

# Assessment Of Menstrual Attitudes And Predictors For Premenstrual Syndrome In University Students Of Ooty, South India

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## ABSTRACT

Aim:

Present study aimed to report prevalence and potential predictors for PMS/PMDD and attitude towards menstruation in university students.

Methods:

Present cross-sectional study was conducted in 250 female students from JSS college of Pharmacy, Ooty. Participants were subjected to Premenstrual Syndrome Screening Tool (PSST). Further the attitudes of the participants towards menstruation were measured using Menstrual Attitude Questionnaire (MAQ).

Results:

The overall prevalence of PMS/PMDD in study was found to be 37.6%. The frequent symptoms associated with PMS/PMDD among the study population were found to be fatigue/lack of energy (74.99%) followed by tearful sensitivity to rejection (67.18%) and anger/irritability (66.66%). Bi-variate analysis revealed age, increased body mass index, altered sleep duration, lack of physical activity, family history of PMS as potential predictors for PMS/PMDD in University students. Overall, study participants demonstrated positive attitude towards menstruation. Participants with PMS/PMDD demonstrated significant difference within attitude in two out of five dimensions of MAQ indicating a slight variation in menstrual attitude with their healthy counterparts.

Conclusion:

The prevalence of PMS/PMDD in current study was less when compared to western countries. Majority of predictors identified were modifiable in nature. Interactive community health awareness campaigns can be undertaken from Universities/Government in order to increase awareness regarding PMS/PMDD in young adults.

**Keywords:** Menstruation; Menstrual Attitude; Pre-menstrual syndrome; Premenstrual dysphoric disorder.

## INTRODUCTION

Premenstrual syndrome (PMS) is a term used to refer a collection of behavioral, emotional and physical symptoms occurring during late luteal phase of menstrual cycle.<sup>1</sup> Severe form of PMS is termed as premenstrual dysphoric disorder (PMDD). Disruptions in mental health, interpersonal relationships have been observed in women affected by PMS. Several risk factors hypothesized for aggravating PMS/PMDD in females include age, stress, body mass index, marital status and low parity<sup>2,3,4</sup>

PMS is one of the commonly neglected and under diagnosed gynecological health conditions in young adults. PMS and PMDD are reported to minimize the well-being, develop emotional instability, affect academic performance, social and occupational aspects of the individual.<sup>5,6</sup> Attitude towards menstruation is multidimensional and plays a significant part in the concept of menstrual distress. In a country like India with huge cultural diversity, menstrual attitudes of the females change from family to family. Present study aimed to report prevalence and potential predictors for PMS/PMDD along with attitude towards menstruation in university students of Ooty, South India.

## MATERIALS AND METHODS

**Study Design:** Cross-sectional study

**Study period:** November 2020 - April 2021

**Source of data:** Female students of JSS college of Pharmacy, Ooty, Tamil Nadu, India.

**Sample size:** 250

**Sample-size calculation:** Sample size was calculated using 'Raosoft sample-size calculator' which predicted 198 participants with 5% margin of error, 95% confidence interval (CI) and population size of 407 at 50% response distribution. However, software predicted that if the sample size was 250, the margin of error would decrease to 3.84%. Study team received

permission from Mc-Master University, Canada to use PSST for up to 250 respondents. Hence, an additional 52 participants were recruited to eliminate any errors occurring during data acquisition.

### Inclusion criteria:

Female students above the age of 18 years and willing to provide details related to gynecological health and menstruation were recruited into the study.

### Exclusion criteria:

Students with a past medical history of sleep disorders, anxiety disorders, depression, severe PCOD, hypothyroidism, recent history of receiving hormonal replacement therapy (within 1 month) and those married were excluded from study.

### Data collection procedure:

All the relevant data for research study was collected through predesigned data collection form. Data collection form included sections like demographic information, socio-economic status, information related to attitudes towards menstruation and symptoms experienced prior to menstruation. Study team took prior permissions from academic In-charges and fixed a time for data collection. All students were explained about the study criteria prior to data collection. Voluntary consent was obtained from students meeting the study criteria. Further, students were requested to fill the details in data collection form followed by Premenstrual symptom screening tool (PSST) and Menstrual attitude questionnaire<sup>7,8</sup>. Wherever required, study team aided participants in filling the data collection form. Study instruments:

