

## ORIGINAL ARTICLE

# Does premenstrual syndrome affect physical activity and quality of life? A cross-sectional study

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**Purpose:** The aim of this study was to determine the relationship between the presence of premenstrual syndrome (PMS), physical activity, and quality of life in female university students.

**Methods:** The study was designed as a prospective and cross-sectional study. Female students aged 18-23 studying at university were included. Demographic information, physical characteristics, and information on menstrual period were recorded by a self-reported questionnaire. The menstrual symptoms, physical activity, and quality of life were evaluated by the Premenstrual Syndrome Rating Scale, International Physical Activity Questionnaire-Short Form (IPAQ-SF) and Short Form-12 (SF-12), respectively. The data were analyzed at  $p < 0.05$  significance level. Independent samples t-test and chi-square tests were used to determine the statistical difference between groups with and without PMS.

**Results:** 153 randomly selected female students (18-23 years old) (89 with PMS, 64 without PMS) participated in this study. Menstrual duration and pain intensity during menstruation were found to be significantly higher in students with PMS and the presence of menstrual irregularity was found to be significantly higher in students with PMS ( $p < 0.05$ ). There was no significant difference in the level of physical activity between the students with and without PMS. It was found that the quality of life of students with PMS was significantly lower ( $p < 0.05$ ).

**Conclusion:** It was found that PMS reduced the quality of life, but there was no difference in the level of physical activity between the students with and without PMS. It is thought that further studies are needed to determine the physical activity level during the menstrual cycle.

**Keywords:** Premenstrual syndrome, Quality of life, Physical activity, Pain.

## Premenstrüel sendrom fiziksel aktivite düzeyini ve yaşam kalitesini etkiler mi? Kesitsel araştırma

**Amaç:** Bu çalışmanın amacı, üniversiteli kadın öğrencilerde premenstrüel sendrom (PMS) varlığı, fiziksel aktivite ve yaşam kalitesi arasındaki ilişkiyi incelemektir.

**Yöntem:** Çalışma, üniversite öğrencilerinde prospektif ve kesitsel bir çalışma olarak tasarlandı. Bu çalışmaya rastgele seçilmiş 153 kadın öğrenci (18-23 yaş arası) (89'u PMS'li, 64'ü PMS'siz) katılmıştır. Katılımcıların demografik bilgileri, fiziksel özellikleri ve adet dönemine ilişkin bilgileri, öz bildirimli bir anket aracılığıyla kaydedildi. Menstrüel semptomlar, fiziksel aktivite ve yaşam kalitesi, sırasıyla "Premenstrüel Sendrom Değerlendirme Ölçeği", "Uluslararası Fiziksel Aktivite Anketi-Kısa Form (IPAQ-SF)" ve Kısa Form-12 (SF-12) ile değerlendirildi. Verilerin değerlendirilmesinde  $p < 0.05$  anlamlılık düzeyi kabul edildi. PMS olan ve olmayan gruplar arasındaki farkın belirlenmesi için bağımsız örneklerde t-testi ve ki-kare testi kullanıldı.

**Bulgular:** Bu çalışmaya rastgele seçilen 153 kız öğrenci (18-23 yaş arası) katılmıştır. Menstrüasyon süresinin ve menstrüasyon sırasındaki ağrı şiddetinin ve düzensiz menstrüasyon varlığının PMS'li öğrencilerde anlamlı olarak yüksek olduğu bulundu ( $p < 0.05$ ). PMS'li öğrencilerle PMS'si olmayan öğrenciler arasında fiziksel aktivite yönünden anlamlı bir fark olmadığı bulundu ( $p > 0.05$ ). PMS'li öğrencilerin yaşam kalitelerinin anlamlı olarak daha düşük olduğu bulundu ( $p < 0.05$ ).

**Sonuç:** PMS'nin yaşam kalitesini anlamlı olarak azalttığı, ancak PMS'nin fiziksel aktivite düzeyi üzerinde anlamlı bir etkisinin olmadığı bulundu. Menstrüel siklus döneminde fiziksel aktivitede olası değişimlerin belirlenmesi amacıyla daha ileri çalışmalara ihtiyaç olduğu düşünülmektedir.

