

# Study to assess the association of PMS with sociodemographic factors and various coping behaviors adopted for premenstrual symptoms



Deepika Badkur<sup>1</sup>, Suchita Singh<sup>2</sup>, Vibha Arjaria<sup>3</sup>, Arun Wanjpe<sup>4</sup>

<sup>1,3</sup>Associate Professor, Department of Community Medicine, L N Medical College and Research Centre, Bhopal, Madhya Pradesh, <sup>2</sup>Assistant Professor and Epidemiologist, Department of Community Medicine, Chhattisgarh Institute of Medical Sciences, Bilaspur, Chhattisgarh, India, <sup>4</sup>Professor, Department of Community Medicine, Nepalgunji Medical College, Chisapani, Nepal

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## ABSTRACT

**Background:** Some women get through their monthly periods easily with few or no concerns. However, other women experience a host of physical and/or emotional symptoms just before and during menstruation (heavy bleeding and missed periods to unmanageable mood swings). These premenstrual syndrome (PMS) symptoms usually start to be problematic in the adolescent years and decline in the climacteric. Symptoms have a devastating effect which starts early in life. **Aims and Objectives:** The study was conducted to estimate the prevalence of PMS and its association with sociodemographic factors among female students of colleges situated in Ujjain city and coping behavior adopted to alleviate these symptoms. **Materials and Methods:** An 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 (18–25 years) who consented to participate were collected using a modified version of the Daily Record of Severity of Problems for at least 2 consecutive menstrual cycles. The diagnosis of PMS was made using the American College of Obstetrics and Gynecology criteria. Data analysis was done using SPSS version 16.0. **Results:** The prevalence of PMS was 39.6% and was not associated with any of the sociodemographic factors. It was found that majority of participants turned to healthy way of dealing with symptoms, i.e., taking hot or cold beverages and talking to family members. **Conclusion:** The frequency of PMS is relatively common in young girls, and most of the girls adopt home remedies to alleviate symptoms.

**Key words:** Premenstrual syndrome; Premenstrual symptoms; Menstrual disorder

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## INTRODUCTION

Premenstrual syndrome (PMS) is a broad diagnostic concept first proposed by Greene and Dalton (1953).<sup>1</sup> There is no single precise definition of the PMS, but it is broadly defined as any constellation of psychological and physical symptoms that recur regularly in the luteal phase of the menstrual cycle, remit for at least 1 week in the follicular phase, and cause distress and functional impairment.<sup>2</sup> It has been estimated from retrospective community surveys (90%)<sup>3,4</sup> and epidemiological surveys (75%)<sup>5</sup> that majority of women in their reproductive age experience some symptoms

attributed to the premenstrual phase of menstrual cycle. Over 200 symptoms have been reported as appearing premenstrually, they involve many body systems, and none of them is exclusively related to the menstrual cycle *per se*.<sup>6,7</sup> A small group of reproductive-age women (3–8%) reported more severe premenstrual symptoms of irritability, tension, dysphoria, and lability of mood, which seriously interfere with their lifestyle and relationships.<sup>6</sup> Without relief from these symptoms, a women's functioning in the home, social situations, and at work can be substantially impaired every month often over a span of many years.<sup>5,8</sup>

### Address for Correspondence:

Dr. Deepika Badkur, Associate Professor, Department of Community Medicine, L N Medical College and Research Centre, Bhopal, Madhya Pradesh, India. **Mobile:** +91-9425080698. **E-mail:** deepikabadkur@gmail.com

## Aims and objectives

To estimate the prevalence of premenstrual syndrome (PMS) and its association with sociodemographic factors and to find coping behavior adopted by females to overcome premenstrual symptoms.

## MATERIALS AND METHODS

The ethical approval was obtained from the Institutional Ethics Committee of R.D. Gardi Medical College letter number (IEC-RDGMC-20/05/2014-IEC-372). 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  $4pq/L^{2.9}$  considering average PMS prevalence (P) of 55%,<sup>10</sup> allowable error 7%, and 20% loss to follow-up.

### Inclusion criteria

Inclusion criteria were as follows: 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 the last 3 months before the start of the study, and who consented for voluntary participation were included.

### Exclusion criteria

Exclusion criteria were as follows: Females using hormonal contraceptive, or who had metrorrhagia (irregular menstruation that occurs between the expected menstrual periods)<sup>11</sup> 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)<sup>11</sup> were excluded.

