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# Does premenstrual syndrome (PMS) affect the lifestyle of adolescent/young college students?

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**Abstract**

**Objectives:** Premenstrual syndrome (PMS) commonly affects adolescent and young women in educational settings, making it an important public health issue. Lifestyle is one of the essential subjects in health. This study assesses how PMS affects the lifestyle of young and adolescent students.

**Methods:** This analytical cross-sectional study utilized a multi-stage cluster sampling method to recruit 450 students from various faculties at Babol University of Medical Sciences. The data collection instruments were self-administered questionnaires that captured variables related to demographics, fertility, anthropometry, premenstrual symptoms screening tool (PSST), and health-promoting lifestyle profile (HPLP). All instruments were completed by the student participants. For all statistical analyses, the threshold for significance was set at $p<0.05$.

**Results:** The results of this study showed that a significant percentage (81.1 %) experienced severe symptoms of PMS. The total lifestyle score was significantly higher in the non-PMS group (131.01 vs. 124.03, $p=0.002$). A significant negative correlation was reported between lifestyle scores and PSST ($r=-0.236$, $p<0.001$). On multiple regression analysis, the income satisfaction ($\beta=-9.644$, $p=0.007$) and PSST ($\beta=-4.142$, $p=0.070$) acted as negative predictors of lifestyle. On the other hand, dissatisfaction with income adequacy and PSST indicated a lower level of lifestyle.

**Conclusions:** PMS had a tremendous impact on students' lifestyles. On the other hand, students who had PMS also had lower lifestyles. These results can help health policymakers to provide appropriate intervention strategies to reduce the severity of PMS and promote healthier lifestyles.

**Keywords:** premenstrual syndrome; lifestyle; adolescence; college student; university

## Introduction

Premenstrual syndrome (PMS) is notably intricate with both gynecological and psychiatric manifestations, presenting a spectrum of cognitive, affective, and somatic symptoms [1]. Affecting nearly half (47.8 %) of women of reproductive age globally, PMS is highly prevalent. A subset of 3–8 % of cases experience severe symptoms that substantially disrupt daily life [2]. The experience of at least one PMS is a near-universal occurrence among women during their reproductive cycles [3]. PMS presents a range of common physical and emotional symptoms that can significantly vary between individuals. Physically, women often report appetite fluctuations, breast tenderness, bloating, weight gain, headaches, and swelling in the hands or feet, alongside skin and gastrointestinal problems like constipation and diarrhea. Emotionally, common experiences include feelings of depression, irritability, anxiety, confusion, a tendency to withdraw socially, difficulty concentrating, and changes in sex drive [4].

Lifestyle is one of the essential subjects in health [5]. A healthier lifestyle will lead to better mental health among university students [6]. Evidence suggests a correlation between lifestyle factors – including diet, physical activity, and tobacco use – and the manifestation of PMS symptoms.

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Consequently, the promotion of healthy lifestyle modifications presents a viable primary strategy for mitigating the incidence of both dysmenorrhea and PMS, thereby enhancing the quality of life for young women [7]. Female students are a demographic particularly susceptible to the effects of PMS. The condition can disrupt their daily lives, academic performance, and psychomotor functions through its impact on cognitive-emotional processes. This may be especially pronounced among medical students, as the rigorous demands of their curriculum – requiring sustained concentration, high-level cognition, and mastery of critical skills – can be disproportionately affected by severe PMS symptoms. The global prevalence of PMS among student populations, however, varies significantly [8, 9].

A study concludes that fostering a healthy lifestyle – specifically through improved time management to promote better sleep and the adoption of effective coping mechanisms to alleviate academic stress – constitutes a key strategy for mitigating PMS symptoms among student populations [10]. Furthermore, a significant inverse correlation was showed between high levels of physical activity and the risk of developing PMS in the population of female university students [11]. The one study's result showed a statistically significant reduction in the severity of PMS, anxiety, depression, and stress among students following the counseling intervention, as compared to pre-intervention levels [12]. In another study, although academic performance was not affected by PMS and Premenstrual dysphoric disorder (PMDD), they significantly impacted the emotional and behavioral aspects of students' lives. Therefore, psychological support and awareness-raising strategies are essential for promoting student health [13].

Self-actualization and stress management are associated with a reduction in PMS symptoms. Improving health-promoting lifestyle behaviors, particularly in the psychological dimension, may also help alleviate PMS symptoms among university students [14]. Given the widespread prevalence of PMS and the importance of lifestyle, which may be significantly associated with academic dysfunction among students, the aim of this study is to investigate the impact of PMS on the lifestyle of adolescent/young students in Babol, Iran.