**Premenstrual symptom screening tool (PSST):** "The tool is composed of 19 items out of which 14 were premenstrual symptoms and 5 functional items which is in line with DSM-IV criteria. The items on the PSST are divided into two domains. The first domain includes physical and

psychological traits whereas the second domain assesses the functional impact of the PMS symptoms. Based on the scorings, subjects were segregated into 3 categories which are “mild/no PMS”, “moderate to severe PMS” and “PMDD”. Prior permission to use PSST was obtained from McMaster University, Ontario”.<sup>7</sup>

**Menstrual attitude questionnaire (MAQ):** “The questionnaire of 33- item measure containing five attitudinal dimensions: Debilitating, Bothersome, Natural, Prediction and Denial scored on a 5- point Likert scale ranging from strongly disagree (1) to strongly agree (5). The first 12 items in the scale belong to the category of debilitating, the next 6 items belong to bothersome criteria followed by the 5 items which belong to the natural category continued by the next 5 items belonging to the prediction category and the remaining 7 items belong to the denial criteria”.<sup>8</sup>

#### **Statistical analysis:**

The collected data was entered in the Microsoft excel. Data cleaning and data validation was performed by before execution of the statistical tests. All the statistical analyses were performed with SPSS Version 16.0. Data was tested for normality using the Shapiro-Wilk test. Comparison of Menstrual attitude scores from various dimensions of MAQ were done using Mann Whitney Test. Predictors for PMS were calculated using the Bi-variate analysis (Chi-square).

#### **Ethical approval:**

Research work was executed in accordance with the ethical principles of ‘Declaration of Helsinki’. Voluntary consent was obtained from the study participants. Research project was approved by the Institutional Ethics committee, JSS College of Pharmacy, Ooty (JSSCP/IRB/09/2020-21).

#### **RESULTS**

A total of 250 female students participated in the study. More than half of study population had attained menarche at the age of 12-14 years with the majority attaining menarche at the age of 13 years (28.8%). Majority of the study population

had bleeding duration of 1-4 days along with a history of dysmenorrhea. Major demographic details of the study participants are represented in Table-1.

Overall prevalence of PMS/PMDD in study population was found to be 37.6% (n=94). Of these, 64 participants (25.6%) reported to have moderate to severe PMS and 30 participants (12%) reported to have PMDD. This combined numbers were used for further statistical analysis. Potential risk factors for PMS/PMDD in the study population were analyzed using Chi-square analysis, which is a non-parametric test. Most of the demographic characteristics compared did not predict PMS/PMDD except for increasing age, lack of physical activity, increased BMI, family history of PMS, and increased duration of sleep ( $p<0.05$ ). Detailed results of analysis are mentioned in Table-2.

Attitude towards menstruation plays an important role as a positive outlook can impact a woman’s self-image and satisfaction with their bodies while a negative attitude can in turn worsen menstrual symptoms. The mean dimension scores of the MAQ in the study population are shown in Table-3. Overall, study population demonstrated positive attitude towards menstruation.

Comparison of MAQ dimension scores between participants with PMS/PMDD and their healthy counterparts were done with the help of Mann Whitney U test. Participants with PMS/PMDD reported more scores in two domains namely ‘debilitating’ and ‘predictable’, the results were found to be statistically significant ( $p<0.05$ ). However, other dimensions such as natural, bothersome and denial did not show any statistical difference. Detailed results of Mann-Whitney U test are represented in Table-4.

#### **DISCUSSION**

Premenstrual syndrome is a set of somatic and behavioral symptoms which is commonly observed during late luteal phase of menstrual cycle. Current research explored prevalence and predictors of PMS/PMDD among university students pursuing pharmacy education with respect to demographic details, menstrual and lifestyle variables. Study also explored whether

there is any difference in menstrual attitudes in participants with PMS and their counterparts without PMS.

The prevalence of PMS and PMDD was found to be 25.6% and 12% respectively. The findings were in line with the prevalence studies from Asian countries (Sivanandh B et al, Steiner et al). PMS/PMDD cannot be quantified by specific laboratory investigations, hence study team explored various possibilities of assessing PMS and found several self-reporting tools like PSST, PMSS, DRSP<sup>7</sup>. However, PSST was the most cited instrument in 'Google scholar' and 'Pubmed' search. PSST has been translated to 9 languages. Many studies have demonstrated high reliability values using PSST. (Cronbach  $\alpha \geq 0.9$ )<sup>9</sup>. A Research team from Brazil suggested that PSST had better utility as a diagnostic screening tool for those with PMS<sup>10</sup>. Apart from the following advantages, our study team also felt that the content of PSST was appropriate and easy to use, given the student population from pharmacy background.

