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Prevalence of Premenstrual Syndrome and its Relationship with Mental Health and Lifestyle Variables Among Nursing Students: A Descriptive and Correlational Study

Hemşirelik Öğrencilerinde Premenstrüel Sendrom Prevalansı ve Mental Sağlık ve Yaşam Tarzı Değişkenleriyle İlişkisi: Tanımlayıcı ve İlişki Arayıcı Bir Çalışma

Ayşe AKALIN[a], Ayşenur KARPUZLUK[b]

[a]Düzce University, Faculty of Health Sciences, Department of Nursing, Department of Gynecology and Obstetrics, Düzce, Türkiye
[b]Biga State Hospital, Clinic of Intensive Care, Çanakkale, Türkiye

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ABSTRACT Objective: This study aimed to investigate the prevalence of premenstrual syndrome and its relationship with mental health, including depression, anxiety, and stress, as well as with demographic and lifestyle variables. **Material and Methods:** The descriptive correlational study was carried among 411 female nursing students between October and December 2021. Data were collected using a Questionnaire Form, the Premenstrual Syndrome Scale, and the Depression Anxiety Stress Scales. Statistical analysis included descriptive statistics, independent samples t-tests, one-way analysis of variance, Tukey's "post hoc" test, and Pearson correlation analysis. **Results:** The prevalence of premenstrual syndrome was 64.0%. The most common premenstrual syndrome symptoms reported were depressive mood (76.9%), appetite changes (70.1%), fatigue (68.1%), swelling (63.5%), and irritability (63.3%). Participants experienced moderate anxiety, low depression, and low stress. Premenstrual syndrome were higher in students who smoked, drank alcohol, consumed coffee, and reported psychological problems ($p<0.05$). The depression, anxiety, and stress scores of participants with premenstrual syndrome were significantly higher than those without premenstrual syndrome ($p<0.001$). Furthermore, premenstrual syndrome showed a strong positive correlation with mental health, including depression, anxiety, and stress ($r=0.659$; $p<0.001$). **Conclusion:** Premenstrual syndrome is a relatively common among nursing students that is highly related to mental health, various lifestyle, and psychological factors. Holistic and tailored approaches that consider the interaction between lifestyle variables, mental well-being, and menstrual health are needed.

Keywords: Depression; premenstrual syndrome; anxiety; sociodemographic factors; life style

ÖZET Amaç: Bu çalışmanın amacı premenstrüel sendrom prevalansı ve depresyon, anksiyete ve stresi kapsayan mental sağlık, demografik ve yaşam tarzı değişkenleri arasındaki ilişkinin araştırılmasıdır. **Gereç ve Yöntemler:** Bu tanımlayıcı ve ilişkisel çalışma 411 kadın hemşirelik öğrencisi ile Ekim-Aralık 2021 tarihleri arasında yürütülmüştür. Verilerin toplanmasında Anket Formu, Premenstrüel Sendrom Ölçeği ve Depresyon Anksiyete Stres Ölçeği kullanılmıştır. Veri değerlendirmesinde tanımlayıcı analizler, bağımsız örneklem t-testi, tek yönlü varyans analizi, Tukey "post hoc" testi ve Pearson korelasyon analizleri kullanılmıştır. **Bulgular:** Premenstrüel sendrom prevalansı %64,0'dır. En yaygın premenstrüel sendrom semptomları; depresif ruh hali (%76,9), iştah değişiklikleri (%70,1), yorgunluk (%68,1), şişkinlik (%63,5) ve irritabilite (%63,3) olarak bildirilmiştir. Katılımcılar orta düzeyde anksiyete, düşük depresyon ve stres deneyimlemektedir. Premenstruel sendrom puanları sigara ve alkol kullanan, kahve tüketen ve psikolojik sorunlar deneyimlediğini belirten öğrencilerde daha yüksek bulunmuştur ($p<0,05$). Premenstruel sendromu olan katılımcıların depresyon, anksiyete ve stres puanları, olmayanlara göre anlamlı şekilde daha yüksektir ($p<0,001$). Ayrıca premenstrüel sendrom depresyon, anksiyete ve stresi kapsayan mental sağlık durumu ile güçlü pozitif bir korelasyon göstermektedir ($r=0,659$; $p<0,001$). **Sonuç:** Premenstrüel sendrom, hemşirelik öğrencileri arasında nisbeten yaygın olup mental sağlık, çeşitli yaşam tarzı ve psikolojik faktörlerle yakından ilişkilidir. Yaşam tarzı, ruhsal iyilik ve menstrüel sağlık arasındaki etkileşimi göz önünde bulunduran bütüncül ve kişiye özel yaklaşımlara ihtiyaç vardır.