Data related to demographic characteristics included questions about sociodemographic information such as age, religion, caste, marital status, permanent residence, living with parents, occupation of mother, economic status, height and weight body mass index (BMI), and physical exercise and two consecutive menstrual cycle symptoms and their severity were self-reported by participants using the modified Daily Record of Severity of Problems (DRSP) questionnaire (constipation/diarrhea, acne, and skin rash).<sup>12,13</sup> Coping behavior adopted to get relief from premenstrual symptoms was self-reported by the participants.

Screening of PMS was made using the American College of Obstetrics and Gynecology (ACOG) criteria.<sup>14</sup>

As only 101 (out of targeted 250) (as 2 consecutive menstrual cycles were followed and self-administered questionnaire was applied) participants submitted forms in a completed manner, so they were only included in the final analysis.

Data were analyzed using SPSS version 16.0, and all categorical variables were expressed in percentage. Chi-square test/Fisher's exact test was 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. Among the 101 participants who returned the forms filled completely for at least 2 menstrual cycles consecutively, PMS was prevalent in 40 (39.6%) and 3 (3%) participants according to the ACOG (Table 1).

Majority of participants, i.e., 73 (72.3%), were between the ages of 18 and 19 years, and the mean ( $\pm$ SD) age of study participants was  $19 \pm 1.48$  years. Seventy-six (75.2%) participants were permanent residents of an urban area, and more than half of the study participants, i.e., 61 (60.4%), were living with their parents. Almost all participants were found to be Hindus 91 (90%), and maximum participants, i.e., 42 (41.6%), belonged to general category. Eighty (79.2%) participants were studying in government colleges and 21 (20.8%) studying in private colleges. Majority of participant's mothers were housewives 90 (89.1%) and 99 (98%) were found to be unmarried. Socioeconomic status was scaled according to modified BG Prasad's scale of socioeconomic status.<sup>15</sup> According to this scale, majority of study participants 66 (65.3%) belonged to class V, class IV accounted for 20 (19.8%), class III accounted for 8 (7.9%), and 7 (6.9%) participants belonged to class II. For the purpose of analysis, study participants were regrouped into lower socioeconomic status and non-lower socioeconomic status. Class V was lower class and classes II, III, and IV were merged into non-lower class. This type of regrouping was done because most of the participants belonged to class V of the socioeconomic scale (Table 2).

Out of 101 participants, 14 (13.9%) were involved in some daily physical exercise (like yoga 3 [3%], meditation 5 [5%], cycling 5 [5%], and running 1 [1%]) and 87 (86.1%) were not involved in any daily physical exercise. Majority of the participants 54 (53.4%) had normal BMI (18.5–22.9), 37 (36.6%) participants were underweight (<18.5), 8 (7.9%) participants were overweight (23–24.9), and only 2 (2%) participants were obese (>25) (Table 3).

To combat and manage premenstrual symptoms, participants adopted various coping strategies. Fifty-five (54.5%) participants accepted symptoms as natural process, 57 (56.4%) participants tried relieving symptoms by taking hot/cold beverages, 29 (28.7%) reported expressing anger on others, 64 (63.4%) turned to studies and forgot all things, 85 (84.2%) participants talked to family members, 38 (37.6%) participants took pain killers, 12 (11.9%) reported taking massage, and 11 (10.9%) switched to exercise to relieve the symptoms. Hence, it is evident that majority of participants adapted healthy coping strategies to cope with premenstrual symptoms (Table 4).

## DISCUSSION

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

**Table 1: Prevalence of PMS in study participants according to the American Congress of Obstetricians and Gynecologists criteria (n=101)**

Criteria	PMS		Total
	Yes	No	
American Congress of Obstetricians and Gynecologists criteria (ACOG) <sup>15</sup>	40 (39.6%)	61 (60.4%)	101 (100%)
Total	40	61	101

PMS: Premenstrual syndrome, ACOG: American Congress of Obstetricians and Gynecologists criteria, Figures in the parentheses indicate the percentage of the row total

