

## ORIGINAL RESEARCH

# Prevalence of premenstrual syndrome among medical students and etiological factors associated with it

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### ABSTRACT

**Background:** Premenstrual Syndrome (PMS) is a psychosomatic disorder that comprises of physical, mental and emotional symptoms that occur one to two weeks before menstruation and resolve after periods. **Methods:** This was a cross-sectional study conducted among the students of GMC Jammu. The research tool applied was 'Premenstrual Symptom Screening Tool (PSST)'. **Results:** A total of 320 girls were enrolled in the study; out of which 184 (57.5%) had no/mild premenstrual syndrome. 84 (26.25%) had moderate/severe PMS and 52 (16.25%) suffered from PMDD. Higher prevalence of sedentary habits was seen in patients with PMS (33.08% vs 19.02%). Also, the patients with PMS had higher prevalence of high salt intake (43.38% vs 22.82%), high fat intake (33.82% vs 23.91%), coffee intake (69.85% vs 43.47%), tea intake (63.23% vs 45.65%), aerated drinks (26.47% vs 15.21%), sweets/icecreams/chocolates (32.35% vs 18.47%) and lower prevalence of consumption of fruits (50% vs 60.86%) as compared to those without PMS. **Conclusions:** Our study found obesity, sedentary lifestyle and consumption of diet rich in salt, fat, sweets, aerated drinks as well as caffeine and low in fruits and vegetables was associated with higher prevalence of PMS.

**Keywords:** Premenstrual syndrome, PMDD, risk factors.

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### INTRODUCTION

Premenstrual Syndrome (PMS) is a psychosomatic disorder that comprises of physical, mental and emotional symptoms that occur one to two weeks before menstruation and resolve after periods. Most common symptoms include acne, breast tenderness, bloating, mood swings, tiredness etc.<sup>1</sup> This disorder has been rapidly gaining interest among the practitioners because of the amount of burden of disease and sickness absenteeism it causes monthly to the women especially who suffer from a severe form of this disorder.

The Premenstrual Syndrome was first described in 1931 by Frank and Horney and they described that it was mainly due to hormonal imbalance.<sup>2,3</sup> Its prevalence has been reported in 20 to 32 % of premenopausal<sup>4</sup> and 30-40% of the reproductive female population.<sup>5</sup> The diagnosis of Premenstrual Syndrome is done using a structured questionnaire about the symptoms before periods and their intensity and duration. The research tool in our study used was

'Premenstrual Symptom Screening Tool (PSST)' in accordance with the DSM-IV criteria for PMDD.

Different etiologies have been proposed for the PMS. The abnormal function of hypothalamic-pituitary-adrenal axis (HPA), abnormal sensitivity to fluctuating levels of sex steroids<sup>6</sup>, serotonin dysregulation<sup>7</sup>, beta endorphin, luteal phase sodium or water, nutritional defects and environmental factors are the main factors for PMS.

The purpose of this study was to detect the prevalence of PMS and PMDD among the college students and the risk factors for the same.

### MATERIALS AND METHODS

The study was approved by the Ethical Committee of Government Medical College. It was a cross-sectional study done among the students of college GMC.

The study comprised of 320 college girls including undergraduate students, interns and postgraduate students. These were subjected to a structured questionnaire about physiological and physical signs

and symptoms they experienced during their menstrual cycle. The criteria were based upon burden of these symptoms.

The research tool applied was ‘Premenstrual Symptom Screening Tool (PSST)’(Appendix 1)<sup>8</sup>. The PSST includes a list of premenstrual symptoms as well as a measure of impairment accordance with the DSM-IV criteria for PMDD. Girls were asked about the symptoms which they experienced before the start of period and stopped within a few days of bleeding. The symptoms listed were depressed mood/hopelessness, anxiety/tension, tearfulness, anger/irritability, decreased interest in work, difficulty in concentrating, fatigue/lack of energy, overeating/food craving, insomnia/hypersomnia, and physical symptoms. Girls were asked to rate the symptoms in severity as ‘not at all’, ‘mild’, ‘moderate’ or ‘severe’. We also collected demographic information on these girls including age, education qualification, height and weight and duration and regularity of menstrual cycle.

