Original Research Article

Premenstrual syndrome and its association with menstrual profile among female students of colleges in Ujjain city, Madhya Pradesh, India

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ABSTRACT

Background: Premenstrual Syndrome (PMS) is a common psychosomatic disorder which affects 30%-50% of women in child bearing age. Symptoms’ have devastating effect which starts early in life. So, the study was conducted to estimate the prevalence of premenstrual syndrome (PMS) and its association with menstrual profile among female students of colleges situated in Ujjain city.

Methods: Observational follow-up study was conducted at 4 colleges selected by convenience sampling located in Ujjain city. PMS and menstrual profile related data from 250 girls (18-25years) who consented to participate were collected using a modified version of daily record of severity of problems for at least 2 consecutive menstrual cycles. Diagnosis of PMS was made using ACOG criteria. Data analysis was done using SPSS version 16.0.

Results: The prevalence of PMS was 39.6% and was found to be negatively associated with any history of mothers having menstrual problems.

Conclusions: Frequency of PMS is relatively common in young girls and has negative association with any history of mothers having menstrual problems. Measures should be adopted so that mothers can condition their daughters about premenstrual symptoms which will influence the quality of life of young females.

Keywords: Menstrual disorder, Premenstrual syndrome, Premenstrual symptoms, PMS

INTRODUCTION

Premenstrual syndrome (PMS) occurs 7-14 days before the onset of menstruation and subsides with the commencement of menstrual flow, affects women during their reproductive age, and is associated with physical, psychological and behavioral changes.² If the mental symptoms predominate, are very severe and are associated with impairment, then the patient is classified as having premenstrual dysphoric disorder (PMDD) which may be viewed as a severe subtype of PMS.³ This can interfere with the lives of the affected, as well as their interpersonal relationships.³

Retrospective community surveys and epidemiological surveys estimate that 75%-90% of women have experienced at least one premenstrual symptom as defined by International Classification of Diseases (ICD) -10 criteria.⁴/⁵ Meta-analysis shows that prevalence of PMS in reproductive age group female was 47.8% and lowest and highest prevalence were reported in France (12%) and Iran (98%), respectively.⁶
It is a multifactorial syndrome that affects adolescent girls with a high frequency. It affects millions of women during their reproductive years. Both dysmenorrhea (usually of the primary type) and PMS are common problems and have negative effect on a woman’s life.9

PMS symptoms usually start to be problematic in the adolescent years.10 Symptoms are most severe in the late 20s to mid 30s but women are most likely to seek treatment after the age of 30 years, but its basis lies with the onset of menses. As adolescence (10-19 years) and youth (15-24 years) are the budding future of society and the country, so their health is the priority and of utmost importance for the wellbeing and prosperity of family and the next generation.11,12 So, this study was planned to estimate the prevalence of premenstrual syndrome (PMS) and its association with menstrual profile among female students of colleges situated in Ujjain city.

METHODS

An observational follow-up study was conducted from December 2014 to June 2015 at 4 colleges selected by convenience sampling located in Ujjain city. A sample size of 250 participants was calculated using the formula 4pq/l² considering average PMS prevalence (p) of 55%, allowable error 7% and 20% loss to follow up.13 Females who were between the age of 18 and 25 years enrolled for regular courses in the selected colleges, had regular periods (28-35 days) for last 3 months before start of study and who consented for voluntary participation were included. Female using hormonal contraceptive, or who had metrorrhagia (Irregular menstruation that occurs between the expected menstrual periods.) and/or menometrorrhagia (Excessive menstrual and uterine bleeding other than that caused by menstruation/excessive uterine bleeding, both at the usual time of menstrual periods and at other irregular intervals.) were excluded.14 Data related to menstrual profile (age at menarche, menstrual cycle duration, the number of bleeding days, the presence of dysmenorrhea and its severity, family history related to menstrual disorder) was collected and two consecutive menstrual cycle symptoms and their severity were self reported by participants using modified Daily Record of Severity of Problems (DRSP) questionnaire (Constipation/diarrhea, acne, skin rash).15,16 Screening of PMS was made using American College of Obstetrics and Gynecology (ACOG) criteria.17 As only 101(out of targeted 250) (as 2 consecutive menstrual cycles were followed and self administered questionnaire was applied) participants submitted forms in completed manner, so they were only included in final analysis.

