



# Prevalence of Premenstrual Syndrome Among University Students: Associated Factors and Comfort Level

## Üniversite Öğrencilerinde Premenstrüel Sendrom Prevelansı, İlişkili Faktörler ve Konfor Düzeyi

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### ABSTRACT

**Objective:** Premenstrual syndrome (PMS) is a combination of behavioral, somatic, emotional, and cognitive symptoms that are very common in women during reproductive age. The worldwide prevalence of PMS varies between 12% and 98%. Thus, this study aimed to determine the prevalence of PMS and its associated factors and comfort level in a group of university students who stay in a dormitory.

**Methods:** This cross-sectional study was conducted in Yozgat Sürmeli Girls' Dormitory, which is located within Yozgat Bozok University Erdoğan Akdağcampus. A total of 1162 students are staying in the dormitory, and the study was completed with 935 students who stayed in the dormitory and volunteered to participate in the study without sample selection. The study collected data using the Participant Information Form that consist of 30 questions prepared by the researchers, the premenstrual syndrome scale (PMSS), and the general comfort scale (GCS). Percentage, mean, chi-square, t-test, correlation, and logistic regression analysis were used for data evaluation.

**Results:** The mean age of the students was 20.81±1.487 years. The total score of the PMS scale was 115.21±41.615. On the scale, the highest score is 20.203±7.493 from the depressive affection dimension and the lowest score is 7.854±3.771 from the sleep change dimension. PMS was found in 34.2% of students. The total GCS score of the students was 2.43±0.35, and scores obtained from the sub-dimensions and GCS levels were lower in students with PMS. A weak and negative relationship was found between

### ÖZ

**Amaç:** Premenstrüel sendrom (PMS), üreme çağındaki kadınlarda çok sık görülen davranışsal, somatik, duygusal ve bilişsel semptomların bir kombinasyonudur. Dünya çapında PMS prevalansı %12 ile %98 arasında değişmektedir. : Bu çalışmada, yurttan kalan bir grup üniversite öğrencisinde premenstrüel sendrom (PMS) prevelansı, ilişkili faktörler ve konfor düzeyinin belirlenmesi amaçlanmıştır.

**Yöntemler:** Kesitsel tipteki bu çalışma, Yozgat Bozok Üniversitesi Erdoğan Akdağ Kampüsü içerisinde yer alan, Yozgat Sürmeli Kız Öğrenci Yurdu'nda yapılmıştır. Yurttan 1.162 öğrenci kalmakta olup, örneklem seçimine gidilmeksizin yurttan kalan, çalışmaya katılmaya gönüllü olan öğrencilerin tamamının araştırmaya alınması planlanarak 935 öğrenci ile çalışma tamamlanmıştır. Araştırmada veriler; araştırmacılar tarafından hazırlanan 30 sorudan oluşan katılımcı bilgi formu, premenstrüel sendrom ölçeği (PMSÖ) ve genel konfor ölçeği (GKÖ) kullanılarak toplanmıştır. Verilerin değerlendirilmesinde yüzdeler, ortalama, ki-kare, t-testi, korelasyon ve logistik regresyon analizi kullanılmıştır.

**Bulgular:** Öğrencilerin yaş ortalaması 20,81±1,487'dir. PMS ölçeğinin toplam puanı 115,21±41,615'tir. Ölçekte depresif duygulanım boyutundan en yüksek puan 20,203±7,493, uyku değişikliği boyutundan en düşük puan 7,854±3,771'dir. Öğrencilerin %34,2'inde PMS saptandı. Öğrencilerin toplam GKÖ puanı 2,43±0,35 olup, PMS'li öğrencilerde alt boyutlardan ve GKÖ düzeylerinden elde edilen puanlar daha düşüktür. PMSS ve GKÖ arasında zayıf ve negatif bir ilişki bulundu. On üç yaş ve öncesinde

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the PMSS and the GCS. The risk of PMS increased by 1.366 times ( $p=0.036$ ) in students with menarche at the age of 13 years and younger, whereas, in students with chronic diseases, it was 2.512 times higher ( $p=0.001$ ). The use of salt without tasting the food and daily coffee consumption increased the risk of PMS by 1.626 times ( $p=0.004$ ) and 1.882 times ( $p=0.000$ ), respectively. The risk of PMS was 2.026 times ( $p=0.000$ ) higher in students with dysmenorrhea, whereas 1.614 times higher in students who used any method to cope with dysmenorrhea ( $p=0.004$ ).