## Prevalence of PMS

The prevalence of PMS in the current study was found to be lower at 39.6% compared to other studies from India.<sup>16-20</sup> The variation in prevalence rates can be attributed to the difference in study designs used in the above studies: observational follow-up (present study), cross-sectional,<sup>16-18,20</sup> and educational interventional,<sup>19</sup> and the high prevalence of PMS among medical students<sup>16</sup> can be attributed to the fact that they have awareness related to the subject. Other possible reasons for variation in detected PMS prevalence included the age of the participants, study population, sample size, and 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%<sup>21</sup> and 81.25%<sup>22</sup>), Tehran (71.1%),<sup>23</sup> and Brazil (91.7%)<sup>24</sup> reported a higher prevalence while studies from Iran (16%)<sup>25</sup> and North Ethiopia (37%)<sup>26</sup> reported a prevalence lower than in the present study. The variation could be due to the differences in participating general community, cultural and geographical variation, and the type of population studied.

## Association of PMS with sociodemographic characteristics PMS and age

In the present study, age-wise distribution of 101 study participants reveals that the majority (72.3%) of study participants were in the adolescent group (18–19 years). Out of these, maximum numbers of study participants

**Table 2: Association of premenstrual syndrome with sociodemographic factors among study participants (n=101)**

Sociodemographic factor	Category	PMS		Total	P-value
		Yes	No		
Age	18–20 years	32 (43.8)	41 (56.2)	73 (100)	0.16
	20–25 years	8 (23.6)	20 (71.4)	28 (100)	
	Total	40	61	101	
Permanent residence	Rural	10 (40)	15 (60)	25 (100)	0.96
	Urban	30 (39.5)	46 (60.5)	76 (100)	
	Total	40	61	101	
Living with parents	Yes	22 (36.1)	39 (63.9)	61 (100)	0.37
	No	18 (45)	22 (55)	40 (100)	
	Total	40	61	101	
Religion	Hindu	37 (40.7)	54 (59.3)	91 (100)	0.51
	Muslim	3 (30)	7 (70)	10 (100)	
	Total	40	61	101	
Caste	General	15 (35.7)	27 (64.3)	42 (100)	0.50
	Backward class	25 (42.4)	34 (57.6)	59 (100)	
	Total	40	61	101	
Socioeconomic status	Lower	25 (38.5)	40 (61.5)	65	0.75
	Non-lower	15 (41.7)	21 (58.3)	36	
	Total	40	61	101	

Figures in parentheses indicate percentage of row total. P<0.05 (sig)\* Result was statistically significant by Chi-squared analysis

**Table 3: Association of premenstrual syndrome with physical exercise and body mass index among study participants (n=101)**

Factor	Category	PMS		Total	P-value
		Yes	No		
Physical exercise	Yes	6 (42.9)	8 (57.1)	14 (100)	0.79
	No	34 (39.1)	53 (60.1)	87 (100)	
	Total	40	61	101	
BMI	Underweight	14 (37.8)	23 (62.1)	37 (100)	0.93#
	Normal	22 (40.7)	32 (59.3)	54 (100)	
	Obese	4 (40)	6 (60)	10 (100)	
	Total	40	61	101	

Figures in parentheses indicate percentage of row total. P<0.05 (sig)\* Result was statistically significant by Chi-squared analysis and Fisher's exact test (#), BMI: Body mass index

**Table 4: Distribution of study participants according to coping behavior adopted to get relief of premenstrual symptoms (n=101)**

Coping behavior adopted to get relief from symptoms	Number		Total
	Yes	No	
Accepted as natural process nothing can be done	55 (54.5)	46 (45.5)	101
Took hot/cold beverages	57 (56.4)	44 (43.6)	101
Expressed anger on others	29 (28.7)	72 (71.3)	101
Turned to study and forget all things	64 (63.4)	37 (36.6)	101
Talked to family members	85 (84.2)	16 (15.8)	101
Took pain killers	38 (37.6)	63 (62.4)	101
Took massage	12 (11.9)	89 (88.1)	101
Did exercise	11 (10.9)	90 (89.1)	101

Figures in parentheses indicate percentage of row total

(42.3%) were of 18 years of age. The mean ( $\pm$ SD) age of study participants was  $19\pm 1.48$  years. There was no statistically significant association found between PMS and age of the participants while previous researches have reported that younger age group is at higher risk of having PMS.