Data was analyzed using SPSS version 16.0 and all categorical variables were expressed in percentage. Chi-square test/Fisher exact test applied to know the association between dependent and independent factors (categorical variables). Results were presented in the form of tables and findings were compared against the standards and/or findings from similar studies and discussed.

RESULTS

Out of a total of 250 target female college students, only 101 students responded (a response rate of ~ 40%) and hence were included for tracking the changes in premenstrual symptoms for at least 2 consecutive menstrual cycles. Amongst the 101 participants who returned the forms filled completely for at least 2 menstrual cycles consecutively, PMS was prevalent in 40(39.6%) according to the ACOG (Table 1).

### Table 1: Prevalence of premenstrual syndrome (PMS) in study participants according to the American congress of obstetricians and gynecologists criteria (ACOG) (n=101).

<table>
<thead>
<tr>
<th>Criteria</th>
<th>PMS</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Congress of Obstetricians and Gynecologists criteria (ACOG)15</td>
<td>40 (39.6%)</td>
<td>61 (60.4%)</td>
<td>101 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>61</td>
<td>101</td>
</tr>
</tbody>
</table>

Figures in the parentheses indicate the percentage of the row total.

Majority of the participants 72(71.3%) had attained menarche between 12 and 14 years of age and mean (±SD) age for menarche was 13±1.11 years. Mean duration of the menstrual cycle was 30±1.66 days.

Mean (±SD) days of bleeding being as 4.95±1.25 days. Almost all participants 80 (79.2%) had dysmenorrhea out of these 35 (43.8%) suffered from severe dysmenorrhea, 28 (35%) suffered from moderate dysmenorrhea and 17 (21.3%) had mild dysmenorrhea.

Hence this was the most common menstruation related problem reported in this study. 29 (28.7%) participants had a history of menstrual problems in their mothers and 72 (71.3%) did not have a history of menstrual problem in their mothers.

Of those with sister, 12 (22.6%) had history of menstrual problems in their sisters and 41 (77.4%) did not have any history of menstrual problems in their sisters (Table 2).


**DISCUSSION**

Out of 101 study participants who returned forms filled completely, PMS was diagnosed in 40(39.6%) females according to the ACOG criteria.

**Prevalence of PMS**

In the present study, the prevalence of PMS was estimated as 39.6%, which was lower as compared to other studies from India. Singh A et al, reported 60.5% of medical students suffered from PMS, Lakshmi et al, found the prevalence of PMS to be 67% whereas, Thakre et al reported prevalence of PMS as 55.8%, 18-20 Ramya S et al reported the prevalence of PMS in urban girls as 40.9% and in rural girls as 51.6% and Sarkar et al reported prevalence of PMS as 61.5%. 21-22 The variation in prevalence rates can be attributed to the difference in study designs used in above studies: observational follow up (present study), cross sectional and educational interventional and high prevalence of PMS among medical students can be attributed to the fact that they have awareness related to the subject. 18-22 Other possible reasons for variation in detected PMS prevalence included the age of the participants, study population, sample size, cultural and geographical influences considered by investigators in various studies.

Studies conducted outside India reported the prevalence of PMS to be higher as well as lower than that in the present study. Studies from Pakistan (51% and 81.25%), Tehran (71.1%) and Brazil (91.7%) reported a higher prevalence while studies from Iran (16%) and North Ethiopia (37%) reported prevalence lower than in the present study. 23-28 The variation could be due to the differences in participating general community, cultural and geographical variation and the type of population studied.

**Association of premenstrual syndrome with menstrual characteristics premenstrual syndrome and age at menarche**

Mean (±SD) age for menarche was 13±1.11 years. Similar findings were reported by Rokade S et al. 29 No statistically significant association was observed with the age of menarche and occurrence of PMS in the present study. Similar findings were reported by Sarkar et al and Nisar et al which can be due to the similar age of participants. 22,23 Amjad W et al and Delara M et al showed that early menarche is associated with occurrence of PMS. 30,31 Variation in the findings can be due to specific biological, social, or lifestyle characteristics and variations in cultural geographical factors.