**Anahtar kelimeler:** Premenstrüel sendrom, Yaşam kalitesi, Fiziksel aktivite, Ağrı.



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**P**remenstrual syndrome (PMS) is a syndrome in which emotional, behavioral, and physical symptoms appear before menstruation in women of reproductive age and have effects after menstruation.<sup>1, 2</sup> It has been reported that the incidence is higher in young and middle-aged women. According to studies, 12-98% of women experience this syndrome, moderate discomfort may occur, and the syndrome affects their daily lives.<sup>3</sup> The effect of premenstrual symptoms may decrease with the onset of menstruation, but in some cases, the symptoms may persist. More intense symptoms may occur in 3-8% of women.<sup>4</sup> Symptoms such as depression, social isolation, loss of concentration, tenderness in the breasts, edema in the hands and feet, and fatigue can be seen in women with PMS.<sup>5, 6</sup> Although there is no clear consensus on the syndrome's etiology, it is emphasized that the effect of the gamma-aminobutyric acid-related serotonin system and progesterone metabolites may be significant.<sup>7</sup> Lifestyle modifications, cognitive-behavioral therapy, and medical treatment options can be preferred in treating women with premenstrual syndrome.<sup>4</sup>

In the literature, there are publications on the change of symptoms by increasing the physical activity levels of women with premenstrual syndrome.<sup>8, 9</sup> Physical activity has mechanisms to suggest possible positive effects on PMS. It has been shown that pain, one of the most important symptoms of premenstrual syndrome, is caused by uterine contractions and increased pain sensitization.<sup>10</sup> Physical activity reduces pain, stress, and prostaglandin levels.<sup>11, 12</sup> By increasing the level of physical activity, the capacity of the cardiovascular and pulmonary systems can be increased, coronary heart diseases, diabetes, cancer, and depression can be prevented.<sup>13</sup> Because of these effects, an exercise program is recommended for menstrual cycle problems such as polycystic ovary syndrome, dysmenorrhea, amenorrhea, and premenstrual syndrome.<sup>8, 14</sup> It is tried to increase the physical activity levels of women with menstrual cycle problems. It was reported that the quality of life and daily life performance of women with the premenstrual syndrome were adversely affected.<sup>15, 16</sup> During the luteal phase, work efficiency and participation in working life may decrease, and accidents may occur.<sup>17</sup> It has been reported that PMS negatively affects the

emotional state, can cause sleep problems, fatigue, and therefore negatively affects the quality of life.<sup>15, 18</sup>

Although studies on the effects of exercise were included in the literature, more studies are needed on the relationship between physical activity level and menstrual cycle variables in individuals with premenstrual syndrome. It has been reported that the level of physical activity is lower in women with PMS, but there are also studies showing that PMS does not significantly affect physical activity.<sup>18-20</sup> The aim of this study was to examine the relationship between the presence of premenstrual syndrome (PMS), physical activity, and quality of life in female university students.

## METHODS

This study was conducted as a prospective and cross-sectional study and was carried out at Dokuz Eylul University School of Physical Therapy and Rehabilitation between March 2019 - June 2019.

Ethical approval for this study was obtained from the human research ethics committee at the University of Dokuz Eylul, and subjects gave written informed consent. Approval was obtained from the University of Dokuz Eylul, Human Ethics Committee (2018/08-04) before commencing this study, and all subjects provided written consent.

### Participants

There were 323 female undergraduate students aged 18-23 at Dokuz Eylul University School of Physical Therapy and Rehabilitation. When literature search was conducted, the prevalence of PMS in the Turkish population was determined and it was designed to reach 170 female students from the total student population, and 170 female students were randomly reached.<sup>21</sup>

During the recording of the data on the assessment forms, it was observed that 17 students still needed to fill out the assessment forms for various reasons. Accordingly, 153 female students were included in the study, and 90% of the designed number was reached. Those who were pregnant, using oral contraceptives, had gynecologic, systemic disease, and were uncomfortable with the questionnaire application were not included in the study.

### Assessments

Assessment forms were delivered to the participants in a sealed envelope. Assessment forms included "Demographic Data Form", "Premenstrual Syndrome Scale", "International Physical Activity Form (Short Form) (IPAQ)" and "SF-12 Quality of Life Scale". Turkish versions of the scales were used.

*Demographic Data Form:* There were questions about the student's demographic and menstrual cycle information.

*Premenstrual Syndrome Scale (PSS):* The scale has nine sub-dimensions, these are; depressive sensation, anxiety, fatigue, nervousness, depressive thoughts, pain, appetite changes, sleep pattern changes, and bloating. In addition to calculating the score of each sub-dimension separately, the PSS total score is also calculated.<sup>20</sup> The lowest score that can be obtained by calculation is 44, and the highest score is 220. An increase in the score indicates an increase in the severity of the symptoms or vice versa.<sup>22</sup> Students with a PSS score of 111 and above were classified as PSS positive (+), and students with a PSS score of 110 and below were classified as PSS negative.