# Methods

## Design

This analytical cross-sectional study was conducted between July 2023 and May 2025. During the baseline survey, eligible college students were identified based on predefined inclusion and exclusion criteria and were subsequently invited to participate in the research.

## Settings

This analytical cross-sectional study employed a multi-stage cluster sampling method to recruit students from various faculties of Babol University of Medical Sciences who met the predefined inclusion criteria. Data collection was carried out using a set of structured questionnaires, including a demographic-fertility questionnaire, anthropometric measurements, a lifestyle assessment, and the premenstrual symptoms screening tool (PSST). The sample size was determined with reference to the methodology established in the prior study by Abu Alwafa et al. [15], which reported the prevalence of premenstrual syndrome as 62.7 %; therefore, the p value was estimated to be 0.627. To determine the sample size for this cross-sectional study, assuming an alpha of 0.047 (a 95 % confidence level) and a 5 % margin of error, a minimum of 408 subjects was estimated using the following formula. Accounting for an approximate 10 % dropout rate, a final sample size of 450 was estimated.

$$n = \frac{\left(z_{1-\alpha/2}\right)^2 p(1-p)}{d^2} = \frac{4 \times p(1-p)}{d^2}$$

## Participations

This study involved 450 students from Babol University of Medical Sciences. The inclusion criteria required participants to be students of the university who consented to participate, had regular menstrual cycles (21–35 day intervals lasting 3–7 days) for at least six months, and were free from several conditions: current use of antidepressants or anti-anxiety medications, stressful life events in the prior six months. Exclusion criteria comprised a history of reproductive system diseases, chronic illnesses, hormonal disorders, severe psychological disorders (including major depression, bipolar disorder, or suicidal thoughts), substance or alcohol abuse, and unwillingness to continue participation and incomplete questionnaire responses. All participants provided written informed consent before their involvement in the research.

## Variables

The independent variable in this study was PMS, while the dependent variable was the lifestyle.

## Measurements

The data analysis tools included self-administered questionnaires covering demographic and fertility information, anthropometric characteristics, PSST, and lifestyle, all of which were completed by the students.

## The premenstrual symptoms screening tool (PSST)

This tool is an efficient and effective screening instrument [16]. PSST is a 19-item instrument divided into two distinct sections. The first part comprises 14 items evaluating mood, physical, and behavioral symptoms, while the second part contains 5 items that assess the functional impact of these symptoms on an individual's daily life. Each item is rated on a 4-point scale of severity: none (0), mild (1), moderate (2), or severe (3).

A diagnosis of moderate-to-severe PMS requires the simultaneous fulfillment of the following three criteria:

(1) At least one of the first four core affective symptoms (items 1–4) must be rated as moderate or severe.
(2) A minimum of four symptoms in total from the first section (items 1–14) must be rated as moderate or severe.
(3) At least one item in the functional impact section (the final 5 questions) must be rated as moderate or severe.

The internal consistency of the questionnaire's questions was assessed using Cronbach's alpha. This value was 0.90 for the symptoms section, 0.91 for the section on the impact of symptoms on life, and 0.93 for all questions. The intra-class correlation between these two sections was 0.8. In the qualitative content validity assessment, necessary changes were made to the questionnaire based on the opinions of relevant experts. Furthermore, in the quantitative content validity discussion, which utilized both the content validity ratio (CVR) and the content validity index (CVI), these values were obtained as 0.7 and 0.8, respectively [17].

## The health-promoting lifestyle profile (HPLP)

Lifestyle was assessed using the Health-Promoting Lifestyle Profile II (HPLP II) developed by Walker et al. This comprehensive instrument comprises 52 items categorized into six distinct dimensions: health responsibility, physical activity, nutrition, spiritual growth, interpersonal relations, and stress management. Responses are recorded on a 4-point Likert scale, ranging from 1 ("Never") to 4 ("Always"). The total score is calculated by summing all responses, yielding a possible range of 52–208, where a higher aggregate score indicates a more health-promoting lifestyle. The reliability for the entire questionnaire has been reported as 0.92, and for its subscales, it ranges from 0.70 to 0.90 [18]. For the Persian version, the reliability for the entire questionnaire has been reported as 0.82 ($\alpha$=0.82) [19].

