

Premenstrual Syndrome and Associated Factors among Adolescent Girls: A Hospital-Based Study

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ABSTRACT

Background: The fundamental concern with premenstrual syndrome is how to appropriately identify and manage it so that women may continue to lead healthy lives. Relatively few studies, nonetheless, have lately examined the connection between premenstrual syndrome and related traits in Chennai-based females. Finding out how common premenstrual syndrome is in adolescent girls and investigating the variables associated with it are the goals of this study.

Methods: This cross-sectional study was conducted in the department of OBGY, Sree Balaji Medical College Hospital among 300 adolescent girls who attended the OPD. Principal investigator assessed the detailed history of all participants and examination was done. Using a structured questionnaire the factors associated with PMS and the pattern of menstrual cycle related details were collected.

Results: According to this study, 71.3% of participants had PMS. Frequent junk food consumption and decreased physical activity were shown to be connected with the occurrence of PMS when the relationship between several factors, including BMI, was evaluated. Among menstrual variables, the mean day of bleeding was significantly higher in PMS-afflicted patients than in PMS-free subjects.

Conclusion: Improper lifestyle may have a role in the rise in the prevalence of PMS in young girls, particularly in relation to their lifestyle, which may be changed to lessen the burden of PMS.

Keywords: School girls, Absenteeism, Premenstrual syndrome

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INTRODUCTION

The start of menarche, which is frequently linked to issues with irregular menstruation, heavy bleeding, and dysmenorrhea, is one of the key physiological changes that occur in teenage females. Among these, dysmenorrhea is a prevalent issue that many teenage females encounter.

Adolescents make up a fifth of the world's population, or over 1 billion people, and four out of five of them reside in developing nations. The number of teenagers in population predictions from the most recent Indian census has barely increased due to a slowdown in the overall population's growth rate. Menarche is the term for the first menstrual cycle. It often begins between the ages of eleven and fourteen. However, it can occur as late as age 15 or as early as age 9. The menarche is a sign of maturity. Adolescents may have tense or emotional feelings in the days leading up to their periods, as well as bloated, water-weight gain, and discomfort in the legs, back, or abdomen that lasts for a few hours or more.

Many women of reproductive age suffer from premenstrual syndrome, or PMS. During the luteal phase of menstrual cycle—the time between ovulation and the start of

menstruation—it describes a group of mental and physical symptoms that usually appear cyclically¹. Although the precise symptoms that each person experiences might differ greatly, breast soreness, bloating, exhaustion, headaches, and changes in appetite are among the physical symptoms of PMS that are often described. Anxiety, sadness, mood swings, impatience, and trouble focusing are examples of emotional and psychological symptoms². Although the precise etiology of PMS is unknown, it is believed that hormonal changes that occur throughout the menstrual cycle are a major contributing factor. PMS symptoms are specifically thought to be influenced by changes in brain chemicals like serotonin and fluctuating levels of progesterone and estrogen³. This hormonal imbalance may make managing PMS symptoms more difficult or worse. In addition to observing the variables that lead to premenstrual syndrome (PMS), such as poor quality sleep, mental impairment, and nutritional/metabolic factors, previous research showed that PMS was common among fresh female university students⁴. In addition to lowering quality of life, PMS can interfere with everyday activities and is a risk factor for a number of illnesses, including cancer,

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arthritis, stroke, Alzheimer's, and reproductive problems⁵. The primary issue with premenstrual syndrome is how to properly diagnose and treat it so that women may maintain a healthy work-life balance. However, relatively few researches have recently looked at the relationship between premenstrual syndrome and associated characteristics in girls from Chennai. The purpose of this study is to ascertain the prevalence of premenstrual syndrome in teenage girls and to examine the factors that are linked to it.

Methodology

Study Design and Setting

A hospital-based cross-sectional study was conducted to determine the prevalence of premenstrual syndrome (PMS) and to identify factors associated with its occurrence among adolescent girls. The study was carried out in the Department of Obstetrics and Gynaecology at Sree Balaji Medical College and Hospital, a tertiary care teaching hospital in Chennai, Tamil Nadu. The outpatient department caters to a diverse population from both urban and peri-urban areas, providing an appropriate setting to study menstrual health issues among adolescents.

Study Population

The study population comprised adolescent girls aged 12–19 years who attended the Obstetrics and Gynaecology outpatient department during the study period. Adolescence was defined according to World Health Organization criteria. Participants were included irrespective of their educational background, socioeconomic status, or menstrual regularity, provided they met the eligibility criteria. Adolescents who were unwilling to participate in the study or whose parents/guardians did not provide consent were excluded.