**Table 2: Association of premenstrual syndrome with menstrual profile of study participants (n=101).**

<table>
<thead>
<tr>
<th>Menstrual profile</th>
<th>Category</th>
<th>PMS</th>
<th>No</th>
<th>Total</th>
<th>X²</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at menarche</td>
<td>12-14yrs</td>
<td>Yes</td>
<td>27</td>
<td>37.5</td>
<td>45</td>
<td>62.5</td>
</tr>
<tr>
<td></td>
<td>12-14yrs</td>
<td>No</td>
<td>45</td>
<td>62.5</td>
<td>27</td>
<td>37.5</td>
</tr>
<tr>
<td></td>
<td>≥15yrs</td>
<td>Yes</td>
<td>13</td>
<td>44.8</td>
<td>16</td>
<td>55.2</td>
</tr>
<tr>
<td></td>
<td>≥15yrs</td>
<td>No</td>
<td>16</td>
<td>55.2</td>
<td>13</td>
<td>44.8</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>Yes</td>
<td>40</td>
<td>61</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>No</td>
<td>61</td>
<td>39</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td>Duration of menstrual cycle</td>
<td>28-31days</td>
<td>Yes</td>
<td>26</td>
<td>41.9</td>
<td>36</td>
<td>58.1</td>
</tr>
<tr>
<td></td>
<td>28-31days</td>
<td>No</td>
<td>36</td>
<td>58.1</td>
<td>26</td>
<td>41.9</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>Yes</td>
<td>40</td>
<td>61</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>No</td>
<td>61</td>
<td>39</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td>Number of bleeding days</td>
<td>3-7days</td>
<td>Yes</td>
<td>37</td>
<td>38.9</td>
<td>58</td>
<td>61.1</td>
</tr>
<tr>
<td></td>
<td>3-7days</td>
<td>No</td>
<td>58</td>
<td>61.1</td>
<td>37</td>
<td>38.9</td>
</tr>
<tr>
<td></td>
<td>Total</td>
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<td>61</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>No</td>
<td>61</td>
<td>39</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td>Dysmenorrhea severity</td>
<td>Mild</td>
<td>Yes</td>
<td>6</td>
<td>35.3</td>
<td>11</td>
<td>64.7</td>
</tr>
<tr>
<td></td>
<td>Mild</td>
<td>No</td>
<td>11</td>
<td>64.7</td>
<td>6</td>
<td>35.3</td>
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<td></td>
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<td>61</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>No</td>
<td>61</td>
<td>39</td>
<td>101</td>
<td></td>
</tr>
<tr>
<td>History of menstrual problem in mother</td>
<td>Yes</td>
<td>Yes</td>
<td>7</td>
<td>24.1</td>
<td>22</td>
<td>75.9</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>22</td>
<td>75.9</td>
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<td>24.1</td>
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<td></td>
<td>Total</td>
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<td>33</td>
<td>54.8</td>
<td>39</td>
<td>45.2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>No</td>
<td>54.8</td>
<td>39</td>
<td>33</td>
<td>45.2</td>
</tr>
<tr>
<td>History of menstrual problem in sister</td>
<td>Yes</td>
<td>Yes</td>
<td>4</td>
<td>33.3</td>
<td>8</td>
<td>66.7</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>8</td>
<td>66.7</td>
<td>4</td>
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<tr>
<td></td>
<td>Total</td>
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<td>15</td>
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<td>26</td>
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<tr>
<td></td>
<td>Total</td>
<td>No</td>
<td>36.6</td>
<td>26</td>
<td>15</td>
<td>36.6</td>
</tr>
</tbody>
</table>

Figures in parentheses indicate percentage of row total. P-value <0.05 (sig)* Result was statistically significant by chi-squared analysis and fisher exact test (#).
Premenstrual syndrome and duration of menstrual cycle

It was found that maximum participants had the duration of the menstrual cycle between 28 and 31 days and mean duration of the menstrual cycle was 30±1.66 days. This can be attributed to the fact that only those participants with regular 28-35 days duration of menstrual cycle were included in the study.