*International Physical Activity Questionnaire (Short Form) (IPAQ):* The short form examines the time spent in activities such as sitting, walking, moderate-vigorous and vigorous activities. The calculation is made according to the duration of the activities mentioned above, and the total score is recorded as MET minutes. At the end of the calculations, the data is divided into 3 as inactive, minimally active, and HEPA (health-enhancing physical activity) active.<sup>23, 24</sup>

*SF-12 Quality of Life Scale:* The SF-12 Quality of Life Scale was created by selecting 12 questions from the SF-36 Quality of Life Scale. It has been stated that it has advantages over SF-36 in measuring the quality of life. Unlike the SF-36, the scoring T-score is not used, and the physical standardization values and mental standardization values are calculated separately. High scores indicate good quality of life.<sup>25</sup>

### Statistical analysis

The data were evaluated using the SPSS 25 (Statistical Package for the Social Sciences 25) program. The normal distribution of variables was determined using Kolmogorov-Smirnov/Shapiro-Wilk tests. Descriptive

statistics were given as mean and standard deviation. Independent Samples t-Test and Chi-Square test were used to determine the statistical difference between the groups with and without PMS. The significance level was accepted as  $p < 0.05$ .

## RESULTS

According to the results of the study; It was found that the mean age of the students participating in the study was  $19.02 \pm 0.79$  years, the age at first menstruation was  $13.39 \pm 1.13$  years, and the duration of previous menstrual period was  $5.51 \pm 1.14$  days. The demographic characteristics of the participants and the comparison of the menstrual characteristics of the participants according to their premenstrual syndrome status are given in Table 1. The duration of menstrual period and pain intensity during menstruation were found to be significantly higher in students with PMS ( $p < 0.05$ ) and the presence of menstrual irregularity was found to be significantly higher in students with PMS ( $p < 0.05$ ).

The scores on the PSS are shown in Table 2. According to the scores of the PSS, 89 (58.2%) students were included in the PMS group, whereas 64 (41.8%) students were in the no-PMS group.

The physical activity and quality of life and physical activity level scores of the students are shown in Table 3. There was no significant difference in the scores of physical activity between the students with and without PMS ( $p > 0.05$ ). According to the findings, the quality of life scores of the students with PMS were found to be significantly lower than those without PMS ( $p < 0.05$ ).

## DISCUSSION

The aim of this study was to examine the relationship between the presence of premenstrual syndrome (PMS), physical activity, and quality of life in female university students. According to the results of the study, no significant difference was found in the physical activity scores between the students with and without PMS. However, quality of life scores of the students with premenstrual syndrome was found to be significantly lower

Table 1. Demographic characteristics and menstruation status of the participants.

	PSS (N=89)	non PSS (N=64)	p <sup>a</sup>
	Mean±SD	Mean±SD	
Age (years)	19.06±0.794	18.96±0.79	0.450
Height (cm)	167.39±5.18	167.91±5.44	0.555
Body weight (kg)	60.32±6.22	62.18±7.92	0.104
Body mass index (kg/cm <sup>2</sup> )	21.55±2.30	22.11±3.08	0.196
Onset of the menstruation (years)	13.48±1.17	13.26±1.05	0.242
Menstruations during the last year (n/year)	11.50±0.64	11.47±0.75	0.807
Duration of menstruation (days)	5.69±1.16	5.26±1.07	0.021*
Mild Pain	4.21±1.17	4.01±1.46	0.320
Severe Pain	7.65±1.12	7.06±0.88	0.001*
	n (%)	n (%)	p <sup>b</sup>
Irregular menstruation			
Yes	46 (52)	17 (27)	0.029*
No	43 (48)	47 (73)	
Onset of discomfort			
2-3 days before menstruation	28 (32)	32 (50)	0.151
1 week before menstruation	51 (57)	26 (41)	
15 days before menstruation	10 (11)	6 (9)	
Amount of bleeding			
Mild	- (0)	1 (2)	0.460
Moderate	48 (54)	36 (56)	
Severe	41 (46)	27 (42)	

\* p<0.05. p<sup>a</sup>: t-test. p<sup>b</sup>: Chi-square test. PSS: Premenstrual Syndrome Scale. PSS(+): Students with Premenstrual Syndrome. PSS(-): Students without Premenstrual Syndrome.

Table 2. Premenstrual Syndrome Scale scores.

Sub-dimensions of the Premenstrual Syndrome Scale	Mean±SD
Depression	20.77±4.25
Anxiety	15.62±1.47
Fatigue	16.74±2.10
Nervousness	14.13±2.21
Depressive Thoughts	18.97±3.37
Pain	8.80±2.89
Apetite Changes	6.37±1.86
Sleep Pattern Changes	7.78±2.17
Bloating	7.58±3.20
Total	116.79±12.83

Table 3. SF-12 Health-Related Quality of Life and International Physical Activity Questionnaire (Short Form) (IPAQ) results.

