

Prevalence of premenstrual syndrome in adolescent girls

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ABSTRACT

Background. Premenstrual syndrome (PMS) is characterized by physical, cognitive, emotional, and behavioral symptoms that appear during the luteal phase of the menstrual cycle, disappear after menstruation, and are recurrent in every cycle. PMS significantly affects the social and academic lives of adolescents, and historically, it has been neglected by healthcare professionals. We aimed to evaluate the current point prevalence of PMS in Turkish adolescents presented to a tertiary adolescent medicine clinic.

Material and Method. Adolescent girls between the ages of 12 and 18 and who had regular menstrual cycles for at least three months without any mental or chronic illness were assessed. A clinic information form and the 'Premenstrual Syndrome Scale' (PMSS) questionnaire were completed. Those with a PMSS total score of more than 50% of the total score (>110 out of 220) were classified as PMS (+). Those classified as PMS were further classified as mild-moderate (score: 110-150) and severe (>150).

Results. The study included 417 adolescents. The point prevalence of PMS was found to be 61.2% (n:255). Of those with PMS, 49.4% had mild-moderate and 50.6% had severe PMS. The mean PMSS score was 154.56 ± 30.43 in the PMS group and 76.17 ± 20.65 in the non-PMS group ($p < 0.001$). The mean age was 15.41 ± 1.3 years in the PMS group and 14.88 ± 1.35 years in the non-PMS group ($p = 0.029$). None of the youth in our study applied to our clinic due to any premenstrual complaints.

Conclusion. PMS is frequently observed in youth, as indicated by our study. Adolescents have little awareness of PMS and their need for healthcare services. During the evaluation of adolescents, it is important for health care providers to acquire knowledge regarding the features of menstrual cycles and conduct a comprehensive psychosocial assessment.

Key words: adolescent health, adolescent girls, premenstrual syndrome, prevalence.

Premenstrual syndrome (PMS) is a cluster of physical, emotional, and behavioral symptoms triggered in the luteal phase starting with ovulation and regressing in the first few days of menstruation, leading to impairment in the academic, social, or individual functioning of the person and cannot be better explained by another diagnosis.^{1,2} The etiology of PMS has not

been fully clarified. It is stated that the current symptoms are related to increased sensitivity to changes in estrogen and progesterone hormone levels during the menstrual cycle.^{3,4} Estrogen and progesterone have been shown to cause psychiatric symptoms via serotonin, dopamine, γ -aminobutyric acid (GABA) pathways, and physical symptoms via the renin-angiotensin-aldosterone system (RAAS). Commonly reported symptoms include headache, breast tenderness, depression, anxiety, social withdrawal, increased appetite, abdominal distension, fatigue, mood swings, irritability, and edema.⁵ Although these symptoms start in

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adolescence, most women present to the clinic for treatment in their late 20s.⁶

Despite the fact that the exact prevalence of PMS is not known, it has been shown that up to 80% of women experience some physical and emotional changes before the onset of menses, 20 to 40% experience some degree of functional impairment and 2.5-5% have a significant effect on functionality.⁶

Studies evaluating the prevalence of PMS prospectively, are quite limited in the literature. In a meta-analysis conducted by Direkvand-Moghadam et al. the prevalence of PMS was found to be 47.8%.⁷ The lowest prevalence was found to be 12.0% in France, and the highest prevalence was found to be 98.0% in Iran⁸. Similar results were obtained in PMS prevalence studies conducted in our country. Güvenç et al. included 250 nursing students with a mean age of 19.89 ± 1.43 in their study in 2012, and reported the prevalence of PMS as 36.4%.⁹ In a 2004 study by Derman et al. on adolescent girls between the ages of 12-16, the rate of PMS was found to be 61.4%. PMS was mild in 49.5%, moderate in 37.1% and severe in 13.4% of the patients.¹⁰

Premenstrual symptoms are observed very frequently and at similar rates in the adolescent age group as in adults. However, PMS is among the most frequently missed and untreated diagnoses in this age group, which significantly affects the social and academic life.⁷ We aimed to evaluate the current point prevalence of PMS in Turkish adolescents presented to a tertiary adolescent medicine clinic.

Methods

This study was conducted at the Division of Adolescent Medicine at Hacettepe University İhsan Doğramacı Children's Hospital, with female adolescents aged 12-18 years who had regularly menstruated for at least 3 months. Adolescents without chronic and/or psychiatric illness were included in the study. Study approval (GO20/838) was obtained from the

Hacettepe University Non-Interventional Clinical Research Ethics Committee. Written assent was obtained from the adolescents and written consent was obtained from their care provider.

A clinic information form was filled out and age, anthropometric measurements (weight, height and body mass index (BMI), and menstrual characteristics such as age at menarche and menstrual cycle duration were recorded. We also recorded if the individual had sought medical care at our clinic for any premenstrual concerns. In addition, the 'Premenstrual Syndrome Scale' (PMSS) was filled out for each patient. This scale was developed by Gençdoğan in 2006 according to DSM III and DSM IV-R and aims to measure the severity of premenstrual symptoms.¹¹ The lowest score that can be obtained from the scale is 44 and the highest score is 220. Those with a PMSS total score of more than 50% of the total score are classified as PMS positive (>110). Those classified as PMS positive were further classified as mild-moderate if they scored between 110-150 and severe if they scored >150.