Based on the number and severity of symptoms, the subjects were classified as ‘PMDD’, ‘Moderate to severe PMS’ and ‘No/Mild PMS’. Girls with at least one of the four symptoms (irritability, dysphoria, tension, liability of mood) as severe and at least 4 additional symptoms (for a total of 5) as moderate to severe; and their symptoms interfered severely with their ability to function in at least one of the five domains (work efficiency/productivity, social life, home responsibilities, relationship at work, or relationships at home). These were classified as PMDD. Girls with at least one of the four core symptoms as moderate to severe and at least four additional symptoms as moderate to severe along with their symptoms interfering moderately to severely with their ability to function in activities of daily living in at least one of the five psychological domains mentioned above were identified as ‘moderate to severe PMS’. Rest of the girls were

classified into ‘No/Mild PMS’ group.

**STATISTICALMETHODS**

Chi square test was used as the statistical tool for calculation of p-value and the level of significance used was <0.005.

**RESULTS**

A total of 320 girls were enrolled in the study; out of which 184 (57.5%) had no/mild premenstrual syndrome, 84 (26.25%) had moderate/severe PMS, and 52 (16.25%) suffered from PMDD (Table 1). Major symptom in moderate/severe PMS was liability of mood (85.7%) and physical symptoms (85.7%). In PMDD, major symptom was anger/irritability (92.30%) followed by depressed mood/dysphoria (84.61%) and physical symptoms (76.92%) (Table 2). The mean age in the mild/no PMS group was 21.81, moderate/severe PMS was 21.36 and that in PMDD group was 22.17 which was comparable. (Table 3). The percentage of both obese girls and underweight girls was higher in the PMS group (30.14% and 27.94%) (Table 4). The patients with PMS had more incidence of irregular cycles (36.02% vs 20.10%) (Table 5). The prevalence of sedentary habits was significantly more in patients with PMS as compared to without PMS (33.08% vs 19.02%) while those girls without PMS had more incidence of regular exercise (32.60% vs 12.5%) (Table 6). The patients with PMS had higher prevalence of high salt intake as compared to those withoutPMS (43.38% vs 22.82%) (Table 7). The patients with PMS also had a higher prevalence of high fat intake (33.82% vs 23.91%) though statistically not significant(Table 8). The patients with PMS had statistically higher prevalence of coffee intake (69.85% vs 43.47%), tea intake (63.23% vs 45.65%) and sweets/icecreams/chocolates (32.35% vs 18.47%) (Table 9). The prevalence of depression was seen to be significantly higher in girls with PMS (11.02% vs 1%) (Table 10).

**Table 1: Percentage of the prevalence of PMS**

Severity	Number	Percentage
No/mild PMS	184	57.5%
Moderate/severe PMS	84	26.25%

Severity	Number	Percentage
PMDD	52	16.25%
Total	320	100%

**Table 2: Proportion of symptoms in patients with either PMS and PMDD**

Symptom	no/mild PMS	moderate/severePMS	PMDD
Anger/irritability	13.04%	76.19%	92.30%
Anxiety/tension	17.39%	42.85%	76.92%
Liability of mood	27.65%	85.71%	76.92%
Depressed mood/dysphoria	12.76%	71.42%	84.61%
Tearfulness	14.89%	47.61%	38.46%
Disinterest(work/home/social)	10.63%	52.38%	53.84%
Fatigue & lethargy	31.91%	66.66%	69.23%

Change in appetite	10.63%	52.38%	61.53%
Difficulty in sleeping	14.89%	38.09%	69.23%
Lack of concentration	17.02%	33.33%	53.84%
Feeling of out ofcontrol	4.25%	23.80%	46.15%
Physical symptoms	29.78%	85.71%	76.92%

**Table 3: Correlation of age with the severity of PMS**

Age(years)	no/mild PMS	moderate/severePMS	PMDD
17-20	50	25	22
20-23	70	35	12
23-26	64	24	18
Mean ± SD (years)	21.81 ± 2.02	21.36 ± 2.15	22.17± 2.12