**Conclusion:** PMS is an important problem among women. A weak and negative relationship was found between PMS and comfort level. Considering the results of this study, menarche before the age of 13, the presence of chronic disease, dysmenorrhea, excessive salt use, and coffee consumption increases the risk of PMS. Many factors lead to the occurrence of PMS. Interventional studies are necessary to reduce the risk factors for PMS that significantly affect the women's health or its risk factors.

**Keywords:** Premenstrual syndrome, prevalence, comfort level

menarş olan öğrencilerde PMS görülme riski 1,366 kat artarken ( $p=0,036$ ), kronik bir hastalığa sahip olan öğrencilerde PMS görülme riski 2,512 kat daha fazladır ( $p=0,001$ ). Yemeğin tadına bakmadan tuz kullanımı PMS riskini 1.626 kat ( $p=0,004$ ), günlük kahve tüketme alışkanlığı 1,882 kat artırmaktadır ( $p=0,000$ ). Dismenore yaşayan öğrencilerde PMS görülme riski, 2,026 kat ( $p=0,000$ ), dismenore ile baş etmek için herhangi bir yöntem kullanan öğrencilerde 1,614 kat daha fazladır ( $p=0,004$ ).

**Sonuç:** PMS kadınlar arasında önemli bir sorundur. PMS ile konfor düzeyinin negatif yönde, zayıf bir ilişkisi olduğu bulunmuştur. Bu çalışmanın sonuçları dikkate alındığında; 13 yaşından önce menarş olma, kronik hastalık varlığı, dismenore, fazla tuz kullanımı, kahve tüketimi PMS görülme riskini artırmaktadır. Birçok faktör PMS'nin ortaya çıkmasına neden olur. Kadın sağlığını önemli ölçüde etkileyen PMS risk faktörlerini veya risk faktörlerini azaltmak için girişimsel çalışmalara ihtiyaç vardır

**Anahtar Sözcükler:** Premenstrüel sendrom, prevalans, konfor düzeyi

## Introduction

Premenstrual syndrome (PMS) is a combination of behavioral, somatic, emotional, and cognitive symptoms that occur during the luteal phase of the menstrual cycle, which is quite common among women during reproductive life, and rapidly improve with the onset of menstruation (1). More than 200 symptoms occur during the first 7-10 days of menstruation. The most frequent symptoms are headache, fatigue, bloating, back pain, breast tenderness, appetite changes, fatigue, anxiety, nervousness, impaired interpersonal communication, and depression (2). Determining the true prevalence of PMS with so many symptoms is difficult (3). Studies revealed different results in the prevalence of PMS depending on the diagnostic criteria and methodology (4). The systematic review and meta-analysis study that was conducted by Direkvand-Moghadam et al. (5) revealed that the prevalence of PMS varied between 12% and 98%. The examination of countries in this study reported that the lowest prevalence was in France (12%) and the highest prevalence was in Iran (98%). Two studies on Turkish women were also included in this meta-analysis and stated that the prevalence of PMS varied between 32.6% and 69.9% (5). The studies that were conducted with university students in our country revealed that the prevalence of PMS varied between 36.4% and 91.8% (6-9). University students, who are among the groups that are most affected by PMS, indicated that this period negatively affected their academic achievements, emotional states, social activities, and family relationships (10). Considering the negative effects of PMS on daily life, conducting scientific studies is very important to determine the frequency of PMS and its affecting factors (11). The cause of PMS is unknown; however, hormonal changes are frequently affected by diet, stress, and lifestyle changes (12). Studies examined the status of PMS in some variables, such as the quality of life, lifestyle changes, healthy lifestyle behaviors, smoking, alcohol, and carbohydrate intake (7,13-16). University students have to change their living environments and even cities due to their education, their lifestyles are changed and they

encounter many stressful situations. The literature reported no studies on the comfort level of students who stay in dormitories; however, a study indicated that the prevalence of PMS was 4.19 times higher among students who stay in dormitories (17). PMS is considered to change the comfort level by changing the experience of performing activities of daily living with many

