrı değerlendirmesinin mevcut durumunu ortaya koymaktır.

Materyal ve Metot: Araştırma, retrospektif ve tanımlayıcı olarak yürütülmüştür. Araştırma evrenini Kasım 2020-Kasım 2021 tarihleri arasında bir araştırma hastanesinin genel cerrahi yoğun bakım ünitesinde kolorektal cerrahi sonrası yatan hastaların kayıtları oluşturmuştur. Veriler, Hasta Tanıtıcı Bilgi Formu ve Ağrı Değerlendirme İzlem Formu uygulanarak elde edilmiştir.

Bulgular: Çalışmaya dahil edilen kayıtlardaki hastaların yaş ortalaması 61,32±14,21'idi. Hastaların %64,2'si erkekti. Yapılan ameliyatların %65,9'u kolon, %34,1'i rektum cerrahisidir. Hastaların ağrı düzeylerinin dağılımına göre postoperatif 0-2. saatte ağrı ortalamaları 2.84±1,79 iken 37.-48. saatte ağrının 1,68±1,44(0-4) olduğu görüldü. Postoperatif ilk 2 saatteki ağrı düzeyi kronik hastalığı olmayan hastalarda anlamlıydı. Ağrı kayıtları değerlendirildiğinde, hemşirelerin %94,7'sinin hastaya uygun geçerlilik güvenirliği kanıtlanmış ölçekler kullandığı, ancak ağrı yeri, niteliği, süresi, ağrıyı arttıran ve azaltan faktörleri içeren kayıtların olmadığı tespit edildi.

Sonuç: Kolorektal cerrahi sonrası ağrı yönetim süreci açısından hemşire kayıtlarının eksik olduğu tespit edilmiştir. Bunun yanında, analiz edilen kayıtların kolorektal cerrahi sonrası ağrı profilini belirleyecek düzeyde olmadığı saptanmıştır. Bu bağlamda bütüncül ağrı değerlendirmesini içeren ağrı ve analjezi kayıtlarının etkin ağrı yönetimindeki rolü önemsenmeli ve elektronik kayıt sisteminin yönetimi desteklenmelidir.

Anahtar Kelimeler: Ağrı değerlendirmesi, ağrı kayıt, hemşire, kolorektal cerrahi

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INTRODUCTION

One of the most common symptoms following colorectal cancer surgery is pain. In the literature, there is limited research into colorectal surgery pain, and in a study, it was found that approximately 70% of patients experienced moderate to severe pain in the first 72 hours postoperatively, the severity of pain increased up to 8 out of 10 in the first 24 hours, and that it was relieved after the 72nd hour.[1,2] Inability to control the pain triggers the surgical stress response, especially in the first 72 hours when hemodynamic parameters are variable, thereby reducing post-surgical recovery. If pain is not managed well, it may cause prolonged hospital stay, increased repeat admissions, decreased patient satisfaction, and post-operative complications, such as ileus, anastomotic leak, nausea, and vomiting.[2]

For effective pain control, pain needs to be evaluated ideally. For an accurate pain assessment, it is essential to determine the location, spread, characteristics, severity, duration, factors that aggravate or alleviate the pain, and accompanying symptoms.[3] There is some research into the assessment of the severity of pain in the literature; however, studies on a comprehensive pain evaluation are limited.[4]

In a study in which the majority of patients underwent colorectal surgery, it was determined that no scale had been used in pain assessment and that pain characteristics had not been evaluated.[4] In another study, it was found that patients' pain was not evaluated comprehensively and accurately.[5] A comprehensive assessment of pain will help to create a pain-specific profile and, thus, an analgesia algorithm. It is thought that increasing nurses' awareness of pain assessment and recording pain data will also improve pain management practices.

The study aimed to examine the post-operative pain assessment records kept by nurses, establish a pain profile in colorectal surgery and evaluate the effectiveness of pain management.

MATERIALS AND METHODS

Ethics Committee Approval: The study was carried out by the Helsinki Declaration. To conduct the study, necessary approvals were obtained from the Nursing Department Academic Committee of A University (Date: 30/09/2021, decision no:200959), The Ethics Committee of A University (Date: 01/10/2021, decision no:40), Adana City Training and Research Hospital (Date: 18/10/2021, decision no:96172664- 604), Adana Provincial Health Directorate (Date: 15/10/2021, decision no:27350520).

The study was conducted between October 18, 2021 and May 18, 2022 by using the pain records of patients who had undergone colorectal surgery in the general surgery intensive care unit of Adana City Hospital between October 1, 2020 and October 1, 2021.

Setting and Sample: The research was conducted retrospectively and descriptively. The study was conducted in the general surgery intensive care unit of a university hospital. The hospital where the research was conducted has a capacity of 1550 beds, and the intensive care unit has 15 beds. No pain assessment protocol was used for patients in the intensive care unit. The numerical rating scale (0-10) is used for conscious patients, and the Wong-Baker Faces Pain Rating Scale was used for unconscious patients. The hospital has a "Hospital Information Management System" that monitors pain assessment and gives warnings. This system guides health personnel to evaluate and record pain. No sample calculation was made in the study. The study population consisted of 5335 pain records of patients who had stayed in the general surgery intensive care unit due to colorectal surgery between October 1, 2020, and October 1, 2021. Total of 5057 pain records did not meet the pain criteria in our study (5051 pain records did not belong to patients who underwent colorectal surgery and 6 pain records belonged to the patient with repeated hospitalizations). The sample of the study involved records of 278 patients who were aged over 18 years, had undergone colorectal surgery, had received general anesthesia during the operation, and had been hospitalized for at least 48 hours after the operation.

Data Collection: The study data were obtained from the hospital's digital information system using a "Patient Descriptive Information Form" and the "Pain Evaluation Follow-up Form," created by the researcher.[4,6]

The Patient Descriptive Information Form included items about patients' demographic and medical characteristics (age, gender, concomitant diseases, type of surgery, status of consciousness, and mechanical ventilation support), and the Pain Evaluation Follow -up Form involved items about pain assessment, pain scale, pain characteristics, the status of pharmacological and non-pharmacological analgesia application, and re-evaluation of pain after analgesia. However, patients' analgesia data could not be reached. In the study, a numeric pain scale (1-10) was used for conscious patients, and the Wong-Baker Faces Pain Rating Scale was used for unconscious patients.

Statistical Analysis: SPSS (IBM SPSS Statistics 26) statistical software package was used in the analysis of the study data. Descriptive statistics were presented as counts, percentages, mean scores, minimum-maximum values, and standard deviations. In the statistical analysis, it was determined whether the data were normally distributed or not. As the data

showed a normal distribution, the t-test, which is a parametric test, was used in paired subgroups (such as female and male). On the other hand, the Mann-Whitney U test was used for paired subgroups in cases where parametric assumptions were not met. P<0.05 was accepted as the significance level. According to the results, since the number of patients was over 50, normality was determined by the Kolmogorov-Smirnov test. Accordingly, p>0.05 as a result of this test and the Skewness and Kurtosis values are close to 0 within the limits of ±1, indicating that the data is normally distributed. Therefore, parametric tests were used. Among normally distributed parametric tests, the T-test was used in binary subgroups (such as men and women).

RESULTS

Patients' descriptive data are given in Table 1. The mean age of patients included in the study was 61.32±14.21 years.

Table 2 was shown the pain levels of patients according to postoperative hours, and while the mean postoperative pain level of patients at 0-2nd hours was 2.84±1.79, it was determined to be 1.68±1.44 (0 -4) at 37-48th hours.

In Table 3, the pain levels of patients in the first 48 hours postoperatively were compared with their descriptive data. Accordingly, it was determined that the pain level of patients without chronic diseases was significantly higher only in the first 2 hours postoperatively (p=0.035).

When the records of the pain evaluation follow-up form were examined, it was seen that 94.7% of nurses had used scales with proven validity and reliability in pain assessment. It was observed that the Wong-Baker pain scale was used instead of the numerical pain assessment scale in 9 patients who were conscious and able to express themselves (Table 4). Findings accompanying pain, including location, character, and duration of pain, evaluation status during rest and movement, and factors that increased and reduced pain, had not been recorded. Pain after analgesia had been re-evaluated and recorded in 60.6% of patients.

Table 1. Distribution of patients' descriptive characteristics (n=173).

Descriptive characteristics		**Data**
Age, Mean±SD, Minimum-Maximum)		61.32±14.21, (25-91)
Gender, n (%)	Male	111 (64.2)
	Female	62 (35.8)
Presence of chronic diseases, n (%)	Yes [a]	88 (50.9)
	No	85 (49.1)
The surgery, n (%)	Colon surgery	114 (65.9)
	Rectal surgery	59 (34.1)
Status of consciousness, n (%)	Conscious	166 (96)
	Unconscious	7 (4)
Mechanical Ventilation support, n (%)	No	164 (94.8)
	Yes	9 (5.2)
Sedation support, n (%)	No	166 (96)
	Yes	7 (4)
Scales used, n (%)	Numerical Rating Scale	157 (90.8)
	Wong-Baker Faces Pain Rating Scale	16 (9.2)

[a:] Heart diseases, respiratory system diseases and diabetes mellitus.

Table 2. Distribution of patients' pain levels according to postoperative hours.

Duration	**Pain severity**	
	Mean±SD	**Minimum-Maximum**
0-2nd hours	2.84±1.79	0-8
3-4th hours	2.25±1.55	0-5
5-8th hours	1.83±1.20	0-4
9-12th hours	1.76±1.64	0-6
13-24th hours	1.57±1.44	0-6
25-36th hours	1.06±0.99	0-3
37-48th hours	1.68±1.44	0-4

Table 3. Comparison of the pain levels of patients in the first 48 hours postoperatively with their descriptive characteristics.

Patients' descriptive characteristics		Pain severity			
		0-2nd hours Mean±SD	3-12th hours Mean±SD	13-24th hours Mean±SD	25-48th hours Mean±SD
Gender	Male	2.87±1.64	1.87±1.81	1.42±1.53	1.47±1.27
	Female	2.83±1.87	2.63±1.16	1.79±1.35	1.83±1.50
Statistical analysis	t	-0.124	1.188	1.177	0.875
	p	0.902	0.64	0.243	0.386
Presence of chronic diseases	Yes	2.57±1.70	2.22±1.33	1.40±1.28	1.82±1.37
	No	3.15±1.84	2.12±1.70	1.76±1.58	1.50±1.41
Statistical analysis	t	-2.129	0.246	-1.180	0.802
	p	0.035	0.806	0.241	0.427
The surgery	Colon surgery	2.91±1.83	2.17±1.46	1.54±1.46	1.53±1.34
	Rectal surgery	2.76±1.70	2.20±1.57	1.62±1.39	1.93±1.48
Statistical analysis	t	-0.520	0.068	0.227	0.925
	p	0.604	0.946	0.947	0.360
Status of consciousness	Conscious	2.88±1.80	2.18±1.50	1.62±1.46	1.70±1.36
	Unconscious	2.28±1.49	2.00± -	0.83±0.75	1.42±1.61
Statistical analysis	t	0.868	0.122	1.315	0.473
	p	0.387	0.903	0.192	0.638
Mechanical Ventilation support	No	2.33±1.50	2.00±0.00	1.12±1.35	1.66±1.50
	Yes	2.89±1.80	2.18±1.51	1.61±1.44	1.65±1.38
Statistical analysis	t	-0.909	-0.174	-0.904	0.017
	p	p=0.311	p=0.863	0.358	0.988
Scales used	Numerical Rating Scale	2.92±1.82	2.19±1.53	1.61±1.46	1.67±1.39
	Wong-Baker Faces Pain Rating Scale	2.25±1.29	2.00±0.00	1.27±1.19	1.60±1.42
Statistical analysis	t	-1.439	-0.215	-0.739	-0.151
	p	0.152	0.830	0.462	0.880

Table 4. Pain evaluation follow-up form (n=173).

		n (%)
1-Standard pain scale, which was suitable for the patient and had validity and reliability, was used.	**Yes**	164 (94.7)
	No	9 (5.3)
2- Findings accompanying the pain were questioned (Nausea, vomiting, etc.)	**Yes**	0 (0)
	No	173 (100)
3-The severity of the pain was evaluated.	**Yes**	173 (100)
	No	0 (0)
4-The area of the pain was evaluated.	**Yes**	0 (0)
	No	173 (100)
5-The character of the pain was evaluated.	**Yes**	0 (0)
	No	173 (100)
6-The duration of the pain was evaluated.	**Yes**	0 (0)
	No	173 (100)
7-Pain during movement/mobilization and at rest was evaluated separately.	**Yes**	0 (0)
	No	173 (100)
8-The factors that increased and decreased the pain were specified.	**Yes**	0 (0)
	No	173 (100)
9-Pain was re-evaluated after analgesic.	**Yes**	105 (60.6)
	No	68 (39.4)
10- Pain assessment was recorded regularly	**Yes**	105 (60.6)
	No	68 (39.4)

DISCUSSION AND CONCLUSION

One of the most common symptoms after colorectal surgery is pain. When this pain is not controlled, it causes a hospital stay longer than 10 days and complications such as post-operative ileus and stress up to 50%.[7]

Holistic pain assessment is necessary for effective pain management. The pain management process should be recorded to provide information to the nurses. Due to a lack of literature on pain after colorectal surgery, nurses' pain assessment records were examined to guide them in this study.

When the findings in our study were examined, it was observed that the pain, which was moderate to mild in the first 4 hours, decreased to a mild level in the following hours (Table 2). Similarly, in a study conducted by Lindberg et al. with patients undergoing colorectal surgery, more than half of the patients

had moderate to severe pain from the day of surgery to the 3rd day after surgery, the severity of pain increased up to a level of 8 out of 10 in the first 24 hours, and it fell under 4 after the 72nd hour.[2] This explains that due to the nature of incision pain, the pain decreases with the regression of the wound healing and inflammation process. Additionally, the pain intensity found in the study by Lindberg et al. was high, but it was observed to be low in our study. This may have been due to the difference in the intensity of pain expressed by the patients and recorded by the nurses.

In our study, it was determined that the pain level was significantly higher in patients without chronic diseases only at the first 0-2nd hour postoperatively (p=0.035) (Table 3). It is stated that individuals with chronic diseases encounter pain more frequently, enabling them to cope harmoniously by displaying an accepting attitude towards pain.[8] No significant correlation was found between pain and chronic diseases in other studies.[9,10] Moreover, it has been reported that chronic diseases can cause negative consequences on individuals with chronic diseases experience more pain.[11,12] This finding may be because chronic diseases increase compliance with the pain experience. Considering that there may be pain caused by chronic diseases in addition to acute pain after surgery, pain management should be carefully planned in elderly groups.[13] Pain should be evaluated holistically, especially in elderly individuals, and analgesics should be determined not only according to the level of pain but also the age and medical condition of the patient.

When the pain evaluation follow-up form was examined in our study, it was seen that the severity of pain had been evaluated and recorded in all patients. Similarly, in the study conducted by Baş et al., it was stated that 84% of nurses had evaluated pain.[14] It is important to use the appropriate pain scale for each patient, even if the pain evaluation rate is high. Although almost all of the nurses had used scales with proven validity and reliability in our study, they were found to use the Wong-Baker Faces Pain Rating Scale in 9 conscious patients, which contradicts the literature.[15] The use of a face scale for a patient who can express himself/herself may lead to misdiagnosis of pain and administration of the wrong dose of analgesia. Indeed, the Wong-Baker Faces Pain Rating Scale was developed to measure pain severity or amount of pain in patients with cognitive or language disabilities, generally in pediatric practice.[13,16] As a matter of fact, it was stated in the literature that laughing and crying expressions on this scale were at two ends and caused conceptual confusion and that 'tear in facial expression' was not appropriate for adults with severe pain.[15]

In clinics with special patient groups, such as intensive care, more comprehensive scales, such as the Behavioral Pain Scale (BPS), the Critical Care Pain Observation Tool (CPOT), in which painful behaviors and compliance are questioned, and the Nonverbal Pain Scale (NVPS), in which the physiological parameters of the patient are evaluated, should be preferred to the Wong-Baker Faces Pain Rating Scale. In another study, it was found that 48.7% of nurses had observed the patient's behavior to measure the severity of pain, while 66.7% had not used any pain scale to determine the severity of the patient's pain.[17] Similar studies conducted in our country showed that although the vast majority of patients experienced pain, approximately one-third or half of nurses did not use a pain scale.[18,19] Some studies indicated that there was no standard pain assessment protocol for acute pain and that nurses' pain assessment records were inadequate.[20]

In our study, factors that reduced the pain were not questioned, and the duration, area, and character of the pain were not evaluated during movement and rest. Similar to the results reported, no pain assessment record, including pain level, was found in the study conducted with colorectal surgery patients.[21] In the study conducted by Özveren et al. with surgical nurses, it was observed that approximately half of the nurses had not recorded the pain assessment data.[22] These results indicate that pain is not evaluated holistically and effectively. In another similar study by Rafati et al., pain assessment was not comprehensive.[5] Indeed, it is known that systematic pain assessment facilitates pain management. In a study by Erden et al. with surgical patients, it was found that standard and holistic pain assessment controlled the pain level, thus regulating the level of blood analgesia and reducing the pain level of the patient and analgesic consumption.[23] It was also stated in the study that regular questioning and recording of all aspects of pain according to the patient's level of pain and analgesia directed the pain management process of nurses. Since the hospital where the data were collected had a digital hospital information system, analgesia records could not be accessed in the nurse observation forms. In addition, it was observed that nurses had not recorded non-pharmacological methods of pain treatment in the system.

Treating pain not only with analgesics but also with non-pharmacological methods is important for multimodal analgesia.[24] In another study conducted with patients who underwent low anterior resection, colon resection, and anterior resection in the literature, it was reported that massage therapy applied on the 2nd and 3rd postoperative days reduced negative moods, such as pain, anxiety, and tension and provided general relief in the patient, but in another study, although the majority of patients experienced

pain, it was determined that 65-88% of the nurses did not use any non-pharmacological techniques.[19,25] Similarly, in the study, it was observed that nurses did not use pharmacological methods in the treatment of pain.[26] Our observations and other studies show that nurses are reluctant to add non-pharmacological methods to analgesics in postoperative pain management.

As a result of our study, it was determined that nurse records of holistic pain assessment and pain management process after colorectal surgery were missing. In this context, it was found that the records were not enough to determine the pain profile after colorectal surgery. For this reason, as in other painful situations, it is recommended that nurses use pain assessment scales with proven validity and reliability, appropriate for the patient's state of consciousness, in addition to questioning the location, character, and duration of pain and factors that increase and decrease pain and evaluate pain in all aspects. In addition, it should not be forgotten that pain records will guide health personnel as the pain management process can be achieved with a multidisciplinary approach.

In conclusion, one limitation of the study was that surgeries were performed by different surgeons. In addition, since the data were collected from hospital records, pain levels or other pain data were accepted as they were in the records. Due to the retrospective nature of the study, no observation or instant evaluation was made. Although it was aimed to examine the analgesia records at the beginning of the study, another limitation was that analgesia use could not be evaluated because the hospital management did not allow access to relevant records. In addition, maintaining pain management records in the hospital management system for proper monitoring is recommended. Provision of the necessary feedback for nurses and recording data electronically into the computer system will increase the quality of patient care.

Ethics Committee Approval: The study was carried out by the Helsinki Declaration. To conduct the study, necessary approvals were obtained from the Nursing Department Academic Committee of A University (Date: 30/09/2021, decision no:200959), The Non- Invasive Ethics Committee of A University (Date: 01/10/2021, decision no:40), Adana City Training and Research Hospital (Date: 18/10/2021, decision no: 96172664- 604), Adana Provincial Health Directorate (Date: 15/10/2021, decision no: 27350520).

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Opinions and Knowledge Levels of Physicians Providing Primary Health Care on Precision Medicine Applications

Birinci Basamak Sağlık Hizmeti Sunan Hekimlerin Hassas Tıp Uygulamaları Konusundaki Düşünceleri ve Bilgi Düzeyleri

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ABSTRACT

Objective: This study aims to determine the awareness, attitudes, expectations and concerns of primary care physicians about precision medicine.

Materials and Methods: This descriptive-qualitative study was conducted with family physicians providing primary health care between January 2023 and April 2023. Data were collected through face-to-face, in-depth interviews using a semi-structured interview form. The interviews were recorded and transcribed with a voice recorder.

Results: This study was conducted with 27 (12 male, 15 female) family physicians. The views of the participants on their previous knowledge on precision medicine are given in Table 2. It was determined that 74.1% of the participants did not have detailed information about precision medicine before.

Conclusions: In order to eliminate disadvantageous aspects such as social discrimination and financial burden in precision medicine practice, the studies can be examined by the managers by taking the opinions of health professionals.

Keywords: Community health, family physician, precision medicine

ÖZ

Amaç: Bu çalışmanın amacı, birinci basamakta hizmet sunan hekimlerin hassas tıp konusundaki farkındalığı, tutumları, beklentileri ve endişelerini saptamaktır.

Materyal ve Metot: Tanımlayıcı-nitel tasarıma sahip bu çalışma, birinci basamak sağlık hizmeti sunan aile hekimleri ile Ocak 2023-Nisan 2023 tarihleri arasında yürütülmüştür. Veriler, yarı-yapılandırılmış görüşme formu kullanılarak, yüz-yüze derinlemesine görüşmelerle toplanmıştır. Görüşmeler, ses kayıt cihazıyla kaydedilmiş ve transkript edilmiştir. Verilerin değerlendirilmesinde betimsel analiz yöntemi kullanılmıştır.

Bulgular: Bu araştırma 27 (12 erkek, 15 kadın) aile hekimi ile yürütülmüştür. Katılımcıların hassas tıp konusunda daha önceki bilgilerine dair görüşleri tablo 2'de verilmiştir. Katılımcıların %74,1'nin daha önce hassas tıp konusunda detaylı bilgilerinin olmadığı tespit edilmiştir.

Sonuç: hassas tıp uygulamalında toplumsal ayrımcılık, maddi külfet gibi dezavantajlı yönlerin giderilebilmesi için sağlık profesyonellerinin görüşleri alınarak çalışmalar yöneticiler tarafından incelenebilir.

Anahtar Kelimeler: Aile hekimi, hassas tıp, toplum sağlığı

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INTRODUCTION

The concept of precision medicine, also called individualized or personalized medicine, has recently attracted attention in scientific, medical and public areas and has become the next model of health care delivery.[1] Because each individual has unique qualities and characteristics in the scientific and social context. Therefore, precision medicine states that it is not correct to apply the same treatment method to 10 people suffering from the same disease.[2] While the concepts of personalized medicine and precision medicine are very similar, precision medicine also encompasses a multidisciplinary data-driven approach to foster better clinical decision-making through a clear understanding of the molecular basis of an individual's disease.[3,4] Factors affecting the launch of the Precision Medicine Initiative are as follows: the dramatic fall in the cost of DNA sequencing and the increase in business driven by the delivery of healthcare as a continuous and rich source of personal data, the adoption of electronic medical records (EMRs), and the growth of digital.[5-7] Physicians are the people who are in contact with patients and will carry out sensitive medicine applications.[8] Although precision medicine is a new perspective, its importance is increasing, and it has started to be used all over the world. It is important to determine the perception of the physicians in our country about precision medicine and the perception of the patients about precision medicine in terms of forming a cohort.

Since the views and understanding of precision medicine among health professionals can play an important role in this process, investigating awareness, attitudes and perspectives on precision medicine in Türkiye with a mixed-method study will guide the steps to be taken in the future. This study was conducted with the aim of determining the awareness, attitudes, expectations and concerns of primary care physicians about precision medicine.

MATERIALS AND METHODS

Ethics Committee Approval: Our study was approved by the Ankara Medipol University Non-Interventional Clinical Research Ethics Committee (Date: 09.05.2023, decision no: 50). The study was carried out by the Helsinki Declaration.

Study Settıng and Recruıtment: A qualitative research method was used in this study. Qualitative research helps to present and interpret social structures and processes by trying to reveal the perceptions and experiences of the participants, to understand situations and events from their perspective, and to interpret their experiences.[9,10]. Interpretation of the data was carried out in 4 stages (coding, ranking, generating themes, ensuring validity and reliability).

Preparation of the Interview Form: A semi-structured interview form was used in the research. The interview form was prepared with reference to the relevant literature and scientific studies, and in this context, 5 questions were developed to be used in the research.

Data Collection Tool: The face-to-face interviews with the participant's family physicians were recorded by voice recording or note-taking with the permission of the participants. Then, the audio recordings were deciphered and converted into text. The 10 -question personal information form was created by the researchers in order to define some sociodemographic characteristics of the family physicians participating in the study. This form consisted of questions about sociodemographic characteristics (age, gender, work experience, etc.).

***Statistics*:** Content analysis was used in the analysis of the data collected using the interview technique; data were analyzed in four stages, as stated by Yıldırım and Şimşek.[9] First, the data were coded, and then the themes-categories of the coded data were determined. Subsequently, codes and themes were organized, and the final findings were defined and interpreted. During the coding phase of the opinions of the participants, the consistency was checked by ensuring that the opinions were coded by both researchers. In qualitative studies, the agreement between expert evaluation and researcher categorization is expected to be 90% or more.[11]

RESULTS

For the questions within the scope of each subproblem, categories and codes were created within the framework of the relevant literature and participant opinions, participant opinions were deciphered for each category and code, the findings were presented in tables, and participant views were included with direct quotations. The findings were interpreted and discussed within the framework of the related literature.

Demographic information of the participants is given in Table 1. It was determined that 44.4% of the participants were between the ages of 28-35, 55.6% were women, and 37% had professional experience in the range of 10-15 years.

The views of the participants on their previous knowledge on precision medicine are given in Table 2. It was determined that 74.1% of the participants did not have detailed knowledge about precision medicine before (Table 2).

Table 1. Demographic information of the participants.

Demographic information		n (%)
Age	28-35	12 (44.4)
	35-45	9 (33.3)
	45 and older	6 (22.2)
Gender	Male	12 (44.4)
	Female	15 (55.6)
Professional experience	0-5 years	4 (14.8)
	5-10 years	7 (25.9)
	10-15 years	10 (37.0)
	15 years and more	6 (22.2)

n: number, % frequency.

Table 2. General knowledge of participants on precision medicine.

Patients' knowledge level		n (%)
Have you heard/do you know the concept of precision medicine?	I've never heard	2 (3.7)
	I've heard of it, but I don't know for sure	5 (18.5)
	I know, but I don't have much detailed information	20 (74.1)
How important do you think precision medicine is in the prevention and treatment of diseases?	Very important	2 (7.4)
	Important	15 (55.6)
	No idea	10 (37.0)
Do you think the data obtained during precision medicine practice can create ethical (moral) problems?	Yes	20 (74.1)
	No	7 (25.9)

While 51.65% of the participants stated that precision medicine is highly effective in personalized clinical care, 33.33% stated that precision medicine is promising enough in therapeutic areas such as oncology. In general, the opinions of the participants that precision medicine can be used in health risk estimation, in the management of chronic diseases, in studies of prolonging life expectancy and in accelerating genetic studies came to the fore (table 3). However, the majority of the participants (n=16) clearly stated that they did not consider their level of knowledge on precision medicine adequate. In this respect, while K1's view was "Precision medicine is a health service delivery that can reveal a more specific and effective approach to treatment, estimation of patient health risks and management of chronic diseases, but I do not think my knowledge is sufficient".

Opinions on the benefits and negative aspects of precision medicine are summarized in Table 4. Participants stated that precision medicine can be beneficial, especially in the subjects of 'prediction of diseases (n=7) and rational drug use (n=7)." In summary, the participants listed in Table 4 summarized the positive aspects of precision medicine as follows; "Precision medicine helps treat diseases more specifically and effectively, better predict health risks, and prevent disease.

Table 3. General information about precision medicine and opinions on the adequacy of the information.

Category	Code	Participant	n
General Health	Health Risk Estimation	K1, K5, K8, K15	4
	Prolongation of life expectancy	K11, K13, K14	3
Disease management	The acceleration of genetic studies	K25, K26	2
	Chronic disease management	K2, K8, K10	3
Knowledge level	Lack of knowledge level	K27, K26, K24, K23, K21, K19, K18, K17, K16, K14, K12, K7, K2, K5, K4, K1	16

Table 4. Opinions on the positive and negative aspects of precision medicine.

Category	Code	Participant	n
Positive aspects	Disease prediction	K1, K5, K8, K15, K19, K26, K27	7
	Using medicine with care	K2, K8, K13, K17, K9, K11, K17	7
	Reduction in health expenditures	K12, K15, K21, K24,	4
	Increasing personal interventions	K5, K19, K11, K27	4
	Increasing life expectancy	K26, K20, K6, K3	4
Negative aspects	Inequality between individuals	K1, K4, K8, K9, K10, K13, K16, K22, K25	9
	Data security issues	K25, K23, K16, K12, K8, K5, K3, K9, K7	9
	Additional cost	K25, K17, K12, K9, K8, K5, K4, K2	8
	Ethical issues	K8, K10, K19, K7, K24, K18	6
	New genetic problems	K27, K22, K11, K5	4

Opinions on the relationship of precision medicine with genetic research and genetic treatments and the social reflections of genetic results were grouped under 3 categories as follows: 1. Genetic treatments will greatly improve public health (n=12) 2. There may be problems in reaching everyone (n=7), and 3. It may cause social discrimination (n=5). Opinions about the confidentiality/reliability of precision medicine and its position within the framework of ethical principles were summarized as "concerns about the protection of ethical principles (n=9)" and concerns about the protection of personal data (n=15)." Views on the social applicability of precision medicine and its place in the health system are given in Table 5. Participants stated that they had insufficient knowledge about the applicability of precision medicine and its place in the health system (n=12). However, although they are at an insufficient level of knowledge, the views that 'integration (n=3) ", "adaptation to social demands (n=3)", and 'supporting technological developments (n=2)" have come to the fore.

Table 5. Views on the social applicability of precision medicine and its place in the health system.