**Table 4: Correlation of BMI with the severity of PMS**

BMI	no PMS		PMS	
	N	%	N	%
Underweight	25	13.58%	38	27.94%
Normal	66	35.86%	18	13.23%
Overweight	74	40.21%	16	11.76%
Obese	18	9.7%	41	30.14%

**Table 5: Correlation of regularity of menstrual cycles with the severity of PMS**

	No PMS		PMS	
Regular	147	79.89%	87	63.97%
Irregular	37	20.10%	49	36.02%

chi<sup>2</sup>(1) = 9.29, p = 0.002

**Table 6: Correlation of exercise with the prevalence of PMS**

		no PMS	PMS	
Regular	60	32.60%	17	12.5%
Occasional	40	21.17%	30	22.79%
Mild	49	26.63%	44	32.35%
Sedentary	35	19.02%	45	33.08%

chi<sup>2</sup>(3) = 20.22, p = <0.001

**Table 7: Correlation of salt intake with the severity of PMS**

	no PMS		PMS	
Low	80	43.47%	34	25%
Medium	62	33.69%	43	31.61%
High	42	22.82%	59	43.38%

Chi<sup>2</sup>(2) = 18.07, p < 0.001

**Table 8: Correlation of fat intake with the prevalence of PMS**

	no PMS		PMS	
Low	72	39.13%	46	33.82%
Medium	68	36.95%	44	32.35%
High	44	23.91%	46	33.82%

chi<sup>2</sup>(2) = 3.80, p = 0.149

**Table 9: Correlation of consumption of types of food products and drinks frequently (more than thrice a week) with the prevalence of PMS**

Food product	no PMS		PMS		P-value
Coffee	80	43.47%	95	69.85%	chi <sup>2</sup> (1) = 20.90, p <0.001
Tea	84	45.65%	86	63.23%	chi <sup>2</sup> (1) = 9.02, p = 0.003
Aerated drinks	28	15.21%	36	26.47%	chi <sup>2</sup> (1) = 5.51, p = 0.19
Sweets/icecreams/chocolates	34	18.47%	44	32.35%	chi <sup>2</sup> (1) = 7.43, p =0.006
Fruits	112	60.86%	68	50%	chi <sup>2</sup> (1) = 3.33, p =0.68
Alcohol	0	0%	0	0%	—

Smoking	0	0%	0	0%	—
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**Table 10: Correlation of prevalence of mental disorders with prevalence of PMS**

	no PMS		PMS		P-value
<b>Anxiety</b>	88	47.82%	60	44.11%	chi <sup>2</sup> (1) = 0.30, p = 0.586
<b>Depression</b>	2	1%	15	11.02%	<b>chi<sup>2</sup>(1) = 13.45, p &lt; 0.001</b>
<b>Self harmthoughts</b>	2	1%	0	0%	chi <sup>2</sup> (1) = 0.25, p = 0.616

## DISCUSSION

The prevalence of PMDD among the students of ASCOMS medical college was found to be 16.25% while that of moderate/severe PMS was 26.25%. In a study by Safarzadeh A et al<sup>9</sup>, prevalence of PMDD was found to be 17.6% in medical students. The result was also consistent with the study of Tabassum et al.<sup>10</sup> which reported the prevalence of PMDD 18.2% and also that of Kuzman R and Hotujac L<sup>11</sup> which reported the prevalence of PMDD 17.24%. The prevalence was higher than reported in study of Raval CM et al<sup>12</sup> (PMDD prevalence 3.7%), Wittchen et al.<sup>13</sup> (PMDD prevalence 9%), Alavi et al.<sup>14</sup> (PMDD prevalence 4.3%) and Tatari's study<sup>15</sup> (PMDD prevalence 9.4%). The high incidence in medical students could be a result of increased psychological stress of studies and increased awareness among medical students about the disorder and thus more recognition of the symptoms by them.

Among the patients of PMDD, anger and irritability were the predominant symptoms followed by depressed mood and anxiety/tension and physical symptoms. Studies by Tabassum S<sup>10</sup> et al, Steiner M et al<sup>16</sup> and Nisar N et al<sup>17</sup> have also reported anger/irritability as the most common symptom.