**Table 1.** Sub-dimensions and total mean scores of the PMSS and GCS

PMSS sub-dimensions	Min	Max	Mean	SD
Depressive affection	7	35	20.203	7.493
Anxiety	7	35	14.726	6.915
Fatigue	6	30	17.124	6.599
Nervousness	5	25	14.065	5.966
Depressive thoughts	7	35	16.632	8.049
Pain	3	15	8.088	3.671
Change in appetite	3	15	8.576	3.710
Sleep change	3	15	7.854	3.771
Bloating	3	15	7.946	3.896
Total scale score	44	218	115.21	41.615
<b>Comfort scale levels</b>				
Relief	1	4	2.67	0.45
Ease	1	4	2.25	0.38
Transcendence	1	4	2.36	0.38
<b>Comfort scale sub-dimensions</b>				
Physical	1	4	2.39	0.41
Psychospiritual	1	4	2.39	0.38
Sociocultural	1	4	2.53	0.40
Environmental	1	4	2.37	0.40
Total scale score	1	4	2.43	0.35

Min: Minimum, Max: Maximum, SD: Standard deviation, PMSS: Premenstrual syndrome scale, GCS: General comfort scale

symptoms. Comfort is a concept that an individual feels while performing activities of daily living, including relaxation, peace, and the experience of overcoming the problem (18). Comfort is affected by many biological, psychological, social, and cultural factors, as in PMS. No study on PMS and comfort level was found in the literature. Thus, this study aimed to determine the prevalence of PMS and its associated factors and comfort level in a group of university students who stay in a dormitory.

## Research Questions

What is the prevalence of PMS among students?

What are the factors that affect the occurrence of PMS among students?

Is there a relationship between PMS and general comfort level among students?

## Method

### Type and Place of the Study

This cross-sectional study was conducted in Yozgat Sürmeli Girls' Dormitory, which is located within Yozgat Bozok University Erdoğan Akdağcampus.

### Ethical Aspect of the Study

Approval was obtained from Gazi University Ethics Committee for the Research (no: 2020-162). Permission was obtained from the Provincial Directorate of Youth and Sports and the Directorate of Yozgat Sürmeli Girls' Dormitory for the institution where the study was conducted. The aim of the study was explained to all students who would participate in the study and informed consent was obtained. Permission was obtained from the authors for the scales used in data collection.

### Population and Sample of the Study

This study included 1,162 students staying in Yozgat Sürmeli Girls' Dormitory. Reaching the entire population without sample selection was planned in the study. However, 4 of 1,162 students were foreign nationals who do not speak Turkish and 123 students refused to participate in the study, thus the study was completed with 935 (80%) students.

### Data Collection Tools

The Participant Information Form prepared by the researchers, the premenstrual syndrome scale (PMSS), and the general comfort scale (GCS) were used as data collection tools in this study.

**Participant Information Form:** The Participant Information Form, which was prepared following the literature, included the questions that determine the socio-demographic characteristics of females with PMS (age, school, department, grade, place of residence, income status, employment status, characteristics related to height and weight, and history of chronic disease and drug use), lifestyle (smoking, alcohol, and exercise habits), menstruation, and history of PMS (age of menarche, frequency

and duration of menstruation, and family history of PMS) (7,19,20). The Participant Information Form consisted of a total of 30 questions.

**PMSS:** It was developed by Gençdoğan (21) based on the Diagnostic and Statistical Manual of Mental Disorders-III and DSM-IV-R diagnostic criteria in 2006. The Cronbach alpha coefficient of the scale is 0.75. The scale is a 44-item 5-point Likert type. While scoring the scale, the "None" option is evaluated as 1 point and the "Continuous" option is evaluated as 5 points. PMSS consists of 9 sub-dimensions. The scale scores range from 44 to 220 points. The theoretical cut-off point is used for the diagnosis of PMS. The presence of PMS is evaluated according to the condition of exceeding 50% of the score obtained from each sub-dimension of the scale. The Cronbach alpha coefficient of the scale is 0.75 (21). This study revealed that the Cronbach alpha coefficient of the scale was 0.97. Written permission was obtained from Gençdoğan (21) to use PMSS in this study.