Bakhshani et al.,<sup>25</sup> conducted a cross-sectional study in 2005 on 300 female students between 18 and 27 years of age studying in Zaheden University of Medical Sciences, Iran. The study showed that out of these 300, 109 participants were of 18–20 years of age and 158 were of 21–24 years of age, with the mean age being  $21.64\pm 2.13$  years. The severity of symptoms was significantly higher for the younger women (18–20 years) as compared to older women (21–24 and 25–27 years). An observational prospective study using the DRSP criteria conducted by Nisar et al.,<sup>21</sup> on medical students of age 18–25 years of Isra University Hospital, Hyderabad, Sindh, Pakistan, in 2006 showed the mean age as  $21.1\pm 1.9$  years. It concluded that PMS is high in young girls. Amjad et al.,<sup>27</sup> conducted a cross-sectional study on women between 15 and 45 years of age and concluded that PMS is highly prevalent in the reproductive age group. The discrepancy in the findings of the above-mentioned studies and the present study may be due to various factors

including differences in the study tools,<sup>25,27</sup> study areas, or study participants.

#### PMS and permanent residence

In the present study, permanent address-wise distribution of 101 participants reveals that a majority of participants were residing in an urban area 76 (75.2%). There was no statistically significant association found between PMS and the residency condition of participants in the present study, while previous studies from India and Pakistan have reported urban residence to be a significant contributing factor in the development of PMS. Thakre et al.,<sup>18</sup> conducted a community-based cross-sectional study on 387 school-going girls between 12 and 16 years of age and found that the problem of PMS was significantly higher in urban girls. Amjad et al.,<sup>27</sup> conducted a cross-sectional study in Pakistan on women aged between 15 and 45 years and found that urban residence has a significant association with the risk of developing PMS. The observed difference between the abovementioned studies and the present study may be due to differences in the enrolled population, geographical differences, and the higher awareness of PMS in females who reside in an urban area.

#### PMS and living with parents

In the present study, out of 101 participants, 61 (60.4%) of the participants were living with their parents. This may be because maximum participants reported their permanent address as being an urban area. It was found that PMS had no statistically significant association with the living condition of participants. Similar findings were reported in a study from Iran.<sup>25</sup> Bakhshani et al.,<sup>25</sup> conducted a cross-sectional study in 2005 on 300 female students between 18 and 27 years of age studying in Zaheden University of Medical Sciences, Iran. It concluded that 46.4% of participants were living with parents and 54.4% far from parents and no significant difference was found.

#### PMS and religion

In the present study, religion-wise distribution of the 101 study participants shows that the majority of participants

91 (90%) were Hindus and 10 (9.9%) were Muslims. This prevalence can be because Ujjain is a Hindu city. It was found that religion had no significant association with the occurrence of PMS as non-Hindus were very few. Similar findings were reported in previous studies. Sarkar *et al.*,<sup>20</sup> studied sociodemographic factors, PMS, and factors associated with PMS. Out of 244 adolescent rural school girls between 13 and 21 years of age, majority 238 (97.5%) were Hindu and 6 (2.5%) were Muslims. It concluded that PMS was not statistically associated with religion of the participants. The similar conclusion of the abovementioned study with the present study might be because of cultural similarities.

### PMS and caste

In the present study, caste-wise distribution of 101 participants shows that a majority of the participants 42 (41.2%) belonged to the general category. This can be attributed to the study population, culture, and geographical influences. PMS was not found to be statistically associated with caste. A similar finding was reported by Sarkar *et al.*,<sup>20</sup> who studied the sociodemographic factors, PMS, and factors associated with PMS on 244 adolescent rural school girls between 13 and 21 years of age, of which a majority of the participants 201 (82.4%) belonged to the general category. It concluded that caste was not statistically associated with PMS. The similar conclusion of the abovementioned study and the present study can be attributed to cultural and geographical influences.

### PMS and occupation of mother

In the present study, distribution of 101 participants according to occupation of their mother reveals that nearly all mothers of the participants (89.1%) were housewives. This finding can be due to the fact that most families do not allow females to go out and work. It was found that the occupation of mother was not statistically associated with PMS. While the study conducted by Sarkar *et al.*,<sup>20</sup> in 2014, concluded the prevalence of PMS to be high in participants whose mothers were homemakers, it may be owing to more apprehensive mothers staying at home. Variation in the findings of the abovementioned study and the present study can be due to cultural and geographical differences.