Category	Code	Participant	n
Social applicability	Integration	K4, K5, K8	3
	Adaptation to social demands	K1, K2, K6	3
	Technological development	K1, K18	2
	Accessibility for all	K5, K11, K27	3
	Sophistication	K26, K20	2
Place in the healthcare system	Application increments	K25, K23, K16, K12	4
	Awareness training	K2, K11, K10, K7	4
Lack of knowledge level	Public inadequacies	K8, K10	2
	Inability to interpret clearly	K1, K3, K9, K13, K14, K16, K17, K20, K22, K23, K26, K27	12

DISCUSSION AND CONCLUSION

The sequencing of the human genome has led many to speculate about the potential for short-term therapy for clinical medicine.[12] It was expected that understanding the genetic basis of the disease would naturally lead to better-targeted therapies. Indeed, the sharp reduction in sequencing cost following the invention of "next-generation" technologies has facilitated the discovery of many more causative genes and their application to individual patients, including several recently widely reported genome-driven samples.[13-15]

One of the focuses of future work is the increasing emphasis on precision medicine's ability to affect not only individuals but also populations. This has been termed "sensitive public health". Another area of emphasis should be to understand how precision medicine can increase or reduce historical disparities in access to care.[16] "Do historically underserved populations have access to precision medicine?" and "What policies can ensure appropriate access?" These questions will need to be addressed in the broader and more variable context of proposed revisions to health reform and Medicaid programs.[17] According to the results obtained in our study, while the participants reported the positive aspects of precision medicine as 'disease prediction', the widespread use of rational drugs, and the increase in personal interventions', they mentioned 'inequality between individuals' concerns as the main negative aspects. Because if precision medicine facilities are limited to only a certain group or population, this will cause great problems in the speed and quality of other individuals' access to health.

Primary care physicians act as a bridge between the community and the health system to use precision medicine practices in patient approaches. Newly developed precision medicine techniques contribute to patient approach similar to laboratory tests and imaging methods (CT, MRI) currently widely used. The genetic profile alone cannot explain the patient's social status, lifestyle, and perspectives. Therefore, primary care physicians are important in the holistic evaluation of patients. In addition to the comprehensive patient evaluation that physicians have already made, the use of precision medicine applications will provide significant benefits for diagnosis and treatment.[2] Family physicians interviewed in our study stated that precision medicine can play an important role in helping individuals lead a more comfortable life, especially by increasing their quality of life. In fact, it was emphasized that the biggest role in this matter belongs to them, but first, the necessary training should be given to health professionals about precision medicine.

In conclusion, it has been determined that precision medicine is generally welcomed by family physicians and that the problems that may occur in the early stages of practice can be eliminated in the following years. It can pave the way for important developments in the direction of public health. However, in order to eliminate disadvantageous aspects such as social discrimination and financial burden in precision medicine practice, the studies can be ex-

amined by the managers by taking the opinions of health professionals. Steps can be taken gradually according to both the position of precision medicine in the health system and, the health of the community and the personal health needs of individuals. Since the views and understanding of precision medicine among health professionals can play an important role in the realization of precision medicine, investigating awareness, attitudes and perspectives on precision medicine in Türkiye through a mixed-method study will guide the steps to be taken in the future. This study had some limitations. These include the study's retrospective nature and the small size of the longitudinal cohort.

Ethics Committee Approval: Our study was approved by the Ankara Medipol University Non-Interventional Clinical Research Ethics Committee (Date: 09.05.2023, decision no: 50). The study was carried out by the Helsinki Declaration.

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Postpartum Depression in Women Gave Birth in the Shadow of the Pandemic

Pandemi Gölgesinde Doğum Yapan Kadınlarda Postpartum Depresyon

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ABSTRACT

Objective: This study aimed to evaluate the level of postpartum depression and related factors in women who gave birth during the COVID-19 epidemic.

Materials and Methods: This is a descriptive cross-sectional study. The study was carried out between January and April 2021 with 351 participants. Data collection instruments included an information form, Coronavirus Anxiety Scale (CAS), Obsession with COVID-19 Scale (OCS), and Edinburgh Postnatal Depression Scale (EPDS).

Results: The average age of the participants was 28.37±6.74. The number of pregnancies was 2.68±1.48. Primary school graduates were 47.3%, and 92% were not working. 7% of the participants had an EPDS cut-off score of 10 or above. A difference was found between the groups in terms of education level, smoking, COVID-19 experience relative to COVID-19 status and CAS and OCS score average ($p<0.05$). Additionally, there was a difference between the groups' employment status, spouse's employment status, income status, smoking, unplanned pregnancy, type of birth and the baby's need for intensive care, and the average EPDS score ($p<0.05$).

Conclusions: Those with a high level of education, smokers, and those whose close relatives have had COVID-19 may be at risk for COVID-19 anxiety and obsession. Starting in pregnancy, anxiety and depressive symptoms should be reduced in at-risk groups.

Keywords: Anxiety, COVID-19, obsessive behavior, pandemics, postpartum depression

ÖZ

Amaç: Bu çalışma, COVID-19 pandemisinde doğum yapan gebelerin postpartum depresyonla ilişkili faktörlerini değerlendirmeyi amaçlamıştır.

Materyal ve Metot: Tanımlayıcı kesitsel tipte olan bu çalışma, Ocak ve Nisan 2021 tarihleri arasında 351 katılımcı ile gerçekleştirildi. Veri toplama araçları olarak Bilgi Formu, Koronavirüs Anksiyete Ölçeği (CAS), COVID-19 Takıntısı Ölçeği (OCS) ve Edinburgh Postnatal Depresyon Ölçeği (EPDS) kullanıldı.

Bulgular: Katılımcıların yaş ortalaması 28,37±6,74 idi. Gebelik sayısı 2,68±1,48 idi. İlkokul mezunlarının oranı % 47,3 olup, %92'si çalışmıyordu. Katılımcıların %7'sinin EPDS kesme puanı 10 ve üzerindeydi. Gruplar arasında eğitim düzeyi, sigara kullanımı, COVİD-19 deneyimine göre COVİD-19 durumu ve CAS ve OCS puan ortalamaları açısından farklılık bulundu ($p<0,05$). Ayrıca grupların çalışma durumu, eşin çalışma durumu, gelir durumu, sigara içme, planlanmamış gebelik, doğum şekli ve bebeğin yoğun bakıma ihtiyaç duyma durumu ve ortalama EPDS puanı arasında da farklılık vardı ($p<0,05$).

Sonuç: Eğitim düzeyi yüksek olanlar, sigara içenler ve yakın akrabasında COVİD-19 geçirenler, COVİD-19 kaygısı ve takıntısı açısından risk altında olabilir. Risk altındaki gruplarda gebelikten itibaren anksiyete ve depresif belirtilerin azaltılması gerekmektedir.

Anahtar Kelimeler: Anksiyete, COVİD-19, pandemi, postpartum depresyon,takıntı

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INTRODUCTION

The coronavirus (COVID-19), first identified in the city of Wuhan in China, has spread worldwide and has been declared a global pandemic by the World Health Organization (WHO).[1] The COVID-19 pandemic has profound implications for all aspects of society, including mental and physical health.[2] The COVID-19 pandemic has been associated with an increase in mental health problems, including anxiety, depression, and stress, particularly exacerbating mental health problems such as anxiety disorders, depression, and generalized anxiety disorder.[3-6] Some studies have found that the constantly changing and evolving information following the emergence of COVID-19 has led to psychosocial effects such as fear of being unable to access healthcare facilities, food shortages, the constant risk of infection, boredom, financial loss, disappointment, and the like. The pandemic measures implemented have significantly exacerbated these concerns.[7,8] In April 2020, two weeks after the declaration of COVID-19 as a pandemic, the United Nations Regional Office for Women in Asia and the Pacific (ROAP) conducted a study to examine the gendered impact of the pandemic in the region. The study found that women and men experienced the impact of the pandemic differently, with women being more affected by the psychosocial impact of the pandemic than men.[9] Prolonged experience of psychosocial problems can, over time, lead to not only neurochemical and cellular immune changes but also endocrine and metabolic disturbances in individuals.[10] The postnatal period, also known as the puerperium, is the period following childbirth during which the physiological changes in the mother associated with pregnancy return to their pre-pregnancy state. In addition to the potential physiological changes and medical concerns that may arise during this period, midwives should be aware of the physical and psychological changes experienced by the postpartum mother and be sensitive to her needs in this context.[11] Many factors can affect the postpartum period and lead to depression.

Global pandemics and potential outbreaks of infectious diseases due to climate change pose a threat to various health issues, including the potential to affect postpartum depression. This study aims to assess levels of postpartum depression in women who have given birth in the context of the pandemic.

MATERIALS AND METHODS

Ethical Considerations: Ethics committee approval Kocaeli University Non-Interventional Clinical Research Ethics Committee (GOKAEK) (Date: 01/04/2021, decision no: 2020/371) and institutional approval for the study were obtained. In addition, participants were informed about the research, the aim of the study was explained, and informed consent was obtained from all participants included in the study. This study was conducted by the principles of the Declaration of Helsinki. Data were collected by protocols for wearing masks, social distancing, and hygiene due to the pandemic conditions. Participants with a risky score on the postnatal depression assessment were referred to the psychiatric clinic.

Study Design and Sample: This is a descriptive cross-sectional study. The study population consisted of women who gave birth in a public teaching and research hospital. Data was collected face-to-face and by phone between January 11, 2021 and April 30, 2021. However, as it was not possible to reach all postpartum women, sampling was considered appropriate. Using the known population sampling formula, it was determined that 351 women who had given birth would need to be interviewed, with a 95% confidence level and 5% margin of error. The hospital has an annual birth rate of approximately 4000.

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

Postpartum data were collected on the first day at the hospital, while data on postpartum depression were collected by telephone from the fifth day after delivery. A researcher-designed information form, the CAS, the OCS, and the EPDS were used to collect data.

Data Collection Tools

Information Form: This form was designed by the researchers. It consists of a total of 14 questions on socio-demographic and obstetric characteristics.[12-15]

Coronavirus Anxiety Scale (CAS): Developed by Lee et al., it consists of 5 items, each scored on a scale of 0 to 4. A response of '0' means 'not at all', while '4' means 'almost every day', and assesses COVID-19 anxiety over the past 2 weeks.[16] The Turkish validity of the scale was established by Evren et al.[17] Lee et al. found Cronbach's alpha coefficient to be 0.92, while Evren et al. reported it to be 0.80. In this study, it was calculated to be 0.77.

Obsession with COVID-19 Scale (OCS): Persistent and intrusive thinking about COVID-19 is a self-report measure of mental health. It was developed by Lee et al. and consists of 4 items. Each item of the OCS is rated on a 5-point Likert scale ranging from 0 (not at all) to 4 (almost every day) based on experiences over the past two weeks.[16] The Turkish validity of the scale was established by Evren et al.[17] The Cronbach's alpha coefficient was calculated as 0.83 by Lee et al., 0.80 by Evren et al., and 0.75 in our study.

Edinburgh Postnatal Depression Scale (EPDS): It was developed by Cox et al. to determine the risk of postpartum depression.[18] Aydın et al. conducted the Turkish validity and reliability of the scale, and Cronbach's alpha coefficient was found to be 0.72. The scale, which uses a 4-point Likert scale ranging from 0 to 3, consists of 10 questions. Scores of 12 or less are considered non-risky for postpartum depression, while scores of 13 or more are considered risky.[19] In this study, the Cronbach's alpha coefficient of the scale is 0.87.

Statistical Analysis: The data obtained in the study were analyzed using statistical software (SPSS 21.0) after being entered into the computer. Frequencies and percentages were used for descriptive analyses. The normal distribution of the data obtained was assessed using the Kolmogorov-Smirnov test; since the data did not meet the assumptions of normality, relationships in comparisons were assessed using the Spearman correlation test, and comparisons of categorical data were assessed using the Mann-Whitney U and Kruskal-Wallis H tests. The P level of significance was accepted as 0.05.

RESULTS

The mean age of the participants in the study group was 28.37±6.74 years, and the mean number of pregnancies was 2.68±1.48. In addition, 47.3% had completed primary school, and 92% were unemployed. Data on other descriptive characteristics are shown in Table 1.

Table 2 shows the mean scores of the participants on the CAS, the OCS, and the EPDS. It was found that 23 individuals (6.55%) scored 10 or higher on the EPDS, and 8 individuals (2.27%) scored 13 or higher, which serves as the cut-off point.

Table 1. Descriptive Characteristics of Participants (n:351).

Characteristics		**Min-Max.**	**Mean±SD**
Age		18-47	28.37±6.74
Gravidity		1–8	2.68±1.48
Parity		1–6	2.32±0.27
			n (%)
Education level	Primary school		166 (47.3)
	High school		162 (46.2)
	Associate's degree and higher		23 (6.6)
Employment status	Employed		28 (8.0)
	Unemployed		323 (92.0)
Partner's working status	Employed		344 (98.0)
	Unemployed		7 (2.0)
Income status	Income more than expenditure		14 (4.0)
	Income equal to expenditure		324 (92.3)
	Income less than expenditure		13 (3.7)
Cigarettte or tobacco usage	Uses		38 (10.8)
	Not using		313 (89.2)
COVID-19 infection history	Yes		90 (25.6)
	No		261 (74.4)
History of COVID-19 infection in a close relative	Yes		228 (65.0)
	No		123 (35.0)
Pregnancy planned	Planned		260 (74.1)
	Unplanned		91 (25.9)
Type of birth	Normal delivery		317 (90.3)
	Cesarean section		34 (9.7)
Need for neonatal intensive care	Yes		38 (10.8)
	No		313 (89.2)

Table 2. Participants' mean scores on the CAS, the OCS, and the EPDS (n:351).

Scales	**Mean±SD**	**Min-Max.**
CAS Total Score (n:351)	0.80±1.45	0-8
OCS Total Score (n:351)	1.75±1.93	0-11
EPDS Total Score (n:351)	3.07±3.79	0-24
EPDS ≥10 (n:23)	12.47±3.31	10-24
EPDS ≥13 (n:8)	15.87±3.60	13-24

SD: Standard deviation; CAS: Coronavirus Anxiety Scale; OCS: COVID-19 Obsession Scale; EPDS: Edinburgh Postnatal Depression Scale.

In Table 3, when examining the relationships between the total mean scores of the scales using the Spearman correlation test, a high level of positive correlation was found between the CAS and the OCS ($p<0.001$). However, no significant relationship was found between the EPDS and either the CAS or the OCS ($p>0.05$).

Table 4 compares the scale scores with specific participant characteristics. In the study, statistically significant differences were found between some descriptive characteristics (level of education, smoking, history of COVID-19 infection, and history of COVID-19 infection in close relatives) and the mean scores of CAS and OCS ($p<0.05$). Participants who were university graduates, smokers, had a history of COVID-19 infection, or had a close relative with COVID-19 infection had higher mean scores for CAS and OCS compared to other groups, and this difference was statistically significant ($p<0.05$). The study also found statistically significant differences between some descriptive characteristics, such as employment status, partner's working status, income status, smoking, planned or unplanned pregnancy, type of birth, and need for neonatal intensive care, and mean EPDS scores ($p<0.05$). Among the participants, mean EPDS scores were higher among those who were employed, those whose partner was unemployed, those whose income was less than their expenses, smokers, those with unplanned pregnancies, those who had a cesarean section, and those whose newborns required intensive care ($p<0.05$).

Table 3. Relationship between mean scores on the CAS, the OCS, and the EPDS (n:351).

Scales	CAS Total Score (n:351)	OCS Total Score (n:351)	EPDS Total Score (n:351)
CAS Total Score (n:351)	-	r: 0.572 p**<0.001**	r: -0.024 p: 0.655
OCS Total Score (n:351)		-	r: -0.038 p: 0.483

CAS: COVID-19 Anxiety Scale; OCS: COVID-19 Obsession Scale; EPDS: Edinburgh Postnatal Depression Scale.

Table 4. Results of the comparison of scale scores with specific participant characteristics (n:351).

Characteristics		n	CAS ORT	OCS ORT	EPDS
Education level	Primary school	166	0.73±1.38	1.73±1.88	2.89±3.63
	High school	162	0.86±1.48	1.71±1.89	2.90±3.57
	Associate's degree and higher	23	0.91±1.80	2.21±2.50	5.65±5.43
	X^2		-140.46	7.69	0.012
	p		**0.001**	**0.006**	0.912
Employment status	Employee	28	0.96±1.66	1.96±2.36	5.53±6.08
	Unemployed	323	0.79±1.43	1.73±1.89	2.86±3.46
	Z		-1.073	-0.394	-2.284
	p		0.283	0.694	**0.022**
Partner's working status	Employee	344	0.81±1.46	1.77±1.94	3.00±3.73
	Unemployed	7	0.57±0.78	0.71± .95	6.85±5.08
	Z		-0.068	-1.489	-2.116
	p		0.946	0.136	**0.034**
Income status	Income more than expenditure	13	0.69±1.18	2.07±1.80	4.69±4.04
	Income equal to expenditure	324	0.82±1.48	1.76±1.95	2.79±3.54
	Income less than expenditure	14	0.50±0.75	1.21±1.62	8.14±5.34
	X^2		0.116	2.113	18.555
	p		0.943	0.348	**0.001**
Smoking	Uses	38	1.97±2.33	2.76±2.34	4.65±4.13
	Not using	313	0.66±1.24	1.63±1.84	2.88±3.71
	Z		-3.43	-3.10	-2.60
	p		**0.001**	**0.002**	**0.009**
COVID-19 infection history	Yes	90	1.75±2.04	3.03±2.31	3.13±3.95
	No	261	0.47±1.00	1.31±1.56	3.05±3.74
	Z		-6.73	-6.58	-0.26
	p		**0.001**	**0.001**	0.788
History of COVID-19 infection in a close relative	Yes	228	0.99±1.62	2.17±2.08	2.92±3.91
	No	123	0.46± 0.98	0.98±1.31	3.34±3.56
	Z		-3.30	-5.69	-1.54
	p		**0.001**	**0.001**	0.122

P-values <0.05 and <0.001 are highlighted in bold; Kruskal-Wallis H Test; Mann-Whitney U Test. CAS: Coronavirus Anxiety Scale; OCS: COVID-19 Obsession Scale; EPDS: Edinburgh Postnatal Depression Scale.

Table 4. Continue.

Pregnancy planned	Yes	260	0.80±1.46	1.75±1.93	2.39±3.41
	No	91	0.81±1.43	1.75±1.95	5.02±4.17
	Z		-0.153	-0.187	-5.773
	p		0.878	0.852	**0.001**
Type of birth	Normal delivery	317	0.80±1.42	1.71±1.83	2.67±3.46
	Cesarean section	34	0.82±1.74	2.14±2.69	6.82±4.69
	Z		-0.462	-0.406	-5.822
	p		0.644	0.685	**0.001**
Need for neonatal intensive care	Yes	38	0.57±1.17	1.65±1.92	5.31±4.09
	No	313	0.83±1.48	1.77±1.94	2.80±3.67
	Z		-1.047	-0.305	-4.085
	p		0.295	0.760	**0.001**

P-values <0.05 and <0.001 are highlighted in bold; Kruskal-Wallis H Test; Mann-Whitney U Test. CAS: Coronavirus Anxiety Scale; OCS: COVID-19 Obsession Scale; EPDS: Edinburgh Postnatal Depression Scale.

DISCUSSION AND CONCLUSION

The COVID-19 pandemic continues to threaten the health and lives of people worldwide as new variants of the disease continue to emerge. The sense of individual vulnerability and mortality caused by the pandemic can lead to psychological problems for many people.[15,20,21] In addition, the COVID-19 pandemic has created a global crisis requiring significant changes in living conditions, social interactions, personal freedoms, and economic activities.[22,23] Studies of the impact of the pandemic on maternal health have focused mainly on pregnancy and pregnancy outcomes. However, disease outbreaks and pandemics that may result from climate change may pose various health challenges and lead to the emergence of long-term maternal and neonatal problems, such as postpartum depression. In this study, we aimed to assess levels of postpartum depression in women who gave birth in the shadow of the pandemic. About 7% of the participants in this study were found to be at risk of postpartum depression. In a study of women in Qatar at the start of the pandemic, 34% reported anxiety, and 39% reported depressive symptoms. However, the distinction between pre-existing mental health symptoms was not addressed in this study.[13] Data from studies carried out on pregnant women in Canada, China, and Turkey also reported that 35 percent of the participants showed symptoms of depression.[12,14,24] The reason for the lower rate in this study could be because the EPDS was administered to participants after 5 days postpartum. This also suggests that pregnant women may indeed need more relaxing and anxiety-reducing care during their pregnancy. In this study, there was no relationship between participants' COVID-19 anxiety and obsession scores and their EPDS scores. When the scale scores were compared with other sociodemographic and obstetric characteristics, college graduates, smokers, participants who had experienced COVID-19 themselves, and those with close relatives who had experienced COVID-19 had higher mean CAS and OCS scores. A study of pregnant women in Italy reported that one of the most important factors in participants' anxiety was related to the health status of family members and people around them during the pandemic.[25] Furthermore, in our study, people with higher levels of education also reported higher levels of anxiety. Similarly, a study conducted in China reported that individuals experienced high levels of anxiety due to their heightened awareness of their health status.[5] This could be related to having more knowledge about this pandemic and following pandemic-related news. During the pandemic, daily pandemic data were shared in Turkey. Sharing pandemic information with the community is crucial, but healthcare workers should be supported to reduce individuals' anxiety and stress when providing services.

In this study, mean EPDS scores were higher among participants who were employed, whose partner was unemployed, whose income was lower than their expenses, who smoked, who had unplanned pregnancies, who had cesarean sections, and whose babies required intensive care. Several studies have shown that economic factors influence postpartum depression.[26,27] Therefore, women with limited financial resources are more susceptible to postpartum depression.[28] Furthermore, in our study, women who had to work or whose spouses were unemployed had higher EPDS scores. This could be due to financial issues and also the inability to maintain social distancing while working. Similarly, participants with unplanned pregnancies and those whose babies required intensive care also had higher EPDS scores. This may be related to women's concerns about the future of their babies.

While this study focused on the levels of anxiety and depression in women who gave birth during the COVID-19 pandemic, the data collected were self-reported, which limits the findings. Cultural factors may also play a role. Secondly, the rapid development of the pandemic and the emergence of acute problems may have affected the data. Thirdly, the

closure of many workplaces due to the data being collected during the pandemic period may have changed the demographic structure of that period, significantly the increase in the number of unemployed women. Finally, the cross-sectional nature of the study, its limited geographical scope and the collection of data from a single institution limit its generalisability.

In conclusion, this study looked at postpartum depression in women who gave birth in the shadow of the pandemic. About 7% of the participants were at risk of postpartum depression and were referred to clinical psychiatry. Participants' COVID-19 anxiety and obsession scores were not significantly correlated with their EPDS scores. Those with a higher level of education, smokers, participants who had personally experienced COVID-19, and those whose close relatives had experienced COVID-19 had higher COVID-19 anxiety and obsession scores. In addition, participants who were employed, had an unemployed spouse, had a lower income, smoked, had an unplanned pregnancy, had a cesarean section, or had a baby requiring intensive care had higher EPDS scores.

With the potential for new pandemics due to climate change, it is recommended that pregnant women receive care to reduce anxiety and depressive symptoms during pregnancy.

Ethics Committee Approval: Our study was approved by the Kocaeli University Non-Interventional Clinical Research Ethics Committee (GOKAEK) (Date: 01/04/2021, Decision no: 2020/371). This study was conducted by the principles of the Declaration of Helsinki.

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

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Social Appearance Anxiety, Self-Esteem, and Life Satisfaction Relationship in Individuals Who Have Undergone Aesthetic Procedures

Estetik İşlem Yaptırmış Bireylerde Sosyal Görünüş Kaygısı, Benlik Saygısı ve Yaşam Doyumu İlişkisi

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ABSTRACT

Objective: The study aims to determine the relationship between social appearance anxiety, self-esteem, and life satisfaction of individuals who have had aesthetic procedures.

Materials and Methods: The study was conducted on individuals who applied to a private clinic in Samsun. The study involved 284 people who received aesthetic surgery services. The data of the study were collected online between August 2022 and October 2022. Study data were collected by questionnaire forms prepared on Google Forms. Study data were collected through four forms, namely, the personal introduction form, social appearance anxiety scale, life satisfaction scale, and Rosenberg self-esteem scale.

Results: As a result of the study, there is a significant negative relationship between life satisfaction and social appearance anxiety (r=-0.393). There is a weak positive correlation between social appearance anxiety and self-esteem (r=0.168). There is a weak negative relationship between life satisfaction and self-esteem (r=-0.173).

Conclusion: It has been determined that individuals with high social appearance anxiety have low life satisfaction. It may be appropriate for individuals with high social appearance anxiety to receive professional support to improve their quality of life.

Keywords: Aesthetic procedures, life satisfaction, self-esteem, social appearance anxiety

ÖZ

Amaç: Bu çalışma, estetik operasyon geçirmiş bireylerde sosyal görünüş kaygısı, benlik saygısı ve yaşam doyumu arasındaki ilişkiyi belirlemeyi amaçlamaktadır.

Materyal ve Metot: Araştırma, Samsun ilinde özel bir kliniğe başvuran bireyler üzerinde yapılmıştır. Araştırmaya estetik cerrahi hizmeti alan 284 kişi katılmıştır. Araştırmanın verileri, Ağustos 2022 ile Ekim 2022 tarihleri arasında çevrimiçi olarak toplanmıştır. Araştırma verileri, Google Forms üzerinde hazırlanan anket formları ile toplanmıştır. Araştırma verileri kişisel tanıtım formu, sosyal görünüş kaygısı ölçeği, yaşam doyumu ölçeği ve Rosenberg benlik saygısı ölçeği olmak üzere dört form aracılığıyla toplanmıştır.

Bulgular: Araştırma sonucunda yaşam doyumu ile sosyal görünüş kaygısı arasında negatif yönde anlamlı bir ilişki vardır (r=-0,393). Sosyal görünüş kaygısı ile benlik saygısı arasında pozitif yönde zayıf bir ilişki vardır (r=0,168). Yaşam doyumu ile benlik saygısı arasında zayıf bir negatif ilişki vardır (r=-0,173).

Sonuç: Sosyal görünüş kaygısı yüksek olan bireylerin yaşam doyumlarının düşük olduğu tespit edilmiştir. Sosyal görünüş kaygısı yüksek bireylerin yaşam kalitelerini artırmak için profesyonel destek almaları uygun olabilir.

Anahtar Kelimeler: Benlik saygısı, estetik işlemler, sosyal görünüş kaygısı, yaşam doyumu

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INTRODUCTION

Social appearance anxiety is a type of social anxiety caused by the stress or anxiety experienced by the individual when her/his environment evaluates her/his physical appearance.[1] Social appearance anxiety is also defined as "the fear that an individual will be negatively evaluated because of her/his appearance.[2,3]

The anxiety felt by an individual is a subjective fear.[4] Social appearance anxiety arises because of the individual's negative perception and interpretation of her/his physical appearance. Thus, social appearance anxiety can be seen as a result of the individual's negative body image perception about her/his body and appearance.[5-7] Body image perception is a mental image of an individual's body and expresses how individuals perceive their own body.[8,9] When individuals are dissatisfied with their appearance and body and evaluate their appearance negatively, they see their body image negatively.[10] Therefore, this situation causes an increase in social appearance anxiety of individuals, dissatisfaction with life, and social anxiety.[11-13]

Individuals have preferred plastic surgery in recent years to change their physical appearance, to have a more attractive appearance, and to destroy the negative image of the formation of other individuals.[14] The plastic surgery industry has been overgrown in the last 20 years. The American Society for Aesthetic Plastic Surgeons (ASAPS) has determined that the demand for aesthetic procedures has increased by 832% since 1997. Again, in the USA, more than 13 million aesthetic procedures were performed in 2016, and people spent more than 15 million dollars on this.[15] The International Society of Aesthetic Plastic Surgery (ISAPS) has reported that more than 30.4 million plastic procedures were performed worldwide in 2021. According to 2021 data from ISAPS, women mostly preferred breast augmentation, breast lifts, liposuction, eyelid surgery, and rhinoplasty. Surgical procedures performed worldwide increased by 12.5% from 2017 to 2021.[16]

When the literature is examined, it is seen that there are many studies examining the relationship between social appearance anxiety, self-esteem, and life satisfaction. However, no research examining the relationship between social appearance anxiety, self-esteem, and life satisfaction of individuals who have aesthetic procedures has been found. For this reason, this study aims to determine the relationship between social appearance anxiety, self-esteem, and life satisfaction of individuals who have aesthetic procedures.

MATERIALS AND METHODS

Ethics Committee Approval: This study was planned to follow the Helsinki Principles. Kütahya Health Sciences University Non-Interventional Clinical Study Ethics Committee approval was obtained (Date 22.06.2022, decision no: 2022/07).

Population and Sample: It is a cross-sectional study. The study population consists of local patients who receive services from the Aesthetic, Plastic, and Reconstructive Surgery Clinic of private health facilities in Samsun (Annual Average: 1000 Patients). The sample of the study was calculated as 278 with a 95% confidence interval and a 5% margin of error.[17]

Data Collection Tools: Study data were collected through four forms, namely the personal introduction form, social appearance anxiety scale, life satisfaction scale, and Rosenberg self-esteem scale.

Personal Introduction Form: It consists of 14 statements (age, gender, educational status, etc.) created by the authors to determine the socio-demographic characteristics of the participants.

Social Appearance Anxiety Scale: The scale was developed by Hart et al.[18] The Turkish validity and reliability of the scale was conducted by Doğan.[19] It is a 16-item 5-point Likert-type self-report scale with an answer key of (1 point) Not at all Appropriate, (5 points) Extremely Appropriate, which was developed to measure the emotional, cognitive, and behavioural concerns of an individual about her/his appearance. Item 1 of the scale is reverse-coded. High scores obtained from SAAS, which measures social appearance anxiety in a unidimensional way, indicate that appearance anxiety is high.[19] In this study, the overall scale reliability Cronbach coefficient of the SAAS was found to be $\alpha = 0.942$.