Anahtar Kelimeler: Depresyon; premenstrüel sendrom; anksiyete; sosyodemografik faktörler; yaşam tarzı

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Correspondence: Ayşe AKALIN
Düzce University, Faculty of Health Sciences, Department of Nursing, Department of Gynecology and Obstetrics, Düzce, Türkiye
E-mail: ayseakalin@duzce.edu.tr

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Menstruation is a physiological event that covers a woman's life reproductive period, continuing from puberty to menopause. Premenstrual syndrome (PMS) is characterized by symptoms that appear at least 5 days before the onset of menstruation and cease within 4 days after menstruation begins, persisting for a minimum of 3 consecutive menstrual cycles.[1] A meta-analysis investigating the global prevalence of PMS across 17 studies revealed an average prevalence of 47.8%.[2] Remarkably, the highest occurrence was reported in Iran at 98%, while the lowest was documented in France at 12%. Similarly, a recent meta-analysis focusing on reproductive-age women in Türkiye, incorporating 18 studies, indicated an overall prevalence of PMS at 52.2%.[3]

Many women may encounter physical, psychological, and behavioral symptoms stemming from hormonal variations during their menstrual cycle.[2,3] Common physical symptoms associated with PMS encompass breast tenderness, abdominal bloating, pain, nausea, edema, fatigue, and alterations in sleep patterns. Furthermore, psychological and behavioral manifestations typically include irritability, social withdrawal, anxiety, and depressive mood swings.[1,4] These symptoms have adverse effects on the reproductive health, interpersonal relationships, quality of life, academic performance, and economic stability, particularly for young women, potentially leading to anxiety, suicidal ideation, aggressive behavior, and financial setbacks.[5-7]

Managing PMS is shifting towards personalized, comprehensive, and gradual approaches.[1] Initial steps should focus on empowering individuals through self-screening and education on self-care practices such as lifestyle adjustments, dietary changes, and coping techniques.[1,8] Non-pharmacological interventions, including complementary medicine and cognitive behavioral therapy, should be considered next. Pharmacological options, including hormonal and non- hormonal treatments, are advised if symptoms persist, as recommended by various medical guidelines.[8-11]

University students, including those in nursing programs, constitute a crucial population among young women regarding PMS, as they are particularly vulnerable due to the stressors associated with academic and various environmental changes, as well as dietary alterations and irregularities that often accompany university life.[5,11,12] Nursing students health and well-being are essential not only for their own personal lives but also for the quality of care they will provide as future healthcare professionals.[12] They also possess significant potential for managing and alleviating PMS symptoms, ultimately improving the quality of life and overall well-being at both individual and community levels.[9,12] Morever, the academic, social, and personal stressors, along with mental health issues such as anxiety and depression, may also exacerbate PMS.[1,9,10] Understanding the relationship between PMS, mental health, and lifestyle factors in this population is therefore important, as it has the potential to influence both their own health and the well-being of the communities they will care for in healthcare.

