

## Original Research Article

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

Deepika Badkur<sup>1\*</sup>, Suchita Singh<sup>1</sup>, Dharmpal S. Chauhan<sup>2</sup>, Abhinav Sinha<sup>3</sup>

<sup>1</sup>Department of Community Medicine, RKDF Medical College and Research Centre, Bhopal, Madhya Pradesh, India

<sup>2</sup>Department of Community Medicine, R. D. Gardi Medical College, Ujjain, Madhya Pradesh, India

<sup>3</sup>Department of Epidemiology and Clinical Research ICMR - National Institute of Malaria Research, New Delhi, India

**Received:** 01 June 2018

**Accepted:** 09 July 2018

### \*Correspondence:

Dr. Deepika Badkur,

E-mail: [deepikabadkur@gmail.com](mailto:deepikabadkur@gmail.com)

**Copyright:** © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

## 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 atleast 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.<sup>1</sup> 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.<sup>2</sup> This

can interfere with the lives of the affected, as well as their interpersonal relationships.<sup>3</sup>

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.<sup>4-7</sup> 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.<sup>8</sup>

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.<sup>9</sup>

PMS symptoms usually start to be problematic in the adolescent years.<sup>10</sup> 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.<sup>11,12</sup> 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  $4pq/l^2$  considering average PMS prevalence (p) of 55%, allowable error 7% and 20% loss to follow up.<sup>13</sup> 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.<sup>14</sup> 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).<sup>15,16</sup> Screening of PMS was made using American College of Obstetrics and Gynecology (ACOG) criteria.<sup>17</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 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).**

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

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 ( $\pm$ SD) age for menarche was  $13\pm 1.11$  years. Mean duration of the menstrual cycle was  $30\pm 1.66$  days.

Mean ( $\pm$ SD) days of bleeding being as  $4.95\pm 1.25$  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).

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

Menstrual profile	Category	PMS		Total	X <sup>2</sup>	P-Value
		Yes	No			
Age at menarche	12-14yrs	27 (37.5)	45 (62.5)	72 (100)	0.46	0.49
	≥15yrs	13 (44.8)	16 (55.2)	29 (100)		
	Total	40	61	101		
Duration of menstrual cycle	28-31 days	26 (41.9)	36 (58.1)	62 (100)	0.37	0.55
	32-35 days	14 (35.9)	25 (64.1)	39 (100)		
	Total	40	61	101		
Number of bleeding days	3-7 days	37 (38.9)	58 (61.1)	95 (100)	0.29	0.68 <sup>#</sup>
	≥7 days	3 (50)	3 (50)	6 (100)		
	Total	40	61	101		
Dysmenorrhea	Present	30 (37.5)	50 (62.5)	80 (100)	0.72	0.40
	Absent	10 (47.6)	11 (52.4)	21 (100)		
	Total	40	61	101		
Dysmenorrhea severity	Mild	6 (35.3)	11 (64.7)	17 (100)	0.81	0.67
	Moderate	9 (32.1)	19 (67.9)	28 (100)		
	Severe	15 (42.9)	20 (57.1)	35 (100)		
	Total	30	50	80		
History of menstrual problem in mother	Yes	7 (24.1)	22 (75.9)	29 (100)	4.07	0.04 <sup>*</sup>
	No	33 (45.8)	39 (54.2)	72 (100)		
	Total	40	61	101		
History of menstrual problem in sister	Yes	4 (33.3)	8 (66.7)	12 (100)	0.04	1 <sup>#</sup>
	No	15 (36.6)	26 (63.4)	41 (100)		
	Total	19	34	53		

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 (#).

## 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% 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%.<sup>18-20</sup> 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%.<sup>21,22</sup> 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.<sup>18-22</sup> 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.<sup>23-28</sup> 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.<sup>29</sup> 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.<sup>22,23</sup> Amjad W et al and Delara M et al showed that early menarche is associated with occurrence of PMS.<sup>30,31</sup> Variation in the findings can be due to specific biological, social, or lifestyle characteristics and variations in cultural geographical factors.

