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Perceived Stress in Medical Education: Relationship with Empathy and Stigmatisation

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Abstract

Objective

Medical students have been shown to report high levels of perceived stress. Perceived stress leads to a loss of empathy and negatively affects attitudes and behaviours towards patients. This study aimed to investigate the perceived stress levels and empathy skills of medical students and their relationship with their attitudes to mental illness.

Material and Method

A cross-sectional study was conducted in Türkiye between March 2024 and April 2024 using an online survey. A total of 544 medical students attending university in the academic year 2023-2024 completed the questionnaire, which included the sociodemographic data form, the perceived medical school stress scale, the empathy scale, and the beliefs towards mental illness scale. Participants were asked whether they had received psychiatry training, whether they had been diagnosed with a mental illness, and whether they would disclose if they were diagnosed with a mental illness.

Results

By gender, the mean Perceived Medical School Stress Scale score of females was statistically significantly higher than that of males (p=0.035). Perceived Medical School Stress Scale scores did not differ by training year, whereas Beliefs Towards Mental Illness Scale Weak Social and Interpersonal Skills sub-dimension scores did (p=0.643; and p=0.027, respectively). The Empathy Scale score of students who received psychiatry training was statistically significantly higher than that of students who did not receive a placement (p=0.003). A low significant negative correlation was found between the Perceived Medical School Stress and Empathy Scale scores (rho=-0.098; p=0.005).

Conclusion

In our study, the perceived stress of medical students during their training differs according to gender, and its relationship with empathy skills is demonstrated. Individualised interventions to prevent and alleviate stress should be developed for students who need support coping with difficulties during their training.

Keywords: Empathy, medical students, stigma, stress

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Introduction

Medical education is a difficult process that continues for years. Stress arising from medical education is a topic that has been investigated all over the world (1-3). Stress awareness in medical education is also growing in Turkey (4, 5). Research has indicated that medical students exhibit elevated levels of anxiety, depression, stress and symptoms of burnout compared to other students, the general population, and their peers (1, 2, 6, 7). A recent prospective study indicated that the stress levels see a notable increase throughout their first year of medical education (8). The elevated degree of stress encountered by medical students is mostly attributed to distinct stressors inherent to medical school. These factors include a rigorous curriculum, excessive knowledge, academic rivalry, high-performance standards, grade-related stress, feelings of inadequacy, and dread of errors (1). In addition, witnessing diseases, disabilities, and deaths are also considered emotional stress factors (9). Perceived intense stress is associated with decreased school performance of students and negative mental health outcomes including burnout (10-12).

According to reports, individuals who possess strong empathy skills can readily experience the emotions of others, effectively utilize problem-solving abilities, enhance their awareness of social dynamics, approach situations without bias, demonstrate a willingness to assist others and maintain a balanced approach in interpersonal relationships (13). Various studies have shown that the adequacy of empathy skills of physicians has a positive effect on the health outcomes of patients (14-16).

Perceived medical school stress has been shown to cause a loss of empathy and negatively affect students' attitudes toward patients (10, 12). The quality of patient care is significantly impacted by high levels of stress (17). A review of studies suggests that empathy may also be a potential predictor of stigmatization (18). The presence of stigmatization of mental illness has also been documented in university populations, more specifically in studies related to health sciences (19-21). In a study examining medical students' attitudes toward disclosure of mental illness, the majority of participants reported that they would not disclose a diagnosis of mental illness (22). In the case of mental health problems, negative attitudes towards psychiatric disorders have been reported to delay necessary treatment (23). Various practices in medical education have been shown to reduce the stigma of mental illness through direct contact with patients (24, 25). Also by implementing technologies like simulated reality in education, it has been shown that stigmatization towards patients with psychotic experiences decreased and empathy increased in medical students who experienced positive psychotic symptoms (26).

It is especially important to know the level of stress perceived by medical students during their education, to be aware of their empathy skills, and to understand their beliefs about mental illnesses, as they will shape the future of society as healthcare professionals in the future. The objective of this study is to quantify the level of stress experienced by medical school students and investigate how it correlates with their empathy abilities and attitudes towards mental diseases. We hypothesized that perceived medical school stress would be related to empathy and that levels of empathy would affect attitudes toward mental illness. In terms of methods to be developed to manage stress during medical education, our study will contribute to the literature.