Life Satisfaction Scale: The scale was developed by Diener et al. in 1985 and adapted into Turkish by Köker in 1991.[20] The scale consists of five items related to life satisfaction. This seven-point Likert type scale was adapted into a five-point Likert type by Dağlı and Baysal, and its validity and reliability study was conducted. Each item is in a five-point Likert-type response system as (1 = Not at all appropriate – 5 = Extremely appropriate). The highest score that can be obtained from the life satisfaction scale is 25, and the lowest score is 5.[21] In this study, the Cronbach reliability coefficient was found to be $\alpha = 0.869$ for the whole scale of LSS.

Rosenberg Self-Esteem Scale (RSES): The scale was developed by Morris Rosenberg in 1965, and the validity and reliability studies of RSES in Türkiye were conducted by Çuhadaroğlu. RSES consists of twelve sub-domains, and its first ten items measure self-esteem.[22] Cronbach α reliability coefficient of the whole scale of RSES was found to be 0.833.

Data Collection*:* The data of this cross-sectional study were collected online between 01.08.2022 and

31.10.2022. The study was carried out on individuals who applied to a clinic in Samsun. The study involved 284 people who received aesthetic surgery services. Questionnaire forms prepared via Google were first shared with the physicians working in the institutions where the study would be conducted. Physicians who agreed to support the study shared the questionnaire forms on social media platforms with their patient groups and ensured the forms were filled. Participants were asked the question, "Do you agree to participate in the study?" and 284 individuals who answered "Yes" were included in the analysis.

Data Analysis: The IBM SPSS 25 package program was used to analyse the data. Descriptive statistics were calculated to show the distribution of the data. The distribution of categorical data was shown as number (n) and percentage (%). Skewness and kurtosis values were analysed to determine whether the data showed normal distribution. VIF value was examined to determine whether there was multicollinearity between the variables. P value significance level was accepted as $p<0.05$. Pearson correlation analysis was used to determine the relationship between variables, and multiple regression analyses were used to examine the effect of the dependent variable on the independent variable.

RESULTS

Information about the demographic characteristics of the participants is shown in Table 1. The mean age of the participants is age arithmetic mean 29.81±10,881; 73.6% of them are female; 44.3% of them are associate degree graduates; 57% are single; 52.5% of them have an income of 4001-8000 TL; 65.5% do not smoke; 78.9% do not use alcohol; 96.5% are social media users; 84.2% use Instagram the most; 41.9% spend 2 hours a day on social media; 57.7% came to the hospital/physician with a recommendation from a friend/relative and 71.1% were satisfied with the service they received. Of the participants, 46.5% (132) underwent rhinoplasty, 14.8% (42) liposuction, and 9.2% (26) breast reduction had gynecomastia procedures (Tablo 1).

Table 1. Socio-Demographic Characteristics of Participants (n=284).

Characteristics		**n (%)**
Gender	Female	209 (73.6)
	Male	75 (26.4)
Education	High school	29 (10.2)
	Associate degree	126 (44.3)
	Bachelor's degree	98 (34.5)
	Master's degree	24 (8.5)
	Doctorate degree	7 (2.5)
Marital Status	Married	122 (43)
	Single	162 (57)
Income Level (Monthly)	0- 4000 TL	50 (17.6)
	4001- 8000 TL	149 (52.5)
	Over 8001 TL	85 (29.9)
Number of Visits	Only one time	158 (55.6)
	2 Times	28 (9.9)
	3 and more	98 (34.5)
Smoking Status	Yes	98 (34.5)
	No	186 (65.5)
Alcohol Drinking Status	Yes	60 (21.1)
	No	224 (78.9)
Do you use social media?	Yes	274 (96.5)
	No	10 (3.5)
How much time do you spend daily on social media?	1 hour	52 (18.3)
	2 hours	119 (41.9)
	More than 3 hours	113 (39.8)
Which social media do you use the most?	Facebook	20 (7)
	İnstagram	239 (84.2)
	Twitter	21 (7.4)
	Tik Tok	4 (1.4)
How did you reach this hospital/physician?	Advice for relatives/friends, etc.	164 (57.7)
	Social media	100 (35.3)
	Brochure/ advertising / TV	20 (7)

Table 1. Continue.

What service did you receive?	Rhinoplasty	132 (46.3)
	Liposuction	42 (14.8)
	Breast Reduction	26 (9.2)
	Abdominoplasty	24 (8.5)
	Breast Augmentation	23 (8.1)
	Blepharoplasty	13 (4.6)
	Hair Transplantation	13 (4.6)
	Botox	10 (3.5)
	Gynecomastia	1 (0.4)
Are you satisfied with the service you received?	Yes, I am pleased.	202 (71.1)
	No, I am not satisfied.	11 (3.9)
	I am undecided/ not sure.	71 (25)
Age Mean ± SD		29.81±10.881

In Table 2, the relationship between social appearance anxiety, self-esteem, and life satisfaction of those who had aesthetic procedures was evaluated with the Pearson correlation. According to the results of the correlation analysis, there is a significant negative relationship between life satisfaction and social appearance anxiety (r = -0.393). A weak positive correlation exists between social appearance anxiety and self-esteem (r = 0.168). There is a weak negative relationship between life satisfaction and self-esteem (r = -0.173).

Table 3 shows the multiple regression model showing the effect of SAA and SE levels on the life satisfaction of individuals who had aesthetic procedures. As a result of the analysis, the regression model is statistically significant (F = 28,010, p < 0.001), and the independent variables explained 16.6% of the change in life satisfaction. LS decreases by -28% points when SE increases by 1 point after controlling other variables. LS decreases by -39% points when SAA increases by 1 point after controlling other variables. In other words, as social appearance anxiety increases and self-esteem, the level of life satisfaction decreases (Tablo 3).

Table 2. The relation between Social Appearance Anxiety, Self-Esteem, and Life Satisfaction.

Variables	LS	SAA	SE
LS	1		
SAA	-0.393**	1	
SE	-0.173**	0.168*	1

r: correlation coefficient; *p<0.05; **: p<0.01 (significance level); SSA: social appearance anxiety; LS: Life satisfaction; SE: Self-Esteem.

Table 3. Multiple regression model.

Variables	B	SE	β	t	p	Statistics VIF
(Constant)	2.900	0.339		8.562	0.000	
SE	-0.283	0.142	-0.110	-1.997	0.047	1.029
SAA	-0.392	0.058	-0.374	6.775	0.000	1.029
R^2=0.166		F=28.010		p=0.000		
Dependent Variable: Life Satisfaction						

B: Regression constant coefficient; SE: Standard error, β: Standardized regression coefficient; t: The ratio of regression constant to standard error; p: Significance levels; VIF: Multicollinearity value; R^2: Effect size; F: Additional variance.

DISCUSSION AND CONCLUSION

In the study, it was first determined which aesthetic procedures the participants had. According to the results of the study, it has been ascertained that the participants have had rhinoplasty, liposuction, breast reduction, abdominoplasty, breast augmentation, eyelid surgery, hair transplantation, botox, and gynecomastia, respectively. In the study conducted by Campbell et al. on medical tourists who had 1760 aesthetic procedures, it is seen that the first ten aesthetic procedures are similar to our study.[14]

In this study, it was determined that women had more plastic surgery procedures than men. Similar results were obtained in other studies.[23,24] All these results show that women are more interested in aesthetic procedures. Although the rate of men undergoing aesthetic surgery was around 10% in the study conducted by Pearlman et al.,[24] in our study, this rate

was approximately 36%. According to ISAPS data, most of those who have aesthetic procedures in the world are women.[16] In addition, this result supports the statement that having a beautiful physical appearance is a requirement of being feminine.

Life satisfaction is the harmony between the expectations of individuals and the realisation of these expectations. As the expectations of the individual are realized, their life satisfaction will increase, and in cases where they are not recognized, their life satisfaction will decrease.[12] Life satisfaction is a concept that expresses the cognitive aspect of the individual's subjective well-being and includes the individual's evaluations of his/her life in line with the criteria determined by the individual. The evaluations in the other two dimensions of subjective -being, positive and negative affect, may change with each experience. However, it is stated that life satisfaction, which constitutes the cognitive dimension of subjective well-being, is generally more consistent and stable.[25] In this study, it was determined that as social appearance anxiety increased, life satisfaction decreased. Current study results show that there is a negative relationship between life satisfaction and social appearance anxiety.[5,24] According to these results, it can be said that life satisfaction will decrease as the social appearance anxiety of individuals increases. It may be appropriate for individuals with high social appearance anxiety to receive professional support to improve their quality of life.

In this study, it was determined that as self-esteem increases, life satisfaction decreases. In a study conducted by Topuz, intense levels of it have been determined that individuals experiencing hopelessness have a high level of life satisfaction.[27] These results appear to contradict other study results in the literature.[28] The reason for such different results may be due to the characteristics of the sample group or the effects of different variables. In future studies, there is a need to examine variables that may mediate the effect of self-esteem on life satisfaction.

In this study, it was determined that there was a positive relationship between Social Appearance Anxiety and Self-Esteem. Liao et al.[29] As a result of the study conducted, it was determined that there was a positive relationship between social appearance anxiety and self-esteem. However, Göbel et al. In the study conducted, it was determined that there was a negative relationship between social appearance anxiety and self-esteem.[30] This difference in results may be due to some characteristics specific to the sample group. The variables causing this difference can be investigated in future studies.

In conclusion, it has been determined that women have more plastic surgery procedures than men. The most performed plastic surgery procedure is rhinoplasty. As Social Appearance Anxiety and Self-Esteem increase, life satisfaction decreases. As self-esteem increases, social appearance anxiety also increases. The important aspect of the study is that it was conducted on individuals who applied to the plastic surgery clinic. The limitation of the study is that the study data was collected from a single centre. In future studies, a multicentre study can be conducted on this subject.

Ethics Committee Approval: This study was planned to follow the Helsinki Principles. Kütahya Health Sciences University Non-Interventional Clinical Study Ethics Committee approval was obtained (Date 22.06.2022, Decision no: 2022/07).

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

Author Contributions: Concept – YD, ED, MN, SÖ; Supervision – MN, YD, ED, SÖ; Materials – YD, ED, MN, SÖ; Data Collection and/or Processing – YD, ED; Analysis and/or Interpretation – YD, ED, MN, SÖ.; Writing– YD, MN, ED, SÖ.

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Associations between Mediterranean Diet Adherence Screener and Healthy Eating Index-2015 with Obesity in Adults: A Cross-sectional Study

Yetişkinlerde Akdeniz Diyeti Bağlılık Ölçeği ve Sağlıklı Yeme İndeksi-2015'in Obezite ile İlişkisi: Kesitsel Çalışma

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ABSTRACT

Objective: Evaluating the agreement between the Healthy Eating Index (HEI)-2015 with the Mediterranean Diet Assessment Screener (MEDAS) and the associations with obesity were aimed.

Materials and Methods: Four-hundred-and-four adults (134 men, 270 women) aged 19-65 participated in this study. HEI-2015 components were calculated from 24-hour dietary recall data. Mediterranean diet adherence was assessed using the MEDAS tool. Body mass index (BMI), waist-to-height, waist-to-hip ratio, body shape index (ABSI), and body roundness index (BRI) were calculated. Pearson correlation coefficients between diet quality and obesity were given. Cohen Kappa test was applied to show agreement between HEI-2015 and MEDAS.

Results: Mean BMI, HEI-2015, and MEDAS scores were 25.35±5.21 kg/m^2, 49.34±12.96, and 7.45±2.17, respectively. MEDAS were negatively related to BMI (r=-0.120, p<0.05), waist-to-height ratio (r=-0.137, p<0.01), and BRI (p=-0.130, p<0.05) after adjusting for age, gender, education level, marital status, and smoking status. There was no association between HEI-2015 scores and obesity indices (p>0.05). Cohen Kappa test showed a slight agreement between the binarized MEDAS score and HEI-2015 scores (κ=0.126, p<0.05).

Conclusions: A slight agreement was found between HEI -2015 and MEDAS. Only MEDAS was related to obesity in this study. Future research should aim to replicate these findings in well-controlled studies.

Keywords: Diet quality, healthy eating index 2015, Mediterranean diet, obesity

ÖZ

Amaç: Çalışmada Sağlıklı Yeme İndeksi (HEI)-2015 ile Akdeniz Diyeti Bağlılık Ölçeği (MEDAS) arasındaki uyum ve obezite ile ilişkilerinin değerlendirilmesi amaçlanmıştır.

Materyal ve Metot: Bu çalışmaya 19-65 yaş arası 404 yetişkin (134 erkek, 270 kadın) katılmıştır. HEI-2015 bileşenleri 24-saatlik geriye-dönük besin tüketim kaydı verilerinden hesaplanmıştır. Akdeniz diyetine bağlılık MEDAS aracı kullanılarak değerlendirilmiştir. Beden kütle indeksi (BKİ), bel-boy, bel-kalça oranı, vücut şekli indeksi (VŞİ) ve vücut yuvarlaklık indeksi (VYİ) hesaplanmıştır. Diyet kalitesi ile obezite arasındaki ilişkiler Pearson korelasyon katsayıları sunularak verilmiştir. HEI-2015 ve MEDAS arasındaki uyumu göstermek için Cohen Kappa testi uygulanmıştır.

Bulgular: Ortalama BKİ, HEI-2015 ve MEDAS skorları sırasıyla 25.35±5.21 kg/m^2, 49.34±12.96 ve 7.45±2.17 idi. MEDAS, yaş, cinsiyet, eğitim düzeyi, medeni durum ve sigara içme durumuna gore düzenlendikten sonra BKİ (r=-0.120, p<0.05), bel-boy oranı (r=-0.137, p<0.01) ve VYİ (p=-0.130, p<0.05) ile negatif ilişkiliydi. HEI-2015 skorları ile obezite indeksleri arasında bir ilişki bulunmamıştır (p>0.05). Cohen Kappa testi, MEDAS skoru ile HEI-2015 skorları arasında hafif bir uyum olduğunu göstermiştir (κ=0.126, p<0.05).

Sonuç: Bu çalışmada HEI-2015 ve MEDAS arasında hafif bir uyum gösterilmiştir. Yalnızca MEDAS'ın obezite ile ilişkili olduğu bulunmuştur. Bu bulguların kontrollü çalışmalarla desteklenmesi gerekmektedir.

Anahtar Kelimeler: Akdeniz diyeti, diyet kalitesi, sağlıklı yeme indeksi-2015, obezite

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INTRODUCTION

Poor dietary habits are associated with chronic diseases, such as cardiovascular disease (CVD) and potentially contribute to global non-communicable disease mortality.[1] To assess the risk factors, nutritional epidemiology uses various methodologies, from considering a single food/nutrient to dietary pattern analysis.[2,3] Dietary pattern analysis can be complex, and generally, diet indices with predefined scoring systems are used according to dietary recommendations.[4] Assessing diet quality from predefined dietary pattern indices such as Healthy Eating Index (HEI), Alternative Healthy Eating Index (AHEI), Mediterranean Diet Score (MDS), Mediterranean Diet Pyramid Index (MedPyr) or Mediterranean Diet Adherence Screener (MEDAS) is a valuable tool.[3,4] Among the predefined tools, HEI and Mediterranean diet (MD) indices are widely used.

Current evidence suggests that higher diet quality is related to greater adherence to recommended dietary patterns and/or intake of dietary habits associated with a lower risk of chronic diseases.[5] In a prospective cohort study, the MD pattern has been inversely associated with lower risk for CVD, cancer mortality, and mortality from all causes.[6] A recent comprehensive review showed MD is effective on CVD and its primary outcomes or main risk factors such as metabolic syndrome, obesity, hypertension, blood lipids, diabetes, cancer, psychological/neurological conditions, and osteoporosis.[7] Similarly, HEI-2015 was inversely associated with all-cause mortality, CVD, and cancer.[8]

In a cross-sectional Italian study, total adherence to MD was related lower risk of being obese rather than a single food or nutrient.[9] However, associations between HEI-2015 and obesity measurements are limited and indicate conflicting results.[10,11] In Türkiye, Koksal and colleagues showed that HEI-2005 and HEI-2010 scores were positively correlated with body mass index (BMI).[10]

Assessments of the dietary index scores usually indicate data from dietary recall/record or food frequency questionnaires. Since they are time-consuming, some short indices have been developed to assess the diet pattern.[12] While HEI-2015 requires food consumption data, MEDAS is a short, easy-to-apply, and valid instrument to estimate adherence to the MD. Therefore, in this study, we aimed to evaluate the agreement between HEI-2015 and MEDAS and show the associations with obesity.

MATERIALS AND METHODS

Ethics Committee Approval: This study was conducted according to the Declaration of Helsinki, and all procedures involving human subjects were approved by the Clinical Research Ethics Committee of Ondokuz Mayıs University (Date: 30.04.2021, Decision no: 2021/220).

Study Design and Subjects: This cross-sectional study was conducted on 404 adults (134 men, 270 women) aged 19-65 years who volunteered to participate in Samsun province between June-December 2021. Individuals with self-reported mental diseases, metabolic disorders, following a special diet, and being pregnant or breastfeeding were excluded.

Data were collected using a questionnaire form that included demographic characteristics, comorbidities, smoking status, the MEDAS tool, and a 24-hour dietary recall form. Participants' anthropometric measurements were taken.

Assessment of Diet Quality: Healthy Eating Index-2015 components were assessed using the scoring system detailed elsewhere.[13] Components were calculated from 24-hour dietary recall records by the Nutrition Information System consisting of country-specific food data. The score ranges from 0 to 100, and high scores reflect high diet quality.[13]

The MD adherence of the participants was assessed by the MEDAS tool. MEDAS is a brief, easy-to-apply instrument and was established to predict obesity[14] and cardiovascular risk[15] in PREDIMED studies. The validation and reliability of the Turkish language were performed by Özkan Pehlivanoğlu et al.[16] The tool consists of 14 items and a two-point scoring system (0-1). The highest score is 14, and increasing scores show higher adherence to the MD.

Anthropometric Measurements: Body weight and height were measured with calibrated scales and a wall-mounted measuring tape in an appropriate private environment. Body mass index (BMI-kg/m^2) was calculated accordingly: Body weight (kg) / $height^2$ (m). Waist circumference (cm) was measured midway between the lowest rib and the iliac crest using a measuring tape. Hip circumference (cm) was measured at the widest circumference around the buttocks. The waist circumference to height was calculated as waist circumference divided by height, and waist circumference to hip circumference as waist circumference divided by hip circumference. A body shape index (ABSI) was calculated as (waist circumference/($BMI^{2/3}$*$height^{½}$)).[17] A body roundness index (BRI) as an indicator of % body fat and % visceral adipose tissue was assessed.[18]

Statistical Analysis: Histogram and q-q plots were examined, and Shapiro-Wilk's test was used to test the data normality. The Pearson correlation coefficients were calculated to determine the relationship between HEI-2015 and MEDAS scores and obesity scores after controlling for age, gender, education level, marital status, and smoking status. HEI-2015 and MEDAS scores were binarized using the median

statistics, and the Cohen Kappa coefficient was calculated to determine the agreement between the binarized HEI-2015 and MEDAS scores. Analyses were conducted using TURCOSA (Turcosa Analytics Ltd. Co., Turkey, www.turcosa.com.tr) and R 4.0.1 (www.r-project.org) statistical software. A *p*-value less than 5% was considered statistically significant.

RESULTS

Demographic characteristics are shown in Table 1. The majority of the participants were women and had Bachelor's degrees. Almost half were married, and about a quarter of the subjects were smokers. Mean BMI, HEI-2015, and MEDAS scores were 25.35±5.21 kg/m^2, 49.34±12.96, and 7.45±2.17, respectively.

According to correlation (Table 2), MEDAS scores were negatively related to BMI (r=-0.120, p<0.05), waist-to-height ratio (r=-0.137, p<0.01) and BRI (p= -0.130, p<0.05) after adjusting for age, gender, education level, marital status, and smoking status. There was no association between HEI-2015 and obesity indices used in the study (p>0.05).

We found a positive, weak, and significant relationship between these scores (r=0.209, p<0.05). After

Table 1. Demographic characteristics of participants.

Variable		Descriptive statistic*
Age (years), n (%)		26 (22-46)
Gender (women), n (%)		270 (66.8)
Education level, n (%)	Primary education	57 (14.1)
	Elementary education	26 (6.4)
	Secondary education	133 (32.9)
	Associate's degree	34 (8.4)
	Bachelor's degree	147 (36.4)
	Master/doctorate degree	7 (1.7)
	Marital status (married)	170 (42.0)
	Smoking status (smokers)	93 (23.0)
Comorbidities, n (%)	Hypertension and cardiovascular diseases	34 (8.4)
	Diabetes	21 (5.2)
	Thyroid diseases	12 (3.0)
	Asthma	11 (2.7)
	Migraine	10 (2.5)
	Kidney diseases	4 (1.0)
	Allergy	3 (0.7)
	Stomach diseases	2 (0.5)
	Other (PCOS, cancer, dermatologic, dental diseases)	12 (3.0)
Obesity indices, mean±SD	Waist-to-height ratio	0.51±0.10
	Waist-to-hip ratio	0.84±0.11
	BMI (kg/m^2)	25.35±5.21
	ABSI	0.005±0.001
	BRI	3.71±2.04
Scales/scores, mean±SD	HEI-2015	49.34±12.96
	MEDAS	7.45±2.17

*: Data are summarized as *n* (%): mean±SD; or median (1st-3rd quartiles); BMI: Body mass index; ABSI: A body shape index; BRI: Body roundness index; HEI-2015: Healthy eating index–2015; MEDAS: Mediterranean Diet Adherence Screener.

Table 2. Association between obesity indices, HEI-2015, and MEDAS scores.

Variable	HEI-2015	MEDAS	Waist/Height	Waist/Hip	BMI	ABSI	BRI
HEI-2015	1.000	-	-	-	-	-	-
MEDAS	0.181***	1.000	-	-	-	-	-
Waist/Height	-0.006	-0.137**	1.000	-	-	-	-
Waist/Hip	-0.067	-0.032	0.558***	1.000	-	-	-
BMI	0.051	-0.120*	0.781***	0.290***	1.000	-	-
ABSI	-0.077	0.079	-0.429***	-0.024	-0.857***	1.000	-
BRI	-0.013	-0.130*	0.987***	0.540***	0.780***	-0.424***	1.000

Partial correlation analysis; *: p<0.05; **: p<0.01; ***: p<0.001; Correlation coefficients are calculated by controlling the effect of age, gender, education level, marital status, and smoking status; HEI-2015: Healthy eating index – 2015; MEDAS: Mediterranean Diet Adherence Screener; BMI: Body mass index; ABSI: A body shape index; BRI: Body roundness index.

adjusting the effect of age, gender, education level, marital status, and smoking status, there was still a positive, very weak, and significant relationship between these scores (Table 2, r=0.181, p<0.05). Cohen's Kappa test showed a slight agreement between the binarized MEDAS score and HEI-2015 scores (Table 3, κ=0.126, p<0.05).

DISCUSSION AND CONCLUSION

Several diet quality indices have been utilized in nutritional research and linked with obesity and chronic disease risk. However, not every diet quality index is associated with obesity globally.[19] In our study, HEI-2015 was not associated with obesity indices, whereas MEDAS was negatively associated with waist-to-height, BMI, and BRI (Table 2). Supported that, in a recent cross-sectional study, HEI-2015 scores were not associated with both BMI and body fat percentage in young women; however, other indices negatively were correlated, reflected as the diet indices may be selected according to cultural features of the target population.[19] Likewise, the relationship between HEI-based score and weight or obesity was inconsistent among the Chinese people who lived in developed countries or regions, suggesting the relationship between HEI and obesity is more accurate where obesogenic dietary habits are more accessible.[20] Mediterranean diet pattern is widely associated with reducing obesity risk in adults.[21,22] MD and other dietary patterns cover MD components consistently related to lower overweight or obesity/obesity outcomes. However, in the same study, the evidence is unclear in HEI.[22]

Table 3. Cohen Kappa analysis in investigating the agreement between HEI-2015 and MEDAS scores.

MEDAS	HEI-2015			Cohen Kappa Test	
	≤50	>50	Total	κ	*p-value*
≤6	85 (39.7)	51 (26.8)	136 (33.7)	0.126	0.006
>6	129 (60.3)	139 (73.2)	268 (66.3)		
Total	214 (100.0)	190 (100.0)	404 (100.0)		

HEI-2015: Healthy eating index-2015; MEDAS: Mediterranean Diet Adherence Screener; κ: Cohen Kappa coefficient.

In this study, a weak positive association between total HEI-2015 and MEDAS scores after adjustments for age, gender, education level, marital status, and smoking status were found (Table 2). A slight agreement between the two diet quality scores was observed (Table 3). Reviewing the associations among diet quality indices to predict the risk of obesity, different versions of HEI have demonstrated different efficiency for diet quality and obesity in various populations.[23] Moreover, not only in terms of obesity but diet quality indices may not be related to different health outcomes. In a comparison study of the Healthy Nordic Food Index (HNFI) with modified MD score (mMDS) with all-cause mortality risk, rather than HNFI, mMDS were more associated with mortality, suggesting that HNFI were dependent on mMDS and may not reflect the full potential of a Nordic diet related to health outcomes in the Swedish population.[24] The nutritional concerns were dissimilar when comparing the HEI-2015 components between U.S. and Japanese populations because of the cultural differences. However, it is noteworthy to note that the total HEI-2015 scores of the two countries were similar.[25]

One possible explanation of this result is that HEI-2015 may have limited utility in the Turkish population to reflect obesity risk because the specific components emphasized by the index are not widely consumed. In a recent study, MEDAS validated slightly better in Mediterranean countries.[26] Turkey is one of the three MD regions in the eastern Mediterranean, along with Greece, Syria, Lebanon, Palestine, and Egypt.[27] Moreover, although there is a lack of consensus on an absolute definition, the MD pattern has some healthy critical elements associated with decreasing obesity risk, such as the consumption of nuts and seeds or olive oil[28] is not to be questioned in detail in HEI-2015. Furthermore, the cooking method or the processing is partially considered in MEDAS, particularly for pan dishes and commercial sweets and pastries. However, these are not a subject covered by HEI-2015. Preference for chicken, turkey, or rabbit meat instead of veal, pork, hamburger, or sausage is one component of MEDAS, while HEI-2015 examines the total protein foods. On the other hand, MEDAS does not contain salt or dairy consumption.

In conclusion, our findings indicate that rather than HEI-2015, MEDAS was related to obesity indices in adults in this cross-sectional study. Due to the differences between adherence to the MD and HEI components, it is difficult to state that both indices determine diet quality associated with obesity. Thus, using two indices interchangeably in determining diet quality may not be appropriate, at least in our culture. There is a need and gap for studies to address a Turkish Healthy Eating Index because of the conflicting results of HEI related to obesity in Turkey. Further research should aim to replicate these findings in well-controlled longitudinal studies comparing body composition changes across diet quality

indices. The utility of HEI should be studied in a larger sample. The MD pattern to improve obesity and, possibly, the risk of chronic diseases should be emphasized. Limitations and strengths should be noted in the current study. First, one of the major limitations of our study could be the food intake calculated from a 24-hour dietary record instead of a food frequency questionnaire. In a recent study showed even a self-reported 24-h dietary record is valid for HEI assessment.[29] However, if available, multiple consumption records can eliminate exceptional consumption. Second, the cross-sectional study design did not serve causation. We note that despite the limitations, the sample size is relatively large in the present study among the cross-sectional studies. This is one of the few studies examining diet quality and associations between obesity indices among Turkish adults in the literature.

Ethics Committee Approval: Our study was approved by the Clinical Research Ethics Committee of Ondokuz Mayıs University (date: 30.04.2021, decision number: 2021/220).

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

Author Contributions: Concept – YEÖ, ZU, MSMÇ; Supervision – YEÖ; Materials – YEÖ, ZU, MSMÇ, PSK; Data Collection and/or Processing – YEÖ, ZU, MSMÇ; PSK Analysis and/or Interpretation – YEÖ, ZU, MSMÇ; Writing – YEÖ, ZU, MSMÇ, PSK.

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Determining the Relationship Between Quality of Life and Perceived Stress in Liver Transplant Patients Receiving Immunosuppression Therapy

İmmunsupresyon Tedavisi Alan Karaciğer Nakli Hastalarında Yaşam Kalitesi İle Algılanan Stres Arasındaki İlişkinin Değerlendirilmesi

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ABSTRACT

Objective: This study was conducted to evaluate the relationship between quality of life and perceived stress in liver transplant patients receiving immunosuppression therapy.

Materials and Methods: This study is a cross-sectional study with the participation of 124 liver transplant patients hospitalized in the liver transplantation center of a university hospital.

Results: The results of the correlation analysis between the perceived stress scale (PSS) and the 36-item Short Form Health Survey (SF-36) subscales of the participants: A negative and weak significant relationship was found between physical function, physical role difficulty, emotional role difficulty, energy/vitality, social functioning, general health perception, and pain sub-dimensions (r=-0.209 and -0.480). A negative, moderate and significant relationship was found between PSS and the mental health sub-dimension (r=-0.563). As a result of the regression analysis, the effect of the PSS total score average on SF-36 sub-dimensions was examined, and it was found that it had the highest and negative effect on the mental health sub-dimension with a rate of 31.7% (R2=.317; B=-1.962; p<0.001).

Conclusions: Our study results revealed that patients' quality of life was low level in the early period after liver transplantation and that stress negatively affected their quality of life.

Keywords: Immunosuppressive therapy, liver transplantation, quality of life, stress

ÖZ

Amaç: Bu çalışma immunsupresyon tedavisi alan karaciğer nakli hastalarında yaşam kalitesi ile algılanan stres arasındaki ilişkinin değerlendirilmesi amacıyla yapılmıştır.

Materyal ve Metot: Bu çalışma, bir üniversite hastanesinin karaciğer nakli merkezinde yatan 124 karaciğer nakli hastasının katılımıyla gerçekleştirilmiş kesitsel bir çalışmadır.