### PMS and socioeconomic status

In the present study, the distribution of the 101 participants according to modified Prasad's scale of socioeconomic status revealed that the majority of participants 66 (65.3%) belonged to class V, 20 (19.8%) belonged to class IV, 8 (7.9%) belonged to class III, and 7 (6.9%) belonged to class II. For purpose of analysis, class V was considered lower class comprising 66 (65.3%) participants and classes II, III, and IV were merged into non-lower class comprising 36 (35.6%) participants. In the present study, no significant association was found between PMS and the socioeconomic

status of the participants. This may be because of the small sample size, participants included in the study being young and the low prevalence of PMS in the present study. Similar findings were reported by Sarkar *et al.*,<sup>20</sup> studies have also shown different outcomes, i.e., a study from Pakistan by Amjad *et al.*,<sup>27</sup> found that the higher income group was significantly associated with the risk of PMS. In contrast, some investigators<sup>28</sup> have suggested that lower socioeconomic status is associated with a higher prevalence of PMS. A possible explanation can be that the awareness of PMS is higher in women from higher socioeconomic status while the presence of other factors such as social habits and living conditions may explain the higher prevalence of PMS in women from lower socioeconomic status. Variation in the outcome of the abovementioned studies and the present study can be because of the differences in the socioeconomic status of the participants including cultural and geographical influences.

### Association of PMS with physical exercise and body mass index (BMI)

In the present study, out of the 101 participants, majority of the participants 87 (86.1%) did not take part in physical exercise and 14 (13.9%) were involved in physical exercise. The present study found no statistically significant association between PMS and physical exercise whereas previously Lakshmi *et al.*,<sup>17</sup> and Rasheed and Al-Sowielem<sup>29</sup> concluded that an association between lack of exercise and PMS existed. This may be because of biological and psychological factors influencing the production of hormones that lead to the occurrence of PMS. Out of 101 participants, 37 (36.6%) participants were underweight, 54 (53.5%) were normal, 8 (7.9%) were overweight, and 2 (2%) were obese. No statistically significant association was found between PMS and body mass index in the present study whereas Lakshmi *et al.*,<sup>17</sup> showed that the increase in BMI is significantly associated with PMS because increase in weight may influence hormonal changes in the body leading to occurrence of PMS. Variation in findings of the present study and the abovementioned study can be attributed to the fact that most of the participants in the present study fall in the normal BMI category.

### Coping behavior adopted to get relief from premenstrual symptoms

In the present study, it was found that majority of participants 85 (84.2%) talk to their family members about their problem, 64 (63.4%) turn to study and forget all things, 57 (56.4%) take hot or cold beverages, 55 (54.5%) accept it as a natural process, and 38 (37.6%) take pain killers. Hence, it is evident that majority of the participants adapted healthy coping strategies to cope with premenstrual symptoms. Similar findings were reported by the study of Kaur and Thakur.<sup>30</sup>

### Limitations of the study

1. The final sample size of 101 participants who submitted fully completed forms was less even though the calculated sample size of 250 was adequate based on the average prevalence of PMS from prior research.
2. Since it is a follow up study and participants had to fill the daily symptom scoring sheet for at least 2 consecutive menstrual cycles, hence results are subjective.
3. Due to the study's small final sample size and the fact that the colleges were chosen on purpose, there can only be a limited amount of generalization from the results.

### CONCLUSION

The present study concludes that the prevalence of PMS is found to be 40% and had no association with sociodemographic characteristics, physical exercise, and BMI. Most of the participants adopted home remedies to cope with premenstrual symptoms. Adolescent-friendly health services (health education and screening) to tackle menstrual problems at the school level should be strengthened and proper counseling of girls should be done, so that its prevalence can be dwindled at college level.

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**Authors' Contributions:**

**DB** - Concept, design, clinical protocol, manuscript preparation, editing, and manuscript revision, prepared first draft of manuscript, review manuscript;  
**SS** - Definition of intellectual content, literature survey, implementation of study protocol, data collection, data analysis, manuscript preparation and submission of article; **VA** - Design of study, statistical analysis and interpretation, literature survey, coordination and manuscript revision; **AW** - Design of study, Manuscript revision.

**Work attributed to:**

Students studying in the colleges of Ujjain city which were included in the study.

**Orcid ID:**

Deepika Badkur - <https://orcid.org/0009-0007-9912-1206>  
 Suchita Singh - <https://orcid.org/0009-0006-9466-743X>  
 Vibha Arjaria - <https://orcid.org/0009-0006-9137-907X>

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