Material and Method

Study Design

A cross-sectional study was conducted between 05.03.2024 and 06.04.2024 during the 2023-2024 academic year was continuing. A total of 544 medical students studying at different universities in various locations in Turkey who agreed to participate in the study participated in the study. Participants were asked to complete four stages of the questionnaire delivered through the Google Forms online platform, which took approximately 10 minutes. The first stage included items about general demographic information, educational information, and information about the presence of chronic diseases in themselves or their families. Additional sections of the study encompassed the Perceived Medical School Stress Scale (PMSS-TR), the Empathy Scale (ES), and the Beliefs towards Mental Illness Scale (BMI), all of which underwent validity and reliability evaluations specific to the Turkish context. As it was mandatory to answer every question before proceeding to the next one, all 544 medical faculty students who participated in the study completed the questionnaire and were then analyzed. Once the questionnaire was finished, the link became invalid, allowing individuals to only complete the form once. The poll was conducted in a manner that ensured the participants' identities remained unknown and the information they provided was kept private. The poll invitation was distributed through WhatsApp student groups, social networks, and email. The investigation employed the snowball sampling technique. Participants were instructed to distribute

the questionnaire to a maximum number of individuals. Before commencing the survey, every participant was required to familiarize themselves with the objective of the study and thereafter provide informed consent. Participants were notified that their involvement in the study was entirely optional. Participants were not compensated for their involvement in the study.

Inclusion and Exclusion Criteria

Inclusion criteria were as follows: being a medical school student in Turkey in the 2023-2024 academic year, being over 18 years of age, agreeing to participate in the study, and signing the consent form. Those who were not medical school students, who did not give consent for participation in the study, and who did not fill out the questionnaire questions properly were excluded from the study.

Data Collection Tools

General and Sociodemographic Information

Participants were asked about their mental health diagnosis and whether they had a family history of chronic illness. Individuals with a mental health diagnosis were asked about their willingness to disclose this information. Participants were asked about years of training and whether they had received psychiatry training. Age was recorded based on self-report, while gender was recorded as either 'male' or 'female'.

Evaluation of Medical School Stress

The Perceived Medical School Stress Scale (PMSS-TR), which was specifically designed for use in medical faculties, was used to measure the stress of medical students due to studying in medical faculty (27). The scale focuses on a wide range of stressors including economic concerns, social isolation, workload, and competition. It consists of 13 items and higher scores indicate higher levels of stress and anxiety. The Turkish scale has been tested for validity and reliability and Cronbach's alpha is 0.81 (28).

Evaluation of Beliefs about Mental Illness

In our study, the Beliefs Towards Mental Illness Scale (BMI), a self-assessment scale developed to determine positive and negative beliefs towards individuals with mental illness in different cultures, was used. The scale consists of 21 items and is a six-point Likert-type scale. Each item is scored between 0-5. The scale consists of statements including negative beliefs about mental illness. The scale has three sub-dimensions: dangerousness (the belief that individuals with mental illness are dangerous), weak social and interpersonal skills (the belief that individuals with mental illness are weak in social and interpersonal relationships), and helplessness (the belief mental illness is incurable). The maximum score of 150 points can be obtained from the scale in total, while the minimum score is 0. High scores obtained from the sub-dimensions and in total indicate negative beliefs (29). The Turkish validity and reliability study was conducted. The Cronbach alpha coefficient of the scale is 0.82, and the subscale Cronbach alpha values are between 0.69-0.80. The scale and subscales showed an acceptable level of internal consistency (30).

Evaluation of Empathic Skills

The Empathy Scale (ES) was developed within the scope of the Empathisation Systemisation theory (31). The Turkish validity and reliability study was performed and internal consistency was found to be 0.84 (32). It consists of 40 items to measure empathy and 20 distractor items. The answers to the questions consist of 4 options with ‘strongly agree’ and ‘strongly disagree’ at both ends. Only the 40 questions evaluating empathy are taken into consideration in scoring. Among the answers given to these questions, 2 points are given to the most empathic response, 1 point to the second empathic response, and 0 points to the 2 least empathic responses. In total, the maximum score that can be obtained from the scale is 80. Some questions are reverse-scored. For some of the answers, ‘strongly agree’ and in others ‘strongly disagree’ express an empathic response. In our study, the short form of the scale consisting of 22 items selected by factor analysis method from 40 empathy questions was used (33).