### ***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  $30 \pm 1.66$  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.<sup>32</sup> 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.<sup>23</sup>

### ***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 ( $\pm$ SD) days of bleeding being as  $4.95 \pm 1.25$  days. Almost similar findings were reported by Sarkar et al.<sup>22</sup>

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.<sup>22</sup> However Tolossa and Bekele, have reported that less number (1-3 days) of bleeding days are associated with the development of PMS.<sup>28</sup> 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.<sup>33-35</sup> No significant association was found between dysmenorrhea, severity of dysmenorrhea and PMS. Similar findings were reported by Lakshmi et al.<sup>19</sup> 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 dysmenorrhic females were more likely to have PMS.<sup>22,23,31</sup>

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.<sup>36,30</sup> 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.<sup>30</sup> 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.

#### ACKNOWLEDGEMENTS

Authors would like to thank the Principals, faculty members and all the students of colleges, who offered their honest perceptions by participating in the present study.

*Funding: No funding sources*

*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee of R. D. Gardi Medical College, Ujjain, Madhya Pradesh, India*

#### REFERENCES

1. Janita PC, Anne MC. Effects of an educational programme on adolescents with premenstrual syndrome, Oxford J. 1998;14(6):817-30.
2. Uriel H, Eric M. Some clues to the etiology of premenstrual syndrome/premenstrual dysphoric disorder. Primary Psychiatry. 2004;11(12):33-40.
3. Shabnam M. Non pharmacological treatment of premenstrual syndrome. Afr J Midwifery Women's Health. 2011;5(3):148-52.
4. Ramcharan S, Love E, Fick G, Goldfien A. The epidemiology of premenstrual symptoms in A population-based sample of 2650 urban women: Attributable risk and risk factors. J Clin Epidemiol. 1992;45(4):377-92.
5. Pearlstein T, Stone A. Premenstrual syndrome. psychiatric clinics of North America. 1998;21(3):577-90.
6. Johnson S. The Epidemiology and Social Impact of Premenstrual Symptoms. Clinical Obstetrics Gynecol. 1987;30(2):367-76.
7. World Health Organization. International Statistical Classification of Disease and Related problems, 10th revision (ICD-10). Geneva: WHO: 1992.
8. Attar K. Epidemiology of Premenstrual Syndrome, A Systematic Review and Meta-Analysis Study. J Clin Diag Res. 2014;8(2):106-9.
9. Shiferaw M, Wubshet M, Tegabu D. Menstrual problems and associated factors among students of Bahir Dar University, Amhara National Regional State, Ethiopia: a cross-sectional survey. Pan Afr Med J. 2014;17:246.
10. Rapkin AJ, Mikacich JA. Premenstrual syndrome in adolescents: diagnosis and treatment. Pediatric Endocrinology. 2006;3(1):132-7.
11. Freeman E. Premenstrual syndrome and premenstrual dysphoric disorder: definitions and diagnosis 11 adapted from the symposium on premenstrual syndrome and premenstrual dysphoric disorders, July 17, 2000, Rhodes, Greece. Psychoneuroendocrinol. 2003;28:25-37.
12. Christolm M. World Youth Report. New York: United Nations Reproduction Section;2003. Available from: <http://www.un.org/esa/socdev/unyin/documents/worldyouthreport.Pdf>. Accessed on 10 Nov 2015.
13. Wittchen HU, Becker E, Lieb R, Krause P. Prevalence, incidence and stability of premenstrual dysphoric disorder in the community. Psychol Med. 2002;32(1):119-32.
14. Shaw W, Padubidri V, Daftary S, Howkins J, Bourne G. Howkinsand Bourne; Shaw's textbook of gynaecology. 16<sup>th</sup> edition. Noida: Elsevier;2015.
15. Endicott J, Nee J, Harrison W. Daily Record of Severity of Problems (DRSP): reliability and validity. Archives Womens Mental Health. 2006;9(1):41-9.
16. Biggs WS, Demuth RH. Premenstrual syndrome and premenstrual dysphoric disorder. American family physician. 2011 Oct 15;84(8):918.
17. American College of Obstetricians and Gynecologists. ACOG Practice Bulletin (No 15): Management of Premenstrual Syndrome. 2000.
18. Singh A, Kiran D, Singh H, Nel B, Singh P, Tiwari P. Prevalence and severity of dysmenorrhea: a problem related to menstruation, among first and second year female medical students. Indian J Physiol Pharmacol. 2008;52(4):389-97.
19. Anandha Lakshmi S, Saraswathi I, Saravanan A, Ramamchandran C. Prevalence of premenstrual syndrome and dysmenorrhoea among female medical students and its association with college absenteeism. Int J Biol Med Res. 2011;2(4):1011-6.
20. Thakre SB, Thakre SS, Ughade S, Thakre AD. Urban-Rural Differences in Menstrual Problems and Practices of Girl Students in Nagpur, India. Indian Pediatrics. 2012;49:733-6.
21. Ramya S, Rupavani K, Bupathy A. Effect of educational program on premenstrual syndrome in adolescent school girls. Int J Reprod Contracept Obstet Gynecol. 2014;3:168-71.
22. Sarkar A, Mandal R, Ghorai S. Premenstrual syndrome among adolescent girl students in a rural school of West Bengal, India. Int J Med Sci Public Health. 2015:1.
23. Nisar N, Zehra N, Haider G, Munir A and Sohoo N. Frequency, Intensity and Impact of Premenstrual Syndrome in Medical Students; J Coll Physicians Surg Pak. 2008;18(8):481-4.
24. Abbassi RM, Masood N and Rizwan N. Study of premenstrual syndrome (PMS) on quality of life at a University Hospital of Sindh. Inter J Med Medical Sci. 2013;3(3):383-5.