Bulgular: Katılımcıların algılanan stres ölçeği (ASÖ) ile SF-36 Yaşam Kalitesi Ölçeği (SF-36) alt ölçekleri arasındaki korelasyon analizi sonucu; fiziksel fonksiyon, fiziksel rol güçlüğü, emosyonel rol güçlüğü, enerji/canlılık/vitalite, sosyal işlevsellik, genel sağlık algısı, ağrı alt boyutları arasında negatif yönde, zayıf düzeyde anlamlı bir ilişki bulunmuştur (r=-0,209 ile -0,480). ASÖ ile ruhsal sağlık alt boyutu arasında ise negatif yönde, orta düzeyde ve anlamlı bir ilişki saptanmıştır (r=-0,563). Yapılan regresyon analizi sonucunda ASÖ toplam puan ortalamasının SF-36 alt boyutlarına etkisi bakılmış ve %31,7 oranı ile en fazla ve negatif yönlü olarak ruhsal sağlık alt boyutu üzerine etkisinin olduğu bulunmuştur (R2=0,317; B= -0,962; p<0,001).

Sonuç: Çalışma sonucu, karaciğer transplantasyonu sonrası erken dönemde hastaların yaşam kalitesinin ciddi düzeyde düşük olduğunu ve stresin yaşam kalitesini olumsuz yönde etkilediğini ortaya koymuştur.

Anahtar Kelimeler: İmmünsüpresif tedavi, karaciğer nakli, yaşam kalitesi, stres

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INTRODUCTION

Liver transplantation (LT) is the only treatment option for patients with end-stage liver disease, acute liver failure and hepatocarcinoma and provides excellent survival and complete recovery of liver function.[1-4] Today, thanks to the improvement in pre-and post-operative care in organ transplantation, the improvement of transplantation techniques and organ preservation, better surgical techniques and the development of powerful immunosuppressive drugs, patients have extended life expectancy, better graft survival, and better functional condition.[4-6] On the other hand, both short- and long-term studies after transplantation have shown that compared to the rest of the population, patients with LT have a poor quality of life (QoL) and need to be improved.[7-10]

LT can cause complications such as acute and chronic rejection, malignancies, life-threatening infection, recurrent organ failure and death.[2,5,11,12] Therefore, following any organ transplant, it is essential to initiate treatments immediately to promote optimal graft and patient survival.[13] Against the graft taken into the body after transplantation, the immune system perceives it as a foreign substance and creates an immune response to destroy it by attacking it. This protective mechanism plays an active role in the rejection of transplanted organs.[14] Immunosuppressive therapy inhibits the innate immune system in the host, preventing an exaggerated and harmful reaction to graft taken into the body after transplantation and thus facilitates the host's organ acceptance.[15] However, immunosuppressive therapy has several complications and causes a number of psychosocial problems, such as stress and depression in these patients.[16] Complications of immunosuppressive therapy can be listed as an increased risk of infection because it suppresses the immune system[17,18] malignancies due to oncogenic effects,[1,19] an increase in morbidity and mortality rate,[20] lower QoL and toxicity affecting each organ.[21] LT patients are in the psychosocially risky group due to the nature of the end-stage liver disease, surgical operation and the side effects of immunosuppressive therapy received after surgical operation. Determination of the psychosocial problems of the patients and the planning and implementation of the necessary psychosocial interventions should be examined in terms of stress and QoL.[5]

In this study, the relationship between immunosuppressive therapy on QoL and perceived stress after LT was investigated. This study aims to evaluate the relationship between quality of life and perceived stress in liver transplant patients receiving immunosuppression therapy.

MATERIALS AND METHODS

Ethics Committee Approval: Prior to the study, the ethical approvals were obtained from Malatya Turgut Özal Medical Center Liver Transplant Institute and Malatya Turgut Özal University Ethics Committee (Date: 26/07/2022, decision no: 2022/127). After the participants were informed about the voluntary submission of answers in the research, the purpose of the research and how to use the results to be obtained from the research, their consent (informed consent principle) was obtained orally and in writing. The patients who participated in the study were explained that the information about them would not be disclosed to anyone else and the "confidentiality principle" was complied with. The research was conducted following the Principles of the Declaration of Helsinki.

In line with the aim of the research, the following research questions were sought to be answered:

RQ1. What is the level of quality of life in patients receiving immunosuppression therapy after liver transplantation?

RQ2. What is the perceived stress level in patients receiving immunosuppression therapy after liver transplantation?

RQ3. Is there a significant relationship between quality of life and perceived stress in patients receiving immunosuppression therapy after liver transplantation?

Research Design and Participants: This study is descriptive and cross-sectional. This research was carried out with patients with LT who were hospitalized at the Liver Transplantation Institute of a university hospital in Turkey after obtaining the permission of the ethics committee. The universe of the study consisted of 130 patients who underwent liver transplantation between August and December 2022 when the study was conducted. After the power analysis, 124 patients were included in the study with an effect size of 0.58, a margin of error of 0.05, a confidence level of 0.95, and a universe representation power of 0.95, and the study was conducted using the purposeful sampling method. The data were collected by face-to-face interview technique. The data collection form was read to the patients by the researcher, and the answers given were marked and recorded on the form.

Inclusion Criteria:

- Having a liver transplant,
- To volunteer to participate in the study,
- Be 18 years of age or older,
- No communication barriers.

Exclusion Criteria:

- Not having a liver transplant,
- Patients under 18 years of age,

- Speak no Turkish, have communication barriers,
- Not willing to participate in research.

Data Collection Tools: The study data were collected using a personal information form, the SF 36 quality of life scale (SF 36) and the perceived stress scale (PSS).

SF 36 Quality of Life Scale (SF 36): The scale, developed by Ware and Sherbourne in 1992, consists of 36 items.[22] It evaluates the QoL, especially in individuals with physical diseases, and provides a measurement of QoL in 8 dimensions: physical function (10 items), social function (2 items), physical role difficulties (4 items), emotional role difficulty (3 items), mental health (5 items), energy/vitality (4 items), pain (2 items) and general perception of health (5 items). Not a single total score is obtained from the scale. A total score is given separately for each subscale, and scores range from 0-100. "100 points" indicates good health, while "0 points" indicates poor health. Turkish adaptation of the scale, validity and reliability studies were conducted by Pınar et al.[23] In the reliability study of the scale, Cronbach's alpha coefficient was obtained between 0.73 and 0.76 for each subscale. In this study, the internal consistency of the SF-36 was re-examined; Cronbach's alpha coefficient was found to be 0.90.

The Perceived Stress Scale (PSS): The Perceived Stress Scale (PSS) was created by Cohen et al.[24] Adaptation of the PSS to Turkish, reliability and validity analysis was conducted by Eskin et al. in 2013.[25] It consists of a total of 14 items. Participants evaluate each item based on 5 Likert-type items ranging from "Never (0)" to "Very often (4)". In line with this information, at least 0 and at most 56 points can be obtained from the scale. A high score indicates that the person's perception of stress is high. The internal consistency coefficient of Turkish PSS-14 is 0.84, and the test-retest reliability coefficient is 0.87.[25] The Cronbach's alpha coefficient of PSS-14 in this study was 0.80.

Statistical Analysis: After the data were coded by the researchers, data analysis was performed by using IBM SPSS (Statistical Package for the Social Sciences) Statistics 25. Descriptive statistics were used in the analysis of the data. Mann Whitney U test was used for intergroup evaluations of nonparametric data, and the Kruskall Wallis test was used for evaluation between more than two groups. Student t-test was applied in parametric intergroup evaluations, and the one-way ANOVA test was applied in more than two group evaluations. Pearson correlation test was performed to determine the direction of the relationship between perceived stress level and QoL. Linear regression analyses were used to evaluate the effect of perceived stress levels on QoL subdimensions. In this direction, a model was established, and the dependent variables were the subdimensions of QoL, while the independent variable, perceived stress level, was determined as the total average score. In the evaluation of the obtained results, a 95% confidence interval and p-value less than 0.05 were taken into account.

RESULTS

73.4% of the participants were male, 87.1% were married, 40.3% were primary school graduates, and 59.7% were not working. 62.1% of the participants had a different chronic disease, 12.9% had Diabetes (DM), and 12.6% had Hypertension (HT). 65.3% of them had 33 days or more after transplantation, and 51.6% of them had previously undergone surgery. Regarding the post-transplantation treatment of the participants, 63.7% of them used calcineurin inhibitors, 61.3% had side effects from the drugs used, and 21.8% of these side effects were determined to be infections (Table 1).

Table 1. Participants' demographic and disease characteristics (n = 124).

Demographic and disease characteristics		n (%)
Age	18-47 years	37 (29.8)
	48- 57 years	43 (34.7)
	58- 85 years	44 (35.5)
	Female	33 (26.6)
Gender	Male	91 (73.4)
	Married	108 (87.1)
Marital status	Single	16 (12.9)
	Literate	16 (13.0)
Education	Primary school graduate	50 (40.3)
	Middle school	19 (15.3)
	High school graduate	21 (16.9)
	University and above	18 (14.5)
Employment	Yes	47 (37.9)
	No	77 (59.7)
Chronic diseases	Yes	47 (37.9)
	No	77 (62.1)

Table 1. Continue.

Existing chronic diseases	DM	16 (12.9)
	HT	16 (12.9)
	Other	7 (5.6)
	DM+HT	11 (8.9)
Time after transplantation	1-10 day	20 (16.1)
	11-21day	16 (12.9)
	22-32 day	7 (5.6)
	33 days or more	81 (65.3)
Previous surgical	Yes	64 (51.6)
	No	60 (48.4)
Immunosuppressive drug used	Calcineurin inhibitör, Calcineurin inh+ steroid ted	79 (63.7)
Side effects of drugs	No	48 (38.7)
	GIS	17 (13.7)
	Infection	27 (21.8)
	Other (vision, sleep, renal problems)	32 (25.8)

When the SF 36 QoL scale and PSS scale score averages of the participants were examined, the SF 36 QoL scale, physical function sub-dimension score average 54.52±32.67, physical role difficulty sub-dimension score average 3.03±16.12, emotional role difficulty sub-dimension score average 1.88±12.96, energy/vitality sub-dimension score average 32.62±18.37, mental health sub-dimension score average 46.64±13.90, social functioning sub-dimension score average was 49.89±17.92, pain sub-dimension score average was 42.43±31.27, general health perception sub-dimension score average was 52.54±14.75 and PSS scale total score average was 27.90±4.42 (Table 2).

The results of the correlation analysis between the PSS scale and the SF-36 scale of the participants are shown in Table 3. A negative, poorly significant relationship was found between the PSS and SF-36 sub-dimensions of physical function, physical role difficulty, emotional role difficulty, energy/vitality, social functioning, general health perception, and pain sub-dimensions of the participants (r=-0.209 and -0.480). A negative, moderate and significant relationship was found between PSS and the mental health sub-dimension (r=-0.563) (Table 3).

As a result of the regression analysis, the average PSS total score had the highest and negative effect on the mental health sub-dimension with a rate of 31.7% (R2=.317; B=-1.962; p<0.001); it was also found to have a negative effect on the energy sub-dimension with a rate of 23% (R2=.230; B=-1.792; p<0.001) (Table 4).

Table 2. Distribution of patients' SF-36 QoL's sub-dimension scores and PSS scores (n=124).

Scores	X±SD	Min-Max
Physical Function	54.52±32.67	0.00-100.00
Physical Role Difficulties	3.03±16.12	0.00-100.00
Emotional Role Difficulty	1.88±12.96	0.00-100.00
Energy/Vitality	32.62±18.37	0.00-90.00
Mental Health	46.64±13.90	12.00-80.00
Social Function	49.89±17.92	0.00-100.00
Pain	42.43±31.27	0.00-100.00
General Perception of Health	52.54±14.75	15.00-85.00
PSS total	27.90±4.42	10.00-42.00

PSS: The perceived stress scale; SF 36: Quality of Life Scale (SF 36); X: Mean; SD: Standard Deviation; Min: Minimum; Max: Maximum.

Table 3. Correlation analysis between patients' SF-36 QoL's sub-dimensions and PSS (n=124).

		Physical Role Difficulties	Emotional Role Difficulty	Energy/ Vitality	Mental Health	Social Function	General Perception of Health	Physical Function	Pain
PSS total	r	-0.209*	-0.247**	-0.480**	-0.563**	-0.333**	-0.338**	-0.235**	-0.317**
	p	0.020	0.006	0.001	0.001	0.001	0.001	0.008	0.001

r: Pearson correlation coefficient; PSS: The perceived stress scale; SF 36: Quality of Life Scale (SF 36).

Table 4. Regression analysis between SF-36 QoL's sub-dimensions and PSS (n=124).

Scales	PSS total						
SF-36	**B**	**SD**	**ß**	**R^2**	**t**	**F**	**p**
Physical Role Difficulties*	-0.763	0.322	-0.209	0.044	-2.365	5.593	0.020
Emotional Role Difficulty*	-0.724	0.257	-0.247	0.061	-2.818	7.940	0.006
Energy/Vitality*	-1.792	0.330	-0.480	0.230	-6.045	36.544	0.000
Mental Health*	-1.969	0.235	-0.563	0.317	-7.530	56.698	0.000
Social Function*	-1.349	0.346	-0.333	0.111	-3.901	15.220	0.000
General Perception of Health*	-1.126	0.284	-0.338	0.114	-3.965	15.721	0.000
Physical Function*	-1.738	0.650	-0.235	0.058	-2.676	7.158	0.008
Pain*	-2.236	0.607	-0.317	0.100	-3.686	13.585	0.000

*: Dependent variables; Independent variable: PSS total; SD: Standard Deviation.

DISCUSSION AND CONCLUSION

Organ transplantation, although challenging and complex, has been set as the gold standard for end-stage organ failure.[26] In 2020, there were a total of about 129,681 solid organ transplants worldwide, of which 32,586 were liver transplants.[27] As the number of people on the active transplant list continues to grow, the number of solid organ transplants is expected to increase all over the world.[2] QoL after LT is accepted as an increasingly important outcome parameter.[4] In addition to the physical condition of the patients, different psychological parameters (such as depression, stress, sexual function) and sociodemographic elements (occupational status, gender, marital status) seem to affect the QoL.[10] The only purpose of health professionals after transplantation surgery should not only be to try to ensure the survival of patients but also to improve the QoL.[4] In this study, the SF 36 QoL scale physical function sub-dimension score average 54.52±32.67 (medium), physical role difficulty sub-dimension score average 3.03±16.12 (low), emotional role difficulty sub-dimension score average 1.88±12.96 (low), energy/vitality sub-dimension score average 32.62±18.37 (low), mental health sub-dimension score average 46.64±13.90 (medium), social functioning sub-dimension score average was 49.89±17.92 (medium), pain sub-dimension score average was 42.43±31.27 (low), general health perception sub-dimension score average was 52.54±14.75 (medium). Studies comparing the QoL of patients in the period before and after LT have shown that the QoL has increased in the early post-transplantation period compared to before transplantation.[28-29] Some studies in the literature report that QoL is poor early after transplantation but tends to increase rapidly over the next two years and then remains stable after reaching almost normal values. On the other hand, some studies determine that the QoL of transplantation patients is low compared to the rest of the population.[7] It appears that the postoperative periods of the patients included in this study are different. Although LT allows patients to recover their synthetic and metabolic functions quickly, the return of physical capacity and performance to normal levels is delayed and often lacking. In our study, especially the physical role difficulty and the significantly low energy subscale support this information. Apart from this, another finding that draws attention is that the emotional role difficulty sub-dimension is low at a serious level. It is thought that many complex burdens brought by both the transplantation surgery and the treatment protocol after the procedure are effective in the emotional strain of the patients. Mental health and social functioning sub-dimension score averages are relatively higher than other sub-dimensions. Here, transplantation surgery is effective in ending the burden of chronic liver disease and the long-lasting search for donors. Our study result reveals that the QoL of patients after LT is low level and needs to be improved.

Established evidence suggests that stress after LT is detrimental to the well-being of recipients in the long term, and depressive symptoms after LT are associated with an increased risk of long-term death. In this study, when the relationship between the scale score averages was examined, a negative and weakly significant relationship was found between the PSS scale and the SF-36 scale sub-dimensions physical function ($p=0.008$), physical role difficulty ($p=0.020$), emotional role difficulty ($p=0.006$), energy/vitality ($p<0.001$), social functioning ($p<0.001$), general health perception ($p<0.001$), pain sub-dimensions ($p<0.001$) ($r=-0.209$ and -0.480). A negative, moderate and significant relationship was found between PSS and the mental health sub-dimension ($p<0.001$) ($r=-0.563$). As a result of the regression analysis, the average PSS total score had the highest and negative effect on the mental health sub-dimension with a rate of 31.7% ($R2=0.317$; $B=-1.962$; $p<0.001$), it was also found to have a negative effect on the energy sub-dimension with a rate of 23% ($R2=0.230$; $B=-1.792$; $p<0.001$). Our results were consistent with previous studies.[4,30] Chen et al. reported that stress affected all sub-dimensions of the SF-36 QoL scale, physical ($r=-0.397$; $p<0.001$) and mental ($r=-0.401$; $p<0.001$) in a study in which they examined the health-related QoL of 256 recipi-

ents after LT.[30] Patients experience stresses due to many reasons such as temporary and compulsory isolation, a decrease in social activities, the necessity of using many and regular medications and side effects of these drugs, changing the environment to be close to the transplant centers and decreasing support from the family and social environment, lifestyle changes such as work, school life and family dynamics, and immunosuppressive therapy side effects, especially in the first 3 months after transplantation. Our study showed that this situation adversely affects the QoL (especially mental health and energy sub-dimension) of the patients.

In conclusion, our study results revealed that the QoL of patients in the early period after LT was low level and that stress adversely affected the quality of life. The perceived level of QoL of patients after transplantation is usually related to their ability to regain their independence in activities of daily living, different psychological parameters (such as depression, stress, sexual function) and sociodemographic elements (occupational status, gender, marital status). Disappointment with the results of surgery after transplantation, the possibility of graft rejection, chronic or acute postoperative complications, immunosuppressive therapy side effects and needing care can lead to stress in patients. Health professionals should screen patients and provide psychosocial support for stress, the impact of which we have proven on patients' QoL. Healthcare professionals should especially inform patients about the immunosuppressive treatment protocol, its side effects and the methods to be used to cope with these side effects. In the literature, the psychological status of transplantation patients has been revealed, but mental treatment methods (cognitive therapy, motivational interviewing, etc.) have not been studied, and their effectiveness has not been revealed. Longitudinal and experimental studies are needed to combat the psychosocial problems of transcription patients. The results obtained from this research are limited to liver patients who have undergone transplantation in a single center within a certain period. Another limitation of the study is that the findings are based on cross-sectional data, which is less informative than that of a longitudinal study. Another limitation is that the data were obtained shortly after the surgery, and the postoperative processes of the patients included in the study were different.

Ethics Committee Approval: Prior to the study, the ethical approvals were obtained from Malatya Turgut Özal Medical Center Liver Transplant Institute and Malatya Turgut Özal University Ethics Committee (Date: 26/07/2022, decision no: 2022/127). The patients were informed by the researchers and the volunteer information form was presented to the patients together with the questionnaire in line with the Helsinki Declaration.

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

Author Contributions: Concept – KK; Supervision – KK; Materials – KK; Data collection and/or processing – KK, HÇ; Analysis and/or interpretation – KK, HÇ; Written – KK.

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The Effects of Health Beliefs on Cancer Screening and Distrust in Health Systems on Healthcare Demand Procrastination: A Cross-Sectional Study

Kanser Taramalarına İlişkin Sağlık İnancı ve Sağlık Sistemlerine Güvensizliğin Sağlık Hizmeti Talep Erteleme Davranışı Üzerindeki Etkisi: Kesitsel Bir Araştırma

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ABSTRACT

Objective: This study aimed to examine the relationship between health beliefs about cancer screening (HBCS) and distrust in the health system (DHS) with healthcare demand procrastination behavior (HDPB).

Materials and Methods: A total of 1040 participants were included in the study. Champion's Health Belief Model Scale, Distrust in Health Systems Scale, Health Service Demand Procrastination Behavior Scale, and general information form were used to collect data. Descriptive statistics, difference analysis, correlation, and regression analysis were used in data analysis.

Results: There was a positive relationship between perceived susceptibility, perceived seriousness, perceived barriers, self-efficacy, and DHS and HDPB, while there was a negative relationship between perceived benefits and HDPB ($p<0.05$). There was a difference according to education level except for the avoidance sub-dimension ($p<0.05$). Single individuals had higher procrastination tendencies in all sub-dimensions and the general scale ($p<0.05$). Avoidance tendency was higher in individuals without private or complementary health insurance ($p<0.05$).

Conclusions: Focusing efforts on reducing perceived barriers to participating in cancer screenings and increasing trust in the health system may reduce HDPB.

Keywords: Cancer screening, distrust in health systems, health belief model, healthcare procrastination

ÖZ

Amaç: Bu araştırmada, kanser taramalarına ilişkin sağlık inancı ve sağlık sistemine güvensizliğin, sağlık hizmeti talep erteleme davranışı ile ilişkisinin incelenmesi amaçlanmıştır.

Materyal ve Metot: Araştırmaya 1040 katılımcı dahil edilmiştir. Veri toplamak için Champion'un Sağlık İnanç Modeli Ölçeği, Sağlık Sistemlerine Güvensizlik Ölçeği ve Sağlık Hizmeti Talep Erteleme Davranışı Ölçeği ile genel bilgi formu kullanılmıştır. Veri analizinde tanımlayıcı istatistikler, farklılık analizleri, korelasyon ve regresyon analizi kullanılmıştır.

Bulgular: Algılanan duyarlılık, algılanan ciddiyet, algılanan bariyerler, öz yeterlilik ve sağlık sistemine güvensizlik ile sağlık hizmeti talep erteleme davranışı arasında istatistiksel olarak anlamlı, pozitif yönlü bir ilişki mevcutken; algılanan faydalar ile sağlık hizmeti talep erteleme davranışı arasında istatistiksel olarak anlamlı, negatif yönlü bir ilişki mevcuttur ($p<0,05$). Eğitim düzeyine göre kaçınma alt boyutu dışında farklılık göstermektedir ($p<0,05$). Bekar bireyler tüm alt boyutlar ve genel ölçek açısından daha yüksek erteleme eğilimine sahiptir ($p<0,05$). Özel ya da tamamlayıcı sağlık sigortası olmayanların ise kaçınma eğilimi daha yüksektir ($p<0,05$).

Sonuç: Çabaların çoğunlukla kanser taramalarına katılma noktasında algılanan bariyerlerin azaltılması ve sağlık sistemine duyulan güvenin artırılmasına yoğunlaştırılması, talep erteleme davranışının azaltılmasını sağlayabilir.

Anahtar Kelimeler: Kanser taramaları, sağlık erteleme, sağlık inanç modeli, sağlık sistemlerine güvensizlik

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INTRODUCTION

Cancer is one of the leading causes of morbidity and mortality worldwide,[1,2] accounting for nearly 10 million deaths in 2020, or almost one in six deaths.[3] Moreover, cancer-related morbidity and mortality are estimated to increase rapidly due to the aging population and changing lifestyles.[4] In Türkiye, the proportion of cancer-related deaths in total deaths is higher than the world average, and therefore, cancer should be carefully addressed in Türkiye.[5] Cancer, which is a fatal disease, can be treated when it is diagnosed early, and thus, the survival rate can be high. Early diagnosis in symptomatic cases and screening in asymptomatic cases play an important role in detecting cancer.[6]

The "Health Belief Model", which emerged to predict individuals' health-related attitudes and behaviors, is now used to measure individuals' participation in preventive health care programs.[7] This model has also been frequently used in research on cancer diagnosis, and in these studies, attention has been drawn to the relationship between the intention to participate in cancer screenings and health beliefs.[8-10] Therefore, it is hypothesized that health beliefs about cancer screenings negatively correlate with healthcare demand procrastination behavior.

Another issue related to health service utilization is trust in the health system. Individuals who trust the health system utilize health services more frequently.[11] On the other hand, it has been suggested that individuals with low trust in health services procrastinate their demand for health services despite their needs.[12] Demand procrastination also leads to a delay in the demand for screening programs related to early diagnosis, which may cause health problems to progress.[13]

Therefore, it may also delay diagnosing a critical disease such as cancer. In such a case, cancer survival rates are predicted to decrease. This study aimed to examine the relationship between health beliefs about cancer screening (HBCS) and distrust in the health system (DHS) with healthcare demand procrastination behavior (HDPB).

MATERIALS AND METHODS

Ethics Committee Approval: This study was approved by the Tarsus University Social Sciences and Humanities Research Ethics Committee (Date: 19.10.2023, decision no: 2023/06). The study was carried out following the international declaration, guidelines, etc.

Design: This research is quantitative and cross-sectional.

Data Collection Tools: The data of the study were collected using a four-part questionnaire form. In the first part of the questionnaire form, the "Healthcare Demand Procrastination Behavior Scale" was used. The scale was developed by Söyler et al.[13] It is a 5-point Likert-type scale and consists of three sub-dimensions and 11 items. The sub-dimensions of the scale are self/individual remedy search (3 items), avoidance (4 items), and not taking action (4 items). The internal consistency coefficients of the sub-dimensions of the scale are 0.737, 0.804, and 0.739, respectively. The overall internal consistency coefficient is 0.854. In the second part of the questionnaire form, "Champion's Health Belief Model Scale", which was developed by Barnes[14] and whose Turkish validity and reliability study was conducted by Pınar et al.[15] was adapted for the study. The scale is a 5-point Likert-type scale consisting of five sub-dimensions and 21 items. The sub-dimensions of the scale adapted to the research and the total scale were subjected to reliability analysis. The perceived sensitivity dimension consists of 4 items, the perceived seriousness dimension consists of 7 items, the perceived benefits dimension consists of 2 items, the perceived barriers dimension consists of 4 items and the self-efficacy dimension consists of 4 items. Cronbach's alpha coefficients are 0.883, 0.831, 0.724, 0.754, 0.887 and the total scale is 0.831. These values indicate that the reliability of the scale is high. In the third part, the "Distrust in Health Systems Scale" developed by Rose et al.[16] and the Turkish validity and reliability study conducted by Yeşildal et al.[17] was used. The scale is a 5-point Likert-type scale consisting of a single dimension and 10 items. The internal consistency coefficient of the scale is 0.789.

***Sampling*:** The universe of the study consists of all individuals over the age of 18. The table prepared by Gürbüz and Şahin[18] was used to determine the sample size. Accordingly, 670 people at a 99% confidence level are sufficient to be included in the study. Therefore, the sample group reached in the survey is of adequate size. Convenience and snowball sampling methods were used in the research. For this purpose, the online questionnaire form created by the researcher was first sent to the individuals in his network, and these individuals were asked to send the questionnaire to their network of acquaintances. Individuals over the age of 18 at the time of the study, who voluntarily agreed to participate, answered all the questions in the questionnaire form completely and left the control question blank appropriately were included in the study. Individuals who did not complete the questionnaire form completely or did not voluntarily agree to participate were excluded from the study. A total of 1126 questionnaire forms were received during November-December 2023. Of these, 86 were excluded from the study due to inappropriate coding, blank-left

questions or inappropriate responses to the control question. The research was conducted with 1040 participants.

Statistical Analysis: Statistical Package for the Social Sciences (SPSS) 23.0 package program was used to analyze the data. The data were first subjected to a normality test by examining skewness and kurtosis values. Since the data were suitable for normal distribution, parametric hypothesis tests were used. Differences between groups with two categories were analyzed by independent samples t-test, and differences between groups with more than two categories were analyzed by one-way analysis of variance (ANOVA). The relationships between continuous variables were subjected to Pearson correlation and simple linear regression. The significant level was set at 0.05.

RESULTS

Skewness and kurtosis values of all continuous variables are between ±1. The values are given in Table 1.

72.4% of the participants are female and 66.2% have associate's or bachelor's degree. 78.2% of the participants are single, and 91.3% do not have chronic diseases. the average age of the participants is 24.79±9.55 years. The mean number of visits to the family physician in the last year is 2.99±2.84, while the mean number of hospital visits is 3.99±3.16 (Table 2).

Table 3 shows the differences in healthcare demand procrastination behaviors according to the general characteristics of the participants. According to analyses, there is no statistically significant difference in both general procrastination scores and sub-dimensions according to the gender of the participants and whether they have a chronic disease ($p>0.05$). While there is no significant difference in the avoidance dimension according to the educational level of the participants ($p>0.05$), there are significant differences in terms of self/individual remedy search, not taking action and total procrastination scores ($p<0.05$). According to the post-hoc analysis in all dimensions, this difference is caused by the differences between the associate's - bachelor's de-

Table 1. Skewness and kurtosis values of continuous variables.

Variable	Skewness	Kurtosis
Perceived sensitivity	0.157	0.070
Perceived seriousness	-0.241	0.057
Perceived barriers	0.240	0.237
Perceived benefits	-0.802	0.673
Self-efficacy	0.577	-0.133
Self/Individual remedy search	-0.054	-0.577
Avoidance	0.651	0.076
Not taking action	0.173	-0.201
Healthcare Demand Procrastination	0.251	0.091
Distrust in Health System	0.161	0.664

Table 2. General characteristics of participants.

Variables		Frequency	Percent
Gender	Female	753	72.4
	Male	287	27.6
Education	Literate or primary school	33	3.2
	Middle School-High School	287	27.6
	Associate Degree-Bachelor's Degree	688	66.2
	Postgraduate	32	3.1
Marital status	Married	227	21.8
	Single	813	78.2
Chronic disease status	Yes	91	8.8
	No	949	91.3
Private or complementary health insurance	Yes	433	41.6
	No	607	58.4
	Min	**Max**	**Mean±SD**
Age	18	68	24.79±9.55
Family doctor visits	0	20	2.99±2.84
Hospital visits	0	20	3.99±3.16

Table 3. Differences in healthcare demand procrastination behaviors according to the general characteristics of the participants.