Statistical Analysis

The data analysis was conducted using the SPSS 24.0 (Statistical Package for the Social Sciences, Version 24.0) software. The data were presented as number and percentage distributions for categorical variables, and as mean, standard deviation, median, lowest value, and maximum value for continuous variables. The normality of continuous variables was assessed using the Kolmogorov-Smirnov test. Given the absence of the normal distribution, statistical analyses were conducted using non-parametric tests, namely the Mann-Whitney U test and the Kruskal-Wallis test. The relationship between the scales and subscales was analyzed using the Spearman correlation test. The degree of correlation between variables was measured with the Spearman correlation coefficient (r).

Results

A total of 544 students, 330 female and 214 male, with a mean age of 21.94±4.22 years, participated in the

study. 24.6% (n=134) of the participants were in their first year of training. 74.1% (n=403) had completed their psychiatry internship. A total of 77.9% of the research group, consisting of 544 people, reported that they would disclose a mental health diagnosis if they had a mental disorder. While 21% of participants had been diagnosed with at least one mental illness, 13.8% (n=75) were currently receiving treatment. 41.5% of the participants had a family member who suffered from a chronic illness. Sociodemographics and some descriptive characteristics of the research group are shown in Table 1.

The mean score of the PMSS-TR was 34±7.42, and the median score was 36 (min=13-max=56); the mean score of the ES was 23.24±8.11, the median score was 23 (min=3-max=43), and the mean score of the BMI-Total was 47.57±14.10, the median score was 48 (min=0-max=91). The mean score of the Dangerousness BMI Subscale was 13.62±3.89, with a median score of 14 (min=0-max=25); the mean score of the Weak Social and Interpersonal Skills BMI Subscale was 19.65±7.53, with a median score of 20 (min=0-max=45); and the mean score of the Helplessness BMI Subscale was 14.30±5.01, with a median score of 14 (min=0-max=30) (Table 2).

The results showing the relationship between some socio-demographic and descriptive characteristics of the research group and the scores on the Beliefs Towards Mental Illness Scale and the Empathy Scale are presented in Table 3. The PMSS-TR and ES scores of females were statistically significantly higher than those of males (p=0.035, p=0.043, respectively), and the BMI total score of males was statistically significantly higher than that of females (p=0.021). The BMI Helplessness sub-dimension scores showed no significant difference (p=0.582) between genders. When analyzing the groups, it was found that the mean scores of the BMI Weak Social and Interpersonal Skills sub-dimension were statistically significantly higher for students in their final year of education compared to students in their first and second years of education (p=0.004; p=0.005). The mean ES scores of students who completed psychiatry training were statistically significantly higher than those who did not (p=0.003). The BMI Weak Social and Interpersonal Skills sub-dimension score of students who did not complete psychiatry training was statistically significantly higher than those who did (p=0.047). The ES score was significantly higher among those who said they would disclose if they had a mental illness (p=0.005). The mean BMI total score was statistically significantly lower among students with a diagnosis of

Table 1 Demographic and descriptive characteristics of the study group.

Variables (n)	**n (%)**	
Age	Mean±SE (year)	21,94±4,22
Sex (544)	Female Male	330 (60.7) 214 (39.3)
Year of training	Year 1 Year 2 Year 3 Year 4 Year 5 Year 6	134 (24.6) 51 (9.4) 85 (15.6) 75 (13.8) 129 (23.7) 70 (12.9)
Psychiatry training	Yes No	141 (25.9) 403 (74.1)
Disclose a mental health diagnosis	Yes No	424 (77.9) 120 (22.1)
Mental illness	Yes No	144 (26.5) 400 (73.5)
Receiving medical treatment (144)	Yes No	75 (13.8) 69 (12.7)
Family history of chronic illness	Yes No	226 (41.5) 318 (58.5)

Table 2 Descriptive characteristics of perceived medical school stress, empathy, and beliefs towards mental illness scale of the study group

		n	Median (min-max)	Mean±SD
PMSS-TR		544	36 (13-56)	34.67±7.42
ES		544	23 (3-43)	23.24±8.11
BMI	**Dangerousness**	544	14 (0-25)	13.62±3.89
	Weak Social and Interpersonal Skills	544	20 (0-45)	19.65±7.53
	Helplessness	544	14 (0-30)	14.30±5.01
	Total	544	48 (0-91)	47.57±14.10

BMI: Beliefs towards Mental Illness Scale; ES: Empathy Scale; PMSS-TR: Perceived Medical School Stress Scale

Table 3 Association between socio-demographic and descriptive characteristics of the study group and scores on the Perceived Medical School Stress, Empathy Scale, and Beliefs towards Mental Illness Scale.