25. Taghizadeh Z, Shirmohammadi M, Arbabi M, Mehran A. The effect of premenstrual syndrome on quality of life in adolescent girls. *Iranian J Psychiatry.* 2008;3(3):105-9.
26. Tacani P, de Oliveira Ribeiro D, Barros Guimarães B, Perez Machado A, Tacani R. Characterization of symptoms and edema distribution in premenstrual syndrome. *Inter J Women's Health.* 2015;7:297-303.
27. Bakhshani N, Mousavi MN, Khodabandeh G. Prevalence and severity of premenstrual symptoms among Iranian female university students. *J Pak Med Asso.* 2009;59(4):205-8.
28. Tolossa F, Bekele M. Prevalence, impacts and medical managements of premenstrual syndrome among female students: cross-sectional study in college of health sciences, Mekelle University, Mekelle, Northern Ethiopia. *BMC Women's Health.* 2014;14(1):52.
29. Rokade S, Mane A. A study of age at menarche, the secular trend and factors associated with it. *The Internet J Biological Anthropology.* 2009;3(2).
30. Amjad A, Kumar R, Mazher SB. Socio-demographic factors and premenstrual syndrome among women attending a teaching hospital in Islamabad, Pakistan. *J Pioneer Med Sci.* 2014;4(4):159-62.
31. Delara M, Borzuei H, Montazeri A. Premenstrual Disorders: Prevalence and Associated Factors in a Sample of Iranian Adolescents. *Iranian Red Crescent Med J.* 2013;15(8):695-700.
32. Dambhare D, Wagh S, Dudhe J. Age at Menarche and Menstrual Cycle Pattern among School Adolescent Girls in Central India. *Global J Health Sci.* 2011;4(1).
33. Agrawal A, Venkat A. Questionnaire study on menstrual disorders in adolescent girls in Singapore. *J Pediatr Adoles Gynecol.* 2009;22:365-71.
34. Banikarim C, Chacko MR, Kelder SH. Prevalence and impact of dysmenorrhea on Hispanic female adolescents. *Arch Pediatr Adole Med.* 2000;154:1226-9.
35. Joseph GA, Bhattachargi S, Joseph A, Rao PS. General and reproductive health of adolescent girls in rural South India. *Indian Pediatr.* 1997;34:242-5.
36. Rasheed P, AlSowielem LS. Prevalence and predictors of premenstrual syndrome among college aged women in Saudi Arabia. *Ann Saudi Med.* 2003;23(6):3817.

**Cite this article as:** Badkur D, Singh S, Chauhan DS, Sinha A. Premenstrual syndrome and its association with menstrual profile among female students of colleges in Ujjain city, Madhya Pradesh, India. *Int J Res Med Sci* 2018;6:2726-31.