Major symptoms of PMS include tension, irritability, depression, anxiety, mood swings, craving for carbohydrate rich food and sleep disturbances<sup>2</sup>. Most frequent symptom in the PMS category reported in study population was fatigue/lack of energy (74.99%) which was in line with Bakshani et al and Balaha et al<sup>11,12</sup>. Second most prevalent symptom reported was tearful/increased sensitivity to rejection (67.18%) in concordance with Bakshani et al and Sivanandh et al<sup>11,13</sup>. While in the PMDD category, anger/irritability (66.66%) was found to be the most common symptom experienced. In other reported Indian studies, anger/irritability was found to be the common prevalent symptom<sup>13,14,15</sup>.

Attitude towards menstruation can influence the perception of women's body image and vary with one's religion. Socio-cultural factors can cause an impact in the beliefs towards menarche and menstruation<sup>16</sup>. Study team wanted to explore menstrual attitude in study participants. Due to the non-availability of indigenous tools, menstrual attitude was screened using the Menstrual Attitude questionnaire (MAQ)

developed by Brooks-Gunn and Rumble<sup>8</sup>. MAQ is segregated into five dimensions that exhibit internal agreement and reliabilities. The debilitation (the most negative attitude) factor measures a woman's discomfort with menstruation in daily life. The second factor, which is the bothersome (less negative) event measures the woman's likes (high score) and dislikes (low score) of menstruation. The third factor, natural event (the most positive attitude) examines a respondent's acceptance of menstruation as a whole. The fourth factor, anticipation, and prediction (attitude tied to premenstrual symptoms) of the onset of menstruation measures the woman's recognition and awareness of menstruation and its effects. High scores on this factor indicates high awareness of menstruation. The fifth factor, denial of any effect of menstruation measures a woman's opinions/judgments on behaviors/attitudes during menstruation. High scores indicate a high degree of denial of menstruation<sup>16</sup>. A previous study from India utilized the same instrument and reported menstrual attitudes of female adults from a South Indian city. Study also reported that menstrual attitudes did not differ among different religious groups<sup>17</sup>. This motivated us to utilize MAQ and see whether any differences existed with respect to attitudes in participants with PMS and those without PMS. Based on dimension scores of MAQ, majority of the participants from the present study demonstrated a positive attitude towards menstruation overall. We observed significant differences in only two dimensions of MAQ namely, menstruation is 'debilitating' and 'predictable' indicating a small variation in menstrual attitude. Majority of the participants with PMS/PMDD felt that menstruation was a more debilitating event when compared to their healthy counterparts. Participants with PMS/PMDD demonstrated higher scores in the 'predictability' domain of MAQ, implicating that they were able to predict the menstruation in the near future as they start to experience psycho somatic symptoms. Our findings from both of these domains clearly show the burden of dysmenorrhea, and PMS in younger adults which could lead to decreased well-being and work productivity. In study conducted by Ghiasi et al., 92% of the participants distinguished

menstruation as a natural event followed by 89.7% reported that the onset of menstruation as a natural event<sup>18</sup>. Firat et al. reported that high school students perceived menstruation as a debilitating event and denied its effects when compared to university students. In university student population, menstruation was seen as more bothersome due to the effect of experience. As with experience, the perception of menstruation as debilitating event lessens<sup>16</sup>. Other dimensions of MAQ include three aspects namely Menstruation is 'Natural', 'bothersome' and 'denial'. However, there were not significant differences observed between the two study groups. These findings support that menstrual attitude between the groups were similar. Similar results were reported from Hoerster et al and Brooks-Gunn et al.<sup>8,19</sup>

Our study reported an increased prevalence of PMS and PMDD in between the age group of 18-20 with few exceptions. There was no significant relationship between days of menstruation and age of menarche. In the study conducted by Rapkin et al., premenstrual disorders are more likely to develop during the adolescent phase and continue to affect around 20% of them once they reach adulthood. Literature also suggests that the teenage population would meet the criteria for PMS/PMDD<sup>20</sup>.

In this study, family history of PMS was found to not be a significant contributor in the development of PMS. Balaha et al stated that PMS had a notable trend with older age and positive family history of PMS<sup>12</sup>. In other studies, conducted in USA and Saudi Arabia, there was a significant association between PMS and a family history of PMS.<sup>21,22</sup>

The most frequent functional hindrance noticed in PMS and PMDD is the impairment with family relationships. No specific correlation was found between the perception of economic status and PMS. Studies conducted in Peshawar and US, about 46.87% and 10.93% of the subject participant's experienced moderate impairment with family relationships in PMS and PMDD respectively<sup>23,24</sup>.