Variables (n) Median (min-max)		PMSS-TR		ES		BMI Dangerousness		Weak Social and Interpersonal Skills		Helplessness		Total	
		Median (min-max)	p	Median (min-max)	p	Median (min-max)	p	Median (min-max)	p	Median (min-max)	p	Median (min-max)	p
Sex (544)	Female (330) Male (214)	35.15 (13-56) 33.84 (13-52)	**0.035**	24 (3-43) 22 (3-41)	**0.043**	13 (0-23) 14 (0-25)	**0.002**	19 (0-41) 21 (3-45)	**0.017**	14 (0-27) 14 (0-30)	0.582	47 (0-88) 50 (4-91)	**0.021**
Year of training	Year 1 (134) Year 2 (51) Year 3 (85) Year 4 (75) Year 5 (129) Year 6 (70)	37 (15-49) 35 (13-52) 36 (13-47) 35 (13-48) 36 (13-56) 37 (13-52)	0.643	21 (5-41) 23 (3-39) 22 (4-41) 23 (3-42) 24 (3-43) 24 (7-41)	0.056	14 (4-25) 14 (2-23) 14 (5-22) 14 (4-21) 14 (4-22) 13 (0-24)	0.163	22 (3-45) 23 (3-41) 20 (2-44) 19 (2-34) 19 (3-43) 17 (0-40)	**0.027**	13.50 (3-30) 15 (3-25) 14 (1-26) 14 (5-27) 15 (0-27) 14 (0-24)	0.890	49 (16-81) 52 (14-88) 47 (13-91) 48 (11-82) 48 (11-84) 46 (0-84)	0.310
Psychiatry training	Yes (141) No (403)	36 (13-56) 36 (13-52)	0.656	26 (7-43) 22 (3-42)	**0.003**	13 (0-24) 14 (0-25)	0.174	19 (3-43) 21 (0-45)	0.047	15 (0-27) 14 (0-30)	0.309	46 (4-84) 48 (0-91)	0.274
Disclose a mental health diagnosis	Yes (424) No (120)	36 (13-56) 36 (13-49)	0.847	23 (3-43) 21 (3-40)	**0.005**	14 (0-24) 14 (5-25)	0.107	20 (0-44) 21 (3-45)	0.146	14 (0-30) 15 (3-27)	0.100	47.50 (0-91) 48.50 (14-84)	0.078
Mental illness	Yes (144) No (400)	33 (13-52) 36 (23-56)	**0.004**	23.50 (3-39) 23 (3-43)	0.379	12 (4-21) 14 (0-25)	**<0,001**	15 (2-32) 21 (0-45)	**<0,001**	15 (0-25) 14 (0-30)	0.394	41 (11-73) 49 (0-91)	**<0,001**
Receiving psychotropic medication (144)	Yes (75) No (69)	32 (13-52) 36 (20-52)	**0.027**	24 (3-39) 22 (5-41)	0.154	12 (0-20) 13 (0-22)	**0.023**	14 (2-40) 20 (0-44)	**<0,001**	15 (0-25) 15 (0-30)	0.0454	41 (4-84) 48 (0-91)	0.005
Family history of chronic illness	Yes (226) No (318)	36 (13-56) 36 (13-52)	0.405	24 (3-43) 22 (3-41)	**0.044**	13 (2-25) 14 (0-24)	**0.042**	19 (2-45) 21 (0-44)	**0.021**	13.50 (1-30) 14 (0-26)	0.252	44 (16-84) 49 (0-91)	**0.024**

BMI: Beliefs towards Mental Illness Scale; ES: Empathy Scale; PMSS-TR: Perceived Medical School Stress Scale

mental illness than among those without a diagnosis (p=<0.001). The mean BMI total score of students without a family history of a disease requiring ongoing treatment was statistically significantly higher than the mean BMI total score of students with a family history of a disease (p=0.024). The ES score of those with at least one family history of chronic disease was statistically significantly higher than that of those without (p=0.044).