**GCS:** The Turkish validity and reliability study of the GCS, which was developed by Katharina Kolcaba in 1992, was performed by Kuğuoğlu and Karabacak (22). The scale is 4-point Likert type consists of a total of 48 items. The comfort levels of the scale are a relief (16 items), ease (17 items), and transcendence (15 items). The scale consists of positive and negative items in the mixed form. The reverse-coded items in the scale evaluation are presented in the table below. The highest and lowest scores that are obtained from the scale are 192 and 48, respectively. The scale is determined with a value between 1 and 4 by dividing the total score by the number of items. The comfort level increases as the scale score approach 4. The Cronbach alpha coefficient of the scale was found to be 0.85 in the validity and reliability study (22). This study revealed that the Cronbach alpha coefficient of the scale was 0.88. Written permission was obtained from Kuğuoğlu and Karabacak (22) to use GCS in this study.

### Statistical Analysis

Statistical Package for the Social Sciences 21.0 (SPSS-PC Version 21.0) package program was used for the statistical analysis of the data. Number, percentage, arithmetic mean, t-test, chi-square, logistic regression, and correlation analysis were used for data evaluation.

## Results

The mean age of the students who participated in the study was 20.81 years. Students who study daytime education accounted for 76.8% and 46.5% were 3rd-grade students. Additionally, 78.8% of students had a nuclear family structure, and mothers of 54.4% and fathers of 36.8% were primary school graduates. Moreover, 54.2% indicated that their income was less than their expenses.

Chronic disease was determined in 11.9% of students, thus use drugs, whereas 18.4% experienced polycystic ovarian syndrome symptoms and 4.3% have obesity.

Students who added salt without tasting the food account for 73.5% and 31.3% had the habit of consuming coffee daily. Of

those who consumed coffee, 54.3% consumed 2 cups or more of coffee daily. Smokers accounted for 13% of students and 4.3% consumed alcohol. Of the smoker students, 45.1% had been smoking for 4 years or more and 41.8% smoked 6 cigarettes or more a day. Of the students, 9.1% had regular exercise, of whom 52.9% regularly exercised 1-3 times a week and only 32.9% had exercise duration of 31 min or more.

The history of first menstruation of 54.8% of students was at the age of 13 years and younger, 77.8% had dysmenorrhea, and 26.2% used any method, such as painkiller and hot application, to cope with dysmenorrhea. Dysmenorrhea was determined in 57.2% of students in one or more of their mothers and sisters and 49.2% of these people had the symptoms of PMS.

The total score of the PMSS was  $115.21 \pm 41.615$ , wherein the highest score is  $20.203 \pm 7.493$  from the depressive affection dimension and the lowest score is  $7.854 \pm 3.771$  from the sleep change dimension.

The total score of the GCS was  $2.43 \pm 0.35$ . The highest value of the sub-dimensions of the comfort scale is  $2.53 \pm 0.40$  in the sociocultural dimension. The highest value among the levels of the scale was found at the relief level by  $2.67 \pm 0.45$ .

PMS by the scoring of 132 points and above was determined in 34.2% of students.

A weak and negative relationship was found between the PMSS and the GCS.

The examination of the comfort levels according to the presence of PMS revealed lower comfort scores in students with PMS. A statistical significance was found at the relief and transcendence levels of the scale compared to those with and without PMS ( $p < 0.01$ ). Physical, sociocultural, and environmental dimensions of the scale were statistically significant compared to students with and without PMS ( $p < 0.01$ ).

A statistically significant relationship was found between PMS and the age of menarche, chronic disease, presence of polycystic ovarian syndrome symptoms, drug use, use of salt without tasting the food, daily coffee consumption, smoking, having dysmenorrhea, using dysmenorrhea coping methods, and dysmenorrhea and PMS in first-degree relatives ( $p < 0.05$ ).