Consumption of excess intake of sweets (63.2%) and junk food (52.8%) has been found to have a

correlation with PMS and PMDD. Kamat et al., reported that 42% of girls consumed junk food, 45% salty food and 47% consumed tea or coffee which contributed to the increased risk of PMDD and possible effects of lifestyle on premenstrual disorders<sup>14</sup>. In a study conducted by Oral et al., higher intake of carbohydrate and junk food were found to be associated with higher PMS scores. High junk food and carbohydrate consumption resulted in severe PMS in about 12.2% of the population<sup>15</sup>.

In this study, majority of the participants reported that their sleep duration was between 6-10 hours (58.94%). In DSM-IV criteria, one among the defining criteria for the diagnosis of PMS is sleep disturbance. There is limited research on the nature and severity of premenstrual sleep disturbances. In study conducted by Parry et al, it was observed that in the late luteal and follicular phase there was no notable difference in terms of sleep duration and time spent awake<sup>25</sup>. While in a contrasting study done by Borenstein et al claimed that PMS significantly affects the well-being of which quality of sleep is an important aspect<sup>26</sup>. Baker et al demonstrated that sleep composition has no association with PMS expression in the late luteal phase<sup>27</sup>.

In a nutshell, our study reported increasing age, BMI, sleep duration, lack of physical activity and family history as potential risk factors for PMS/PMDD. Of these, majority of the variables are modifiable in nature. Suitable lifestyle alterations could actually reduce the risk of worsening of PMS/PMDD symptoms. This point is also evident from previously reported research studies<sup>28</sup>.

Current study is one among the few studies from South India to systematically report prevalence and potential risk factors for PMS/PMDD. Our study also reports attitudes of participants towards menstruation which was not previously reported from the region. However, the results from the present study have to be carefully interpreted as it is a single centered study. Also, the results were completely based on the responses given by participants. Future studies in this line should consider adding an additional psychiatric evaluation of the participants for

accuracy of data. Also, large-scale multi-center community studies can be taken up to quantify the PMS/PMDD burden in general population.

## CONCLUSION

By observing the findings of current study, we are in the opinion that Premenstrual syndrome is a common health problem with negative impact on quality of life among female students. In our study, prevalence of PMS was found to be less compared to Western countries. Several demographic characters like increasing age, BMI, duration of sleep, family history and lack of physical activity were found to be associated with risk of PMS/PMDD. Menstrual attitudes in females suffering with PMS/PMDD did not vary much with their healthy counterparts except for two dimensions of MAQ (Menstruation is 'debilitating' and 'predictable'). Universities should consider health literacy programs to increase the level of awareness towards common gynecological problems like PMS in student population.

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## CONFLICT OF INTEREST

All authors declare no conflict of interest

## AUTHOR CONTRIBUTIONS

All authors made substantial contributions for the work. (Ganga Priyadharshini D-GPD, Arya Suresh-AS, Shweta Mariam Philip-SMP, Sanatkumar B Nyamagoud-SBN, Sivasankaran Ponnusankar-SP, Hunsur Nagendra Vishwas-HNV). Concept and design done by: SMP, HNV, SBN. Data acquisition was done by: GPD, AS, SMP. Data analysis / interpretation was done by: GPD, AS, SMP, HNV. Drafting manuscript was done by: GPD, AS, SMP, SP. Critical revision of Manuscript done by: SP, SBN, HNV. Statistical analysis done by: HNV. Admin, technical or material support done by: SP. Supervision: SP, HNV Final approval done by: SP.

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## ETHICAL APPROVALS

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Demographic details	n (%)
Age	
18-22	201 (81%)
23-28	49 (18.1%)
Menarche age:	
9-13 years	96 (38.4%)
≥ 14 years	154 (61.6%)
Bleeding duration (in days):	
≤ 4 days	168 (67.2%)
≥ 5 days	82 (32.8%)
Dysmenorrhea:	
Yes	184 (73.6%)
No	66 (26.4%)

Amount of bleeding: (as reported by participant)	
Reduced	14 (5.6%)
Moderate	209 (83.6%)
Severe	27 (10.8%)
Sleep duration: (as reported by participant)	
<6 hours	96 (38.4%)
6-10 hours	146 (58.4%)
>10 hours	8 (3.2%)
Recent history of anemia (Within 2 months):	
Yes	22 (8.8%)
No	228 (91.2%)
BMI (As per WHO BMI cut-off criteria)	
Underweight- normal	184 (73.6%)
Overweight	52 (20.8%)
Obesity	14 (5.6%)