While studies have explored PMS in various populations including reproductive-age women and healthcare professionals, there is a scarcity of research focusing on this critical cohort of future healthcare providers.[2,3,5,8,11] Given their unique stressors and lifestyle demands, investigating the relationship between PMS with mental health and lifestyle variables in nursing students is crucial for developing targeted interventions and support mechanisms. Moreover, since the majority of nursing students are female, understanding PMS in this population is particularly important, as it may impact their well-being, academic performance, and future professional practice in healthcare settings. The aim of this study was to investigate the prevalence of PMS and evaluate the relationship between PMS and mental well-being, including depression, anxiety, and stress among nursing students. Additionally, it seeks to assess the impact of demographic factors and lifestyle variables on PMS symptoms related to the menstrual cycle. Addressing this gap will provide insights that could inform effective strategies to manage PMS symptoms and enhance the overall well-being of nursing students. It is also expected that the study will provide a new contribution to the findings of studies on this subject in the literature.

The research questions included the following:

- What is the prevalence of PMS among nursing students?

- Are there differences between PMS and the demographic and lifestyle variables of nursing students?
- Are there differences in depression, anxiety, and stress levels between nursing students with and without PMS?
- Is there a relationship between PMS and the mental health of nursing students, including depression, anxiety, and stress?

MATERIAL AND METHODS

STUDY DESIGN

The reserach utilized a descriptive and correlational design.

POPULATION AND SAMPLING

The study population consisted of 619 female students enrolled in the nursing department of a state university during the fall semester of the 2021-2022 academic year. The university, located between the major cities of İstanbul and Ankara in northwestern Türkiye, attracts a diverse student body representing various socioeconomic backgrounds and demographics. The inclusion criteria for the study were: (1) having experienced menstruation in the past 12 months, (2) being 18 years of age or older, and (3) providing voluntary consent to participate in the research. Exclusion criteria included individuals with any gynecological (e.g., endometriosis, polycystic ovary syndrome) or chronic illnesses (e.g., diabetes, hypertension), as well as those with any previously diagnosed psychiatric disorders. The study sample included the entire population that met the inclusion criteria.

DATA COLLECTION TOOLS

Data collection involved administering 3 instruments: the Individual Information Form, the PMS Scale (PMSS), and the Depression Anxiety Stress Scale (DASS).

Questionnaire Form

The form was prepared by the researchers, drawing upon existing literature, and comprises a total of 25 questions.[5,6,8,11,12] The form covers students' sociodemographic characteristics (e.g., age, study year, place of residence, income), characteristics related to their menstrual cycle (e.g., age at first menstruation, menstruation length (days), menstrual cycle regularity), lifestyle factors (e.g., exercise habits, coffee consumption, smoking status), and factors related to PMS risk (e.g., height, weight, presence of health issues, medication use, complaints). Regular exercise is defined as engaging in 150 minutes of physical activity per week.[13] Body mass index (BMI) was computed using the formula: BMI=weight (in kg)/height squared (in meters) [BMI=weight (kg)/height^2 (m^2)].[14]

PMSS

The PMSS, a Turkish questionnaire developed by Gençdoğan, assesses the severity of premenstrual symptoms.[15] The scale comprises 44 items across 9 subscales: depressive mood, anxiety, fatigue, irritability, depressive thoughts, pain, appetite changes, sleep changes, and swelling, rated on a 5-point Likert scale. The total score ranges from 44 to 220, with a cutoff point of 110. A score of 111 or higher indicates the presence of PMS, with higher scores indicating more severe symptoms. Gençdoğan reported a Cronbach's Alpha of 0.75 for the scale, whereas in our study, the Cronbach's Alpha was 0.95.[15]

DASS

The scale, originally developed by Lovibond and Lovibond and adapted for Turkish by Akın and Çetin.[16,17] It uses a 4-point Likert-type scale with 42 items, 14 each for depression, anxiety, and stress. Scores range from 0 to 42 for each category. Depression scores: 0-9 (normal), 10-13 (mild), 14-20 (moderate), 21-27 (severe), 28 or above (very severe). Anxiety scores: 0-7 (normal), 8-9 (mild), 10-14 (moderate), 15-19 (severe), 20 or higher (very severe). Stress scores: 0-14 (normal), 15-18 (mild), 19-25 (moderate), 26-33 (severe), 34 or above (very severe). Akın and Çetin reported a Cronbach's Alpha of 0.89 for the scale.[17] In our study, the Cronbach's Alpha was calculated to be 0.96.