	PSS (+)	PSS (-)	p <sup>b</sup>
	(N=89)	(N=64)	
	n (%)	n (%)	
<b>IPAQ-SF</b>			
HEPA active	14 (16)	11 (17)	0.731
Minimally active	50 (56)	33 (51)	
Inactive	25 (28)	21 (32)	
	Mean±SD	Mean±SD	p <sup>a</sup>
<b>SF 12</b>			
Physical component	47.74 (1.77)	50.26 (1.61)	0.001*
Mental component	40.24 (1.26)	44.00 (2.00)	<0.001

\* p<0.05. p<sup>a</sup>: t-test. p<sup>b</sup>: Chi-square test. PSS: Premenstrual Syndrome Scale. PSS(+): Students with Premenstrual Syndrome. PSS(-): Students without Premenstrual Syndrome. SF-12: SF-12 Quality of Life Scale. IPAQ-SF: International Physical Activity Questionnaire-Short Form. HEPA: Health-Enhancing Physical Activity.

than those without PMS.

When the results obtained regarding the menstrual status of the participants participating in the study were examined, results were found to be the same as in previous studies. In the study conducted by Akarsu et al., it was reported that the onset age of menstruation in students was between 13.2±1.2 years and that 32.6% of participants had regular menstrual cycles.<sup>19</sup> In another study, it was shown that this variable was 12.3±0.81 years.<sup>26</sup> In our study, the age of onset of menstruation in students was 13.39±1.22 years. In addition to this result, it was observed that 41.2% of the students had irregular menstrual cycle. When the students were divided into two groups with PSS score of 111 and above, the rate of those with irregularity in the PMS group increased to 51.6%. In the group without PMS, this situation was found to be 31.6%. Our study findings are consistent with the study of Akarsu et al.<sup>19</sup> The onset of menstrual symptoms was predominantly 1 week before the menstruation in the PMS group and 2-3 days before the menstruation in the non-PMS group. It was understood that menstrual symptoms appeared earlier in the group with PMS. When the pain status of the participants was compared, it was found that in the case of severe pain during the menstrual period, it was significantly higher in the PMS group. In the study conducted by Yilmaz et al., pain severity was reported as 5.66±2.36 cm on the VAS scale.<sup>27</sup> In our study,

pain intensity was defined as mild and severe pain, and mean score of the severe pain was determined as 7.65±1.12 cm on the VAS.

The mean PSS score of the participants participating in the study was 116.79±12.83. It was observed that 58.2% of the participants got 111 points and above. In the analysis of the PSS results, it was understood that our study showed similar results to the previous studies. In a study by Aba et al., it was reported that the mean PSS score was 122.14±32.60 and the PMS ratio was 65.2%.<sup>28</sup> In a systematic review study investigating the incidence of PMS, it was reported that it was 47.8% on average, with the lowest incidence in France (12%) and the highest in Iran (98%).<sup>29</sup> The PSS results of the students participating in our study were examined in detail. The most common parts of the scale that students complained about were depressive affect and depressive thoughts.

In the literature, results are investigating the effects of PMS on quality of life and physical activity level. Although there is a common consensus that PMS negatively affects the quality of life, there is no such consensus on the level of physical activity. In the study of Aba et al., it was found that PMS significantly reduced the quality of life. It has been reported that the parameters of depressive affect, anxiety, fatigue, irritability, depressive thoughts, and sleep change affect the quality of life significantly.<sup>30</sup> In the present study, we found that no significant relationship between

physical activity level and PMS. As the reason for this, it was shown that most of the students participating in the study were inactive individuals. In our study, a relationship between physical activity level and PMS was investigated, and it was found that there was no significant difference between groups. PMS significantly reduced the quality of life, and it was found to be significantly lower in the mental dimension score as well as the physical dimension score. In the study performed by Akmalı et al. on healthcare employees, it was reported that the presence of PMS significantly reduced the quality of life.<sup>18</sup> Similarly, in the study of Nisar et al., it was reported that quality of life, emotional state, and academic achievement were negatively affected.<sup>30</sup> Similar to these results, the study conducted by Sahin et al. showed that the presence of PMS significantly reduced the quality of life.<sup>15</sup>

#### Limitations

The limitation of the present study is that the level of physical activity was evaluated with a questionnaire. It has been determined that in determining the level of physical activity, it should be evaluated with methods based on objective measurements (i.e., accelerometer).

#### Conclusion

It was found that PMS significantly reduced the quality of life, but PMS did not have a significant effect on physical activity level. We suggest that further studies are needed to determine the physical activity level during the menstrual cycle.

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