Table 4 Correlation between Perceived Medical School Stress, Empathy Scale and Beliefs towards Mental Illness Scale

		PMSS-TR	ES	BMI			
				Total	Dangerousness	Weak Social and Interpersonal Skills	Helplessness
PMSS-TR		-	-0.098*	-0.042	-0.054	-0.037	-0.020
ES		-0.098*	-	-0.069	-0.004	-0.120**	-0.010
BMI	**Total**	-0.042	-0.069	-	0.825**	0.918**	0.793**
	Dangerousness	-0.054	-0.004	0.825**	-	0.682**	0.520**
	Weak Social and Interpersonal Skills	-0.037	-0.120**	0.918**	0.682**	-	0.549**
	Helplessness	-0.120**	-0.010	0.793**	0.520**	0.549**	-

BMI: Beliefs towards Mental Illness Scale; ES: Empathy Scale; PMSS-TR: Perceived Medical School Stress Scale
**Indicates statistically significant difference (p<0.01).
*Indicates statistically significant difference (p<0.05).

There was a low level of significant negative correlation between the PMSS-TR score and the ES score (r=-0.098; p=0.022). There was a low level of significant negative correlation between the ES score and the BMI Weak Social and Interpersonal Skills subscale (r=-0.120; p=0.005). The relationship between the PMSS, the ES, and the BMI scores is shown in Table 4.

Discussion

In this study, we aimed to quantify the stress level perceived by medical students. We examined the relationship between stress levels, empathy, and attitudes towards mental illness. Our results show that stress differs according to gender and that there is a relationship between stress and empathy. Training in psychiatry was found to increase empathy. Perceived stress in medical school is an important measure of vulnerability but can be reduced by early intervention.

Perceived stress in medical school has also been found to be an indicator of psychological stress after graduation (6). An investigation utilizing the PMSS-German version reported that the stress score of medical students in Germany was 37.2±8.3 and that perceived medical school stress was high (34). Our study's students had an average PMSS-TR score of 34.67±7.42. The mean score for the PMSS was 36.4±8.4 in a Polish study (35). The stress score of students in Norway was 30.7±7.6 (6). These results suggest that various factors, such as differences in working conditions, the structure of the educational program, the intensity of the curriculum, the assessment and evaluation system, social facilities, and the working conditions of doctors, may contribute to the stress levels perceived by students. The financial status and economic well-being of students may also have influenced the results. Larger, multi-center, prospective studies are needed to clarify the factors that lead students to perceive high levels of stress.

The study, which was conducted to determine the level of psychological distress in medical students and to investigate the factors predicting psychological distress, showed that students in the fourth year showed a considerable decrease in psychological suffering. It has been shown that females have higher stress levels than male students throughout the education period (36). A study including 421 medical school students revealed that females exhibited a higher stress level (37). In a study conducted in Germany, it was shown that there was no difference in stress levels between male and female students (34). In our study, it was found that females perceived stress at a higher level than male students. The stress level did not differ according to the training year. It was found that the stress level of those who had a mental illness was low. It is possible that receiving pharmacotherapy or psychotherapy related to the diagnosis is the reason for the difference in stress levels in these students.

Although the majority of medical students accepted that they needed health care, many reported that they sought services outside their educational institution, consulted their peers, or gave up seeking care altogether because of fears of confidentiality and stigma (2). Research indicates that medical students possess an understanding of the stress they encounter, although they display hesitancy in acknowledging their mental health issues and actively pursuing assistance from trained professionals (38, 39). They have been shown to face unique barriers to care and problems related to stigma (40). In our study, 20% of students reported that they would not disclose if they had a mental illness. Hence, it is imperative to ascertain the stress encountered by medical students and the determinants that impact it, to formulate preventive measures.

There is evidence that there is a positive correlation between medical students' empathy scores and communication scores in clinical skills (41). The results of our study align with a comprehensive review that found higher levels of empathy among female medical students compared to males. Whether empathy is an inherent and unchanging characteristic of one's personality or a dynamic and adaptable skill with cognitive and emotional components is a subject of ongoing debate (42). In our study, it was found that those who received training in psychiatry had better empathic skills. Those who had a family history of mental illness had higher empathy scores. It was found that empathy did not differ according to the training year. Longitudinal studies with large samples are needed to follow the development of empathy during medical training.