## Analysis

For data analysis, SPSS software (version 27) was used. Descriptive statistics are presented as mean ± standard deviation for continuous variables and as frequencies and percentages for categorical variables. For the analytical statistics, the normality of the distribution for quantitative data was assessed using the Kolmogorov-Smirnov test. Based on this assessment, if the data followed a normal distribution, Pearson's correlation coefficient was used to examine relationships between continuous variables, and an independent *t*-test was applied to compare means across categorical variables. The Fisher's Exact Test was utilized for contingency tables where applicable. If the normality assumption was violated, non-parametric equivalents were employed, namely the Mann-Whitney U test for group comparisons. To control for potential confounders, a multiple linear regression model was constructed. For all statistical tests, a p-value of less than 0.05 was considered statistically significant.

# Results

Table 1 examines the sociodemographic characteristics of women based on the presence of PMS. The results showed that the mean age in the PMS group (22.77 ± 2.60 years) was significantly higher than in the non-PMS group (22.16 ± 3.55 years) (p=0.037). Body mass index was also higher in the PMS group (24.63 ± 3.55) compared to the non-PMS group (23.36 ± 3.9) (p=0.001). The age at menarche was higher in the PMS group than in the non-PMS group (12.88 vs. 12.37 years, p<0.001). No differences were observed between the two groups regarding the duration of menstrual bleeding or the duration of dysmenorrhea. Qualitative variables such as residence status, parental education, university acceptance status, and income satisfaction generally showed no significant differences between the two groups. In contrast, a history of absenteeism from classes due to symptoms (p<0.001) was significantly more common in the PMS group (Table 1).

The mean duration of PMS among the students was 6 years (6.03 ± 2.21). Table 2 examines the severity of PMS

**Table 1:** Sociodemographic data of the study participants (n=450).

| Variable | No PMS[a] (n=286) (Mean ± SD) | PMS[a] (n=164) (Mean ± SD) | p-Value |
|---|---|---|---|
| Age, years | 22.16 ± 3.55 | 22.77 ± 2.60 | 0.037[b] |
| BMI, kg/m$^2$ | 23.36 ± 3.9 | 24.63 ± 3.55 | 0.001[b] |
| Menarche, years | 12.37 ± 1.07 | 12.88 ± 1.30 | <0.001[b] |
| Duration of bleeding, day | 6.33 ± 1.46 | 6.35 ± 1.40 | 0.882[c] |
| Duration of dysmenorrhea, years | 2.63 ± 1.80 | 2.64 ± 2.08 | 0.501[c] |
| **Variable** | **No PMS[a] (n=286) f, %** | **PMS[a] (n=164) f, %** | **p-Value** |
| **Acceptance** | | | |
| Daily | 248 (62.2) | 151 (37.8) | 0.91[e] |
| Payer | 38 (74.5) | 13 (25.5) | |
| **Residence** | | | |
| Urban | 237 (63.5) | 139 (37.0) | 0.692[e] |
| Rural | 49 (66.2) | 25 (33.8) | |
| **Father's education** | | | |
| Illiterate | 44 (62.9) | 26 (37.1) | 0.985[d] |
| Diploma or lower | 95 (63.3) | 55 (36.7) | |
| University | 147 (63.9) | 83 (36.1) | |
| **Mother's education** | | | |
| Illiterate | 44 (61.1) | 28 (38.9) | 0.823[d] |
| Diploma or lower | 121 (63.0) | 71 (37.0) | |
| University | 121 (65.1) | 65 (34.9) | |
| **Satisfaction with income** | | | |
| Satisfied | 86 (61.0) | 55 (39.0) | 0.055[d] |
| Somewhat satisfied | 170 (67.7) | 81 (32.3) | |
| Dissatisfied | 30 (51.7) | 28 (48.3) | |
| **Absence from class** | | | |
| Yes | 57 (44.9) | 70 (55.1) | <0.001[e] |
| No | 229 (71.1) | 93(28.9) | |

[a]Premenstrual syndrome. [b]Independent samples test. [c]Mann-Whitney test. [d]Chi-square test. [e]Fisher's exact test.

**Table 2:** Distribution of PSST[a] severity scores among participants with PMS[b].

| Variables | Number | Percent |
|---|---|---|
| Mild (0–19) | 2 | 1.2 |
| Moderate (19–28) | 29 | 17.7 |
| Severe (>28) | 133 | 81.1 |
| Total | 164 | 100.0 |

[a]Premenstrual symptoms screening tool. [b]Premenstrual syndrome.

symptoms using the PSST questionnaire. The results indicated that a significant percentage (81.1 %) experienced severe symptoms (Table 2).