Sample Size Calculation

The sample size was calculated using the formula for estimating a single population proportion. Based on previous literature reporting a prevalence of PMS of 79%,⁶ with an absolute precision of 5% and a confidence level of 95%, the minimum required sample size was estimated to be 288. To account for potential non-response and incomplete data, the sample size was rounded off to 300 participants. All eligible adolescents presenting during the study period were consecutively recruited until the desired sample size was achieved.

Ethical Considerations

Ethical approval for the study was obtained from the Institutional Human Ethics Committee prior to commencement. The study adhered to the principles of the Declaration of Helsinki. Written informed consent was obtained from parents or legal guardians, and assent was obtained from the adolescent participants themselves after explaining the objectives, procedures, benefits, and potential risks of the study in a language they could understand. Confidentiality of participant information was strictly maintained, and participation was entirely voluntary, with the option to withdraw at any point without any impact on medical care.

Data Collection Procedure

Data collection was carried out by the principal investigator. After obtaining consent and assent, participants underwent

a detailed interview followed by a brief general and gynecological assessment where appropriate. A structured, pre-tested questionnaire was used to collect information. The questionnaire was administered in a face-to-face interview format to minimize missing data and ensure clarity of responses.

The questionnaire included sections on sociodemographic characteristics (age, educational status, type of family), lifestyle factors (dietary habits, physical activity, consumption of junk food and caffeinated beverages), and menstrual history. Menstrual-related information included age at menarche, duration of menstrual bleeding, amount of bleeding, cycle regularity, presence of dysmenorrhea, and family history of PMS.

Assessment of Premenstrual Syndrome

The diagnosis of PMS was made using the American College of Obstetricians and Gynecologists (ACOG) diagnostic guidelines. According to these guidelines, PMS is defined by the presence of at least one affective symptom (such as irritability, anxiety, or mood swings) and one somatic symptom (such as breast tenderness, bloating, or headache) occurring during the luteal phase of the menstrual cycle, resolving shortly after the onset of menstruation, and occurring for at least two consecutive cycles. Participants were classified as having PMS if they met these criteria based on their symptom history.

Assessment of Lifestyle and Associated Factors

Lifestyle factors assessed included frequency of junk food consumption, physical activity patterns (regular versus irregular), coffee intake, and residence status (day scholar or hosteller). Physical activity was categorized based on self-reported regular engagement in exercise or sports. Body mass index (BMI) was calculated using measured height and weight and classified according to standard BMI categories for adolescents. These variables were examined to assess their association with the presence of PMS.

Data Management and Statistical Analysis

All collected data were entered into Microsoft Excel and subsequently analyzed using Statistical Package for Social Sciences (SPSS) version 21. Continuous variables were summarized using mean and standard deviation, while categorical variables were expressed as frequencies and percentages.

The association between PMS and categorical variables was assessed using the Chi-square test. For continuous variables, such as age at menarche and duration of menstrual bleeding, the Independent Sample t-test was used to compare means between participants with and without PMS. A p-value of less than 0.05 was considered statistically significant for all analyses.

Results

The prevalence of PMS in this study was found to be 71.3% with 76.3% of subjects having physical symptoms, 75% of subjects having emotional symptoms and 70.3% in cases PMS had affected the subject's academic and daily routine (Table 1).

Table 1: Prevalence and symptoms of PMS

| PMS Symptoms | Frequency | Percentage |
|------------------------|-----------|------------|
| Physical symptoms | | |
| Present | 229 | 76.3 |
| Absent | 71 | 23.7 |
| Emotional symptoms | | |
| Present | 225 | 75.0 |
| Absent | 75 | 25.0 |
| Affects academics/work | | |
| Yes | 211 | 70.3 |
| No | 89 | 29.7 |
| PMS | | |
| Present | 214 | 71.3 |
| Absent | 86 | 28.7 |

On assessing the association between different variables BMI, frequent consumption of junk food and reduced physical activity were found to be associated with presence of PMS. However, the factors like age, type of family, food preference like vegetarian or non vegetarian, days scholar or hosteller and consumption of coffee were not found to be associated with the presence of PMS (Table 2).