DATA COLLECTIONS

Data were collected by the researchers using 2 methods: face-to-face interviews with 346 participants and

an online survey via "Google Forms (Google Inc., Mountain View, CA, USA)" a secure data collection tool, with 65 participants. The online survey, which prevented multiple submissions from the same user, was chosen because 4th-year students could not be accessed in a classroom setting during their clinical practices. The survey was exclusively distributed to 4th-year nursing students through a mobile messaging application (WhatsApp Inc., Menlo Park, CA, USA). Participants were required to confirm on the first page of the survey, after clicking on the link, that they were female students who experienced menstruation. To evaluate the clarity and comprehensibility of the data collection instruments, a pilot study was conducted with 10 female student participants who met the inclusion criteria. No changes were made to the data collection forms after the pilot study, and the data from these 10 participants were included in the final analysis. Completing the data collection tools took approximately 10-15 minutes.

ETHICAL CONSIDERATIONS

The study was approved by the Non-Interventional Clinical Research Ethics Committee at a state university (date: May 03, 2021, no: 2021/124). Additionally, written permissions were obtained from the institution where the research was conducted. Students were briefed on the study's objectives and their rights, and the voluntary nature of their participation. Those participating via the online data collection form were required to electronically acknowledge their informed consent. For face-to-face data collection, participants provided both verbal and written consent. Electronic written consent for using the scales in this study was obtained from the corresponding authors. The research adhered to the principles outlined in the Helsinki Declaration.

DATA ANALYSES

Data analysis was conducted using SPSS for Windows (Version 26; IBM Corp, Armonk, New York, USA). Descriptive statistics including frequency, percentage distribution, mean, and standard deviations were computed. Before analysis, normality tests were conducted on the study variables (PMS symptoms, depression, anxiety, and stress). Normal distribution of the variables was assessed through visual examination of normal Q-Q plots, histograms, box plots, Kurtosis and Skewness values, and the Shapiro-Wilk test.[18]

The independent samples t-test was used to assess differences between 2 independent groups, while one-way analysis of variance was employed for comparisons among more than 2 independent groups. In cases where differences were found among groups, the source of the difference was determined using the Tukey "post hoc" test. Pearson correlations were conducted to evaluate possible correlations between PMS symptoms and depression, anxiety, and stress-related variables.

When interpreting Pearson's correlation coefficient (r), values below 0.20 suggest negligible or very weak relationships, 0.20-0.39 indicate weak relationships, 0.40-0.59 signify moderate relationships, 0.60-0.79 denote strong relationships, and 0.80-1.0 indicate very strong relationships.[18] Statistical significance was set at $p<0.05$ (two-tailed).

RESULTS

From a convenience sample of 619 female nursing students, 420 participated in the study. Five participants were excluded due to incomplete data, and an additional 4 did not meet the study criteria, resulting in a final sample of 411 students and a participation rate of 66.4%.

The mean age of the participants was 20.31±1.31 years (minimum: 18; maximum: 25), with a mean age at menarche of 13.20±1.21 years (minimum: 10; maximum: 18). The BKI was 21.54±3.89 (minimum: 14.7; maximum: 65.0). The majority (80.8%) reported a menstrual length of 5-7 days, and their cycle length ranged between 22-34 days. Additionally, over half (60.8%) reported sometimes experiencing irregular menstrual cycles (Table 1).