The mean age in no/mild PMS group, moderate/severe PMS and PMDD was comparable and statistically non significant. Safarzadeh et al<sup>9</sup> also did not find any relation with age.

In our study, we found higher prevalence of PMS in obese (30.14%) as well as underweight girls (27.94%) as compared to those who fell on moderate or overweight BMI category. Masho et al.<sup>18</sup> also, in their study, reported that the risk of PMS in obese women was 8.2% higher than that of underweight women. Study by Seedhom AE et al<sup>19</sup> also showed higher prevalence of PMS in underweight and obese students. Similar study by Rad M et al<sup>20</sup> showed that hip circumference and BMI were associated with PMS.

Our study also revealed that the prevalence of sedentary habits was significantly more in patients with PMS as compared to without PMS (33.08% vs 19.02%) while those girls without PMS had more incidence of regular exercise (32.60% vs 12.5%). Seedhom AE et al<sup>19</sup> also, in their study, showed that a large proportion of students who were sedentary (91%) had PMS compared to those women (49.2%) who were physically active. Johnson et al. (1995) have reported that the amount of aerobic exercise was significantly associated with lower water retention, autonomic reactions, and appetite<sup>21</sup>. Aerobic exercise

seems to have more beneficial effect on premenstrual symptoms than anaerobic exercise, especially with respect to premenstrual depression.<sup>22</sup>

Among the dietary patterns, our study revealed that the patients with PMS had significantly higher prevalence of high salt intake (43.38% vs 22.82%). The patients with PMS also had higher prevalence of coffee intake (69.85% vs 43.47%), tea intake (63.23% vs 45.65%) and sweets/icecreams/chocolates (32.35% vs 18.47%) as compared to those without PMS as shown by our study. Rasheed and Saad (2003) also found a significant positive effect on premenstrual symptom severity by total intake of caffeinated beverages in general and caffeinated coffee and cocoa-chocolate drinks in particular. Phillis (1989) suggested that the depressive action of adenosine on central neurons was the mechanism by which caffeine might cause PMS.<sup>23</sup> Hashim MS, in their study, revealed that smoking status was associated with increased risk of reporting psychological symptoms (OR 2.5, 95% CI 1.1–5.8; p < 0.05) and behavioral symptoms (OR 2.2, 95% CI 1.0–4.9; p < 0.05), while high calorie/fat/sugar/salt foods intake was associated with increased risk of reporting physical symptoms (OR 3.2, 95% CI 1.4–7.3; p < 0.05). However, fruit consumption (OR 0.34, 95% CI 0.125–0.92; p < 0.05) was associated with a decreased risk of reporting behavioral symptoms.<sup>24</sup>

Among the prevalence of mental disorders, depression was significantly higher in girls with PMS (11.02% vs 1%). Forrester-Knauss C recorded the prevalence of major depression as 11.3% in women screening positive for moderate PMS and 24.6% in women screening positive for severe PMS.<sup>25</sup> Firoozi R et al found that the mean scores of psychiatric symptoms (Depression, Anxiety, Aggression, Interpersonal sensitivity) in the PMS group were significantly higher than the healthy group.<sup>26</sup>

## CONCLUSION

Our study found obesity, sedentary lifestyle, lack of regular exercise to be positively associated with the prevalence of premenstrual syndrome. Among the dietary patterns, consumption of diet rich in salt, sweets, tea as well as caffeine were associated with higher prevalence of PMS among the medical students. Girls with higher incidence of psychiatric disorders like depression also had increased prevalence of premenstrual syndrome.

It is, therefore, essential to encourage the female adolescents to adopt a healthy life style, which includes appropriate healthy nutrition and increasing

the intake of vegetables and fruits. Cutting of the added salt in their food, as well as decreasing consumption of caffeinated beverages, particularly coffee, from their diet would be useful in decreasing the symptoms of PMS.

Also increased awareness is required among the girls about this disorder so that they do not feel inhibited to seek treatment for this as this disorder which is responsible for a lot of absenteeism from schools, colleges and workplace. So decrease in prevalence of PMS and PMDD would go a long way in improvement of female health and well-being.

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