Table 3 compares different dimensions of lifestyle between the two groups. The findings revealed significant differences in the dimensions of responsibility (18.67 in PMS vs. 21.33 in non-PMS, p<0.001), physical activity (17.01 in PMS vs. 18.96 in non-PMS, p<0.001), nutrition (21.74 in PMS vs. 22.89 in non-PMS, p=0.008), and stress management (18.33 in PMS vs. 19.68 in non-PMS, p<0.001). However, no significant differences were observed in spiritual growth and social relationships. Additionally, the total lifestyle score was significantly higher in the non-PMS group (131.01 vs. 124.03, p=0.002). These results emphasize the role of a healthier lifestyle in reducing the occurrence of PMS (Table 3). The results of Pearson's correlation coefficient revealed a significant negative relationship between lifestyle and the severity of PSST (r=−0.236, p<0.001). As the PSST score increased, the lifestyle score decreased. On the other hand, improvement in lifestyle was associated with a reduction in symptom severity. Additionally, income satisfaction had a negative impact on the lifestyle associated with PMS, meaning that lower income satisfaction was correlated with a poorer lifestyle (β=−9.644, p=0.007).

The scatter plot shows a negative relationship between the lifestyle score (LSQ) and the severity of PSST symptoms. The negative slope of the regression line (β=−0.477) indicates that as the severity of PSST symptoms increases, the lifestyle score decreases. The coefficient of determination ($R^2$=0.056) suggests that approximately 5.6 % of the variation in lifestyle is explained by the severity of PSST symptoms. Although this value is relatively low, the direction of the relationship indicates that higher symptom severity is associated with a lower quality of lifestyle (Figure 1).

The results of the multiple linear regression analysis are presented in Table 4. In the multiple regression for lifestyle, the variables of age, BMI, bleeding duration, absence from class, maternal education, income satisfaction, and PSST were entered into the model. After adjusting for other variables, the multiple regression analysis results revealed that income satisfaction (β=−9.644, p=0.007) and PSST (β=−4.142, p=0.070) acted as negative predictors of lifestyle. On the other hand, dissatisfaction with income adequacy and PSST indicated a lower level of lifestyle (Table 4).

## Discussion

Our study showed whether PMS affects the lifestyle of adolescent/young college students. The results of this study revealed that a significant percentage (81.1 %) of students experienced severe symptoms. In line with our study, the

**Table 3:** Levels of lifestyle scores of participants by PMS[a] status.

| Variable | No PMS (n=286) | PMS (n=164) | 95 % CI | | p-Value[b] |
|---|---|---|---|---|---|
| | (Mean ± SD) | (Mean ± SD) | Lower bound | Upper bound | |
| Spiritual growth | 24.14 ± 4.86 | 23.88 ± 4.64 | −1.179 | 0.660 | 0.580 |
| Responsibility | 21.33 ± 5.01 | 18.67 ± 4.47 | −3.593 | −1.736 | <0.001 |
| Physical activity | 18.96 ± 4.41 | 17.01 ± 4.37 | −2.793 | −1.100 | <0.001 |
| Nutrition | 22.89 ± 4.52 | 21.74 ± 4.25 | −2.004 | −0.298 | 0.008 |
| Social relationships | 23.98 ± 4.52 | 24.37 ± 4.29 | −0.459 | 1.250 | 0.364 |
| Stress management | 19.68 ± 3.79 | 18.33 ± 3.46 | −2.060 | −0.645 | <0.001 |
| Lifestyle (total) | 131.01 ± 24.53 | 124.03 ± 19.90 | −11.357 | −2.602 | 0.002 |

[a]Premenstrual syndrome. [b]Independent t-test.