		Self/Individual remedy search		Avoidance		Not taking action		Healthcare Demand Procrastination	
		Mean±SD	Coefficient	Mean±SD	Coefficient	Mean±SD	Coefficient	Mean±SD	Coefficient
Gender	Female	2.72±0.87	t:1.680	2.16±0.80	t:0.110	2.49±0.72	t:0.790	2.43±0.64	t:0.987
	Male	2.61±1.02		2.16±0.92		2.45±0.82		2.39±0.77	
Education	Literate or primary	2.31±0.85		2.13±0.78		2.27±0.88		2.23±0.69	
	Middle or High School	2.58±0.92	F:4.415**	2.12±0.81	F:0.424	2.41±0.74	F: 2.874**	2.35±0.67	F: 2.663**
	Associate or Bachelor's	2.75±0.90		2.17±0.84		2.53±0.74		2.46±0.67	
	Postgraduate	2.68±1.02		2.27±1.01		2.37±0.92		2.42±0.82	
Marital status	Married	2.40±0.93	t:-5.481*	2.04±0.82	t:-2.548**	2.29±0.78	t:-4.280*	2.23±0.70	t:-4.905*
	Single	2.77±0.89		2.20±0.84		2.53±0.73		2.48±0.66	
Chronic disease status	Yes	2.66±1.00	t:-0.272	2.15±0.86	t:-0.195	2.47±0.80	t:-0.136	2.40±0.70	t:-0.243
	No	2.69±0.90		2.16±0.84		2.48±0.75		2.42±0.67	
Private or complementary health insurance	Yes	2.70±0.92	t:0.378	2.09±0.84	t:-2.266**	2.50±0.78	t:0.603	2.41±0.02	t:-0.637
	No	2.68±0.90		2.21±0.83		2.47±0.73		2.43±0.75	

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

Table 4. Correlations between variables.

	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	1											
2. Family doctor visits	0.145**	1										
3. Hospital visits	0.047	0.362**	1									
4. Perceived sensitivity	-0.014	0.000	-0.008	1								
5. Perceived seriousness	0.006	0.031	0.009	0.400**	1							
6. Perceived benefits	-0.029	0.046	0.001	0.029	0.269**	1						
7. Perceived barriers	0.022	-0.072*	-0.075*	0.270**	0.250**	-0.193**	1					
8. Self-efficacy	0.083**	-0.010	-0.034	0.189**	0.073*	0.024	0.149**	1				
9. Distrust	-0.030	0.027	-0.007	0.344**	0.268**	-0.037	0.306**	0.099**	1			
10. Self/Individual remedy search	-0.220**	-0.063*	-0.008	0.193**	0.221**	-0.005	0.218**	0.091**	0.217**	1		
11. Avoidance	-0.075*	-0.135**	-0.142**	0.289**	0.130**	-0.097**	0.316**	0.124**	0.275**	0.389**	1	
12. Not taking action	-0.142**	-0.111**	-0.082**	0.247**	0.115**	-0.070*	0.217**	0.077*	0.286**	0.430**	0.660**	1
13. HC Demand Procrastination	-0.172**	-0.129**	-0.100**	0.301**	0.186**	-0.074*	0.310**	0.120**	0.319**	0.717**	0.861**	0.860**

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

gree group and the other groups except the post-graduate group. There is a difference according to marital status in terms of all three sub-dimensions and overall procrastination scores, and singles have a higher tendency to procrastinate their healthcare demand (p<0.05). There is no difference in dimensions other than avoidance and total procrastination score according to whether the participants have private or complementary health insurance (p>0.05). On the other hand, those who do not have private or complementary health insurance have higher avoidance behavior (p<0.05).

Table 4 shows the correlations between the variables. While there are statistically significant, negative, and weak relationships between healthcare procrastination behavior and age, number of visits to the family doctor and physician, and perceived benefits, there are weak and positive relationships between health procrastination behavior and perceived seriousness and self-efficacy (p<0.05). There is a

statistically significant, positive and moderate relationship between healthcare demand procrastination behavior and perceived sensitivity, perceived barriers and distrust in the health system ($p<0.05$). There are statistically significant, positive, and strong relationships between healthcare demand procrastination and its sub-dimensions ($p<0.05$).

Following the correlation analysis, a simple linear regression analysis was performed. The results of the analysis are presented in Table 5. Tolerance and VIF values and the Durbin-Watson coefficient showed no multicollinearity between the variables, and regression assumptions were met. On the other hand, the regression model was found to be significant ($F=32.935$; $p<0.05$). It was determined that hospital visits, perceived seriousness, perceived benefits, and self-efficacy did not contribute significantly to the model ($p<0.05$).

Age, family doctor visits, perceived susceptibility, perceived barriers, and distrust in the health system explained 21% of the change in the variance of the healthcare demand procrastination variable.

Table 5. Simple linear regression analysis.

Variables*	B	S.E.	β	t	p	Tolerance	VIF
Age	-0.011	0.002	-0.160	-5.743	0.000	0.967	1.034
Family doctor visits	-0.019	0.007	-0.080	-2.681	0.007	0.845	1.183
Hospital visits	-0.010	0.006	-0.046	-1.561	0.119	0.865	1.156
Perceived sensitivity	0.033	0.006	0.161	5.071	0.000	0.748	1.336
Perceived seriousness	0.005	0.004	0.041	1.273	0.203	0.718	1.393
Perceived benefits	-0.020	0.011	-0.051	-1.721	0.085	0.848	1.179
Perceived barriers	0.038	0.007	0.175	5.652	0.000	0.787	1.270
Self-efficacy	0.010	0.005	0.054	1.920	0.055	0.943	1.061
Distrust	0.109	0.018	0.189	6.211	0.000	0.816	1.225
Constant	1.438	0.147	-	9.797	0.000	-	-
$\Delta R^2=0.217$. $F=32.935$. $p<0.05$. Durbin-Watson = 1.995							

*: Dependent: Healthcare demand procrastination behavior.

DISCUSSION AND CONCLUSION

Procrastination of necessary health services or preventive services may lead to negative health outcomes. According to the health belief model, if individuals feel sensitive about a health issue, think that it will be characterized by high seriousness in case of exposure, and evaluate that the benefits of taking action are superior to barriers, an intention to perform the behavior may occur.[19,20] Indeed, in many studies in the literature, it has been revealed that individuals' having high sensitivity and seriousness about cancer, as well as high perceived benefits and low perceived barriers, are associated with their intention to take action. Considering the findings of a few of these studies, in their study, Pak and Eliş Yıldız[21] found that the health beliefs of breast self-examination practitioners were higher than those who did not, and their perceptions of barriers were lower. In another study, it was found that there were significant relationships between cervical cancer screening intention and health belief model sub-dimensions.[8] However, the present study concluded that the effect of the health belief model on procrastination behavior is low compared to the literature. Unlike other sub-dimensions, perceived sensitivity and perceived barriers make a positive contribution. This situation can be explained by the fact that individuals engage in procrastination behavior due to high barrier perception despite feeling sensitive. In fact, among the sub-dimensions of the health belief model, the sub-dimension that has the strongest relationship with procrastination behavior and has the highest effect is perceived barriers. Witte et al.[20] likewise state that high perception of other dimensions and low barriers increase the likelihood of performing the behavior. Similarly, Fisher and Fisher[19] stated that if the benefits of adopting the behavior exceed the costs, action will be taken for the recommended health behavior. According to another study, the barriers perceived by individuals prevented their intentions to participate in cardiac rehabilitation from turning into behaviors.[22] In another study, it was found that a decrease in perceived barriers was associated with an increase in intentions to consult a general practitioner for psychological problems and a significant correlation between intentions and subsequent general practitioner consultations.[23] Similarly, Donadiki et al.[24] reported that high perceived barriers were associated with not receiving HPV vaccination. Al-Metwali et al.[25] concluded that perceived barriers negatively affect the willingness to receive the Covid-19 vaccine. In parallel, the present study reveals that high barrier perception increases procrastination behavior by decreasing the likelihood of individuals taking action.

When individuals apply for health services, they trust that health service providers will act in their best interest. Therefore, in order for individuals to apply for health services and not delay this demand when they need it, they must first have trust in the

health system.[26] When individuals do not trust the health system, they may avoid service utilization and seek alternative ways.[27] Blanchard and Lurie[12] suggested that individuals who do not trust health services postpone their demand for health services. The present study concluded that low trust in the health system is associated with delaying the demand for health services. This result is in line with the literature. Similarly, Katapodi et al.[11] stated that individuals who trust the health system apply to health services more frequently. Based on this finding, it is of utmost importance to establish and maintain a sense of trust in the health system. Thus, one of the important reasons for delay would be prevented.

In conclusion, delayed demand for healthcare services has several negative consequences. It is clear that morbidity and mortality will increase due to procrastination. When it comes to cancer, early diagnosis becomes even more important. Early detection significantly increases the chances of successful treatment in cancer cases. Therefore, participation in cancer screenings should not be postponed. Cancer cases that may arise due to postponed healthcare services may bring a great financial burden to the health system and may adversely affect the general health level of society in the future. Therefore, it is necessary to continuously examine the procrastination of health service demand in society. Examining the factors that may have an impact on delaying health service applications may be an important reference point for eliminating these factors. The findings suggest that efforts should focus on reducing perceived barriers to participation in cancer screenings and increasing trust in the health system. Only in this way, individuals' intentions to participate in cancer screenings will increase and these intentions could be transformed into actions. This research is limited to individuals who have the technological capability to fill out this questionnaire. The research is also limited to the items in the questionnaire form and the answers given to these items. Another limitation of the research is that the literature review was conducted in Turkish and English.

Ethics Committee Approval: Our study was approved by the Tarsus University Social Sciences and Humanities Research Ethics Committee (Date: 19.10.2023, decision no: 2023/06). The study was carried out following the international declaration, guidelines, etc.

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

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

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The Relationship Between E-Health Literacy Level and Healthcare Demand Postponement Behavior

E-Sağlık Okuryazarlık Düzeyi ile Sağlık Hizmeti Talebi Erteleme Davranışı Arasındaki İlişki

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ABSTRACT

Objective: The study aims to determine the relationship between e-health literacy levels and the behavior of delaying healthcare demand. The association of this impact dimension has also been examined in terms of demographic variables.

Materials and Methods: This descriptive cross-sectional study used a survey method with 684 participants. Data collection involved a personal information form, e-health literacy, and a health service postponement behavior questionnaire.

Results: According to the research findings, no significant difference was found between hospital admission and e-health literacy (p=0.491). However, a significant difference was observed between hospital admission and health service postponement behavior (p<0.000). The importance of the internet in health decisions varied between e-health literacy and postponement behavior (p=0.000; p=0.018). Access to online health resources showed significant differences for both health literacy and postponement behavior (p=0.000; p=0.000). A positive correlation was found between e-health literacy and health service postponement. Additionally, e-health literacy significantly impacted traditional search behavior (R2=0.024; p<0.000).

Conclusions: The research findings suggest that higher levels of e-health literacy correlate with a tendency to postpone healthcare services. Given the importance of early diagnosis and treatment, behaviors that delay healthcare should be mitigated.

Keywords: E-health literacy, health procrastination behavior, health services

ÖZ

Amaç: Bu araştırmanın amacı, e-sağlık okuryazarlık düzeyi ile sağlık hizmeti talebi erteleme davranışı arasındaki ilişkinin belirlenmesidir. Bu etki boyutunun demografik değişkenler açısından da ilişkisine bakılmıştır.

Materyal ve Metot: Tanımlayıcı ve kesitsel olan bu araştırma anket yöntemi ile 684 kişiye yapılmıştır. Veri toplamada kişisel bilgi formu, e-sağlık okuryazarlık ve sağlık hizmeti talebi erteleme davranışı anketi kullanılmıştır.

Bulgular: Araştırma sonuçlarına göre, hastane başvurusu ve e-sağlık okuryazarlığı arasında anlamlı bir fark bulunamamıştır (p=0,491). Hastane başvurusu ile sağlık hizmeti erteleme davranışı arasında anlamlı bir fark gözlemlenmiştir (p<0,000). İnternetin sağlık kararlarında önemi, e-sağlık okuryazarlığı ile erteleme davranışı arasında değişkenlik göstermiştir (p=0,000; p=0,018). Çevrimiçi sağlık kaynaklarına erişim, hem sağlık okuryazarlığı hem de erteleme davranışı için önemli ölçüde farklılık göstermiştir (p=0,000; p=0,000). E-sağlık okuryazarlığı ile sağlık hizmeti erteleme arasında pozitif bir korelasyon bulunmuştur. Geleneksel arama davranışı üzerinde e-sağlık okuryazarlığının önemli bir etkisi olduğu belirlenmiştir (R2=0,024; p<0,000).

Sonuç: Araştırma bulguları, daha yüksek düzeyde e-sağlık okuryazarlığının, sağlık hizmetlerini erteleme eğiliminin artmasıyla ilişkili olduğunu göstermektedir. Erken teşhis ve tedavinin önemi göz önüne alındığında, sağlık hizmetinin gecikmesine neden olan davranışların azaltılması gerekmektedir.

Anahtar Kelimeler: E-sağlık okuryazarlığı, sağlık erteleme davranışı, sağlık hizmetleri

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INTRODUCTION

In daily life, many individuals can procrastinate and exhibit procrastination behavior.[1-3] Procrastination is defined as delaying a decision, taking responsibility, completing a task, or postponing it to a later time.[4] Procrastination behavior in the field of health works differently than other procrastination behaviors. Due to the fact that health cannot be postponed, postponement can only be done with different substitution issues. When the literature is examined, it is seen that procrastination behavior in terms of health is grouped under three headings: Seeking personal/ individual solutions, avoidance and failure to take action. This situation also includes the sub-dimensions of healthcare postponement behavior.[5]

In other words, if an individual is ill or faces a health -threatening situation, they should immediately benefit from healthcare services.[6] There are some factors hindering individuals' demand for healthcare services. These can be listed as physical-environmental barriers, financial-structural barriers, communication problems with healthcare professionals, cultural competence, healthcare materials and technology, and health literacy.[7]

Health literacy is the ability to obtain and use health information to make appropriate health decisions and maintain health.[8] The utilization of e-health applications has increased in recent years; however, some evidence suggests that it may increase health literacy in patients. Nonetheless, individuals with limited digital or e-health literacy may not fully benefit from these advantages. To mitigate this limited literacy level, a telehealth or e-health task force comprised of trained healthcare personnel is proposed.[9]

The World Health Organization defines "health literacy" as the cognitive and social skills required to acquire, understand, and use health-related information to improve and maintain health. Inadequate health literacy leads to insufficient health information, inability to take preventive measures, inadequate access to healthcare, and inadequate use of healthcare services.[10] Put another way, e-health literacy is defined as the ability to search, find, understand, and evaluate health information from electronic sources and use the acquired information to solve a health problem.[11]

This research aims to explore the relationship between individuals' e-health literacy levels and their tendency to postpone healthcare demands.

MATERIALS AND METHODS

Ethical Considerations: This study was conducted following the principles of the Code of Ethics of the World Medical Association Declaration of Helsinki in 2013.[12] Ethics committee approval was received from Tokat Gaziosmanpaşa University Social and Humanities Research Ethics Committee (Date: 31.10.2023; decision No: 2023/17-8), and consent from the participants who agreed to participate in the study was obtained before they filled out the forms.

Research Design: E-health literacy has generally been studied regarding social media usage, the COVID-19 pandemic, individuals with chronic diseases, various demographic variables, mobile health applications, cyberchondria, children's health, e-Pulse (e-Nabız) system, breastfeeding mothers, students, technological readiness, and pregnant women. On the other hand, healthcare demand postponement behavior is a relatively new concept in the literature. It has been mainly studied in the context of academic procrastination, more nursing students, and work procrastination. This study aims to investigate individuals' e-health literacy levels and their behavioral tendencies to delay seeking healthcare despite their desire to receive it. In doing so, the behavioral dimension and its sub-dimensions were examined based on their significance levels and integrated within the conceptual framework.

Study Design and Participants: The research was conducted on adults residing in Türkiye, which has an adult population of approximately 62 million, in 2022, as reported by the Turkish Statistical Institute.[13] Before starting the research, it was aimed to reach a minimum of 600 individuals. During the research process, the convenient sampling method[14] was utilized, and 676 adult individuals were included in the research sample. According to the acceptable minimum sample sizes table created by Gürbüz and Şahin[15] for different populations, it was deemed sufficient to reach a minimum of 384 individuals with a 95% confidence interval to represent populations of 250,000 and above. Additionally, when considering a 99% confidence interval with a 5% margin of error, it has been demonstrated that for populations of 1,000,000 and above, 665 individuals are sufficient to represent the population. In this context, it is believed that the inclusion of 684 individuals in the sample represents the population within the scope of the research. According to the findings of the research, 396 females and 280 males participated in the study. Regarding the age groups, there were 365 participants in the age range of 18-35, 273 participants in the age range of 36-54, and 38 participants in the age range of 55-74.

Data Collection Tools: The administered survey consists of three sections. In the first section, participants were initially asked about their gender, age, average annual visits to a healthcare institution due to health issues, and their daily internet use duration. Following that, the "e-health Literacy" scale developed by Coşkun and Bebiş[16] was administered. It

consisted of 2 items related to internet use and 8 items measuring internet attitudes. Participants were asked to respond to the 2 items related to internet use on a scale of "a) Not at all useful, b) Not useful, c) Undecided, d) Useful, e) Very useful," while the other 8 items measuring internet attitudes required responses on a scale of "1-Strongly disagree, 2-Disagree, 3-Undecided, 4-Agree, 5-Strongly agree." The internal consistency reliability coefficient (Cronbach's alpha) for this scale was calculated as 0.87 in the relevant study. Finally, the "Healthcare Demand Procrastination Scale" developed by Söyler et al.[5] was administered. The scale involved 11 items. The scale had three sub-dimensions. Participants were asked to respond to these statements on a scale of "1-Strongly disagree, 2-Disagree, 3-Undecided, 4-Agree, 5-Strongly agree." The internal consistency reliability coefficient (Cronbach's alpha) was observed to be 0.85 in the relevant study.

Statistical Analysis: The data obtained were analyzed via the SPSS 25 software package. The data were only evaluated for individuals who received health services and ensured they had completed all the items. Descriptive statistics were presented, including frequency distribution for demographic characteristics of individuals receiving health services, mean and standard deviation values, and Cronbach's Alpha coefficient for reliability level determination. Skewness and Kurtosis analyses were conducted to assess the normal distribution of the data. Independent Samples t-test was employed to compare binary variable groups to test the research hypotheses. Finally, One-Way Analysis of Variance (ANOVA) was used to compare more than two variable groups. In the correlation analysis, $p<0.01$ was accepted as the significance level. The significance value was accepted as $p<0.05$. An outlier analysis was conducted on the survey data obtained from the 684 participants. The analysis found that 8 data points were outliers and these data were removed from the analysis. The Cronbach's alpha value for the e-health literacy scale was 0.84, and for the Healthcare Demand Procrastination scale, it was found to be 0.80.

RESULTS

The following conclusions have been drawn from the study regarding the impact of individuals' e-health literacy levels on health procrastination behavior:

According to Table 1, there was no significant difference between the average number of visits to healthcare facilities due to any health problem and e-health literacy ($p=0.491$). However, there was a significant difference between the average number of visits to healthcare facilities due to any health problem and health service postponement behavior ($p<0.000$). Post-hoc Tukey test, according to in group comparisons, individuals who visited healthcare institutions less than twice a year exhibited higher healthcare postponement behavior than other groups. Those who visited the hospital less than twice had higher scores in traditional health information-seeking behavior than those who visited 4-5 times and more than 5 times. Individuals who visited healthcare institutions less than twice daily showed higher avoidance behavior than other groups (Table 1).

Table 1. Annual results of those admitted to the hospital due to any health problem.

	Average Annual Admissions to Healthcare Facilities	n (%)	Health Problem Score Mean±SD	Test
Average E-health Literacy Level	Less Than 2	196 (28.9)	3.57±0.59	F=0.80 p=0.491
	2-3 Times	192 (28.4)	3.58±0.53	
	4-5 Times	148 (21.9)	3.49±0.54	
	More Than 5	140 (20,8)	3.52±0.76	
Average Health Postponement Behavior	Less Than 2	196 (28.9)	2.84±0.62	F=13.65 *p=**0.000**
	2-3 Times	192 (28.4)	2.63±0.58	
	4-5 Times	148 (21.9)	2.57±0.56	
	More Than 5	140 (20,8)	2.46±0.40	
Traditional Search	Less Than 2	196 (28.9)	2.94±0.72	F=6.32 *p=**0.000**
	2-3 Times	192 (28.4)	2.81±0.89	
	4-5 Times	148 (21.9)	2.69±0.89	
	More Than 5	140 (20,8)	2.58±0.66	
Avoidance	Less Than 2	196 (28.9)	2.78±0.90	F=22.16 *p=**0.000**
	2-3 Times	192 (28.4)	2.38±0.75	
	4-5 Times	148 (21.9)	2.40±0.72	
	More Than 5	140 (20,8)	2.10±0.66	
Procrastination of Action	Less Than 2	196 (28.9)	2.81±0.58	F=2.263 p=0.080
	2-3 Times	192 (28.4)	2.76±0.50	
	4-5 Times	148 (21.9)	2.66±0.56	
	More Than 5	140 (20,8)	2.73±0.41	

n: number; X: mean; SD: standard deviation; *: $p < 0.05$.

As illustrated in Table 2, the significance of the internet in assisting you in making decisions about your health was found to be different for both e-health literacy and health postponement behavior (p=0.000; p=0.018). Post-hoc Tukey test revealed that individuals who found the internet very useful for making health decisions (4.02±0.693) had higher e-health literacy scores compared to those who did not find it useful (3.09±0.796). In another comparison, it was observed that for the sub-dimension of health postponement behavior, those who believed the internet to be very useful (3.27±0.769) had higher scores than those who believed it to be not useful (1.77±0.796) (Table 2).

According to Table 3, there was a significant difference between the importance of accessing health resources on the Internet and health literacy, as well as health postponement behaviour (p=0.000; p=0.000). The significant differences observed in all sub-dimensions of health postponement behavior

Table 2. Results on the beneficial aspects of the Internet in assisting decision-making about your health.

	The Internet's Utility in Assisting Decision-Making Regarding Your Health	**n (%)**	**Beneficial Score Mean±SD**	**Test**
Average E-health Literacy Level.	Not Helpful at All	36 (5.4)	3.09±0.796	F=34.99 ***p=0.000**
	Not Helpful	92 (13.6)	3.20±0.721	
	Undecided	172 (25.5)	3.40±0.516	
	Helpful	304 (44.9)	3.67±0.435	
	Very Helpful	72 (10.6)	4.02±0.693	
Average Health Postponement Behavior	Not Helpful at All	36 (5.4)	2.33±0.542	F=6.56 ***p=0.000**
	Not Helpful	92 (13.6)	2.63±0.545	
	Undecided	172 (25.5)	2.63±0.632	
	Helpful	304 (44.9)	2.63±0.486	
	Very Helpful	72 (10.6)	2.90±0.717	
Traditional Search	Not Helpful at All	36 (5.4)	1.77±0.796	F=24.19 ***p=0.000**
	Not Helpful	92 (13.6)	2.71±0.816	
	Undecided	172 (25.5)	2.70±0.822	
	Helpful	304 (44.9)	2.84±0.707	
	Very Helpful	72 (10.6)	3.27±0.769	
Avoidance	Not Helpful at All	36 (5.4)	2.19±0.772	F=2.270 p=0.060
	Not Helpful	92 (13.6)	2.53±0.792	
	Undecided	172 (25.5)	2.47±0.910	
	Helpful	304 (44.9)	2.39±0.730	
	Very Helpful	72 (10.6)	2.61±0.931	
Procrastination of Action	Not Helpful at All	36 (5.4)	2.88±0.811	F=2.989 ***p=0.018**
	Not Helpful	92 (13.6)	2.68±0.446	
	Undecided	172 (25.5)	2.72±0.534	
	Helpful	304 (44.9)	2.73±0.413	
	Very Helpful	72 (10.6)	2.91±0.778	

n: number; X: mean; SD: standard deviation; *: $p < 0.05$.

Table 3. Results on the importance of accessing health resources on the Internet.

	The Importance of Accessing Health Resources on the Internet	**n (%)**	**Health Resources Score Mean±SD**	**Test**
Average E-health Literacy Level.	Not Important at All	28 (4.1)	2.67±0.57	F=37.53 ***p=0.000**
	Not Important	116 (17.1)	3.37±0.70	
	Undecided	88 (13,1)	3.38±0.39	
	Important	352 (52.1)	3.60±0.51	
	Very Important	92 (13.6)	3.98±0.58	
Average Health Postponement Behavior	Not Important at All	28 (4.1)	2.18±0.40	F=13.43 ***p=0.000**
	Not Important	116 (17.1)	2.41±0.44	
	Undecided	88 (13,1)	2.64±0.62	
	Important	352 (52.1)	2.75±0.52	
	Very Important	92 (13.6)	2.67±0.73	
Traditional Search	Not Important at All	28 (4.1)	1.76±1.06	F=20.93 ***p=0.000**
	Not Important	116 (17.1)	2.52±0.62	
	Undecided	88 (13,1)	2.63±0.91	
	Important	352 (52.1)	2.91±0.68	
	Very Important	92 (13.6)	3.01±0.98	

n: number; X: mean; SD: standard deviation; *: $p < 0.05$.

Table 3. Continue.

Avoidance	Not Important at All	28 (4.1)	2.07±0.72	F=7.26 ***p=0.000**
	Not Important	116 (17.1)	2.18±0.63	
	Undecided	88 (13,1)	2.53±0.92	
	Important	352 (52.1)	2.56±0.78	
	Very Important	92 (13.6)	2.34±0.91	
Procrastination of Action	Not Important at All	28 (4.1)	2.60±0.50	F=6.03 ***p=0.000**
	Not Important	116 (17.1)	2.56±0.44	
	Undecided	88 (13,1)	2.76±0.43	
	Important	352 (52.1)	2.82±0.50	
	Very Important	92 (13.6)	2.76±0.70	

n: number; X: mean; SD: standard deviation; *: $p < 0.05$.

indicate the importance of accessing health resources online. Post-hoc Tukey test when comparing groups, it was found that the e-health literacy scores of those who considered accessing health resources on the internet to be very useful (3.98±0.58) were higher than those who considered it not useful (2.67±0.57). In another comparison, for the sub-dimension of health postponement behavior, it was observed that those who believed accessing health resources on the internet to be very useful (3.01±0.98) had higher scores than those who believed it to be not useful (1.76±1.06) (Table 3).

As shown in Table 4, according to the results of the correlation analysis, a positive relationship was found between e-health literacy and healthcare postponement behavior. In other words, as the level of e-health literacy increases, the behavior of postponing health services increases (Table 4).

According to Table 5, a significant difference was found in the impact of e-health literacy level on traditional search behavior according to the results of the regression analysis (R2=0.024; p<0.000). As the e-health literacy level increases, a noticeable change occurs in people's traditional search behavior. In other words, individuals more knowledgeable about e-health tend to prefer traditional methods more when searching for health-related information.

Table 4. Correlation analysis between e-health literacy and health procrastination behavior.

	Average health Literacy Level.	**Average Health Postponement Behavior.**	**Traditional Search**	**Avoidance**	**Procrastination of Action**
Average E-health Literacy Level.	1				
Average Health Postponement Behavior	0.154**	1			
Traditional Search	0.238**	0.724**	1		
Avoidance	0.040	0.885**	0.425**	1	
Procrastination of Action	0.122**	0.785**	0.352**	0.040	1

**: p<0.01.

Table 5. The impact of e-health literacy level on health service procrastination behavior.

B	**Std Error**	**R**	**T**	**F**	**R^2**	**p**
0.145	0.124	0.154	4.038	16.309	****0.024**	***0.000**

Dependent Variable: Average health procrastination behavior; Independent variable: average e-health literacy level; B: unstandardised coefficients; ; Std Error: standard error; R: Correlation coefficient; T: difference between means; F: distribution; **R2: determination coefficient; *p: meaningfulness.

DISCUSSION AND CONCLUSION

When reviewing other academic studies related to this research, no prior research has been identified that specifically explores the intersection of e-health literacy and the behavior of delaying requests for health services.

In the study, no significant difference was found between health literacy levels and age, gender, average annual visits to healthcare facilities, and daily internet usage. However, Norgaard et al.,[17] Deniz,[18] Uslu and Şeremet,[19] Aktürk,[20] Orhan et al.,[22] and Hoşgör and Tosun,[23] observed differences in their studies.

The study found no statistically significant difference between the mean number of healthcare facility visits related to any health issue and e-health literacy ($p=0.491$). However, a significant disparity was observed between the mean number of healthcare facility visits for any health concern and behavior associated with postponing health services ($p<0.000$). The significance of the internet in aiding individuals in making health-related decisions was found to vary between e-health literacy and health postponement behavior ($p=0.000$; $p=0.018$). A notable distinction was observed in the significance of accessing health resources on the Internet concerning both health literacy and health postponement behavior ($p=0.000$; $p=0.000$).

The correlation analysis revealed a positive association between e-health literacy and healthcare postponement behavior, indicating that as e-health literacy levels increase, there is a greater inclination to delay seeking healthcare services.

In contrast, the regression analysis demonstrated a significant effect of e-health literacy level on conventional search behavior ($R2=0.024$; $p<0.000$), showing that as e-health literacy levels increase, individuals tend to favor traditional search methods for health-related information.

The importance of accessing health resources on the Internet was expressed by 352 participants (52%). Zhang et al.[24] found that cancer patients had a high level of e-health literacy, emphasizing that cancer patients increasingly sought health information from the Internet. Furthermore, individual needs affect e-health literacy. The literature underlines the significance of improving the e-health of patients with chronic diseases to enhance overall health and reduce the hospital burden.[25]

The finding suggests a significant difference ($p=0.00$) between the perceived usefulness of the Internet in assisting individuals in making decisions about their health and the importance of accessing health resources online. Kurtoğlu, Yılmaz, and Taş[26] have demonstrated that e-health literacy increases with various factors. Tümer and Sümen[27], conducted research and found that individuals who understand the importance of health and have easy access to the internet tend to have higher scores in digital health literacy. Further, there was a statistically significant difference between both e-health literacy and healthcare postponement behavior and the significance of accessing online health resources. Parallel to this research, Hasannejadasl et al.[9] expressed in their study that the perceived level of e-health literacy was satisfactory and that the Internet was a strategic tool source of health information.