Similar findings were reported by Dambhare et al. This could be because of changing trends in lifestyle, dietary habits, stress, hormonal imbalance or medical reasons which require gynecological assessment at the earliest. No statistical significance was observed between the duration of the menstrual cycle and PMS. Similar findings were reported by Nisar et al.

Premenstrual syndrome and number of bleeding days

In present study, almost all participants 95 (94.1%) had 3-7 days of menstrual bleeding with the Mean (±SD) days of bleeding being as 4.95±1.25 days. Almost similar findings were reported by Sarkar et al.

No statistically significant association was found between premenstrual syndrome and the number of bleeding days. This can be because of inclusion criteria of the present study. Similar findings were reported by Sarkar et al. However Tolossa and Bekele, have reported that less number (1-3 days) of bleeding days are associated with the development of PMS. This could be explained by the light and shorter duration of menses associated with rapid fluctuations of estrogen and progesterone and hence, development of PMS symptoms during the late luteal phase which are responsible for endometrial growth, as its growth status determines the volume and duration of menses.

Premenstrual syndrome and dysmenorrhea and its severity

It was found that almost all participants 80 (79.2%) had dysmenorrhea out of these 35 (43.8%) suffered from severe dysmenorrhea, 28 (35%) suffered from moderate dysmenorrhea and 17 (21.3%) had mild dysmenorrhea. Hence this was the most common menstruation related problem reported in this study. This finding is similar to previous reports. No significant association was found between dysmenorrhea, severity of dysmenorrhea and PMS. Similar findings were reported by Lakshmi et al. However Sarkar et al, Nisar et al and Delara M et al, found that PMS was significantly associated with presence of dysmenorrhea and its severity i.e. severe dysmenorrheic females were more likely to have PMS.

This could be due the differences in study population, the reporting of participants about the perception of dysmenorrhea and geographical variation.

Premenstrual syndrome and history of menstrual problem in mother

In the present study, 29 (28.7%) participants had a history of menstrual problems in their mothers and 72 (71.3%) did not have a history of menstrual problem in their mothers. Out of the participants with a positive history of menstrual problem in their mothers, the majority did not have PMS, and of the participants who were positive for premenstrual syndrome, a majority had no history of their mothers having menstrual problems.

Hence, premenstrual syndrome was found to be negatively associated with any history of mothers having menstrual problems. This finding can be attributed to the fact that mothers who had suffered from menstrual problems might be able to condition their daughters towards premenstrual symptoms, so the daughters are less likely to experience premenstrual symptoms and are more likely to accept the phenomena.

However, studies from Saudi Arabia and Pakistan have shown other reasons, such as biological and psychological factors, that may influence PMS i.e. if mothers do not suffer from premenstrual problem, then the chances of their daughters having it are very less which is opposite to what the present study shows.

Studies conducted by Rasheed P et al and Amjad et al, found that women with PMS had a higher prevalence of family history of PMS in mothers. The variation in findings can be because of difference in study participants and biological and psychological factors associated with cultural and geographical influences.

Premenstrual syndrome and history of menstrual problem in sister

In present study, out of the 101 participants, 48 (47.5%) participants did not have sisters and 53 participants had sisters. Of those with sister, 12 (22.6%) had history of menstrual problems in their sisters and 41 (77.4%) did not have any history of menstrual problems in their sisters. Premenstrual problem was found to have no statistically significant association with the history of menstrual problem in sisters. This can be due to shared biological factors i.e. if one sister had no history of menstrual problem than it is unlikely that other sibling will have any such complain. However, the study from Pakistan by Amjad et al, found a statistically significant positive association between PMS and family history of PMS. Shared biological and psychological factors may influence expectations and self-awareness and may underlie this finding.

CONCLUSION

Present study concludes that prevalence of premenstrual syndrome is found to be 40% and it is negatively associated with history of having menstrual problems in
mothers while other menstrual characteristics (age at menarche, menstrual cycle duration, number of bleeding days, dysmenorrhea and its severity, and history of menstrual problem in their sisters) were found to have no statistically significant association with premenstrual syndrome. Measures should be adopted so that mothers can condition their daughters about premenstrual symptoms which will have positive impact on their quality of life.

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