Table 2: Association between PMS and lifestyle related factors

| Variables | Premenstrual Syndrome | | Total | p value |
|---------------------|-----------------------|---------------|------------|---------|
| | Present (N=214) | Absent (N=86) | | |
| Age group | | | | |
| 10-12 years | 63 (21) | 27 (9) | 90 (30) | 0.8471 |
| 13-15 years | 79 (26.3) | 33 (11) | 112 (37.3) | |
| 16-19 years | 72 (24) | 26 (8.7) | 98 (32.7) | |
| BMI | | | | |
| Underweight | 12 (4) | 18 (6) | 30 (10) | 0.0002* |
| Normal | 92 (30.7) | 29 (9.7) | 121 (40.3) | |
| Overweight | 79 (26.3) | 22 (7.3) | 101 (33.7) | |
| Obese | 31 (10.3) | 17 (5.7) | 48 (16) | |
| Type of family | | | | |
| Nuclear family | 196 (65.3) | 74 (24.7) | 270 (90) | 0.1479 |
| Joint family | 18 (6) | 12 (4) | 30 (10) | |
| Food preference | | | | |
| Vegetarian | 71 (23.7) | 26 (8.7) | 97 (32.3) | 0.6219 |
| Non Vegetarian | 143 (47.7) | 60 (20) | 203 (32.3) | |
| Intake of junk food | | | | |
| 1-2 times/month | 24 (8) | 28 (9.3) | 52 (17.3) | 0.0000* |
| 3-4 times/month | 127 (42.3) | 38 (12.7) | 165 (55) | |
| > 4 times/month | 63 (21) | 20 (6.7) | 83 (27.7) | |
| Residence | | | | |
| Day scholar | 112 (37.3) | 40 (13.3) | 152 (50.7) | 0.3614 |
| Hosteller | 102 (34) | 46 (15.3) | 148 (49.3) | |
| Physical activity | | | | |

| | | | | |
|------------------|------------|-----------|------------|----------|
| Irregular | 199 (66.3) | 27 (9) | 226 (75.3) | <0.0001* |
| Regular | 15 (5) | 59 (19.7) | 74 (24.7) | |
| Intake of coffee | | | | 0.229 |
| Yes | 145 (48.3) | 52 (17.3) | 197 (65.7) | |
| No | 69 (23) | 34 (11.3) | 103 (34.3) | |

*Significant

Notably, among the menstrual factors, the mean day of bleeding was remarkably high among subjects with PMS compared to subjects without PMS however the age at menarche was similar in both the groups. Dysmenorrhoea was also remarkably associated with the presence of PMS. However amount of bleeding and family history of PMS were not associated with the presence of PMS (Table 3).

Table 3: Association between PMS and menstrual symptoms

| Variables | Premenstrual Syndrome | | Total | p value |
|---------------------------------|-----------------------|---------------|------------|---------|
| | Present (N=214) | Absent (N=86) | | |
| Mean age at menarche (in years) | 12.4±1.3 | 12.5±1.1 | - | 0.5302 |
| Mean days of bleeding | 3.7±0.7 | 3.4±0.5 | - | 0.0003* |
| Amount of bleeding | | | | |
| Reduced | 51 (17) | 22 (7.3) | 73 (24.3) | 0.8542 |
| Normal | 99 (33) | 41 (13.7) | 140 (46.7) | |
| High | 64 (21.3) | 23 (7.7) | 87 (29) | |
| Dysmenorrhoea | | | | |
| Present | 170 (56.7) | 47 (15.7) | 217 (72.3) | 0.0001* |
| Absent | 44 (14.7) | 39 (13) | 83 (27.7) | |
| Family h/o of PMS | | | | |
| Present | 56 (18.7) | 29 (9.7) | 85 (28.3) | 0.1892 |
| Absent | 158 (52.7) | 57 (19) | 215 (71.7) | |

*Significant

DISCUSSION

According to this study, 71.3% of participants had PMS, with 76.3% reporting physical symptoms, 75% reporting emotional symptoms, and 70.3% reporting that PMS had interfered with their daily routine and academic performance. This findings were comparable with several studies⁶⁻¹¹. The frequency and potential risk factors of PMS in medical students were ascertained by Nandakumar H et al⁶. According to their findings, 76.35% of students had PMS. Participants in the 18–21 age range, those who were housekeepers, those who reported irregular physical activity, and those who were under a lot of stress had a considerably greater prevalence of PMS. While pains and stomach bloating were the most prevalent bodily symptoms of PMS, decreased social contact and irritation were the most often reported psychological symptoms. Compared to females without PMS, girls with PMS had considerably greater PSS levels. They proposed that stress may be a contributing reason to the rising prevalence of PMS in young females. PMS can affect students' academic performance and lower their quality of life. Chauhan A et al⁷. calculated the frequency and signs of premenstrual syndrome in teenage females and evaluated