In conclusion, a positive relationship has been found between e-health literacy and healthcare postponement behavior. In other words, as e-health literacy increases, the behavior of postponing healthcare demands increases. These findings underscore the relationship between e-health literacy and healthcare postponement behavior, as well as its impact on conventional search behavior. As e-health literacy levels increase, individuals may be more inclined to postpone healthcare services while also showing a greater preference for traditional search methods. These results suggest that e-health literacy can influence health decision-making and alter information-seeking behaviors. Understanding the increasing significance of e-health literacy and the complexities and implications of digital transformation in accessing healthcare services is crucial.

Ethics Committee Approval: This study was conducted following the principles of the The Code of Ethics of the World Medical Association Declaration of Helsinki in 2013. Ethics committee approval was received from Tokat Gaziosmanpaşa University Social and Humanities Research Ethics Committee (Date: 31.10.2023; decision No: 2023/17-8), and consent from the participants who agreed to participate in the study was obtained before they filled out the forms.

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

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

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Investigation of the Short-Term Functional Outcomes and the Impact on Nasal Tip Shape of the Caudal Septal Batten Grafting Technique

Kaudal Septal Batten Greftleme Tekniğinin Kısa Dönem Fonksiyonel Sonuçlarının ve Burun Ucu Şekli Üzerindeki Etkisinin Araştırılması

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ABSTRACT

Objective: Septoplasty is a common rhinological intervention. We aimed to evaluate the effectiveness of septoplasty techniques applied to patients with septal deviation.

Materials and Methods: 300 patients admitted to our clinic in 2022 and 2023 and underwent septoplasty were involved and divided into two groups: The "Caudal", which used a caudal septal batten graft, and the "Classic", which involved the 2-5 region, where the caudal septum was not touched. The patients' conditions were evaluated by applying the NOSE scale preoperatively and postoperatively in the 1st and 3rd months.

Results: Our study included 223 patients who came for follow-up visits and consented to participate. The preoperative, postoperative 1st and 3rd month NOSE scale average scores of the "Caudal" group were 12.3±3.7, 5.4±2 and 2.8±1.2, respectively. In the "Classic" group, the values were 9.3±2.1, 5±1.4 and 3.3±1 and significantly different ($p<0.001$). When a comparison was made between the two groups, the changes in the postoperative 1st month were not found to be significantly different ($p=0.152$). In contrast, the preoperative and postoperative 3rd month results were different ($p<0.001$).

Conclusions: Septal batten grafts can be considered a useful endonasal technique in septoplasty surgery. Studies with more extended follow-up periods are needed.

Keywords: Batten graft, caudal septum, septoplasty

ÖZ

Amaç: Septoplasti en yaygın rinolojik cerrahi prosedürlerden birisidir. Bu çalışmada septum deviasyonu nedeniyle hastalara uygulanan septoplasti tekniklerinin etkinliğini değerlendirmeyi amaçladık.

Materyal ve Metot: 2022 ve 2023 yıllarında kliniğimize başvuran ve septoplasti operasyonu geçiren 300 hasta çalışmaya alındı. Hastalar septumdaki patolojinin özelliğine ve yapılan cerrahinin şekline göre; kaudal septal batten greft kullanılan "Kaudal" grup ve 2-5. bölgeyi içeren ve kaudal septuma dokunulmayan, Cottle metodu kullanılan "Klasik" grup şeklinde iki gruba ayrıldı. Hastalara preoperatif, postoperatif 1. ve 3. aylarda NOSE skalası uygulanarak durum değerlendirmesi yapıldı.

Bulgular: Çalışmamıza takip ziyaretleri için gelen ve katılmayı kabul eden 223 hasta dahil edildi. Kaudal grubun ameliyat öncesi, ameliyat sonrası 1. ve 3. aydaki NOSE ölçeği puan ortalamaları sırasıyla 12,3±3,7, 5,4±2 ve 2,8±1,2 olarak belirlendi. "Klasik" grupta ise değerler 9,3±2,1, 5±1,4 ve 3,3±1 olup anlamlı derecede farklıydı ($p<0,001$). İki grup arasında karşılaştırma yapıldığında ameliyat sonrası 1. aydaki değişiklikler anlamlı olarak farklı bulunmadı ($p=0,152$). Buna karşın ameliyat öncesi ve ameliyat sonrası 3. ay sonuçları farklıydı ($p<0,001$).

Sonuç: Dikkatli hasta seçimi ve doğru uygulama planlaması sayesinde septal batten greftler, günümüzün septoplasti cerrahisinde en yararlı endonazal tekniklerden biri olarak kabul edilebilir. Hastaların daha uzun takip süresi ile değerlendirildiği gelecek çalışmalara ihtiyaç duyulmaktadır.

Anahtar Kelimeler: Batten greft, kaudal septum, septoplasti

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INTRODUCTION

Nasal obstruction presents a pervasive and bothersome symptom, often stemming from physical blockages within the nasal passages and associated physiological issues like rhinitis and rhinosinusitis.[1] Treatment avenues encompass a range of medications, including antihistamines, decongestants, and steroids, alongside surgical interventions aimed at rectifying anatomical impediments.[1] Among these, the deviated nasal septum emerges as a significant culprit, particularly in caudal nasal septal deviation cases.[1-3] Given the intricate nature of the septal cartilage's structural support, addressing such deviations poses a challenge, compounded by the inherent resilience of cartilaginous memory.[1,4] The diversity of surgical techniques employed underscores the ongoing quest for effective management strategies tailored to the complexities of caudal septal deviation.[1]

Septoplasty stands as a cornerstone procedure within the realm of rhinological surgery, addressing not only functional concerns related to nasal airflow but also contributing to the aesthetic harmony of the nose. The intricate array of septal deformities presents a challenge, as no single technique can universally rectify the diverse deviations encountered. Convexity, concavity, and angulation represent prevalent deformities within the septal cartilage landscape.

Numerous conventional surgical methods, such as wedge resection, submucous resection, suture techniques, and cross-hatching incision, have shown limitations in achieving reliably consistent results in septoplasty procedures.[5,6] Despite initial correction attempts, septal deviation recurrence remains a common issue, often due to inadequate correction or excessive manipulation during surgery, leading to complications like loss of nasal tip support, collapse of the nasal valve, or saddle nose.[7] Recognizing the challenges and limitations associated with these traditional endonasal septoplasty techniques, there's a growing imperative to explore alternative approaches to improve surgical outcomes.

Our study aims to scrutinize the efficacy of various septoplasty techniques in patients seeking relief from nasal breathing difficulties attributable to deviated septum.

MATERIALS AND METHODS

Ethics Committee Approval: Our study was approved by the Sakarya University Ethics Committee (Date: 13.06.2022, decision no: 75). The study was carried out following the international declaration of Helsinki.

After obtaining local ethical committee approvals, our study was initiated. A total of 300 patients who presented to our clinic with complaints of nasal obstruction and were determined to require septoplasty based on examination and necessary imaging techniques in 2022 and 2023 were included in the study. Consent forms confirming participation in the study were obtained from each patient.

The patients were categorized into two groups according to the septal pathology's characteristics and the specific surgical procedure undergone:

"Caudal" Group: This group included patients who underwent septoplasty using caudal septal batten graft.

"Classic" Group: Patients in this group underwent septoplasty using the Cottle method, which involves the manipulation of the 2-5 region of quadrangular cartilage without affecting the caudal septum.

Patients underwent satisfaction assessments using the NOSE (Nasal Obstruction Symptom Evaluation) scale at preoperatively, 1st and 3rd months postoperatively. The gathered data underwent statistical analysis utilizing the SPSS 22.0 software package to evaluate satisfaction levels and potential differences between the two surgical groups.

The Surgical Procedure of Caudal Septal Batten Grafting Technique:

***Harvesting the Graft*:** Cartilage segments from the deviated portions are extracted to create a graft of equal length to the anterior septum, shaped in a strip -like form.

Graft Placement: The prepared graft is then placed onto the concave portion of the deviated caudal septum using permanent sutures.

Securing the Graft: Subsequently, the caudal septum is suspended superiorly and inferiorly from the nasal tip and subnasal region using anchor sutures in the midline. Eight sutures are used to secure the base, with fixation between the maxillary crest and anterior alar cartilage medial crura.

Completion: Once the graft is securely positioned and anchored, the procedure is finalized.

This technique aims to provide structural support and correction to the deviated caudal septum, thereby improving nasal airflow and addressing associated symptoms of nasal obstruction (Figure 1).

***Inclusion Criteria for the Study*:** Patients with the following characteristics were included in the study: age between 18 and 65 years; patients experiencing nasal obstruction attributed to septal pathology; patients with caudal septal deviation; patients without coagulopathy; and patients who expressed their readiness to take part in the study.

***Exclusion Criteria for the Study*:** Patients with the following characteristics were excluded from the study; patients who have undergone previous nasal surgery; patients who had mild septal deviation; patients with coagulopathy; patients unsuitable for general anesthesia; and patients with a desire for an

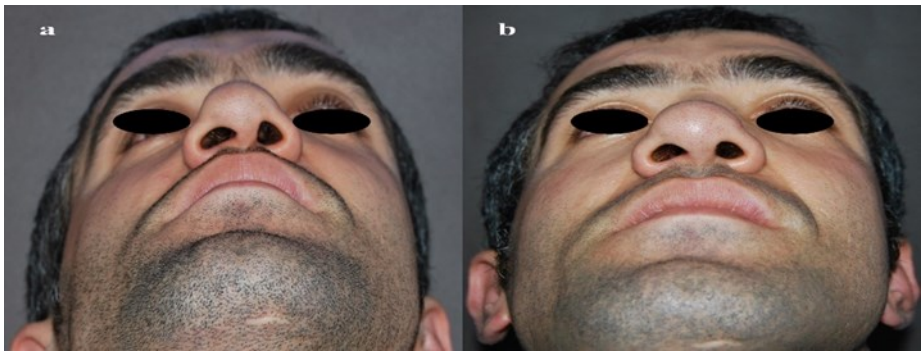

Figure 1. Photos of the patient who underwent caudal septal batten graft technique.
(a) Preoperative photo, (b) 3rd month postoperative photo

aesthetic nasal correction.

Statistical Analysis: Statistical analysis was performed using SPSS 22.0 (IBM, Armonk, NY, USA). A significance threshold of $p<0.05$ was used. Data from quantitative variables were represented as mean standard deviation (SD). Repeated measures ANOVA and paired sample t-tests were used for data analysis (preoperative and postoperative NOSE scores).

RESULTS

In our study, a total of 223 patients who attended all assessments and agreed to participate were included. In the "Caudal" group, there were 115 patients, comprising 41 females and 74 males, with a mean age of 37.5±13.5 years (range: 18-74). In the "Classic" group, there were 108 patients, including 37 females and 71 males, with a mean age of 38.8±13.3 years (range: 19-69). There were no statistically significant differences in age and gender between the two groups ($p>0.001$). Patient characteristics are given in Table 1.

In the "Caudal" group, the mean NOSE scale scores were found to be 12.3±3.7 preoperatively, 5.4±2 at 1 month postoperatively, and 2.8±1.2 at 3 months postoperatively. Significant differences were observed between the preoperative and postoperative time points ($p<0.001$). In the "Classic" group, the mean NOSE scale scores were 9.3±2.1 preoperatively, 5±1.4 at 1 month postoperatively, and 3.3±1 at 3 months postoperatively. Statistically significant differences were also observed between the preoperative and both postoperative time points ($p<0.001$) (Table 2).

When comparing the two groups, no significant difference was found in the changes in NOSE values at the postoperative 1-month assessment ($p=0.152$). However, significant differences were observed between the preoperative and postoperative 3-month results ($p<0.001$, $p<0.001$) (Table 2).

Table 1. Patients characteristics.

Variables		**Caudal Group (n=115)**	**Classic Group (n=108)**
Age, Mean±SD, (min-max), yr		37.5±13.5 (18-74)	38.8±13.3 (19-69)
Sex, n %	**Male**	74 (64.3)	71 (65.7)
	Female	41 (35.7)	37 (34.3)
Type of surgey	**Primary**	115	108
	Secondary	0	0
Follow-up (mean), **months**		1.3 (0.5-3.5)	1.4 (0.5-4)
Turbinate surgery	**Yes**	100	97
	No	15	11
Postoperative complication		0	0

n: Number; min: Minimum; max: Maximum; SD: Standard deviation.

Table 2. Statistical analysis of NOSE scores of the patient groups.

Scale	**Groups**	**Preoperative**	**Postoperative (1 month)**	**Postoperative (3 month)**	**p-values***
NOSE Scale	**Caudal**	12.3±3.7	5.4±2	2.8±1.2	p<0.001
(mean±SD)	**Classic**	9.3±2.1	5±1.4	3.3±1	p<0.001
	p values**	p<0.001	p=0.152	p<0.001	

NOSE: Nasal Obstruction Symptom Evaluation; p value*: Statistical analysis between the preoperative and both postoperative time points in the same group (One-way ANOVA); p-value; **: Statistical analysis of the preoperative and postoperative scores between groups (paired T-test); SD: Standard deviation.

DISCUSSION AND CONCLUSION

Previous studies have identified various caudal septal deviations, including deviations and displacements such as anterior subluxation, S or C-shaped deviations, and combinations of vertical and/or horizontal deviations.[8-11] Modification of caudal septal deviation is considered one of the greatest challenging health issues in septal surgery. While scoring, excision, swing-door techniques and extracorporeal endonasal septoplasty have been described for correcting deviations of caudal septum, these techniques may not suffice for high-level caudal septal deviations.[8,12,13] In our study, we performed unilateral batten graft application for high-level deviations of the caudal septum, where the caudal septum was dissected at the base, excess portions were excised, and the batten graft was applied.

Our study's findings indicate that dissection of the caudal septum at its base, followed by strip excision and unilateral batten graft placement, can effectively alleviate nasal obstruction symptoms. A notable reduction in postoperative NOSE scores (88.4) is apparent compared to preoperative scores (28.9). Approximately 65% of patients reported "significant improvement" in nose-related obstruction, while 28% reported "improvement." Additionally, postoperative nasal septum examinations revealed a straight septum in 79% of patients. In a study utilizing dissecting the caudal septum at its base and using unilateral batten grafts to correct the deviation of the caudal septum, authors observed improvement in nose-related obstruction manifestations in the patients and NOSE scores changed from 43.5 to 11.[2] In a study, it was reported that in cases of caudal septal deviation, in the period following anterior septal reconstruction, the preoperative NOSE scores declined from 68.2 to 21.1.[14] Hosokawa et al. reported that NOSE scores were 77.5 preoperatively and 5 postoperatively and the postoperative score was significantly lower than the preoperative score.[12]

Cheon et al. have recommended the use of caudal septal division and unilateral cartilage batten grafts for correcting deviations of caudal septum.[2] Following the division of the caudal septum, they positioned the cartilage pieces to overlap and then secured the batten graft onto the concave side with sutures. The overlapping of the cut pieces may cause the upper piece to protrude to one side, potentially hindering the creation of a completely straight septum. However, with the approach we employed, the removal of the projecting portion of either the upper or lower segment, followed by the insertion of the batten graft onto the concave side, led to a more aligned septum. Additionally, none of our cases showed any decrease in the height of the caudal septum or the subsequent development of a saddle nose deformity. This finding may be attributed to cartilage grafts and strip removal in our patients, which may lower the risk of bending.

The surgical method we described may have some potential drawbacks. Firstly, unilateral placement of the cartilage batten graft may cause unilateral narrowing of the nasal cavity. However, in our study, none of the patients experienced unilateral nasal cavity narrowing or associated nasal obstruction. This could be attributed to our positioning of the graft closer to the concave side and adequate cartilage thinning. Previous studies have noted slight constriction of the nasal passages and no significant nasal obstruction resulting from unilateral bone batten graft applications.[9,11] Secondly, a recurrence of deviation may occur due to the absorption of the graft. However, prior studies have shown minimal absorption due to the membranous structure of the ethmoid bone.[7] Thirdly, a potential disadvantage of the method could be the shortening of the caudal septum, leading to a saddle nose deformity. Nevertheless, none of our patients demonstrated a saddle nose deformity.

In conclusion, septoplasty techniques employed for septal deviations are effective surgeries that provide significant symptom improvement in patients in the near to mid-term. Particularly, using batten grafts represents a safe and successful surgical technique for correcting moderate to severe cartilaginous septal deviations that cannot be fully corrected with traditional methods. Given meticulous patient selection and thoughtful planning during implementation, septal batten grafts emerge as a highly advantageous endonasal technique within contemporary septoplasty procedures. Future studies evaluating patients over more extended follow-up periods are needed to assess the outcomes further.

Ethics Committee Approval: Our study was approved by the Sakarya University Ethics Committee (Date: 13.06.2022, decision no: 75). The study was carried out following the international declaration of Helsinki.

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

Author Contributions: Concept – MG, OKE; Supervision – MG, EMG; Materials – OKE, EHA; Data Collection and/or Processing – OKE, EHA; Analysis and/or Interpretation – OKE, MG; Writing –OKE, MG, EMG, EHA.

Peer-review: Externally peer-reviewed.

Other Information: This study was presented as an e-poster in the 44th Turkish Otolaryngology and Head and Neck Surgery Congress on 15th-19th of November 2023, Antalya.

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Ex-vivo Evaluation of the Accuracy of Three Different Apex Locators in the Presence of Sodium Hypochlorite in Root Canals

Kök Kanallarında Sodyum Hipoklorit Varlığında 3 Farklı Apex Bulucunun Doğruluğunun Ex-vivo Olarak Değerlendirilmesi

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ABSTRACT

Objective: To evaluate the precision of three endodontic apex locators-Propex Pixi, Woodpex III, and VDW Gold Reciproc-in vitro and under clinical conditions.

Materials and Methods: Thirty-six single-rooted teeth were decoranated, and actual root canal lengths were measured and recorded with an operating microscope at x20 magnification. The teeth were then embedded in an ex -vivo model, and the measurement of the root canal length was obtained electronically. Each measurement was performed in triplicate, and the mean value was recorded. Data were analyzed statistically. Two paired sample t-tests were used for normally distributed data, and the Wilcoxon test was used for data that did not show normal distribution. A chi-squared test was used to compare categorical variables according to the experimental groups.

Results: Woodpex III showed significantly more accurate results than the other apex locators. Propex Pixi and VDW Gold Reciproc apex locators showed no significant difference.

Conclusions: Under the circumstances of the present study, Woodpex III allowed for more accurate measurements compared with the other tested devices.

Keywords: Apex locators, electronic root canal length determination, root canal treatment

ÖZ

Amaç: Propex Pixi, Woodpex III, ve VDW Gold Reciproc apex bulucu cihazların doğruluğunun klinik koşulları yansıtacak şekilde in-vitro olarak kıyaslanması.

Materyal ve Metot: Otuz altı adet tek köklü diş dekorone edildi ve gerçek kanal boyları 20X büyütme altında operasyon mikroskobu ile belirlenerek kaydedildi. Ardından dişler kanal boylarının elektronik olarak ölçülebilmesi için ex-vivo modele gömüldü. Her ölçüm üçer defa tekrarlandı ve ortalama değerler kaydedildi. Veriler istatistiksel olarak analiz edildi. Normal dağılıma uygun verilerin incelenmesinde ikili paired sample t test ile, uygun olmayan veriler ise Wilcoxon testi ile değerlendirildi. Gruplar arasındaki kategorik değişimlerin incelenmesinde ki-kare testi kullanıldı.

Bulgular: Woodpex III Propex Pixi ve VDW Gold Reciproc cihazlarından istatistiksel olarak anlamlı düzeyde doğru sonuçlar verdi.

Sonuç: Mevcut çalışmanın limitasyonları dahilinde Woodpex III apex bulucu diğer cihazlardan daha tutarlı sonuçlar vermiştir.

Anahtar Kelimeler: Apex bulucular, elektronik kök kanal boyu tespiti, kök kanal tedavisi

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INTRODUCTION

Accurately determining the working length during root canal therapy is one of the most crucial determinants of successful endodontic therapy.[1] Successfully determining the working length prevents procedural errors, such as over-instrumentation and insufficient instrumentation, and reduces the bacterial load of the root canals.[2,3] Root canal therapy might not succeed if the working length is determined incorrectly due to foreign body reactions, tissue destruction, and persistent inflammation.[4-6] Optimal results have been reported when the apical end of the root canal treatment is located at the apical construction.[7,8] In the past, working length was frequently determined using periapical radiography,[9] however, measuring root canal length with periapical X-rays has many drawbacks.[10] These shortcomings include image distortion, superposition of the anatomical structures,[10] and most crucially, the physiological and the radiological apex do not always relate to the same point and might even be at different locations.[11] Furthermore, the patient is exposed to additional radiation.[12]

Apex locators (ALs) are electronic devices used to measure root canal length, surpassing the limitations of radiography and other methods. ALs were first developed by Custer in 1918[13] and since then, their working mechanisms have been improved. The first generation of ALs utilized resistance technique and alternate current, while the second generation relied on single frequency impedance. The third-generation devices used multiple frequencies, as did the fourth-generation. Fifth-generation devices measure electrical differences in the root canal system. The latest sixth-generation devices combine the features of the fourth and fifth-generation devices.[13,14]

This study aims to compare the accuracy of two fifth -generation apex locators (Propex Pixi, Woodpex III) and a fourth-generation apex locator (VDW Gold Reciproc endodontic motor apex locator) in the presence of sodium hypochlorite in the root canals.

MATERIALS AND METHODS

Ethical Statement: The study protocol was evaluated and approved by the Invasive Research Ethics Committee at Sakarya University (Date: 09.08.2023, decision no: E-16214662-050.01.04-276216-95). The study was carried out following the principles of the Declaration of Helsinki.

Sample Size Calculation: An initial power analysis was conducted at a 95% confidence level. The minimum sample size for each group was determined to be 12, resulting in a total sample size of 36 for three groups.

Study Design: For the study, 36 single-rooted human teeth with straight root canals were used. These teeth were stored in 1% thymol solution until use. Any remaining soft tissue and calculus were removed using an ultrasonic scaler.[15] To ensure the presence of a single root canal, digital periapical radiographs were taken from the buccolingual and mesiodistal inclinations. The root surfaces were examined under an operating microscope (Zumax OMS2350, Zumax Medical Co. Ltd, Jiangsu, China) at x20 magnification. A standard reference point was created by decorating the teeth under the cementoenamel junction and preparing the root canal orifices with an SX rotary file (ProTaper, Dentsply Maillefer, Ballaigues, Switzerland).

Teeth were placed in acrylic, exposing the root at least 5 mm. Then, the samples were kept in position until the acrylic solidified. Apical patency was checked with a size 10 K file (Micro Mega, Beascon, France). During working length measurements, two stoppers were employed to prevent stopper movement. The file was advanced through the root canal until it was visible at the apical foramen under an operating microscope at x20 magnification. After removing the file, the distance between the tip and stopper was measured using a digital calliper. Each measurement was made three times, and the mean was used to determine the actual root canal length (ARCL), which was then recorded.

The apical portions of the roots were embedded in alginate for electronic measurements, and a labial clip was inserted into the alginate (Figure 1). All electronic measurements were completed within 2 hours. Three different apex locators—Woodpex III, Propex Pixi, and VDW Gold Reciproc Endomotor—were used for the electronic measurements. All measurements were taken under the operating microscope at x20 magnification, before which the root canals were irrigated with 2.5% NaOCl to mimic clinical conditions. Then, the distance between the file tip and the coronal reference point was measured using a digital calliper. Electronic measurements were recorded as electronic root canal length (ERCL). All measurements were recorded in triplicate, and the median values were collected for statistical analysis in a manner identical to the ARCL measurement methods.

Statistical Analysis: The statistical analysis was conducted using SPSS software (version 23; IBM Corp, Armonk, NY). The normal data distribution was assessed using the Shapiro–Wilk test. When the data was found to be non-normally distributed, the Kruskal–Wallis test was used to compare it. When the data was normally distributed, one-way variance analysis was used to compare it. To compare manual and electronic measurements within the groups, two paired-sample t-tests were used for normally distributed data and the Wilcoxon test was used for non-

Figure 1. Stages of the setup. **a:** Setup of the samples before alginate placement; **b:** Setup of the samples after alginate placement.

normally distributed data. The categorical variables were compared according to the groups using the chi -squared test. Statistical significance accepted $p<0.05$.

RESULTS

Double stoppers were used to prevent stopper movement when recording working length measurements. The file was advanced through the root canal until it was visible at the apical foramen under an operating microscope at x20 magnification. After removing the file, the distance between the tip and stopper was measured using a digital calliper. Each measurement was made three times, and the mean was used to determine the actual root canal length (ARCL), which was then recorded.

Table 1 shows the mean differences between ARCL and ERCL measurements. The data from the study demonstrated a significant difference between the Propex Pixi and VDW Gold Reciproc groups ($p<0.05$) regarding ARCL and ERCL measurements. However, the Woodpex III group showed statistically similar results to ARCL measurements ($p>0.05$). Moreover, in the Woodpex III group, 66.67% of the samples had a variation of less than 0.5 mm from the ARCL compared to 58.33% in the other groups. The difference in the remaining samples was more significant than 0.5 mm. Furthermore, all groups had statistically significant agreement between ARCL and ERCL measurements ($p<0.001$).

Table 1. Distribution of the actual and electronic working length measurements.

Specifications	Group						Test	p
	Propex Pixi		Woodpex III		VDW Gold Reciproc			
	Mean ± SD	Median (Min-Max)	Mean ± SD	Median (Min-Max)	Mean ± SD	Median (Min-Max)		
Actual root length (mm)	15.25±1.67	16.00 (12.00-17.50)	15.12±1.92	15.75 (12.00-18.00)	16.29±1.91	16.50 (13.00-20.00)	1.457[1]	0.248
Elektronik root length (mm)	14.93±1.62	15.92 (11.66-16.66)	14.87±2.00	15.33 (12.00-18.00)	15.92±2.17	16.00 (12.00-20.00)	2.117[2]	0.347
Difference (Actual-Electronic root length)	0.32±0.35	0.26 (0.00-1.00)	0.25±0.52	0.00 (-0.50-1.17)	0.38±0.44	0.26 (-0.16-1.00)	0.704[2]	0.703

[1]: Oneway variance analysis; [2]: Kruskall Wallis H test.

DISCUSSION AND CONCLUSION

Various studies have been conducted to test the accuracy of electronic apex locators. These studies involved methods such as immersion in agar solutions or gels,[16] embedding in alginate,[17] and contacting roots with a saline solution-soaked sponge.[18] In contrast to the study by Venturi et al.,[19] the present study used a setup where teeth were embedded in alginate instead of immersed in a NaOCl solution. This was done due to concerns about intracanal and extracanal sodium hypochlorite contact and its possible effect on the measurements. Similar studies have used alginate models to determine the accuracy of electronic apex locators.[20,21] This is because it is a simple, accurate, easily reproducible, and affordable method.[9,16,17]

Previous studies have used the same teeth to compare two different apex locators.[16-18] In the present study, to avoid disrupting the major apical foramen by repeated measurements, different teeth were used for each apex locator, while the same protocol was used from previously published studies.[19,20]

The current study conducted electronic root length measurements while sodium hypochlorite solution was inside the root canal. This solution is most widely used as an irrigation solution,[21]. However, the accuracy of these measurements performed by ALs depends on several factors, including the instrument's size and the canal's diameter.[22] Furthermore, irrigants within the root canals can lead to incorrect measurements.[23] Thanks to recent advances in AL technology,[24] these devices can now be used with irrigation solutions in the root canal. It's important to note that using files in dry root canals is unacceptable in root canal treatment.

Cimpean et al.[25] applied different concentrations of NaOCl inside the canal before using three different ALs and found that NaOCl concentration affects readings of the devices. This study took the readings with 2.5% NaOCl to mimic clinical conditions. However, the effect of different NaOCl concentrations on the readings of ERCL was not examined, which means that the findings of this study cannot be compared to the previously published study.[25]

There is a considerable amount of research on using ALs in endodontics, with some studies focusing on the impact of irrigation solutions on ALs.[14,26] Studies have also focused on the effect of different canal conditions and file sizes on the working mechanism of the ALs.[27,28] In contrast, others have focused solely on the accuracy of different ALs.[16,17,19]

Previous studies that have compared the accuracy of ALs have found significant differences among the tested devices,[15,16] whereas others have found no difference.[19,20] In the present study, Woodpex III, Propex Pixi, and VDW Gold Endodontic Motor apex locators were used, and Woodpex III showed significantly better accuracy than the other tested devices. However, no studies have compared these results because, as far as we know, no previous accuracy tests have compared these three particular devices. The closest study in terms of devices that are used was by De Deus et al.,[15] where they compared Propex Pixi, Woodpex III, and Root ZX II apex locators, where it was reported that Woodpex III takes significantly more accurate measurements. This finding is compatible with the findings of the present study.

The goal of the current study was to replicate clinical conditions as much as possible. To achieve this, acrylic insulation was created such that the apical foramen and coronal access were disconnected, and teeth with similarly sized root canals were chosen. However, in clinical settings, variables such as pulp conditions, apical foramen diameter, and root canal width may alter the outcome. Because it is not feasible to replicate clinical conditions one-on-one, the current study has the limitation of being an in-vitro investigation.

In conclusion, it was found that Woodpex III provided more precise readings compared to Propex Pixi and VDW Gold Reciproc Endodontic Motor apex locator under the conditions of the present in-vitro study. However, it is recommended that further in-vivo and in-vitro studies be conducted that consider different clinical conditions under which measurements are taken to obtain more comprehensive and reliable results.