The risk of PMS was higher in students with menarche at age 13 years or younger (1.366 times,  $p = 0.036$ ), who had the chronic disease (2,512 times,  $p = 0.001$ ), a high salt use (1.626 times,  $p = 0.003$ ), a high daily coffee consumption (1,882 times,  $p = 0.000$ ), had dysmenorrhea (2,026 times,  $p = 0.000$ ), and used any method to cope with dysmenorrhea (1,614 times,  $p = 0.003$ ).

## Discussion

This study aimed to determine the prevalence of PMS and its associated factors and comfort level in a group of students who stay in a dormitory and revealed that 34% of students had PMS. The study of Güvenç et al. revealed that the prevalence of PMS was 36%, which is similar to our study results. The prevalence of

PMS was 62% in the study of Bakır and Yangın (7) and 57% in the study of Kısa et al. (19) The prevalence of PMS was 60% in the study of Silva et al. (23) and 84% in the study of Houston et al. (24). A wide range of results was obtained in studies on the prevalence of PMS. Many factors, such as the presence of different evaluation criteria, different attitudes of different cultures, and different forms of health service delivery, can make the determination of the true prevalence difficult. Additionally, the same scale is used in the studies conducted in our country; however, calculations according to different cut-off points led to different results in PMS prevalence. Our study used 132 as the cut-off value of the scale, and the prevalence of PMS was found to be 34.2%.

Our study revealed that the total score of PMSS was  $115.21 \pm 41.615$ . The highest score on the scale was in the depressive affection dimension and the lowest was in the sleep change dimension. The study by Topatan and Kahraman (16) with university students revealed that the total score of the PMSS was  $118.4 \pm 32.4$ . Similarly, the highest score was obtained from the depressive affection dimension ( $18.21 \pm 7.42$ ) and the lowest score from the sleep change dimension ( $7.85 \pm 2.96$ ) (16). Another study revealed that the mean total score from the PMSS was  $122.14 \pm 32.60$  (25). This study revealed that the highest score was from the depressive thought sub-dimension ( $20.42 \pm 6.76$ ) and the lowest score was from the pain sub-dimension ( $8.10 \pm 3.27$ ). The study results of Tanrıverdi et al. (26) are also similar to the study of Aba et al. (25) and differ from the results of this study.

The study revealed a statistically significant relationship between the menarche age of the students and the PMSS and observed that the risk of PMS was 1,366 ( $p = 0.036$ ) times higher in students whose menarche age was 13 years and younger. The literature reported studies that revealed the relationship between PMS and menarche age as statistically insignificant (4,14,25,27).

No statistically significant relationship was found between the body mass index and PMS in the literature (4,25,28). The results on body mass index in this study are also consistent with the literature.

PMS coexists with dysmenorrhea in many women, and premenstrual symptoms alternate with dysmenorrhea at the beginning of menstruation (7,14,25,29). Our study revealed that 77.8% of the students had dysmenorrhea and that the risk of PMS was 2.026 times higher in students with dysmenorrhea. The study conducted by Bakır and Yangın revealed this value to be 1.62. The study on Japanese students that was conducted by Yamamoto et al. (30) revealed a relationship between dysmenorrhea and PMS. Studies also reported different results from our study. The study that was conducted by Rupani and Lema (31) and Freeman et al. (32) revealed no relationship between dysmenorrhea and PMS.