Statistical analyses

The statistical evaluation of results was performed using IBM SPSS 22 program (Chicago, IL). The distribution of variables was examined using the Kolmogorov-Smirnov test. Numerical data are presented as mean \pm SD, and prevalence data are presented as n (%). To assess differences between numerical variables independent samples t-test was employed for normally distributed data and Mann-Whitney U test was used for non-normally distributed data. The level of significance was set at $p < 0.05$.

Results

The study included 417 adolescent female patients. When the participants were classified according to the PMSS, 255 were determined to have PMS (61.2%) with a mean score of 154.56 ± 30.43 . Of those with PMS, 126 (49.4%) had mild-moderate PMS with a mean score of 129.01 ± 11.74 , and 129 (50.6%) had severe PMS with

a mean score of 179.91 ± 20.34 . The mean age was slightly higher in the PMS group compared to the non-PMS group ($p= 0.032$). Other data were similar in both groups. Anthropometric measurements and menstrual information of the participants are given in Table I. None of the participants in our research sought medical attention at our clinic for any premenstrual issues.

Discussion

The aim of this cross-sectional, prospective evaluation, was to assess the point prevalence of PMS in a group of Turkish females. We found the point prevalence of PMS to be 61.2% in this population, and more importantly, of those PMS (+) individuals over 50% were classified as having severe PMS. Diagnosing PMS in adolescence is challenging due to several factors, including the lack of clear diagnostic criteria during this stage, the irregularity of adolescent menstrual cycles, the potential confusion between PMS symptoms and normal puberty symptoms, and the tendency of adolescents to withhold information about this issue unless specifically asked.¹²

The prevalence of adolescents meeting the diagnostic criteria for PMS ranges from 42% to 78% in the literature.^{2,13} In 2023, the prevalence of PMS in adolescent girls in China was found to be 24.6%.¹⁴ In the same year, a study conducted among university students in South Korea found that severe PMS findings were

72.7%.¹⁵ In 2019, in a cross-sectional study conducted on high school students in Iran, the PMS rate was found to be 33.9%.¹⁶ In a meta-analysis conducted in Turkey, the prevalence of PMS was analyzed in 6890 women of reproductive age. A total of 18 studies reporting the prevalence of premenstrual syndrome in Turkey were included in this meta-analysis and the prevalence of PMS was found to be 52.2%.¹⁷ The subgroup prevalence was 59% in high school students, 50.3% in university students and 66% in women in the general population. Meta-regression analysis showed that there was no significant relationship between the mean age of the participants and the prevalence of premenstrual syndrome. The results of this study also showed that PMS is common among Turkish women of reproductive age. In a study conducted in our department in 2004, the prevalence was found to be 61.4% in 171 adolescent girls with a mean age of 13.9 years.¹⁰ Our study builds upon the 2004 findings by Derman et al. by providing updated prevalence data and examining trends over time with a larger sample size. Given the potential changes in lifestyle, environmental factors, and healthcare practices over the past two decades, it is crucial to revisit and update these findings. These studies demonstrate the vast variation in the prevalence of this disorder. The absence of a definitive rate can be attributed to the variations in PMS diagnosis criteria employed in research studies and the limitations of community-based studies.² Additionally, cultural attitudes and perceptions towards menstruation and

Table I. Anthropometric measurements and menstrual information of the participants.

Anthropometric measurements and menstruation information	PMS N: 255	Non-PMS N:162	p value
PMSS scores	154.56 ± 30.43	76.17 ± 20.65	<0.001
Age (years)	15.41 ± 1.30	14.88 ± 1.35	0.032
Height (cm)	160 ± 5.48	161.48 ± 6.85	0.580
Body weight (kg)	58.16 ± 9.98	57.76 ± 15.59	0.856
BMI (kg/m ²)	22.47 ± 3.90	21.97 ± 4.79	0.512
Age at menarche (years)	11.80 ± 1.04	11.85 ± 1.19	0.777
Menstrual duration (days)	5.76 ± 1.00	5.87 ± 1.05	0.557

BMI: body mass index, PMS: premenstrual syndrome, PMSS: PMS Scale

women's health may influence the reporting and recognition of PMS symptoms, further complicating prevalence estimates. Another factor could be the age range of adolescents included in the studies. The increase in ovulatory cycles with age might lead to a higher PMS prevalence. The age difference between PMS and non-PMS adolescents in our study can be interpreted to suggest that PMS prevalence might be even higher in late adolescence.