how it affected their quality of life. They discovered that 65.7% of people reported having PMS. The most common symptom was a headache (66%), which was followed by acne (60%), and a broad body soreness (57%). When asked if they had experienced any unpleasant emotions before menstruation, such as sadness, worry, or a blue mood, only 37.8% of girls rated their quality of life as excellent, and 1.8% as very good. Of these, 26% said that they never feel bad about anything. They asserted that because they suffer from the most severe symptoms of PMS, teenage girls are particularly in need of physical and psychological help. The incidence of premenstrual syndrome in teenage females was evaluated by Padmavathi P et al⁸. The majority of the samples (54%) experienced mild PMS, 28% had moderate PMS, and 18% had severe PMS, according to their findings. The incidence of PMS scores was significantly correlated with factors such as age and absence from school. However, the occurrence of PMS in teenage girls did not significantly correlate with other factors such as academic performance, source of knowledge, length of cycle, type of flow, familial history of PMS, or age at menarche. They asserted that female students have a significant prevalence of PMS. The majorities of people self-treats and avoid seeking medical guidance. The frequency, pattern, and determinants of PMS

and PMDD in South Indian college ladies were ascertained by Durairaj A et al⁹. They found that 3.7% of people had PMDD and 14.3% of people had moderate to severe PMS. Among college ladies, the most prevalent premenstrual symptoms were exhaustion or low energy, anger among those with moderate to severe PMS group, and anxiety in the PMDD category. 82.66% of students with moderately severe PMS and 100% of students with PMDD reported being less productive or efficient in college. There was a significant correlation between the prevalence of moderate to severe PMS and PMDD and mean age, education, heavy menstrual flow, dysmenorrhea, and family history of PMS. Of college students with moderate to severe PMS and PMDD, 85.6% did not consider their symptoms abnormal, and only 16.4% sought medical advice. They said that a considerable percentage of college ladies suffer from PMS and PMDD, which have a detrimental impact on their behavior, emotional health, and academic achievement.

In this study, frequent junk food consumption and decreased physical activity were shown to be connected with the occurrence of PMS when the relationship between several factors, including BMI, was evaluated. However, there was no correlation identified between the presence of PMS and characteristics such as age, family type, dietary preferences (vegetarian or non-vegetarian), days of study or hosteller, and coffee use. Among menstrual variables, the mean day of bleeding was significantly higher in PMS-afflicted patients than in PMS-free subjects; nonetheless, both groups' menarche ages were comparable. Additionally, there was a noteworthy correlation between the prevalence of PMS and dysmenorrhea. However, the occurrence of PMS was not linked to the amount of bleeding or a family history of the condition. The frequency, severity, and effects of PMS on Nepali female students were evaluated by Shrestha DB et al¹⁰. Of the 285 participants, 72.3% reported having at least one moderate to severe PMS symptom, with 25.9% reporting at least one severe symptom. 80.7% had nil or mild premenstrual syndrome with isolated symptoms, 2.1% met all PMDD criteria, and 17.2% met the criteria for moderate to severe PMS. Physical activity, family history of PMS, the degree of dysmenorrhea, and monthly bleeding were found to be significantly correlated with PMS. They asserted that although its severe form, PMDD, is less prevalent, premenstrual syndrome is widespread in women and significantly affects daily activities.

According to a study by Sahu R et al¹¹. on the prevalence of PMS in young girls, 13%, 13.60%, and 11.40% of girls, respectively, had mild, moderate, and severe PMS symptoms. Arousal, negative consequences, and behavioral alterations were the most impacted symptoms. Autonomic response, water retention, discomfort, loss of control, and difficulty concentrating were other symptoms. An overall mean of 47.91, the majority of the females reported experiencing some kind of menstrual discomfort. The quality of life and daily activities are affected by PMS. Financial expenditures and social growth are also associated with it. Therefore, knowledge about PMS and how to handle it is necessary. Vineeta V et al¹². look into sociodemographic and other related parameters in order to ascertain the frequency of moderately severe PMS and

PMDD across young women in India. 2% of respondents had a diagnosis of PMDD, whereas 23.5% had a diagnosis of moderate-to-severe PMS. Of individuals with a moderate-to-severe PMS/PMDD diagnosis, 27.3% were between the ages of 17 and 24 and 13.2% were between the ages of 25 and 30. This difference was statistically significant. Additionally, there was a remarkable difference between the 17.1% of working professionals and the 30.6% of students who had a diagnosis of moderate-to-severe PMS. They asserted that quality of life is greatly impacted by moderate-to-severe PMS.