Our study revealed that the risk of PMS was 1.882 times higher in students who consumed coffee daily. Several studies that were conducted with university students revealed that the chi-square analysis of coffee consumption was statistically significant;



**Table 2. Prevalence of PMS**

	Number	Percentage (%)
Those with premenstrual syndrome	320	34.2
Those without premenstrual syndrome	615	65.8
Total	935	100

PMS: Premenstrual syndrome

**Table 3. Correlation of the PMS scale and the GCS**

Scale	Comfort scale
	r <sub>p</sub>
Having PMS	-0.1920.001

PMS: Premenstrual syndrome, GCS: General comfort scale

**Table 4. Evaluation of the presence of PMS and comfort levels in students**

Comfort levels	PMS <132	PMS ≥132	t-test*	p
Relief	2.757±0.466	2.526±0.376	8.194	<b>0.000</b>
Ease	2.254±0.400	2.260±0.339	-0.249	0.803
Transcendence	2.387±0.414	2.317±0.327	2.792	<b>0.005</b>
<b>Comfort sub-dimensions</b>				
Physical	2.466±0.431	2.258 ± 0.345	8.013	<b>0.000</b>
Psychospiritual	2.400±0.400	2.382 ± 0.346	0.680	0.497
Sociocultural	2.567±0.429	2.482 ± 0.358	3.232	<b>0.001</b>
Environmental	2.405±0.418	2.327 ± 0.385	2.795	<b>0.005</b>
<b>GCS total score</b>	2.463±0.377	2.367 ± 0.285	4.365	<b>0.000</b>

\*Independent sample t-test, PMS: Premenstrual syndrome

however, the presence of PMS in the logistic regression analysis was not statistically significant (7,14). A study conducted with university students in Thailand revealed a relationship between coffee consumption and PMS symptoms (33). The study conducted by Moon-Soo et al. (34) with university students in Korea revealed a statistically significant difference in coffee consumption between the group with moderate to severe PMS and the group with mild PMS. Another study revealed no statistically significant relationship between the consumption of tea, coffee, and cola-containing caffeine and the PMS (13,15). The study conducted by Çelik et al. (35) revealed no significant relationship with coffee consumption, whereas a statistically significant relationship between cola and tea-drinking variables. A study on high-caffeine coffee intake conducted with nurses revealed no significant relationship between PMS and caffeine intake (36).

The literature reported many studies on the presence of PMS in smoking and alcohol use. A study conducted with Japanese

adolescent students revealed that smoking and alcohol use increased problems, such as concentration disorders, behavioral changes, fluid retention, and negative affection, in the premenstrual period (37). Studies revealed statistically significant results in the chi-square tests on alcohol, smoking, and PMS (14,15,38). The study of Pinar et al. (14) revealed that the risk of PMS was 0.4 times higher in smoker students compared to non-smokers. Studies by Demir et al. (13) and Çelik et al. (35) revealed a statistically significant relationship between smoking and PMS. Deuster et al. (39) also revealed that the prevalence of PMS was higher in those who smoked for >5 years. The study on PMS that was conducted by Bakır and Yangın (7) revealed no association with smoking, whereas results of the chi-square analysis of alcohol use were significant and regression results were statistically insignificant. Our study revealed no relationship between alcohol use and the presence of PMS; however, a relationship was found with smoking. A recent case-control study on smoking and PMS determined that smoking and PMS are correlated (40).

The literature reported studies that reveal the relationship of PMS with genetic factors (7,13-15). The square test in our study revealed the presence of PMS and dysmenorrhea in the mother, elder sister, or younger sister, which was statistically significant. A study in Malaysia determined that PMS was more common in people with any relative complaints of PMS (4). A study conducted in Turkey revealed that PMS was highly detected in people with PMS complaints in their mothers or sisters (13). The study of Bakır and Yangın determined that the risk of PMS was 2.27 times higher in students whose mothers had PMS complaints. Another study found that the presence of PMS in mothers of students increased the risk of PMS by 1.68 times (8).

Another PMS symptom is edema. Salt intake increases the formation of edema in the body (41). Our study revealed that 26.5% of students used salt without tasting the food. Our analysis on the risk of PMS was 1.626 times higher in students who used salt without tasting the food. The study of Aşçı et al. (8) revealed that 35.6% of students used salt without tasting the food, and the PMSS score was found significantly ( $p=0.021$ ) higher in students who used salt. The study conducted by Hashim et al. (28) found that the use of salt increased the risk of PMS. Şahin et al. (20) revealed that the risk of PMS was 1,982 times higher in students who used salt, whereas Bakır and Yangın (7) found this value as 2,415. The study conducted by Pinar et al. (14) determined that salt was not a factor that increased the risk of PMS.