**Table 1: Demographic details of the study population**

Variables	No PMS (n=156)	PMS/ PMDD (n=94)	Chi-square	p value
<b>Age:</b> 18 years ≥ 19 years	46(25.48%) 110(70.51%)	17(18.08%) 77(81.91%)	4.0456	0.044*
<b>Menarche age:</b> 9-13 years ≥ 14 years	110(70.51%) 46(25.48%)	58(61.70%) 36(38.29%)	2.0658	0.1506
<b>Bleeding duration</b> ≤ 4 days ≥ 5 days	42(26.92%) 114(73.07%)	27(28.72%) 67(71.27%)	0.0951	0.757
<b>Dysmenorrhea:</b> Yes No	112(71.79%) 44(28.20%)	73(77.65%) 21(22.34%)	1.048	0.305
<b>Amount of bleeding:</b> Reduced-moderate Heavy	144(92.30%) 12(7.69%)	79(84.04%) 15(15.95%)	4.1593	0.0414*
<b>Regular physical activity:</b> Yes No	44(28.20%) 112(71.79%)	39(41.48%) 55(58.51%)	4.667	0.0307*
<b>BMI (As per WHO BMI cut-off criteria)</b> Underweight- normal Overweight Obesity	120(76.92%) 25(16.02%) 11(7.05%)	64(68.08%) 27(28.72%) 3(3.19%)	6.729	0.034*
<b>Family history of PMS:</b> No Yes	120(76.92%) 36(23.07%)	60(63.82%) 34(36.17%)	4.987	0.0255*
<b>Duration of sleep (as reported by participant):</b> < 6 hours 6-10 hours	63(40.38%) 92(58.97%)	33(35.10%) 54(57.44%)	8.939	0.011*

> 10 hours	1(0.64%)	7(7.44%)		
<b>Salt intake (as per the participant's perception):</b>				
Normal	81(51.92%)	40(42.55%)	2.798	0.246
Moderate	72(46.15%)	50(53.19%)		
High	3(1.92%)	4(4.25%)		
<b>Sweet consumption (at least 2 to 3 times a week):</b>				
Yes	97(62.17%)	61(64.89%)	0.185	0.666
No	59(37.82%)	33(35.10%)		
<b>Street/junk food (at least 2 to 3 times a week):</b>				
Yes	79(50.64%)	53(56.38%)	0.776	0.378
No	77(49.35%)	41(43.61%)		
<b>Residence:</b>				
Rural	64(41.02%)	43(45.74%)	0.533	0.465
Urban	92(58.97%)	51(54.25%)		
<b>School type:</b>				
Government	10(6.41%)	8(8.51%)	0.387	0.533
Private	146(93.58%)	86(91.48%)		
<b>Study medium:</b>				
Tamil	9(5.76%)	4(4.25%)	0.2727	0.601
English	147(94.23%)	90(95.74%)		
<b>Family type:</b>				
Joint	39(25%)	22(23.40%)	0.081	0.775
Separate	117(75%)	72(76.59%)		
<b>SES (modified Kuppusamy scale-2019):</b>				
Upper class	48(30.76%)	31(32.97%)	1.417	0.701
Upper middle	77(49.35%)	45(47.87%)		
Lower middle	29(18.58%)	15(15.95%)		
Upper lower	2(1.28%)	3(3.19%)		

\*Significant 'p' value

**Table 2: Prevalence along with Potential risk factors for PMS/PMDD using chi-square analysis in study population**

Dimensions of MAQ	MEAN	SD	MEDIAN
Debilitating	38.44	5.21	39
Bothersome	18.6	3.45	19
Natural	14.82	2.47	15
Predictable	13.056	2.26	13
Denial	19.976	4.36	20

**Table 3: Overall menstrual attitude of the study population**

Dimension of	No PMS Group	PMS/PMDD Group	Mann Whitney U Test
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<b>MAQ</b>	<b>Mean</b>	<b>Std. deviation</b>	<b>Mean</b>	<b>Std. deviation</b>	<b>Z Value</b>	<b>P value</b>
Debilitating	37.73	5.40	39.62	4.72	-3.108	0.001*
Bothersome	18.75	3.61	18.35	3.19	1.274	0.204
Natural	14.71	2.40	14.98	2.59	-0.792	0.429
Predictable	12.70	2.26	13.63	2.15	-3.471	0.001*
Denial	20.03	4.34	19.87	4.44	0.576	0.561

\*Significant 'p' value

**Table 4: Comparison of MAQ dimension scores between two groups**