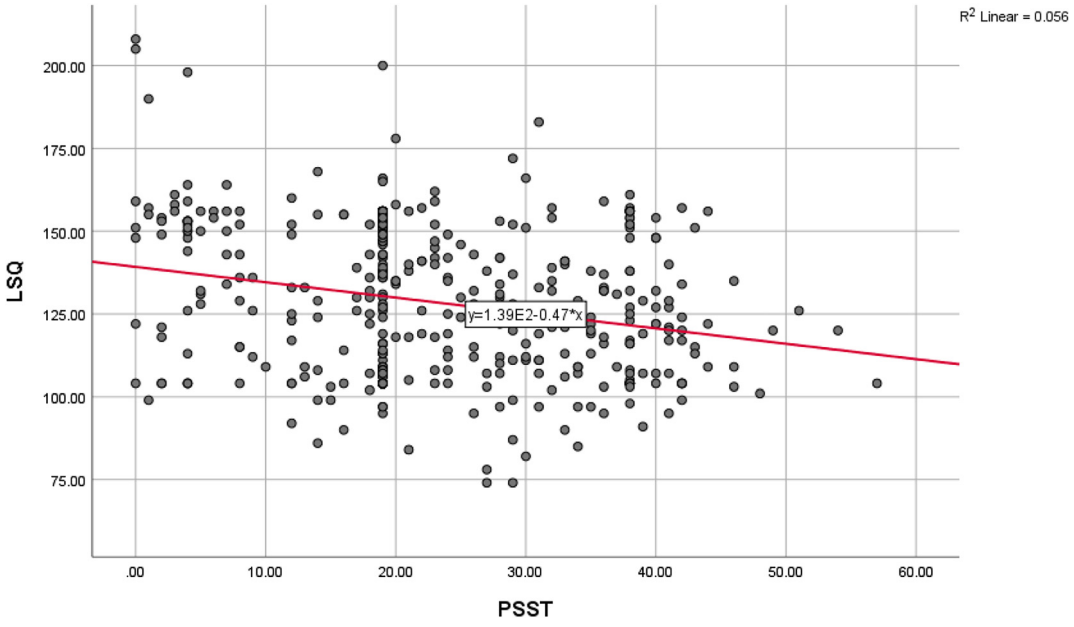


**Figure 1:** Distribution of lifestyle scores among students with PMS.

**Table 4:** Results of multiple linear regression analysis for lifestyle and demographic characteristics in students with PMS[a].

| Variable | Lifestyle | | | |
|---|---|---|---|---|
| | β[b] | 95 % CI[c] | | p-Value[e] |
| | | Lower bound | Upper bound | |
| Constant | | 87.27 | 128.47 | <0.001 |
| Age | 0.397 | −0.31 | 1.10 | 0.272 |
| BMI[d] | 0.474 | −0.10 | 1.05 | 0.110 |
| Duration of bleeding | 4.684 | −0.82 | 10.19 | 0.960 |
| Absence from class | −0.420 | −6.09 | 5.25 | 0.885 |
| Mother's education | 4.495 | −1.63 | 10.62 | 0.151 |
| Satisfaction with income | −9.644 | −16.62 | −2.66 | 0.007 |
| PSST[e] | −4.142 | −8.63 | 0.34 | 0.070 |

[a]Premenstrual syndrome. [b]Standardized coefficients. [c]Confidence interval. [d]Body mass index. [e]Premenstrual symptoms screening tool. [e]Multiple linear regression.

results of one study showed that 40 % of university students experienced moderate or severe premenstrual symptoms [8]. In contrast, the results of one study showed that mild symptoms were the most commonly reported symptoms among students. This study reported that symptom persistence typically fluctuates and its prevalence is influenced by cultural and geographical characteristics. France has the lowest rate of PMS (12 %), while Iran has the highest rate (98 %) [20]. This difference in different societies is due to geographical and cultural patterns, which shows that sociocultural factors deeply influence biological processes. Cultural norms dictate the acceptability of expressing pain, emotional distress, or physical discomfort. These norms directly influence how women experience and report premenstrual symptoms.

The findings of this analytical cross-sectional study demonstrated a significant association between health-

promoting lifestyle profiles and the prevalence of PMS. Specifically, students without PMS exhibited markedly higher scores in the key lifestyle dimensions of health responsibility, physical activity, nutrition, and stress management compared to their counterparts with PMS. While no significant inter-group differences were observed in the spheres of spiritual growth and interpersonal relations, the total HPLP II score was significantly greater in the PMS-free group. These results strongly suggest that a comprehensive, health-promoting lifestyle is a critical modifiable factor associated with a reduced risk and incidence of PMS among the student population. This study's findings are consistent with existing literature, which identifies PMS as a prevalent menstrual disorder that significantly disrupts the daily routines of university students. Previous research has similarly established a strong association between PMS and modifiable lifestyle factors, particularly dietary habits. In light of this evidence, experts have recommended the implementation of structured health promotion programs. These initiatives, aimed at fostering healthy diets and positive lifestyle behaviors beginning in early adolescence – particularly within the school environment – are posited as a foundational strategy for the primary prevention of PMS [21]. Consistent with this, a separate investigation reported that women in sedentary occupations experienced more pronounced physical symptoms compared to psychological and behavioral manifestations of PMS [22]. The study by Franco-Antonio et al., showed that Lifestyle habits, physical activity, diet, and tobacco use influence the occurrence of PMS, and promoting lifestyle changes can be an effective strategy for reducing the incidence of PMS [7].