In terms of demographic characteristics, more than half of the students (56.4%) were aged between 18-20 years, while 29.7% were 2nd-year students. A majority (51.1%) resided in urban areas, with 83.0% living in dormitories, and 73.5% had a normal BMI. Furthermore, 67.2% of participants' mothers were elementary school graduates. Regarding lifestyle factors, a significant rate of participants did not smoke cigarettes (86.1%) or consume alcohol (88.8%), and

TABLE 1: Participants' menstrual characteristics (n=411)

Menstrual characteristics	n	%
Age at menarche mean(SD)	13.20 (1.21) (minimum: 10; maximum: 18)	
Age at menarche (years)		
10-12	113	27.5
13-15	287	69.8
16-18	11	2.7
Menstruation length (days)		
3-4	43	10.5
5-7	332	80.8
8-11	36	8.8
Menstraul cycle regularity		
Regular	121	29.4
Sometimes regular	250	60.8
Irregular	40	9.7
Frequency of menstruation (days)		
21 and below	41	10.0
22-34	324	78.8
35 and higher	46	11.2

SD: Standard deviation

85.8% did not report experiencing psychological problems. However, a majority (78.8%) consumed more than 2 cups of coffee per day, while 59.4% did not engage in regular physical exercise (Table 2).

The participants' mean PMSS score was 19.00±5.62. A statistically significant difference was observed between mean PMSS scores and several variables, including smoking, alcohol consumption, coffee consumption, and the experience of psychological problems ($p<0.05$). Specifically, participants who smoked, drank alcohol, consumed more than 2 cups of coffee per day, and those with psychological problems had statistically significantly higher mean PMSS scores ($p<0.05$). Furthermore, no statistically significant difference was found between the mean PMSS scores and variables age, place of residence, living place, BMI, and physical exercise ($p>0.05$) (Table 2).

The prevalence of PMS was found to be 64.0% (PMSS score≥111). According to the PMSS subscales, 76.9% of students (n=316) reported experiencing depressive mood, 70.1% (n=288) appetite changes, 68.1% (n=280) fatigue, 63.5% (n=261) swelling, 63.3% (n=260) irritability, 62.3% (n=256) pain, 52.1% (n=214) sleep changes, 50.1% (n=206) depressive thoughts, and 33.3% (n=137) anxiety. Furthermore, the mean DASS score of participants with PMS (47.11±23.48) was significantly higher than those without PMS (20.41±14.86) ($p<0.001$). Specifically, participants experiencing depressive mood ($p<0.001$), fatigue ($p<0.001$), irritability ($p<0.001$), depressive thoughts ($p<0.001$), sleep changes ($p=0.015$), and swelling ($p=0.002$) during menstruation had higher DASS means compared to those who did not (Table 3).

There is a strong, positive, and statistically significant relationship between PMSS and DASS scores ($r=0.659$; $p<0.001$). Furthermore, significant correlations were observed between PMSS and

TABLE 2: The PMSS scores according to demographic and lifestyle variables (n=411)

Characteristics	n (%)	PMSS mean (SD)	Analyze
Age (years) mean (SD)	20.31 (1.31) (minimum:18; maximum:25)		
Age (years)			
18-20	232 (56.4)	124.58 (34.57)	F=0.031
21-23	174 (42.3)	125.45 (35.77)	p=0.969
≥24	5 (1.2)	124.80 (16.05)	
Place of residence			
Rural	201 (48.9)	122.07 (31.99)	t=0.101
Urban	210 (51.1)	127.71 (37.08)	p=0.050
Living place			
Alone	12 (2.9)	136.58 (29.90)	F=1.624
With friends/dormitory	341 (83.0)	125.58 (34.17)	p=0.198
With family	58 (14.1)	118.86 (38.54)	
BKI			
<18.5	65 (15.8)	127,41 (35.01)	F=0.230
18.5-24.9	302 (73.5)	124,59 (34.90)	p=0.795
25≥	42 (10.2)	123,23 (33.29)	
Smoking			
Smoker	57 (13.9)	133.61 (32.50)	t=-2.033
Non-smoker	354 (86.1)	123.56 (34.95)	p=0.043*
Drinking alcohol			
Yes	46 (11.2)	138.80 (30.02)	t=-2.892
No	365 (88.8)	123.21 (34.96)	p=0.004*
Drinking coffee (daily)			
≥2 cups/day	324 (78.8)	127.13 (34.42)	t=2.469
<2 cups/day	87 (21.2)	116.83 (35.01)	p=0.014*
Physical exercise			
Yes	167 (40.6)	121.14 (34.13)	t=-1.846
No	244 (59.4)	127.56 (35.01)	p=0.066
Psychological problems			
Yes	58 (14.2)	140.81 (35.13)	t=3.809
No	353 (85.8)	122.35 (34.04)	p<0.001**