Ethics Committee Approval: Our study was approved by the Sakarya University Ethics Committee (Date: 09.08.2023, decision no: E-16214662-050.01.04-276216-95). The study was carried out following the principles of the Declaration of Helsinki.

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

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

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Effects of the COVID-19 Pandemic on Mental and Sexual Health of Women

KOVİD-19 Pandemisinin Kadınların Ruh ve Cinsel Sağlığı Üzerindeki Etkileri

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ABSTRACT

Objective: This study was conducted to determine the effects on women's mental and sexual health of the COVID-19 pandemic.

Materials and Methods: The research in the case-control involved 315 women, out of which 171 were part of the control group. These women had no history of COVID-19 infection before and were free from any mental or physical health issues. The remaining 144 female participants formed the case group. They had contracted COVID-19 disease at least two months ago and had tested negative.

Results: Based on the study data, women who have had COVID-19 show a higher rate of moderate to severe depression ($p<0.05$). Additionally, anxiety, depression, and negative self-esteem are more severe among those who have had COVID-19 compared to those who have not ($p<0.05$). The study also found that women who have not had COVID-19 experience better sexual function ($p<0.05$).

Conclusions: As a result, this study showed that anxiety along with depressive symptoms increased in participants with COVID-19 disease and that these parameters negatively affected female sexual function.

Keywords: BDI, BSI, COVID-19, female, sexual function

ÖZ

Amaç: Bu çalışma KOVİD-19 pandemisinin kadınların mental ve cinsel sağlığı üzerindeki etkilerini belirlemek amacıyla yapıldı.

Materyal ve Metot: Vaka kontrol tipte olan araştırmaya toplam 315 kadın katıldı. Kadınlardan 171'i daha önce KOVİD-19 enfeksiyonu geçirmemiş, mental ve fiziksel açıdan sağlık sorunu bulunmayan kontrol grubunu oluşturan kişilerdi. 144 kadın katılımcı ise en az iki ay önce KOVİD-19 hastalığını geçirmiş ve testi negatifleşmiş vaka grubunu oluşturuyordu.

Bulgular: Çalışmadan elde edilen verilere göre orta ve şiddetli depresyona sahip olan kadınların oranı KOVİD-19 geçirenlerde daha fazladır ($p<0.05$). KOVİD-19 geçirenlerde anksiyete, depresyon ve olumsuz benlik durumları hastalığı geçirmeyenlere kıyasla çok daha şiddetli düzeylerde görülmektedir ($p<0.05$). KOVİD-19 geçirmeyen kadınların daha iyi bir cinsel fonksiyona sahip olduğu saptanmıştır ($p<0.05$).

Sonuç: Sonuç olarak bu çalışma, KOVİD-19 hastalığı geçiren katılımcılarda depresif belirtiler ile beraber kaygının arttığını ve bu parametrelerin kadın cinsel işlevini olumsuz etkilediğini gösterdi.

Anahtar Sözcükler: BDE, Cinsel işlev, Kadın, KSE, KOVİD-19

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INTRODUCTION

COVID-19 is a viral disease that negatively affects many human systems, especially the respiratory system.[1-3] Due to the coronavirus pandemic, isolation has caused economic damage, loneliness, fear of death, and depression worldwide. Self-isolation and social distancing have led to undesirable psychological effects and negatively impacted sexual health.[4-6]

After quarantines and curfews were declared following the pandemic, new routines began to form in the family and social relationships, causing significant disruptions in many social areas.[3] The occurrence of many anxiety and depression disorders became easier in people because of the increase in time spent at home, fear of one's health or the health of loved ones, and the resulting economic losses during this period.[4,7] Common psychological reactions during the COVID-19 pandemic include anxiety, depression symptoms (16-28%), stressful mood (8%)[8] and sexual dysfunction (81%).[9]

The World Health Organization defines sexual health as the physical, emotional, mental, and social well-being of the individual.[10] Sexual dysfunction is a condition where an individual is unable to attain satisfaction during any stage of sexual intercourse. It can be caused by organic factors and psychological factors such as anxiety and depression.[11] Although changes in sexual activity and behaviors are the result of a very complex process, it is already known that biological, social, economic, political, cultural, and psychological factors are directly associated with the sexual activity of the individual.[12] According to studies, sexual satisfaction and sexual activity were negatively affected during the pandemic period.[13,14] COVID-19 might negatively affect female sexuality because of the fear of contamination, stressful conditions, and changes in daily life that come with the pandemic.[6,15] During home quarantine, longer contact between couples intensified negative emotions and increased marital conflicts.[16] While the sexual lives of some couples are negatively affected by COVID-19 infection due to fear of disease and lack of psychological well-being, some studies have reported that social isolation and increased time spent at home cause an increase in the frequency of sexual activity.[5,9,15]

Our study aims to investigate the effects of coronavirus infection on women's mental and sexual health. Through identifying these effects, we aim to take preventive measures for public and family health in future epidemics with similar characteristics and to raise awareness among health professionals and couples about the potential issues they may face.

MATERIALS AND METHODS

Ethical Principles of Research: The study was conducted following ethical principles at every stage, with written permission obtained from the ethics committee before implementation (Date: 26.05.2021, decision no: 2021-05/19). The study was carried out following the international declaration, guidelines, etc.

Type of Study: The study had a case-control.

The Place of the Study: The study was conducted at Sivas Cumhuriyet University, Gynecology and Children's Hospital, Gynecology outpatient clinic.

Population and Sample of the Study: The study population included female patients who visited our gynecology clinic between June 1, 2021 and March 1, 2022. The study included 315 women who met the following criteria: sexually active women who have not had COVID-19 and those previously infected with COVID-19.

The researchers conducted face-to-face interviews with women who provided written consent to participate in the study. Necessary permissions were obtained from the Ministry of Health, our university ethics committee, and the hospital to examine the participants' retrospective hospital test results.

Inclusion Criteria: Being between the ages of 18-45, not being pregnant, not being vaccinated, not having chronic pelvic pain and pelvic organ prolapse, not having a chronic disease (diabetes, cardiovascular disease, etc.), and having a signed consent form agreeing to participate in the study. In addition to the specified criteria, we included individuals in the control group who had not previously been infected with COVID-19.

Exclusion criteria: Women who do not have a regular sexual life and a partner, women who have entered the menopausal period, those who use gynecological hormonal drugs including oral contraceptives, individuals who have undergone ovarian surgery or hysterectomy for various reasons, and individuals who are under psychiatric treatment and using medication.

Data Collection Tools: The data of the study were collected with the "Personal Data Form", which was created by the researchers in line with the literature data, "FSFI-Female Sexual Function Index", "BDI-Beck Depression Inventory", and "BSI-Brief Symptom Inventory" were used to collect the study data. We received permission from the authors via email to use the scales.

Personal Data Form: The form included 19 questions on socio-demographic, clinical, and obstetric characteristics.[6,8]

Female Sexual Function Inventory (FSFI): FSFI is a Likert-style scale used to evaluate sexual dysfunction in women. The validity and reliability study

of the FSFI was conducted by Rosen et al. (2000),[17] and the Cronbach's Alpha Coefficient was found to be 0.82. The Turkish validity and reliability analysis of the scale was conducted by Aygın and Aslan (2005).[18] The scale has 19 questions to determine the participants' ongoing sexual functions in the last four weeks. Participants are asked to tick only one option that suits them during the last four weeks. The questions in the items have 6 sub-dimensions (Satisfaction, Desire, Lubrication, Orgasm, Arousal, and Pain). Better sexual function is associated with higher scores, and the scores for each domain vary between 0 and 5, with the maximum total score in each sub-dimension being 6. The minimum score is 2, and the maximum total score is 36. The sexual function status is evaluated using the FSFI score. A score of 30 points or more indicates good sexual function, while a score between 23 and 29 points indicates moderate sexual function, and a score of less than 23 points indicates poor sexual function.[17] Cronbach's Alpha values of the scale were found to be 0.98 in Aygin and Eti Aslan's study.[18] In our research, the Cronbach Alpha coefficient obtained for FSFI was found to be 0.94.

Beck Depression Inventory (BDI): BDI is a self-report rating scale that measures the severity of depression. The main version of the scale was prepared by Beck et al. [19] The validity and reliability study of the Beck Depression Inventory, which was adapted to Turkish society, was conducted by Hisli.[20] The Cronbach Alpha coefficient of BDI was evaluated as 0.82. The 21 items in the BDI are evaluated on a graded scale that ranges from "0" to "3", depending on the severity of depression. In the form, participants are asked to self-question their appetite, sleep patterns, decision-making, work status, and suicidal thoughts. The score range is 0-63, with scores from "0" to "9" indicating no depression, scores between 10-16 indicating mild depression, scores between 17 -29 indicating moderate depression, and scores between 30-63 indicating severe depression.[19] The Cronbach's alpha value of the scale in our study is 0.79.

Brief Symptom Inventory (BSI): BSI is a concise version of the Symptom Checklist 90-Revised (SCL -90-R) that evaluates psychological distress and psychiatric symptoms experienced in the past month. The SCL-90-R is a self-reported screening tool used to assess general psychiatric symptomatology. BSI is a self-evaluation inventory developed by Derogatis to make a psychopathological evaluation and identify some psychological symptoms.[21] Derogatis (1992) identified the subscales of BSI and found that internal consistency coefficients ranged from 0.71 to 0.85.[21] The adaptation study of this scale was conducted by Şahin and Durak.[22] In their validation study, the scale's Cronbach's alpha value was 0.94.[22] It has a Likert-style self-rating design that screens psychological symptoms and consists of 53 items and 5 sub-dimensions (Anxiety, Depression, Negative Self, Somatization, and Anger). The score range is between 0-212. The scale can be applied to adolescent and adult individuals and groups. The individual who answers the scale marks one of the following options for each question: (0) "Not at all", (1) "Very little", (2) "Moderately", (3) "Quite a lot", and (4) "Extremely". There is no time limit for answering the scale. Higher scores represent higher levels of symptomatology. The Cronbach's alpha value of the scale in our study is 0.96.

Statistical Analysis: All analyses were done with SPSS 23 (Statistical Package for the Social Sciences, version 23). The suitability of quantitative variables to normal distribution was examined with the Kolmogorov-Smirnov Test in the data evaluation, and the differences between frequency distributions in the groups for categorical variables were examined with the Chi-Square Test. The Mann-Whitney U Test was used to compare 2 groups for the variables. The strength and direction of relationships between the quantitative variables associated with the scales were evaluated using Spearman's rank correlation coefficient (RS). All statistical analyses were performed at 95% Confidence Interval. $p<0.05$ was considered significant.

RESULTS

A total of 54.3% (n=171) of the participants had never had COVID-19 before, and 45.7% (n=144) had had COVID-19 at least once. No statistically significant relationships were detected between women's experience of COVID-19, some sociodemographic characteristics (i.e., age, education, family type, residence, etc.), smoking, number of pregnancies and children, and pregnancy plan care ($p>0.05$).

The COVID-19 pandemic negatively affected the quality of life in most women who had COVID-19 and participated in the study (n = 109, 75.7%) ($p< 0.05$). The partners of 68.8% of women who had COVID-19 also had COVID-19. The sexual urges of 89.5% of women who did not have COVID-19 were not affected by COVID-19 ($p< 0.05$) (Table 1).

According to the Beck Depression Inventory, the rate of those with moderate and severe depression was higher in those who had had COVID-19, but the rate of those with minimal and mild depression was higher in those who had not had COVID-19 ($p< 0.05$). Upon evaluation of the short inventory, it was found that those who had COVID-19 experienced much more severe levels of anxiety, depression, and negative self-states compared to those who did not have the virus ($p< 0.05$) (Table 2).

Table 1. Distribution of COVID-19 infection-related characteristics of the participants by having had a COVID -19 infection.

Specifications		Have you ever had COVID-19 infection before?, n=315 No, n=171 (54.3) n (%)	Yes, n=144 (45.7) n (%)	p-value
Has COVID-19 impacted your quality of life?	No.	77 (45.0) [a]	35 (24.3) [b]	0.000**
	Yes	94 (55.0) [a]	109 (75.7) [b]	
Has your partner had COVID-19 infection before?	No.	156 (91.2) [a]	45 (31.3) [b]	0.000**
	Yes	15 (8.8) [a]	99 (68.8) [b]	
Has COVID-19 impacted your sex drive?	No	153 (89.5) [a]	81 (56.3) [b]	0.000**
	Decreased	9 (5.3) [a]	54 (37.5) [b]	
	Increased	9 (5.3) [a]	9 (6.3) [a]	

Values are numbers (n) and percentages (%); P-value was determined by the Chi-Square Test; * : p<0.05 ; **p<0.001.
[a,b]: When there was no significant difference between the study groups, the variables marked with the same letter (p<0.05).

Table 2. Distribution of Depression Severity Levels of BDI and Severity Levels of BSI Sub-dimensions by COVID-19 infection history.

Specifications			Have you ever had COVID-19 infection before?, n=315 No, n=171 (54.3) n (%)	Yes, n=144 (45.7) n(%)	p-value
BDI	**Depression Levels**	Minimal Depression (0-9)	80 (46.8) [a]	46 (31.9) [b]	**0.000****
		Mild Depression (10-16)	69 (40.4) [a]	52a (36.1) [a]	
		Moderate Depression (17-29)	16 (9.4) [a]	32 (22.2) [b]	
		Severe Depression (30-63)	6 (3.5) [a]	14 (9.7) [b]	
BSI Sub-dimensions	**Anxiety**	None	54 (31.6) [a]	21 (14.6) [b]	**0.000****
		Mild	55 (32.2) [a]	40 (27.8) [a]	
		Moderate	33 (19.3) [a]	35 (24.3) [a]	
		Severe	21 (12.3) [a]	20 (13.9) [a]	
		Very Severe	8 (4.7) [a]	28 (19.4) [b]	
	Depression	None	51 (29.8) [a]	17 (11.8) [b]	0.000**
		Mild	49 (28.7) [a]	16 (11.1) [b]	
		Moderate	39 (22.8) [a]	34 (23.6) [a]	
		Severe	22 (12.9) [a]	30 (20.8) [a]	
		Very Severe	10 (5.8) [a]	47 (32.6) [b]	
	Negative Self	None	52 (30.4) [a]	14 (9.7) [b]	0.000**
		Mild	44 (25.7) [a]	18 (12.5) [b]	
		Moderate	33 (19.3) [a]	27 (18.8) [a]	
		Severe	25 (14.6) [a]	48 (33.3) [b]	
		Very Severe	17 (9.9) [a]	37 (25.7) [b]	
	Somatization	None	35 (20.5) [a]	24 (16.7) [a]	0.727
		Mild	87 (50.9) [a]	72 (50.0) [a]	
		Moderate	22 (12.9) [a]	23 (16.0) [a]	
		Severe	14 (8.2) [a]	1a (11.1) [a]	
		Very Severe	13 (7.6) [a]	9 (6.3) [a]	
	Hosting	None	44 (25.7) [a]	21 (14.6) [b]	0.125
		Mild	26 (15.2) [a]	24 (16.7) [a]	
		Moderate	41 (24.0) [a]	33 (22.9) [a]	
		Severe	30 (17.5) [a]	35 (24.3) [a]	
		Very Severe	30 (17.5) [a]	31 (21.5) [a]	

BDI: Beck Depression Inventory; BSI: Brief Symptom Inventory; P-value was determined by the Chi-square Test; *: p<0.05; **: p<0.001. [a,b] When there was no significant difference between the study groups, the variables marked with the same letter (p<0.05).

A statistically significant difference was detected between women with and without COVID-19 infection in terms of BDI and BSI total score values, anxiety and depression BSI sub-dimension total score values ($p<0.001$). The median value of women with COVID-19 infection was higher than those without COVID-19 infection (Table 3).

This was also valid for the FSFI sub-dimension total score values of arousal, lubrication, satisfaction, and pain, which showed a significant difference ($p<0.05$). Women who do not have COVID-19 have better sexual functions. Participants who did not have COVID-19 had significantly higher median total score values than those who had COVID-19 ($p<0.05$). (Table 4).

Table 3. Total Scores for BDI, BSI, and BSI Sub-dimensions by COVID-19 infection history.

Specifications		Have you ever had COVID-19 infection before?, n=315				p-value
		No, n=171 (54.3)		Yes, n=144 (45.7)		
		Median (IQR) [Range]	Mean Rank	Median (IQR) [Range]	Mean Rank	
BDI Total Score		10 (5-14) [0-50]	141.266	12 (7-20) [0-54]	177.872	**0.000****
BSI Total Score		15 (6-32) [0-84]	110.234	43 (29-71) [9-153]	214.722	0.000**
BSI sub-dimensions	**Anxiety Total Score**	1 (0-4) [0-7]	86.131	15 (11-25.75) [7-64]	243.344	0.000**
	Depression Total Score	1 (0-3) [0-12]	96.096	15 (10-24.75) [0-57]	233.885	0.000**
	Negative Self-Total Score	3.30 (1-11) [0-41]	162.427	3 (1-7) [0-29]	152.743	0.345
	Somatization Total Score	2 (0-6) [0-30]	152.544	3 (0-7) [0-21]	164.479	0.238
	Hostility Total Score	2 (1-6) [0-24]	155.947	2 (1-7) [0-19]	160.437	0.661

BDI: Beck Depression Inventory; BSI: Brief Symptom Inventory; IQR: Interquartile range, (IQR)=(Q1 - Q3); [Range]=[min-max]; p-value was determined by the Mann-Whitney U Test; *: $p<0.05$; **: $p<0.001$.

Table 4. Total Scores for FSFI and its sub-dimensions by COVID-19 infection history.

Specifications		Have you ever had COVID-19 infection before?, n=315				p-value
		No, n=171 (54.3)		Yes, n=144 (45.7)		
		Median (IQR) [Range]	Mean Rank	Median (IQR) [Range]	Mean Rank	
FSFI Total Score		18.91 (16.83-24) [9.41-30]	183.06	16.99 (14.01-19.56) [6-30.66]	128.21	0.000**
FSFI Sub-dimensions	**Desire Total Score**	3 (2.50-4) [1-6]	166.39	3 (2-3.88) [1.20-6]	148.03	0.071
	Arousal Total Score	3.25 (2.50-4)[1-6]	182.28	2.50 (1.75-3.50)[0-5]	129.16	0.000**
	Lubrication Total Score	3.25 (2.75-4)[1-6]	175.94	3 (2-3.5)[0-5]	136.69	**0.000****
	Orgasm Total Score	3.33 (2.66-4) [1.66-6]	167.04	3 (2.66-3.66) [1.66-6]	147.27	0.057
	Satisfaction Total Score	2.66 (2-4)[1-6]	173.91	2 (1.33-3) [1-6]	139.10	**0.000****
	Pain Total Score	5 (3.33-5)[1-6]	183.65	3.33 (2.66-4.33) [1-5]	127.54	0.000**

FSFI: Female Sexual Function Index; IQR: Interquartile range , (IQR)=(Q1 - Q3) ; [Range]=[min-max]; p-value was determined by the Mann-Whitney U test; *: $p<0.05$; **: $p<0.001$.

The FSFI total score value was weakly and negatively correlated with the anxiety (r_S=–0.227) and depression (r_S=–0.210) sub-dimensions and was weakly and positively related with the negative self (r_S=0.130) and somatization (r_S=0.113) sub-dimensions. A weak and positive correlation (r_S=0.156) was detected between the sexual desire sub-dimension and the BDI total score. The pain sub-dimension was weakly and negatively correlated with the BDI total score (r_S=–0.156) and the somatization (r_S=–0.135) sub-dimension, but the BSI total score (r_S=–0.217) was negatively correlated with the anxiety (r_S=– 0.306) and depression (r_S=–0.234) sub-dimensions (Table 5).

Table 5. The relationships between the total scores of FSFI and its sub-dimensions with the total scores of BDI, BSI and BSI sub-dimensions.

Specifications			FSFI Total Score	FSFI Sub-dimensions					
				Desire	Arousal	Lubrication	Orgasm	Satisfaction	Pain
BDI Total Score		r	0.070	0.156	0.040	0.084	0.089	0.102	-0.156
		p	0.214	0.006**	0.477	0.138	0.116	0.070	0.005*
BSI Total Score		r	-0.094	-0.030	-0.082	-0.005	-0.017	-0.093	-0.217
		p	0.094	0.591	0.145	0.923	0.761	0.098	0.000**
BSI Sub-dimensions	**Anxiety**	r	-0.227	-0.069	-0.225	-0.131	-0.087	-0.156	-0.306
		p	0.000**	0.223	0.000**	0.020*	0.124	0.005*	0.000**
	Depression	r	-0.210	-0.046	-0.233	-0.123	-0.090	-0.164	-0.234
		p	0.000**	0.421	0.000**	0.029*	0.112	0.003*	0.000**
	Negative Self	r	0.130	0.074	0.117	0.162	0.034	0.039	-0.002
		p	0.021*	0.189	0.039*	0.004*	0.546	0.492	0.973
	Somatization	r	0.113	0.057	0.111	0.151	0.126	0.075	-0.135
		p	0.045*	0.317	0.049*	0.007*	0.026*	0.181	0.017*
	Hosting	r	0.046	-0.012	0.028	0.113	0.076	-0.009	-0.065
		p	0.412	0.834	0.625	0.045*	0.179	0.87	0.248

FSFI: Female Sexual Function Index; BDI: Beck Depression Inventory; BSI: Brief Symptom Inventory; r: Spearman's rho correlation coefficient; *: $p<0.05$; **: $p<0.001$.

DISCUSSION AND CONCLUSION

The mental well-being of women has been affected by the COVID-19 pandemic.[3,23] When the Brief Symptom Inventory-53 data were evaluated in the study, anxiety, depression, and negative self-esteem scores were found to be higher in individuals with COVID-19 infection compared to the group without the disease. Many studies emphasize that depression and anxiety increased during the pandemic process.[3,23,24] We thought that high anxiety scores in patients with COVID-19 might be associated with phobic anxiety, infecting loved ones, the recovery process, and the danger of intensive care as a result of disease exacerbation.

The COVID-19 pandemic had impacts on women's sexual and mental health.[6,23] According to the data obtained in the study, as the severity of anxiety, depression, and stress perception increased during this period, an increase in sexual dysfunctions was observed in the women in the study group. In our study, the average BDI score of the patient group was found to be 12, and the FSFI total score was 16.99, which showed that the pandemic causes high levels of stress, depression, and sexual function problems. In the study of 1644 women, in which Szuster et al. examined the impacts of the COVID-19 pandemic on the mental and sexual health of Polish women who were of reproductive age, the average BDI score was 11, which corresponded to minimal depression.[23] A decrease was detected in the Short-Form (36) Health Survey evaluation scale, from a total of 82.2 points before the pandemic to 64.2 points during the pandemic period.[6]

Symptoms of anxiety and depression occur in people during pandemic periods.[24] It was reported in many studies that female sexual dysfunction rates were higher in people with depression and anxiety, regardless of their severity and type.[6,23,25] In the present study, no significant relationships were detected between the FSFI total scores and total BDI and BSI scores according to sperm correlation analysis ($p>0.05$). However, a significant correlation was observed between the anxiety, depression, negative self, and somatization subgroups and the FSFI total score in the short symptom inventory ($p<0.05$). A statistically significant relationship was detected between the BDI total score and desire ($p<0.05$).

The COVID-19 pandemic caused a deterioration in women's sexual functions.[25,26] In the present study, it was observed that there was a significant decrease in sexual function arousal, lubrication, and satisfaction scores of women who had the infection compared to women who did not have it. The pain score on the FSFI scale was found to be higher in women who had not had coronavirus infection. The findings of our study, which included impairments in sexual functions, including FSFI scores, were supported by the results of many other studies.[15,26]

In the present study, it was found that the frequency of sexual intercourse decreased significantly (n:54,37.5%) in couples who had COVID-19 ($p<0.00$), and although the study was conducted on recovered patients, it was quite striking that women behaved in abstinence from sexuality like actively ill individuals. The frequency of sexual intercourse was one of the main factors that determined the sexual satisfaction level of individuals.[27] Studies similar to the present study also showed that the COVID-19 pandemic reduced the frequency of sexual intercourse.[27] A study conducted by Bowling and his colleagues included 247 women to examine the effects of COVID-19 on adult sexual life. Some of the

women reported that they experienced a decrease in their libido due to reasons such as financial insecurity and mental health issues.[28] What was striking in our results was that there were no changes in the frequency of sexual intercourse in the majority of women in the disease-free group (n:153, 89.5%). This finding is consistent with the results of the study by Micelli et al.[29]

Examining individuals' perceptions using qualitative data in our study is one of our limitations. Another limitation was that we examined unvaccinated individuals. Depending on the properties and doses of the vaccines, changes in mental and sexual health can also be investigated.

In conclusion, the present study showed that the disease had a significant impact on women's sexual behaviors during the pandemic period. It was also found that anxiety and depressive symptoms increased in participants with COVID-19, and the related parameters were negatively associated with female sexual function. Sexual health is fundamental to our overall well-being, and the results of the present study showed that sexuality is intertwined with all aspects of people's lives.

Ethics Committee Approval: Permission was obtained by Sivas Cumhuriyet University Non-Interventional Clinical Research Ethics Committee for the study (Date: 26.05.2021, Decision no: 2021-05/19).

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Investigation of COVID-19 Fear and Burnout in General Surgery Assistants

Genel Cerrahi Asistanlarının COVID-19 Korkusu ve Tükenmişliklerinin İncelenmesi

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ABSTRACT

Objective: The study aims to examine the burnout of general surgery assistants due to fear of COVID-19.

Materials and Methods: The study, which had a descriptive and cross-sectional design, was conducted with 103 general surgery residents. Data: It was obtained with the Personal Information Form, COVID-19 Fear Scale and Maslach Burnout Scale. The data were evaluated in the SPSS program.

Results: The average score of the residents on the Fear of COVID-19 Scale was above the middle score. While depersonalization and emotional exhaustion, which are the sub-dimensions of the Maslach Burnout Scale, were experienced at moderate levels, it was determined that there was a significant decrease in the personal accomplishment dimension. It has been determined that assistants with a high fear of COVID-19 experience high levels of emotional exhaustion and high levels of depersonalization, as well as a feeling of decreased personal accomplishment.

Conclusions: It is important to consider general surgery assistants, who are at high risk of contracting the COVID-19 virus, as risky groups during epidemic periods and to implement necessary protective measures and crisis management policies, including psychological support in reducing burnout syndrome.

Keywords: Burnout, fear of COVID-19, pandemic

ÖZ

Amaç: Çalışmanın amacı, genel cerrahi asistanlarının COVID-19 korkusu ile tükenmişliklerinin incelenmesidir.

Materyal ve Metot: Tanımlayıcı ve kesitsel tasarımda olan çalışma 103 genel cerrahi asistanı ile yapılmıştır. Veriler; kişisel Bilgi Formu, COVID-19 Korku Ölçeği ve Maslach Tükenmişlik Ölçeği ile elde edilmiştir. Veriler SPSS programında değerlendirilmiştir.

Bulgular: Asistanların COVID-19 Korkusu Ölçeği puan ortalaması orta puanın üzerinde bulunmuştur. Maslach Tükenmişlik Ölçeği'nin alt boyutları olan duyarsızlaşma ve duygusal tükenme orta düzeyde yaşanırken, kişisel başarı boyutunda ise önemli derecede düşüş olduğu belirlenmiştir. COVID-19 korkusu yüksek olan asistanlarda yüksek düzeyde duygusal tükenme yaşandığı ve yüksek düzeyde duyarsızlaşma geliştiği, aynı zamanda kişisel başarıda azalma hissi yaşandığı saptanmıştır.

Sonuç: COVID-19 virüsünün bulaşma riski yüksek olan genel cerrahi asistanlarının salgın dönemlerinde riskli gruplar olarak ele alınması, gerekli koruyucu önlemlerin ve psikolojik desteği kapsayan kriz yönetim politikalarının uygulamaya geçirilmesi tükenme sendromunun azaltılmasında önemlidir.

Anahtar Kelimeler: COVID-19 korkusu, pandemi, tükenme

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INTRODUCTION

The death of many healthcare workers due to COVID-19 causes intense anxiety, stress and fear in the surgical team at high risk of contamination, as well as in all healthcare workers fighting the pandemic on the front lines.[1-3] Close contact with the surgical team is inevitable during the treatment of COVID-19 patients.[4,5] Surgical procedures such as tracheal intubation, mask ventilation, extubation, cough reflex, orotracheal secretions, and laparoscopic smoke increase the risk of COVID-19 infection transmission due to aerosol production.[6,7] In addition, the admission of asymptomatic patients to both elective and emergency operations increases the risk of COVID-19 infection to surgical personnel. It can expose people to the risk of contamination.[5,8] Surgical staff working for long periods under these challenging conditions may trigger the team's fear of potential COVID-19 infection. The fear of being infected and infecting others may challenge the ability of assistants, who are young and active members of the surgical team, to cope with the epidemic-related crisis that may be caused by COVID-19 and similar viruses.[4,6,7]

General surgery assistants, who are among healthcare professionals with intense workloads, continue their work by consuming physical, emotional and mental energy. In crisis situations caused by epidemic diseases, factors such as extended working hours, excessive workload, and dangerous working environment can cause assistants to spend excessive energy and become an important risk factor for burnout syndrome.[8,9] While the increased workload, especially with the crisis arising from the COVID-19 epidemic, increases the burnout levels of general surgery assistants, it can also make them vulnerable in psychological aspects such as fear, stress, and anxiety.[8-10]

Therefore, in crisis situations such as the COVID-19 epidemic, it is very important to understand the mechanisms that trigger fear and burnout on the faces of all healthcare professionals, especially hospital staff with little work experience, such as general surgery assistants. Thus, the effects of the crisis can be reduced or eliminated by providing the necessary support. This study draws attention to the fear and burnout that general surgery assistants experience and/or may experience in the ongoing COVID-19 epidemic and similar situations that may develop in the future. In this context, the study was conducted to examine general surgery assistants' fear and burnout of COVID-19.