According to the Royal College of Obstetricians and Gynecologists (RCOG) guidelines, the diagnosis of PMS depends on the prospective recording of symptoms for at least two cycles using a tool such as the daily recording of the severity of symptoms.¹⁸ This recording system may not work in adolescents in whom irregular and anovulatory cycles are frequently observed and for this reason it is important that PMS be inquired as a routine part of the evaluation. In addition, adolescents have low health care seeking habits. Therefore, compliance with recording systems and follow-ups that require prospective responsibility and attention are health behaviours that are difficult for many adolescents. Even in adult women, studies have shown that although 80 percent of women experience mood and physical symptoms related to the menstrual cycle and 50 percent have a problem with functioning at work, only a quarter of them seek help.¹⁹ Therefore, asking an adolescent to record her symptoms and come back may delay treatment or discourage the patient from giving feedback.

Psychosocial development throughout adolescence might create upheaval that complicates the diagnosis of PMS in youth. During middle adolescence, disagreements and mood variations between parents and adolescents occur more frequently and with greater intensity. If sudden shifts in mood occur during the luteal phase of the menstrual cycle, they may be seen as psychological symptoms of PMS, which are commonly considered typical psychological and behavioral patterns during this time.²⁰ Under such circumstances, it may be unwise to base one's actions solely on the

symptoms observed during a limited number of cycles. Conversely, it is important to do thorough psychosocial questioning to avoid any delay in diagnosing PMS.

To address these issues, it is essential to gather a comprehensive and thorough medical history from an adolescent. This should include details such as the age of onset of menstruation, frequency of menstrual cycles, characteristics of menstrual bleeding, presence of dysmenorrhea, evaluation of premenstrual syndrome using a standardized scale, assessment of physical and mental distress, duration of symptoms, and any concurrent medical conditions or treatments. Obtaining this information will provide us with the necessary data for diagnosing PMS.¹⁹

A significant finding of the study was the lack of medical consultation for premenstrual issues among participants, despite the high prevalence of PMS symptoms. We hypothesize several factors contributing to this phenomenon. Firstly, the limited knowledge about PMS among adolescents and their parents can be attributed to insufficient education on menstrual health within school curricula and familial settings.²¹ Secondly, cultural taboos surrounding menstruation perpetuate a lack of open discussion and awareness regarding PMS.²² Lastly, the accessibility and availability of healthcare services, particularly adolescent-friendly clinics, play a crucial role in determining whether medical advice is sought for PMS symptoms.²³

While there is debate about the use of diagnostic scales in adolescents, we maintain that they can serve as a valuable tool for screening for PMS. Subsequently, a comprehensive examination can be carried out for those who test positive. The PMSS scale utilized in this study has demonstrated its reliability in diagnosing PMS and determining its severity.¹¹

Our study has some limiting features. The most important limitation is the small number of participants. In addition, detailed clinical interviews could not be performed to confirm

the diagnosis of our participants. The fact that our study was conducted among adolescents who applied to a tertiary adolescent medicine clinic may have caused the point prevalence to be higher. Additionally, the only available socio-demographic data pertained to the geographical location, with all patients originating from the same city. We recognize that more comprehensive socio-demographic and clinical data would have been valuable for a more detailed analysis. Despite these limitations, we believe that it is an important contribution to the literature in assessing the prevalence of PMS in adolescent girls in our country. Future longitudinal, cross-cultural studies with large and representative samples from diverse populations using standardized diagnostic criteria are needed.

Conclusions

PMS is a highly prevalent condition in the adolescent age group and severe cases are also prominent. However, it is also among the most frequently missed and untreated diagnoses in this age group. When left untreated, it can significantly interfere with their daily functioning, including school attendance.²⁴ Adolescents and adults exhibit variations in the diagnosis and monitoring of PMS. The level of awareness among adolescents regarding PMS and their need for healthcare services related to this issue is insufficient. Healthcare providers should familiarize themselves with the characteristics of the menstrual cycle and perform a comprehensive psychosocial assessment when examining youth, even if the presenting complaint is not PMS-related. By raising awareness, destigmatizing menstruation, and providing support services, PMS could be managed more effectively. This can be accomplished by implementing comprehensive menstrual health education programs in schools, launching public health campaigns, and raising awareness about PMS. Adolescent and adult women accept PMS symptoms as a natural part of their lives and

do not complain about them. Encouraging open discussions, promoting positive media representation, and supporting advocacy for menstrual equity can help destigmatize menstruation. Additionally, establishing adolescent-friendly clinics, offering counseling services, and developing school-based support systems will provide the necessary support services for effective PMS management. These actions collectively aim to normalize menstruation, improve understanding, and ensure access to appropriate care for adolescents experiencing PMS.

Ethical approval

Study approval (GO20/838) was obtained from the Hacettepe University Non-Interventional Clinical Research Ethics Committee.

Author contribution

The authors confirm contribution to the paper as follows: study conception and design: SA, OA, LJ, MPK, data collection: OA, LJ, DAA; analysis and interpretation of results: OA, LJ, DAA, MPK, OD, SA; draft manuscript preparation: OA. All authors reviewed the results and approved the final version of the manuscript.

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Conflict of interest

The authors declare that there is no conflict of interest.

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