*p value<0.05; **p value<0.001; PMSS: Premenstrual Sendrom Scale; SD: Standard deviation; BKI: Body mass index

TABLE 3: The DASS scores according to premenstrual syndrome symptoms (n=411)

PMSS and subscales	n	%	DASS Mean	DASS SD	Analyses
PMS					
Yes	263	64.0	47.11	23.48	t=-12.487
No	148	36.0	20.41	14.86	<0.001**
Depressive mood					
Yes	316	76.9	43.19	24.03	t=-9.531
No	95	23.1	18.53	13.86	<0.001**
Anxiety					
Yes	137	33.3	52.36	23.33	t=-9.661
No	274	66.7	30.06	21.39	0.09*
Fatigue					
Yes	280	68.1	44.52	24.33	t=-9.392
No	131	31.9	22.48	16.60	<0.001**
Irritability					
Yes	260	63.3	44.76	24.56	t=-8.634
No	151	36.7	24.93	18.34	<0.001**
Depressive thouhgts					
Yes	206	50.1	49.96	24.58	t=-12.063
No	205	49.9	24.97	16.62	<0.001**
Pain					
Yes	256	62.3	44.05	24.02	t=-7.440
No	155	37.7	26.67	21.03	0.057
Appetite changes					
Yes	288	70.1	40.12	24.46	t=-3.383
No	123	29.9	31.34	23.25	0.732
Sleep changes					
Yes	214	52.1	46.07	24.27	t=-7.962
No	197	47.9	28.18	20.95	0.015*
Swelling					
Yes	261	63.5	42.83	25.17	t=-6.102
No	150	36.5	28.20	19.95	0.002*

*p<0.05; **p<0.001; DASS: Depression, Anxiety, Stress Scale; PMSS: Premenstrual Sendrom Scale; PMS: Premenstrual sendrom; SD: Standard deviation

DASS sub-scales, with strong, positive relationships found for anxiety (r=0.630; p<0.001) and stress (r=0.637; p<0.001). Additionally, a moderate-level, positive, and statistically significant relationship was identified between PMSS and the DASS sub-scale of depression (r=0.551; p<0.001) (Table 4).

DISCUSSION

The aim of this study was to assess the prevalence of PMS and investigate its relationship with depression, anxiety, stress, as well as demographic characteristics and lifestyle variables. Our findings indicated a

TABLE 4: Correlation between PMSS and DASS scores

Total and subscale scores of DASS	Analyses	Total and subscale scores of PMSS: Depressive mood	Anxiety	Fatigue	Irritability	Depressive thought	Pain	Appetite changes	Sleep changes	Swelling	PMSS
Depression	r value	0.485**	0.410**	0.537**	0.404**	0.591**	0.308**	0.125*	0.367**	0.240**	0.551**
	p value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.011	<0.001	<0.001	<0.001
Stress	r value	0.490**	411	0.553**	0.594**	0.592**	0.388**	0.252**	0.396**	0.407**	0.637**
	p value	<0.001	0.478**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Anxiety	r value	0.443**	0.591**	0.575**	0.423**	0.598**	0.437**	0.232**	0.483**	0.370**	0.630**
	p value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
DASS	r value	0.518**	0.530**	0.604**	0.518**	0.648**	0.407**	0.218**	0.448**	0.366**	0.659**
	p value	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