The results of this study demonstrate a significant inverse correlation between overall lifestyle score and the severity of PMS symptoms, as measured by the PSST, indicating that a lower quality of lifestyle is associated with greater symptomatic burden. This finding is corroborated by prior research which, through multiple regression analysis, has identified specific behavioral risk factors. Notably, smoking was significantly associated with an increased risk of psychological and behavioral symptoms, while the consumption of high-calorie and high-salt foods was linked to a greater risk of physical symptoms. Conversely, fruit consumption emerged as a protective factor, associated with a reduced risk of behavioral symptoms. Collectively, these results substantiate that smoking and poor dietary habits constitute significant risk factors for PMS, thereby reinforcing the critical role of comprehensive lifestyle interventions in its management [8].

Therefore, PMS can influence lifestyle, and an unhealthy lifestyle can contribute to the occurrence and severity of PMS. In one study, PMS was associated with various socio-demographic, dietary, and lifestyle factors [23]. Another study found a significant association between BMI and PMS [24]. Lifestyle, particularly healthy dietary habits, along with stress reduction and avoiding unhealthy behaviors, can influence PMS [25]. In one study, diet, physical activity, and stress management were effective in reducing PMS symptoms. The authors also suggest that cultural, social, and healthcare factors based on lifestyle changes may be effective in reducing PMS symptoms [26]. Lifestyle factors – including diet, physical activity, and tobacco use – significantly influence the occurrence and severity of PMS. Consequently, promoting comprehensive lifestyle modifications represents a viable and effective primary strategy for reducing the incidence of PMS and improving quality of life, particularly among young women [7].

In our study, results showed that income satisfaction and PSST were negative predictors of lifestyle. The results of one study indicated a significant association between PMS and the consumption of fried foods, sugary drinks, fast food, fruit intake, lack of regular exercise, family history of PMS, hip circumference, and BMI. Therefore, adopting a healthy lifestyle is effective in reducing PMS [27]. Alharbi states that smoking, dietary habits, physical inactivity, and sleep patterns are modifiable risk factors associated with PMS [26]. This study's conclusion, which identifies a significant inverse relationship between lifestyle quality and PMS severity, is strongly supported by the existing body of research. As corroborated by previous authors, modifiable factors such as diet, physical activity, and tobacco use are key determinants in the occurrence of PMS. The convergence of these findings substantiates the position that the proactive promotion of a healthy lifestyle is not merely beneficial but an effective primary strategy for reducing the incidence of PMS and, ultimately, enhancing the quality of life for young women [7].

## Conclusions

PMS had a tremendous impact on students' lifestyles. On the other hand, students who had PMS also had lower lifestyles. These results can help health policymakers to provide appropriate intervention strategies to reduce the severity of PMS and promote healthier lifestyles among students, who are the adolescent and nation-building generation.

## Study limitations and suggestions

This study is subject to several limitations. Firstly, the research was conducted at a single medical sciences university in northern Iran, which may affect the representativeness

of the sample and limit the generalizability of the findings. Future studies should examine whether these results can be replicated across diverse geographical regions and broader student populations. Secondly, the study did not include adolescents or students from non-medical universities, thereby restricting a comprehensive understanding of PMS experiences among all young adults. Future research incorporating participants from diverse academic backgrounds would provide a more holistic perspective. Another limitation is that the data collection method relied on self-report questionnaires, which may be influenced by respondents' tendency to provide socially desirable answers and may be subject to social desirability bias and recall inaccuracy. Additionally, the use of qualitative methods in future investigations is recommended to gain deeper, more nuanced insights into students' lived experiences and perceptions.

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**Informed consent:** Written informed consent was provided to all students before data collection for the present research. The study was conducted under the declaration of Helsinki.

**Author contributions:** Hajar Adib-Rad, Fatemeh Zolfaghary, Fatemeh Bakouei, and Mouloud Agajani Delavar did the study design and manuscript preparation. Literature review, data analysis, and manuscript drafting were done by Hajar Adib-Rad and Zahra Geraili. Data collection was done by Nazanin Karimihamzekolaee and Hajar Adib-Rad. All authors read and approved the final manuscript.

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