According to Molugulu N et al¹³., 22% of their samples had mild PMS and 37% had a diagnosis of PMS. 5.3% have severe PMS and 9% have mild PMS. PMDD was detected in 7% of the sample. The results of the study indicated a correlation between the severity of PMS and younger age groups, hectic lives, academic stress, and sleep issues. Out of 430 rural adolescent girls, Mann P et al¹⁴. found that 41.9% were 15 years old, 64.4% were from nuclear families, 54.9% exercised for less than 30 minutes, 33.5% menarched at 13 years old, 67% had regular cycles, 61.9% experienced moderate flow during their periods, 70.2% experienced a flow length of < 7 days, and 56.5% experienced dysmenorrhea. Girls reported 17.4% PMS and 8.8% PMDD. A statistically significant correlation was found between PMDD and age, family status, the length of the cycle, the intensity of the menstrual flow, and the presence of anxiety, sadness, and dysmenorrhea. The following factors were statistically significantly associated with PMS: the class/grade in which studying was taking place, the regularity of the cycle, the flow throughout the menstrual cycle, the length of the cycle, dysmenorrhea, anxiety, and depressive status.

According to Kanapur KS et al¹⁵., 52.3% of research participants reported having PMS, and 60.2% reported having dysmenorrhea. 68.42% of research participants said they were unable to go to school during their periods, 65.1% said they were unable to focus on their academics, and 60% said they were unable to engage in sports. In contrast, 25% of research participants did not attend any social events, and 77.3% of them reported being unable to perform home tasks like cooking. More than half of the research participants experienced PMS and dysmenorrhea, which had a major impact on their daily routine activities and attendance at school. Schools should offer comprehensive health education about menstruation, including information on menstrual issues and the treatments available for them. The goal of Deo S et al¹⁶ was to investigate the variables linked to PMS and PMDD in young and teenage females. They observed that individuals' emotional symptoms, such as irritability, anxiety, and furious outbursts, were substantially more linked to PMS and PMDD. There was a strong correlation between headache and weight increase in the somatic symptoms. PMS and PMDD were also substantially correlated with height, weight, and BMI. This study found that the most common and strongly correlated symptoms in teenage girls and young women with PMS and PMDD were BMI, affective symptoms, and physical symptoms. The incidence of PMS symptoms, both psychological and physiological, among teenage females in

Tripura's rural and urban regions was compared by Goswami S et al¹⁷. According to the ACOG diagnostic criteria, 60.8% of the 217 girls—66 of whom were from urban regions and the remaining 66 from rural ones—were diagnosed with PMS. Fatigue and stomach pain/muscle cramps were the most prevalent physical and psychological complaints among females in both urban and rural areas. They asserted that schoolgirls in metropolitan areas were more likely than those in rural areas to have both psychological and physical symptoms of PMS.

According to Bhuvanewari K et al¹⁸, 62.7% of people had PMS. The most prevalent symptoms were back, joint, and muscular pains, which were followed by discomfort and heaviness in the abdomen. In every area, PMS was linked to a worse quality of life. Affective symptoms were present in around half of the students during the premenstrual period. They found that the prevalence of PMS was linked to dietary and lifestyle variables, including the consumption of sweets and inactivity. According to Kamat SV et al¹⁹, 4.6% of people had PMDD and 19.3% of people had moderate to severe PMS. Of the females, 65.7% reported moderate to severe symptoms, and 94.8% had at least one PMS symptom. They discovered that 15.2% of the females had menorrhagia and 71.2% had dysmenorrhea. 53.5% of respondents experienced physical discomfort, 41.7% reported disruptions to daily activities, and 25.1% reported missing school or college. 53.0% of respondents experienced moderate to severe stress, and the majority (81.3%) believed that PMS was a typical aspect of menstruation. Older age, dysmenorrhea, menorrhagia, high levels of stress, and PMS in the mother were all found to be substantially linked with PMS using a multivariate logistic regression model. In addition to this, junk food and a younger menarche age were major contributors to PMDD. According to Gupta M et al²⁰, the mean age of the 397 females who took part in the study was 14.34. The average age at menarche was 12.54 years old. 4.8% of people were found to have PMDD. Sixty-two percent of the respondents said they felt moderately stressed. The respondents' age, perceived stress levels, anxiety, depression severity, and PMDD severity all showed favorable correlations. PMDD affects over 5% of teenage females, and it is more common in those who also have depression, GAD, or greater levels of perceived stress.

CONCLUSION

This study's 71% PMS prevalence is greater than that of numerous other studies published in India. According to the present study, improper lifestyle may have a role in the rise in the prevalence of PMS in young girls, particularly in relation to their lifestyle, which may be changed to lessen the burden of PMS. Therefore, lowering their inactive lifestyle and, consequently, the intensity of PMS symptoms may be achieved by raising awareness and teaching them about lifestyle changes including playing sports, exercising, and practicing mind-calming methods like yoga and meditation.

Declarations

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