*p<0.05; **p<0.001 (Pearson's correlation); PMSS: Premenstrual Sendrom Scale; DASS: Depression, Anxiety, Stress Scale

PMS prevalence of 64.0%, with common symptoms including depressive mood, appetite changes, fatigue, irritability, and swelling. PMS were higher in students who had an unhealthy lifestyle and reported psychological problems. Furthermore, significant relationship were observed between PMS and mental health issues, including depression, stress, and anxiety.

Our study revealed that the prevalence of PMS among nursing students is 64.0%, indicating that more than half of them experience PMS. According to a meta-analysis study, the global prevalence of PMS varies: 47.8% overall, 12% in France, 21% in China, 49.7% in Türkiye, 73% in Spain, and 98.2% in Iran.[2] The prevalence of PMS varied across countries, potentially influenced by variations in participant sociodemographic characteristics and the utilization of different measurement instruments by researchers. In a recent meta-analysis by Erbil and Yücesoy, the overall prevalence of PMS was reported as 52.2%, with a specific prevalence of 50.3% observed among university students in Türkiye.[3] Consistent with our results, previous studies demonstrated that PMS is prevalent among female of reproductive age, affecting a majority of individuals within this group and potentially impacting their daily functioning, emotional well-being, and overall quality of life.

We found that the most common PMS symptoms include depressive mood, changes in appetite, fatigue, irritability, and swelling. Similarly, the most common PMS symptom is reported both physical symptoms and psychological symptoms. These findings suggest that despite sociocultural differences; menstruation-related symptoms are similar and are mostly of biopsychosocial origin. These symptoms are considered health problems that require early intervention because they can significantly affect participants' performance, social relationships, normal daily life, and quality of life.[11,19-21] Addressing these diverse symptoms may require a multifaceted strategy, including psychological support, dietary and lifestyle adjustments, and medical interventions to alleviate the overall burden of PMS and improve quality of life for those affected. Additionally, knowing the most common PMS symptoms and their prevalence is important for guiding coping strategies and directing future research efforts.

Our findings indicate that PMS symptoms were higher in students who reported smoking and drinking alcohol, and consuming high amounts of coffee daily. A recent meta-analysis found that across studies, smoking is associated with an increased risk of PMS.[22] Additionally, a systematic review and meta-analysis indicated that alcohol intake was associated with a moderate increase in the risk of PMS, with heavy drinking yielding an even larger increase in risk compared to moderate or low drinking.[23] The effects of nicotine and alcohol on hormonal regulation, neurotransmitter activity, and inflammation, all of which contribute to the pathophysiology of PMS.[22,23] ACOG recommends that women with PMS avoid caffein.[1] Furthermore, while more than 3-quarters of the nursing students did not have psychological problems, those with psychological issues exhibited higher PMS symptoms, underscores the interplay between mental health and PMS. Aşcı et al. found that feeling stressed likelihood of experiencing PMS by 3.6 times.[24] Moreover, Cheng et al. reported a higher frequency of PMS in individuals with psychiatric disorders.[25] These results underscore the interplay between lifestyle variables and mental health challenges in contributing to the severity of PMS symptoms, highlighting the importance of addressing both lifestyle factors and psychological well-being in PMS management. Understanding these associations is crucial for developing targeted interventions and comprehensive strategies that promote healthier lifestyle choices and support mental health could potentially mitigate PMS symptoms and improve the quality of life for those affected.