Evidence suggests that education can effectively diminish negative attitudes, perceptions, and beliefs about mental illness. Attending courses on mental illness has been shown to have a positive effect on beliefs (43,44). Various curricula used in psychiatric training have been shown to reduce stigma towards patients with mental illness through education and direct contact with patients (45,46). Attitudes towards people with mental illness have been shown to change positively in those who have attended courses on how to deal with people with mental illness (47). A study of 458 medical students reported that final-year students had more positive attitudes towards mental illness (48). Another study, which aimed to evaluate the effect of psychiatry training on medical students' attitudes toward psychiatric patients, showed that students' positive beliefs about mental illness increased with years of training (49). Similarly, a study of medical students in Turkey found that final training-year students had more positive attitudes towards people with mental illness than first-year students (50). It has been observed that education about mental illness and knowledge that treatment is available reduces the belief that these individuals are dangerous and should be avoided and the belief of helplessness associated with being diagnosed with the illness (51,52). A study has shown that among university students, medical students who have received psychiatric training have more positive attitudes towards mental illness (53). In a study assessing stigma towards patients with mental illness among medical students, the presence of a relative with mental illness was found to have a significant effect on stigma levels (54). In our study, it was observed that those who received psychiatry training had more positive attitudes towards mental illness, but no statistically significant difference was found. As medical students will be directly or indirectly involved in caring for people with mental illness after graduation, it is important to know their attitudes and awareness of mental disorders.

Although psychological distress in medical students reflects the difficulties of training, it is also thought to be related to stigma. Empathy leads to positive attitudes towards people with mental illness and then influences individual behavioural motivations to support these individuals (55). In a study of nurses working in a psychiatric ward, empathy was shown to reduce limitations in relationships with people with mental disorders (56). A study of 558 dental students found that empathic skills were better in fourth and fifth-year students at the start of clinical placements (57). Studies have found that levels of empathy and social distance influence beliefs about mental illness and that lack of empathic skills explains negative beliefs about mental illness (58,59). In a study of 536 university students, attitudes towards mental illness were found to be influenced by demographic factors, faculty, and year of study, and having a relative with mental illness was associated with positive attitudes (60). Our study found that those who disclosed a mental illness had higher levels of empathy. Students with a diagnosis of mental illness were shown to have more positive attitudes towards mental illness. Those with a family history of chronic illness were not found to have more positive attitudes towards mental illness. This implies that personal experiences may enhance empathy, but this does not necessarily result in more favourable attitudes toward mental illness. In our study, it was also found that the level of empathy did not differ according to the year of education. In addition to the individual's educational attainment, the community's view of mental illness in the environment in which each student grows up, the presence of mental illness

in themselves, and access to mental health services may influence attitudes towards mental illness and empathy.

The study was restricted to medical students enrolled at Turkish universities during the academic year 2023-2024. The data cannot be generalized due to its cross-sectional nature. Longitudinal studies evaluating the change in perceived stress levels over time in medical school are needed.

Conclusion

This study shows that among medical students, women have higher stress levels and better empathy skills. Empathy skills were found to decrease as perceived stress in medical school increased. As empathy skills decreased, attitudes towards mental illness were found to be negative. As expected, students who had been treated for mental disorders and had a family history of chronic illness tended to have more understanding and positive attitudes toward mental illness. Students who received psychiatry training during their education were found to have better empathy skills.

This study contributed to the assessment of the level of stress experienced by medical students during their education and to the understanding of the relationship between educational stress and empathic skills and attitudes toward mental illness. Various interventions such as student counselling, promotion of positive thinking, and awareness training are recommended to manage stress during medical training. Periodic evaluation of patient-physician communication aptitude may assist in mitigating the adverse effects of stress on empathy. There is limited literature comparing medical students in different years of training. Prospective studies comparing consecutive years of training will help to understand the effect of training on empathy and attitudes toward mental illness.

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Conflict of Interest Statement
The authors have no conflicts of interest to declare.

Ethical Approval
The study was conducted according to the Declaration of Helsinki and approved by the Süleyman Demirel University Clinical Research Ethics Committee (decision dated 29.12.2023 and numbered 17/371).

Consent to Participate and Publish
Participants were informed of the purpose of the study and then gave informed consent for participation and publication.

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Availability of Data and Materials
Data available on request from the authors.

Authors Contributions
GBY: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Supervision; Validation; Visualization; Writing-original draft.

BN: Conceptualization; Formal analysis; Investigation; Methodology; Validation; Writing-review & editing.

Gİ: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Validation; Visualization; Writing-original draft.

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