Exercise is also used to relieve PMS by increasing serotonin levels (25,41). Şahin et al. (20) revealed that the risk of PMS was 1.710 times higher in those who did not exercise. Our study revealed no significant relationship between exercise and PMS prevalence. The literature reported similar results (8,13,25). A low number of students, who exercised regularly in the studies with similar results to our study, and this study, may have caused the statistics to be insignificant.

**Table 5. Examination of the factors affecting the presence of PMS among students**

Variables		PMS <132		PMS ≥132		Test value	
	Number (%)	n	%	n	%	X <sup>2</sup>	p
<b>Age</b>							
18-20 years	389 (41.6)	259	66.6	130	33.4	0.192	0.661
21 years and above	546 (58.4)	356	65.2	190	34.8		
<b>Type of education</b>							
Daytime education	718 (76.8)	482	67.1	236	32.9	2.525	0.112
Evening education	217 (23.2)	133	61.3	84	38.7		
<b>Age of menarche</b>							
13 years and below	512 (54.8)	320	62.5	192	37.5	<b>5.393</b>	<b>0.022</b>
14 years and above	423 (45.2)	295	69.7	128	30.3		
<b>Body mass index</b>							
Slim (18.4 and below)	116 (12.4)	78	67.2	38	32.8	0.592	0.744
Normal (18.5-24.9)	664 (71.0)	439	66.1	225	33.9		
Overweight and fat (25.0 and above)	155 (16.6)	98	63.2	57	36.8		
<b>Chronic disease</b>							
Yes	111 (11.9)	49	44.1	62	55.9	26.180	<b>0.000</b>
No	824 (88.1)	566	68.7	258	31.3		
<b>Symptoms of polycystic ovarian syndrome</b>							
With	172 (18.4)	99	57.6	73	42.4	6.322	<b>0.012</b>
Without	763 (81.6)	516	67.6	247	32.4		
<b>Drug use</b>							
Yes	111 (11.9)	58	52.3	53	47.7	10.232	<b>0.001</b>
No	824 (88.1)	557	67.6	267	32.4		
<b>Use of salt without tasting the food</b>							
Yes	248 (26.5)	139	56.0	109	44.0	14.186	<b>0.000</b>
No	687 (73.5)	476	69.3	211	30.7		
<b>Daily coffee consumption</b>							
Yes	293 (31.3)	156	53.2	137	46.8	29.775	<b>0.000</b>
No	642 (68.7)	459	71.5	183	28.5		
<b>Smoking</b>							
Yes	122 (13.0)	65	53.3	57	46.7	9.734	<b>0.002</b>
No	813 (87.0)	550	67.7	263	32.3		
<b>Alcohol use*</b>							
Yes	40 (4.3)	21	52.5	19	47.5	2.684	0.101
No	895 (95.7)	594	66.4	301	33.6		
<b>Regular exercise</b>							
Yes	85 (9.1)	59	69.4	26	30.6	0.549	0.459
No	850 (90.9)	556	65.4	294	34.6		
<b>Having dysmenorrhea</b>							
Yes	727 (77.8)	448	61.6	279	38.4	25.030	<b>0.000</b>
No	208 (22.2)	167	80.3	41	19.7		
<b>Use of a method for coping with dysmenorrhea</b>							
Yes	245 (26.2)	137	55.9	108	44.1	14.329	<b>0.000</b>
No	690 (73.8)	478	69.3	212	30.7		

Table 5. Continued

Variables	PMS <132		PMS ≥132		Test value		
<b>Presence of dysmenorrhea in the mother, elder sister, younger sister</b>							
Yes	535 (57.2)	325	60.7	210	39.3	14.166	<b>0.001</b>
No	144 (15.4)	106	73.6	38	26.4		
Do not know	256 (27.4)	184	71.9	72	28.1		
<b>Presence of PMS in the mother, elder sister, younger sister</b>							
Yes	460 (49.2)	271	58.9	189	41.1	19.456	<b>0.000</b>
No	154 (16.5)	115	74.7	39	25.3		
Do not know	321 (34.3)	229	71.3	92	28.7		
*0 cells (0%) have expected count <5. The minimum expected count is 13.69 continuity correction							
PMS: Premenstrual syndrome							