Our results show that students with PMS experience higher levels of depression, anxiety, and stress compared to those without PMS. These elevated psychological factors suggest that depression, anxiety, and stress may contribute to or exacerbate the symptoms of PMS. In line with these findings, previous research has demonstrated that women with PMS experience higher levels of depressive symptoms than those without PMS.[26,27] Chehreh et al. similarly reported higher levels of anxiety and depression among students with PMS compared to those without.[28] These results emphasize the importance of addressing mental health concerns in the management

and treatment of PMS. By integrating psychological interventions with traditional approaches, we can potentially alleviate the burden of PMS symptoms and improve the overall quality of life for individuals affected by this condition.

Furthermore, our study revealed a significant positive relationship between mental health issues-namely depression, anxiety, and stress-and PMS symptoms. This suggests that nursing students experiencing higher levels of depression, anxiety, or stress may be more susceptible to severe PMS symptoms. Consistent with our results, previous studies have reported a strong positive association between PMS and mood changes.[29-31] Acikgoz et al. found a positive significant association between depression and PMS.[32] Moreover, given the academic pressures and responsibilities faced by nursing students, which can exacerbate psychological symptoms, Younes et al. demonstrated a significant relationship between academic stress and worsening PMS symptoms.[33] These results highlight the intricate interplay between psychological well-being and physical health, suggesting that heightened emotional distress may aggravate the physiological and emotional PMS symptoms experienced during the menstruation. Addressing mental health is crucial for alleviating PMS symptoms and improving overall well-being. Moreover, mental health support and stress management interventions can enhance both psychological well-being and PMS outcomes in this population, leading to more effective interventions and improved quality of life for nursing students dealing with both PMS and psychological challenges.

LIMITATIONS

Our study has several notable limitations. Firstly, the sample was limited to nursing students, which may not be representative of the broader student population or of students in other fields of study. Secondly, conducting the study at a single institution further constrains the generalizability of the findings, as institutional-specific factors may influence the results. Additionally, the use of convenience sampling introduces potential bias, as the sample may not accurately reflect the diversity of experiences and backgrounds within the student population. These factors collectively limit the external validity of the study's conclusions. To address these limitations, future research should involve larger and more diverse samples drawn from multiple institutions, and employ more rigorous sampling methods to enhance the generalizability and reliability of the findings.

CONCLUSION

In conclusion, our research findings highlight that approximately 3-quarters of the students experience PMS, characterized by low levels of depression and stress, with moderate levels of anxiety. The most common PMS symptoms reported include depressive mood, appetite changes, fatigue, irritability, and swelling. Participants who smoked, drank alcohol, consumed coffee, or experienced psychological issues were more likely to report severe PMS symptoms. A positive relationship identified between the severity of PMS symptoms and mental health issues, including depression, anxiety, and stress. These findings emphasize the need for tailored interventions and support strategies to alleviate the impact of PMS on nursing students' mental well-being. Educational interventions focusing on stress management and mental health awareness could be beneficial in reducing the impact of PMS symptoms. Additionally, promoting healthier lifestyle choices, such as reducing alcohol and caffeine intake and providing resources for psychological support, could also help alleviate symptoms. Future research could investigate the effectiveness of targeted interventions and lifestyle modifications in reducing the severity of PMS symptoms and improving overall well-being among nursing students.

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Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Ayşe Akalın, Ayşenur Karpuzluk;* ***Design:*** *Ayşe Akalın, Ayşenur Karpuzluk;* ***Control/Supervision:*** *Ayşe Akalın;* ***Data Collection and/or Processing:*** *Ayşe Akalın, Ayşenur Karpuzluk;* ***Analysis and/or Interpretation:*** *Ayşe Akalın, Ayşenur Karpuzluk;* ***Literature Review:*** *Ayşe Akalın, Ayşenur Karpuzluk;* ***Writing the Article:*** *Ayşe Akalın, Ayşenur Karpuzluk;* ***Critical Review:*** *Ayşe Akalın;* ***References and Fundings:*** *Ayşe Akalın, Ayşenur Karpuzluk.*

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