MATERIALS AND METHODS

Ethical Approval: Ethical approval was received for this study from a university's noninvasive ethics committee. (Date: 14.04.2021, decision no: 2021-04/36). The rules of the Declaration of Helsinki were followed to carry out this study.

Study Design: The study, which aimed to examine the fear of COVID-19 and burnout in general surgery residents, was carried out in a descriptive and cross-sectionally nature.

Setting and Sample: The data collected with the help of an e-survey prepared digitally with the Google form was obtained between May and July 2021. Telephone numbers of general surgery assistants actively working throughout Türkiye were obtained. Thus, the Google form was sent to these assistants, and the data and answers of 103 assistants who participated in the research voluntarily were evaluated.

Data Collection Tools: Personal Information Form: This form includes general surgery assistants' characteristics (age, gender, marital status...) and characteristics explaining their working status (the region they work in, the institution they work in, whether the institution they work in is a pandemic hospital, whether they are assistants or not, whether he was diagnosed with Covid-19, whether he was assigned to another clinic during the pandemic period, working time in the pandemic unit, etc.) was questioned.

COVID-19 Fear Scale: It was developed by Ahorsu et al.[11] to measure individuals' fear levels caused by COVID-19. Validity and reliability in Turkish were determined by Satıcı et al. (2020)[12]. The scale has a single-factor structure and consists of seven items on a five-point Likert type (1 = Strongly disagree; 5 = Strongly agree). Each question is evaluated as a minimum of 1 and a maximum of 5 points. The total score is calculated by adding the scores of 7 items (7 -35 points). The internal consistency of the scale was found to be 0.82, and the test-retest reliability was 0.72. A high score on the scale indicates that the fear of COVID-19 is high.

Maslach Burnout Scale (MBI): *It* was developed by Maslach, Leiter, and Jackson).[13] It is a scale that is widely used in the evaluation of burnout syndrome, is scored between 0-6 and contains 22 items. MBI has three sub-dimensions: emotional exhaustion, depersonalization and personal accomplishment.

The emotional exhaustion subscale consists of 9 questions, and the highest score is 54. The depersonalization subscale consists of 5 questions, and the highest score that can be obtained is 30. The feeling of decreased personal accomplishment is evaluated with 8 questions. The highest score that can be obtained is 48. It is scored between "0-never" and "6-always". A high score in the emotional exhaustion and depersonalization subscales and a low score in the sense of diminished personal accomplishment

subscale indicate burnout.[13] The validity study for Türkiye was conducted by Ergin.[14]

Statistical Analysis: The data were examined in the Statistical Package for Social Sciences (SPSS) (Vesion:25). For descriptive data, numbers, percentages, minimum-maximum values, and mean and standard deviation were calculated. The relationship between assistants' fear of COVID-19 and fear of burnout was obtained by Pearson Correlation analysis. Statistical tests were performed considering the 95% confidence interval and the $p<0.05$ significance level.

RESULTS

The sociodemographic characteristics of the general surgery assistants participating in the study are shown in Table 1. Accordingly, the average age of the assistants was 29.15±2.89, with the lowest age being 25 and the highest age being 40. 79.6% of general surgery assistants are male, 35.9% work in the Central Anatolia region, 64.1% work in a university hospital, 72.8% work in a pandemic hospital, and 51.5% work in COVID-19. At the same time, 90.3% of general surgery assistants were assigned to another clinic during the pandemic period, and 42.7% of these clinics were COVID-19 outpatient clinics. The assignment period was determined to be between 1-3 months at a rate of 47.6%.

The average score of general surgery assistants on the Maslach Burnout Scale Depersonalization Subscale was 8.08 ± 3.11, the average score on the Emotional Exhaustion Subscale was 19.48±5.09, and the average score on the Personal Accomplishment Subscale was 11.76±3.90. In addition, the average score of general surgery assistants from the COVID-

Table 1. Individual and clinical characteristics of participants.

Variable		n (%)
Age, years, mean±standard deviation (min-max)		29.15±2.89 (22-38 years)
Gender	Female	21 (20.4)
	Male	82 (79.6)
Working Region	Central Anatolia	37 (35.9)
	Marmara	32 (31.1)
	Mediterranean	10 (9.7)
	Aegean	8 (7.8)
	Eastern Anatolia	8 (7.8)
	Southeastern Anatolia	4 (3.9)
	Black Sea	4 (3.9)
Institution of Work	University Hospital	66 (64.1)
	Ministry of Health Training and Research Hospital	25 (24.3)
	Ministry of Health City Hospital	12 (11.7)
Is the institution you work at a Pandemic Hospital?	Yes	75 (72.8)
	No	28 (27.2)
Status of being diagnosed with COVID-19	Yes	50 (48.5)
	No	53 (51.5)
Being assigned to another clinic during the pandemic	Yes	93 (90.3)
	No	10 (9.7)
If your answer is yes; clinics you are assigned to	Intensive care	41 (39.8)
	Emergency	15 (14.6)
	COVID-19 outpatient clinic	44 (42.7)
	COVID-19 sampling team	14 (13.6)
	Other	13 (12.6)
Mission time	<1 month	17 (16.5)
	1-3 month	49 (47.6)
	3-6 month	20 (19.4)
	>6 month	17 (16.5)

Table 2. COVID-19 Fear Scale and Maslach Burnout Scale Sub-Dimension Mean Scores of General Surgery Assistants.

	Mean± Standard Deviation	Minimum- Maximum Score
Depersonalization Subscale	8.08 ± 3.11	0-36
Emotional Exhaustion Subscale	19.48±5.09	0-20
Personal Success Subscale	11.76±3.90	0-32
COVID-19 Fear Scale	18.76±6.42	7.00-35.00

19 Fear Scale was determined as 18.76±6.42 (Table 2).

Table 3 shows the relationship between the COVID-19 Fear Scale and Maslach Burnout Scale mean scores of general surgery assistants. Accordingly, there is a positive significant relationship between the subscales of the Maslach Burnout Scale, namely depersonalization subscale, emotional exhaustion (r=0.471; p=0.000) and personal accomplishment subscale (r=0.428; p=0.000).

On the other hand, between the emotional exhaustion subscale and the personal accomplishment subscale (r=0.309; p = 0.001) and the COVID-19 Fear Scale (r=0.362; p=0.000), a positive significant relationship was detected between the personal success subscale and the COVID-19 Fear Scale (r=0.258; p=0.008).

A positive significant relationship was also obtained between the COVID-19 Fear Scale and the emotional exhaustion and personal accomplishment subscales.

Table 3. Relationship Between COVID-19 Fear Scale and Maslach Burnout Scale Subscales Mean Scores of General Surgery Assistants.

		Depersonalization Subscale	Emotional Exhaustion	Personal Success Subscale	COVID-19 Fear Scale
Depersonalization Subscale	r	1	.471**	0.428**	0.145
	p		0.000	0.000	0.144
Emotional Exhaustion Subscale	r	0.471**	1	0.309**	0.362**
	p	0.000		0,001	0.000
Personal Success Subscale	r	0.428**	0.309**	1	0.258**
	p	0.000	0.001		0.008
COVID-19 Fear Scale	r	0.145	0.362**	0.258**	1
	p	0.144	0.000	0.008	

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

DISCUSSION AND CONCLUSION

The COVID-19 epidemic affects and scares the individual biopsychosocially due to the loss of function and damage it causes physically on the body, as well as the stress response and emotional changes it causes.[15,17] In a study, Özgünay et al.[18] found that the fear of COVID-19 was high in physicians working in anesthesia intensive care units. In the study conducted by Lu et al.,[19] it was determined that 43.9% of healthcare workers had a moderate level of fear of COVID-19, and 26.7% had a high level of fear of COVID-19. In a study conducted in Mexico, it was determined that healthcare workers experienced a high level of fear.[20] In another study conducted on healthcare professionals working in surgical clinics, the fear of COVID-19 was found to be at a moderate level.[10] Bakioğlu et al.[21,] the participants' average fear of COVID-19 was found to be above average. In this study, general surgery residents' fear of COVID-19 was found to be above the average score. As can be seen, studies have found the fear of COVID-19 to be high, mainly among healthcare workers. Among all physicians, surgical physicians come first in terms of risk.[11] Studies have shown[5,22,23] that most of the deaths caused by COVID-19 are among those working in surgical clinics. For this reason, it is understandable that surgical assistants with little experience and high workload are afraid of COVID-19. For this reason, it is very important to quickly implement the necessary equipment, training and other protective measures to eliminate the ways of transmission of the virus to the surgical team, which is one of the risky groups among healthcare workers.

Another dimension of work is burnout. When studies in the literature on the burnout of healthcare workers during the pandemic period were examined, it was determined that there was a high level of burnout.[9,17,24] As a result of scanning different databases on issues related to the maintenance of healthcare services by healthcare professionals during the COVID-19 pandemic, 2858 studies were evaluated, and 76 studies on burnout caused by the COVID-19 epidemic were examined.[24] In this study conducted by Lluch et al.,[24] it was determined that while there was a decrease in personal accomplishment, one of the dimensions of burnout, there was a high level of burnout in the dimensions of depersonalization and emotional exhaustion. Factors such as insomnia, depression, and anxiety were found to be associated with burnout. Similarly, in a study aiming to determine the burnout in healthcare professionals due to the COVID-19 epidemic, Jalili and colleagues[17] examined healthcare professionals working in six hospitals. They reported that there was a high prevalence of burnout in healthcare professionals. In a cross-sectional study[25] conducted during the COVID

-19 pandemic period, 30 articles were examined, and the results were evaluated. Similarly, in this study, it was determined that the epidemic had a consuming effect on healthcare workers, and more than half of healthcare workers experienced burnout.[25] In another study,[26] it was determined that most healthcare professionals experienced a high degree of emotional exhaustion and that their sense of personal accomplishment was negatively affected and depersonalization developed.

In a study on burnout experienced during COVID-19 among residents in the United States, Lin et al.[27] determined that 46.1% of residents experienced high levels of emotional exhaustion, one of the dimensions of burnout. In the same study[27], it was determined that 72.5% of the assistants experienced depersonalization, which is another dimension of high-level burnout, and personal success decreased by 30.6%. In the study of Abdelghani et al.,[15] it was found that 71% of physicians had high levels of depersonalization, 39% had low personal accomplishment, and 20% had high levels of emotional exhaustion. In a study conducted in our country by Yıldırım and Solmaz,[28] it was determined that participants in the study experienced burnout above a moderate level. Although there is no study that focuses only on surgical assistants, it is known that burnout is experienced at high levels among healthcare professionals working in surgical clinics. In this study,[28] it was determined that surgical assistants whose work intensity increased during the pandemic period and faced the threat of contamination experienced burnout above a moderate level, developed depersonalization, and experienced a decrease in their achievements. Our study result is compatible with the literature.

In the correlation analysis, a positive significant relationship was obtained between fear of COVID-19 and burnout. Accordingly, it has been determined that assistants with a high fear of COVID-19 experience high levels of emotional exhaustion and depersonalization, and at the same time, the feeling of a decrease in personal success increases. Studies on the fear of COVID-19 indicate that as the fear of COVID-19 increases, anxiety, stress, depression, and other psychological problems increase, and this leads to burnout.[21,24,29]

In the study conducted by Arpacıoğlu et al.,[9] a significant relationship was found between burnout and fear of COVID-19 in healthcare workers during the COVID-19 pandemic. In another study conducted to determine the effect of excessive workload and perceived social support on the relationship between fear of COVID-19 and burnout of healthcare personnel using a structural equation model, Yakut et al.[29] obtained a significant relationship between fear of COVID-19 and burnout. Similar results have been obtained in studies on the subject, showing that as healthcare professionals' fear of the COVID-19 epidemic increases, burnout also increases.[24,26,30] In our study, which is consistent with the literature, it was determined that burnout increased as the fear of COVID-19 increased.

As a result, in this study, which aims to investigate the fear of COVID-19 and burnout syndrome in general surgery residents, the fear of COVID-19 and burnout were found to be above average, while personal success was found to be low. Additionally, a positive significant relationship was obtained between fear of COVID-19 and burnout. It has been determined that as the fear of COVID-19 increases in assistants, burnout increases. In line with these results, we think that general surgery assistants who are at high risk of transmission of COVID-19 and similar viruses are considered risky groups during epidemic periods and implementing crisis management policies covering the necessary protective measures and psychological support may be effective in reducing burnout syndrome.

Ethics Committee Approval: Our study was approved by the Sivas Cumhuriyet University Ethics Committee (Date: 14.4.2021, decision no: 2021-04/36). The study was carried out following the international declaration, guidelines, etc.

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

Author Contributions: Concept - MCM, KK; Materials - MM; Data Collection and/or Processing - MCM; Analysis and/or Interpretation - MCM, KK; Writing - MCM, KK.

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Assessing the Diagnostic Accuracy of the Smartwatch ECG in Detecting Complete Atrioventricular Block: A Case Report

Tam Atriyoventriküler Bloğu Saptamada Akıllı Saat EKG'sinin Tanısal Doğruluğunun Değerlendirilmesi: Bir Olgu Sunumu

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ABSTRACT
This study aimed to assess the effectiveness of the smartwatch electrocardiogram (ECG) in detecting atrioventricular block. A case study was conducted to demonstrate the use of wearable technology, specifically the ECG, in monitoring cardiac health outside of traditional clinical settings. The patient in question was a 71-year-old woman who was hospitalized due to a complete atrioventricular (AV) block. Her ECG recordings were taken with an Apple Watch, which accurately displayed the complete AV block. After undergoing coronary angiography, the ECG recordings taken with the Apple Watch demonstrated that the complete AV block had been correct. These results indicate that wearable technology, such as smartwatches, holds great potential for monitoring third-degree AV block in non-clinical settings. The findings of this study can add to the growing body of evidence supporting the use of wearable technology in cardiac monitoring during emergencies.
Keywords: Atrioventricular block, coronary angiography, smartwatch

ÖZ
Bu çalışma, akıllı saat Elektrokardiyogramının (EKG) atriyoventriküler (AV) bloğu tespit etmedeki etkinliğini değerlendirmeyi amaçladı. Geleneksel klinik ortamların dışında kalp sağlığının izlenmesinde giyilebilir teknolojinin, özellikle de EKG'nin kullanımını göstermek için bir vaka çalışması yapıldı. Söz konusu hasta, tam AV blok nedeniyle hastaneye kaldırılan 71 yaşında bir kadındı. EKG kayıtları, tam AV bloğunu doğru bir şekilde görüntüleyen bir Apple Watch ile çekildi. Koroner anjiyografi sonrası Apple Watch ile çekilen EKG kaydında AV bloğunun tamamının düzeldiği görüldü. Bu sonuçlar, akıllı saatler gibi giyilebilir teknolojilerin, klinik dışı ortamlarda üçüncü derece AV bloğun izlenmesinde büyük potansiyel taşıdığını göstermektedir. Bu çalışmanın bulguları, acil durumlarda kardiyak izlemede giyilebilir teknolojinin kullanımını destekleyen giderek artan kanıtlara katkıda bulunabilir.
Anahtar Kelimeler: Atriyoventriküler blok, koroner anjiyografi, smartwatch

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INTRODUCTION

Smartwatches are used for various purposes in cardiovascular medicine. These encompass the computation of risk for both individuals in good health and patients, the screening and diagnosis of acute coronary syndrome and cardiac dysrhythmia, and the identification of prolonged QT. Additionally, they are used for cardiac telerehabilitation, identifying electrolytic disorders, managing heart failure, and drug titration.[1] The electrocardiogram (ECG) application on Apple Watch Series-4 or subsequent models generates an ECG similar to a single-lead (Lead I) ECG. A single-lead ECG can furnish information regarding heart rate and rhythm. It has been demonstrated that it is possible and reliable to detect atrial fibrillation (AF) by monitoring the heart rate using optical sensors on the Apple Watch.[2] The ECG feature of the Apple Watch (Apple Inc., Cupertino, CA, USA) has received approval from the Food and Drug Administration (FDA) for AF detection.

Studies have shown that smartwatches, including the Apple Watch, can detect a range of arrhythmias beyond AF, such as ventricular tachycardia, atrial flutter, and bradyarrhythmias.[3,4] Although it was not originally designed for AF patients, its intended use is becoming increasingly common.

The third-degree (complete) atrioventricular (AV) block exhibits a relatively distinctive appearance on

the ECG, characterized by the presence of atrial (P waves) and ventricular (QRS complexes) activities that occur independently of each other, along with an atrial rate that surpasses the ventricular rate. ECG findings are critical in guiding AV block therapy. In recent years, technological advancement has led to the development of portable ECG devices integrated into smartwatches, allowing for continuous heart rhythm monitoring outside of clinical settings.[5] This innovation has great potential for early detection and management of cardiac conditions, including AV block, improving patient care and outcomes.

This study aimed to assess the effectiveness of the smartwatch ECG in detecting atrioventricular block.

CASE REPORT

The patient/relatives have signed an informed consent form, and the study was conducted following the international declaration. Ethics committee approval is not required.

A 71-year-old female patient, who has a medical background of hypertension and hyperlipidemia but lacks any established presence of coronary artery disease, was admitted to the emergency department due to experiencing symptoms of dizziness and weakness over three days. Bradycardia was noticed in the patient's first evaluation. Later, we were consulted on the ECG recordings taken after the AV complete block was seen. At the time of assessment, the hemodynamics was stable except for bradycardia. Cardiac and lung auscultation was not remarkable. Transthoracic echocardiography performed at admission showed that the left ventricular ejection fraction (LVEF) was 60%. Blood pressure was 142/88mmHg; pulse was between 30-35/min, respiratory rate was 26, and SaO2 was 98. Afterwards, the patient was admitted to the coronary intensive care unit for additional examination and therapy. Coronary angiography was planned when the patient's troponin values exceeded the upper limit. There was no evidence of chest pain, hypotension, signs of shock, altered cognitive condition, persistent chest pain due to ischemia, or sudden onset of pulmonary oedema, which were among the signs and symptoms of hemodynamic instability. Since the patient's complaints were relatively moderate, temporary intravenous pacemaker implantation was not considered. The patient was continuously monitored with on-site transcutaneous pacing pads. In this process, the patient's ECG was recorded three times for 30 seconds using an Apple Watch-6 (Figure 1A). It was compared with the patient's standard 12-lead ECG (Figure 1B).

The ECG recording taken with the Apple Watch-6 showed the AV complete block accurately. Later, the patient underwent coronary angiography with a preliminary diagnosis of NSMTI. Coronary angiography of the patient revealed critical stenosis in RCA (Figure 2A). There was no significant stenosis in the other coronary vessels (CX and LAD). The patient's rhythm returned to normal sinus rhythm within the first hour after recanalizing the RCA acute lesion (Figure 2B).

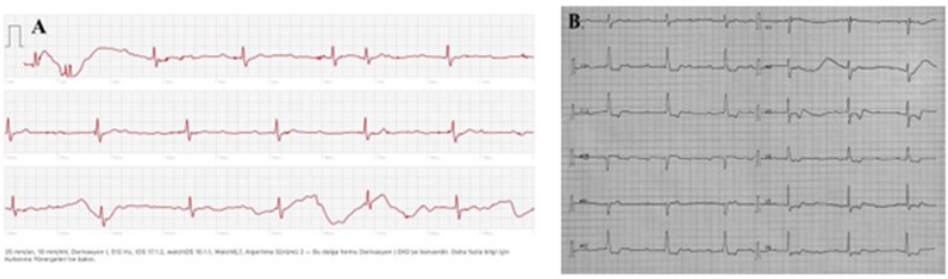

Figure 1. Apple Watch ECG single-lead (Lead I) recording before coronary angiography. A: Third-degree (complete) atrioventricular (AV); B: Traditional ECG recording before coronary angiography: Third-degree (complete) atrioventricular (AV).

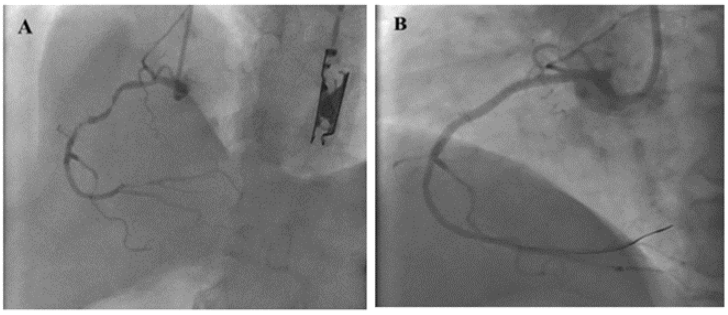

Figure 2. Coronary angiography baseline (A) and final images after revascularization (B).

After taking another ECG recording with the Apple Watch, it was confirmed that the complete block had been corrected (Figure 3A and Figure 3B).
During his hospital stay, both the conventional 12-lead ECG and continuous ECG monitoring using the Apple Watch 6 provided parallel and supporting data on his cardiac status. The patient's clinical condition, devoid of any complications, stabilized significantly, and she was discharged after two days of hospitalization.

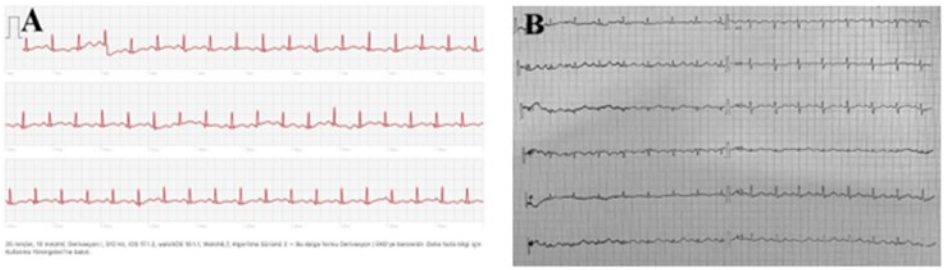

Figure 3. Apple Watch ECG single-lead (Lead I) recording after coronary angiography. A: Sinus rhythm; B: Traditional ECG recording after coronary angiography: Sinus rhythm.

DISCUSSION AND CONCLUSION

The comparative analysis between the Apple Watch ECG and the traditional 12-lead ECG demonstrated notable accuracy in the detection of complete AV block. Before the coronary angiography, the smartwatch ECG and the traditional 12-lead ECG both displayed a complete AV block, with matching characteristics in heart rhythm and rate. Following the revascularization of the RCA, both ECG methods showed a return to normal sinus rhythm within the first-hour post-procedure. This rapid normalization of the heart rhythm, consistently detected by both the smartwatch and traditional ECGs, highlights the potential of smartwatch technology in post-intervention monitoring. These results underscore the potential of wearable technology, such as the Apple Watch, to complement traditional diagnostic methods in detecting and monitoring significant cardiac events.
The core of our methodology revolves around the use of an Apple Watch equipped with the capability to perform an ECG comparable to a single-lead (Lead I) ECG. The choice of this device was influenced by its FDA approval for detecting arrhythmias such as atrial fibrillation, which underscores its reliability and potential utility in a clinical setting.
Smartwatches are experiencing a growing surge in popularity due to their ability to detect alterations in heart rhythm at a premature stage, thus aiding the individual in obtaining an early recommendation for admission to a medical facility in the presence of potentially severe ailments.[6]
The FDA has approved the ECG and irregular rhythm notification features of the Apple Watch, which are increasingly being used to detect arrhythmias.[7] Earlier research indicated that identifying premature atrial contractions and premature ventricular contractions through a 15-second single-lead ECG in middle-aged individuals without any cardiovascular disease is linked to a higher probability of developing atrial fibrillation and heart failure.[8] In another study, the smart device was placed in different body positions for recording. Multi-lead ECGs were recorded. After the data was combined, the Smartwatch ECG was consistent with the standard ECG for diagnosis. The precision of the smartwatch ECG in detecting ST segment alterations was excellent. The sensitivity of the smartwatch ECG to normal ECG was 84%, the sensitivity to ST elevation was 93%, and the sensitivity to NSTMI ECG changes was 94%.[9] In another study, bradyarrhythmias and tachyarrhythmias were accurately detected. Due to the limitations of the smartwatch, the diagnosis of atrial rhythms was made less accurate, while for ischemic heart disease, it resulted in high specificity but poor sensitivity. Multiple Apple Watch ECG recordings taken from different suitable locations have been shown to improve diagnostic accuracy.[5]
Smart devices, which can provide very important results in diagnosis and follow-up, particularly in arrhythmia, can accurately show vital rhythm disorders, as shown in our study. As a result, we think that the following points reflected in our practice are important. Unlike traditional ECGs, which record heart activity briefly during a clinic visit, Apple Watch provides continuous monitoring. This feature is particularly useful in catching intermittent heart abnormalities that may not be present during a doctor's visit but may occur occasionally in a home environment. Early diagnosis facilitates rapid medical intervention, which can prevent the progression of the current clinical condition and reduce the risk of complications.
Our study's findings should be viewed in the context

of the limitations of smartwatch ECG technology, which restricts the depth of cardiac analysis compared to a standard 12-lead ECG. While our results are promising, they should not replace traditional diagnostic tools in all clinical scenarios. As a case report, our research offers valuable insights but cannot definitively establish causality or generalize findings to a broader population. Further investigation through larger-scale research is needed to validate and extend our findings.

In conclusion, AV complete block, a type of life-threatening arrhythmia that may not show any obvious symptoms for a long time, was followed with a smart device comparatively. The observed consistency between Apple Watch and traditional 12-lead ECG in detecting and monitoring important cardiac events, such as complete AV block, highlights their potential to enhance clinical diagnosis and patient management at home or in routine care settings.

Ethics Committee Approval: The patient/relatives have signed an informed consent/consent form, and the study was conducted following the international declaration. Ethics committee approval is not required.

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Letter to Editor on Evaluation of Thyroid Dysfunction in Patients with Atrial Fibrillation

Atriyal Fibrilasyonlu Hastalarda Tiroid Fonksiyon Bozukluğunun Değerlendirilmesi Konusunda Editöre Mektup

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ABSTRACT
I have read with great interest the research article by Varım and Demirci, titled "Evaluation of Thyroid Dysfunction in Patients with Atrial Fibrillation", published in Volume 8, Issue 3 of the Online Turkish Journal of Health Sciences in 2023. I would like to express our appreciation to the authors and the editorial board for this insightful and informative article. In this letter, I aim to address specific points that I believe will enhance the discussion of the article.
Keywords: Atrial fibrillation, hyperthyroidism, hypothyroidism

ÖZ
Online Türk Sağlık Bilimleri Dergisi'nin 2023 yılı, 8. cilt ve 3. sayısında yayımlanan Varım ve Demirci tarafından kaleme alınmış olan "Atriyal Fibrilasyonlu Hastalarda Tiroid Fonksiyon Bozukluklarının Değerlendirilmesi" başlıklı araştırma makalesini büyük bir ilgiyle okudum. Bu değerli ve bilgilendirici makale için yazarlara ve editoryal kurula teşekkürlerimi sunmak isterim. Bu mektupta, makalenin tartışma bölümünü zenginleştireceğine inandığım belirli noktalara değinmeyi amaçlıyorum.
Anahtar Kelimeler: Atrial fibrilasyon, hipertiroidizm, hipotiroidizm

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Dear Editor,

I have read with great interest the research article by Varım and Demirci, titled "Evaluation of Thyroid Dysfunction in Patients with Atrial Fibrillation", published in Volume 8, Issue 3 of the Online Turkish Journal of Health Sciences in 2023.[1] I would like to express my gratitude to the authors and the editorial board for their informative and insightful article. In this letter, I will address specific points that I believe will further enhance the discussion of the article.

In this study, the authors assessed thyroid function tests in patients newly diagnosed with atrial fibrillation and obtained noteworthy results. They indicated a higher prevalence of thyroid dysfunction in these patients. The correlation between both overt and subclinical hyperthyroidism and atrial fibrillation (AF) is extensively supported in medical literature and constitutes a frequently addressed issue.[2] Moreover, as emphasized in the research conducted by Varım and Demirci, the association between hypothyroidism and AF is under scrutiny in recent studies, with diverse findings being reported.

In the review conducted by Baumgartner et al., which encompassed a cohort of 30,085 patients, no association was found between elevated TSH levels and atrial fibrillation.[3] However, Huang et al.'s meta-analysis of 13 studies involving 649,293 patients revealed that while subclinical hypothyroidism was linked to a heightened risk of atrial fibrillation (AF), overt hypothyroidism did not show an increased AF risk.[4]

In the study by Varım and Demirci, 587 patients with atrial fibrillation were examined, revealing incidences of hypothyroidism at 0.3% and subclinical hypothyroidism at 2%. These rates were compared with population data for individuals aged 12 and older, indicating a lower prevalence than that of the general population.[5] Since atrial fibrillation is known to be more common in older age groups, I think that it would be appropriate to mention that comparing the findings with age- and gender-matched control groups rather than population data could yield more meaningful results with a stronger level of evidence.

Moreover, it is worth noting that while the discussion section of the study highlights a lower prevalence of overall hypothyroidism compared to the general population, the conclusion section of the abstract asserts that "Atrial Fibrillation is associated with both hyperthyroidism and hypothyroidism." However, it should be acknowledged that the study does not offer substantial evidence to substantiate this claim.

In conclusion, I would like to express my sincere gratitude to the authors for their invaluable contribution to this study. It is of utmost importance to evaluate thyroid function tests in patients with atrial fibrillation. Since atrial fibrillation poses a significant burden on society in terms of morbidity, mortality, and healthcare expenditures, it is imperative to accurately identify risk factors and implement appropriate community screening measures.[6] Given the contemporary data suggesting hypothyroidism as a potential risk factor, further studies are needed to increase evidence-based medical knowledge regarding the relationship between subclinical and overt hypothyroidism and atrial fibrillation. For this purpose, studies could be conducted that compare thyroid function between AF and sinus rhythm groups. These studies should involve extensive patient participation, particularly in the geriatric population where AF is prevalent, and ensure matching for age, gender and other comorbidities.

Ethics Committee Approval: Ethics committee approval is not required for Letter Writing to the Editor.
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Author Contributions: Concept – IS; Supervision – IS; Materials – IS; Data Collection and/or Processing – IS; Analysis and/or Interpretation – IS; Writing – IS.
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