Our study revealed that 18.4% of students had polycystic ovarian syndrome symptoms. A statistical significance was found between having the symptoms of the polycystic ovarian syndrome and PMSS scores. The fluctuation in hormonal levels in polycystic ovarian syndrome and PMS causes the exacerbation of PMS syndromes and the emergence of short-term mixed mood changes (42). Our study revealed that the risk of PMS was 2,512 times higher in people with any chronic disease compared to those without chronic disease. The study conducted by Arslantaş et al. (15) revealed a statistically significant difference between those with and without chronic diseases other than gynecological diseases and the presence of PMS was. The study conducted by Acikgoz et al. (38) revealed that PMS was 2.35 times higher in students with chronic diseases. Our study results were consistent with the literature. Our study revealed a statistical significance between regular drug use for chronic diseases and PMSS score, whereas no statistically significant difference in the regression analysis.

### Study Limitations

Our study revealed a weak and negative relationship between GCS and PMSS. The mean scores in each level and dimension

of the GCS were lower in students with PMS. The relief and ease levels in the GCS were significantly lower in people with PMS. The scores of the students with PMS in the physical, sociocultural, and environmental dimensions of the scale sub-dimensions were significantly lower. No study on the relationship between comfort level and PMS was reported in the literature; however, it can be said that PMS negatively affects the comfort level of students.

### Conclusion

Of the university students who participated in the study, 34.2% had PMS. The total score of the GCS of the students was  $2.43 \pm 0.35$ , and based on the scores from the subscales and levels of GCS, the comfort levels of students with PMS were found to be lower. Considering our study results, menarche age under 13 years, presence of chronic disease, dysmenorrhea, salt use, and coffee consumption increased the risk of PMS. Many factors lead to the occurrence of PMS. Interventional studies are necessary to reduce the risk factors for PMS that significantly affect the women's health or the effects of these risk factors.

Table 6. Logistic regression analysis of the factors that affect the presence of premenstrual syndrome in students

Variables	β	SH	Wald	P	OR	95% CI for EXP (B)	
						Lower	Upper
Constant	-2.109	0.212	99.244	0.000	0.121		
Age of menstruation (1)	0.312	0.148	4.411	<b>0.036</b>	1.366	1.021	1.827
Have a chronic disease (1)	0.921	0.273	11.360	<b>0.001</b>	2.512	1.470	4.292
Polycystic ovarian syndrome (1)	0.313	0.185	2.868	0.090	1.367	0.952	1.963
Drug use (1)	0.012	0.276	0.002	0.966	1.012	0.590	1.736
Use of salt (1)	0.486	0.162	8.988	<b>0.003</b>	1.626	1.183	2.233
Coffee consumption (1)	0.632	0.157	16.210	<b>0.000</b>	1.882	1.383	2.560
Smoking (1)	0.346	0.213	2.645	0.104	1.413	0.932	2.143
Dysmenorrhea (1)	0.706	0.200	12.518	<b>0.000</b>	2.026	1.370	2.995
Coping with dysmenorrhea (1)	0.479	0.163	8.637	<b>0.003</b>	1.614	1.173	2.222

CI: Confidence interval

## Ethics

**Ethics Committee Approval:** Approval was obtained from Gazi University Ethics Committee for the Research (no: 2020-162). Permission was obtained from the Provincial Directorate of Youth and Sports and the Directorate of Yozgat Sürmeli Girls' Dormitory for the institution where the study was conducted.

**Informed Consent:** The aim of the study was explained to all students who would participate in the study and informed consent was obtained.

**Peer-review:** Externally peer reviewed.

## Authorship Contributions

Surgical and Medical Practices: D.Y.G., Concept: D.Y.G., N.B., Design: D.Y.G., N.B., Data Collection or Processing: D.Y.G., Analysis or Interpretation: D.Y.G., N.B., Literature Search: D.Y.G., N.B., Writing: D.Y.G., N.B.

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