Section: Community Medicine

Original Research Article

PREVALENCE OF PREMENSTRUAL SYNDROME AND ASSOCIATED RISK FACTORS AMONG UNDERGRADUATE STUDENTS OF GIMS, KALABURAGI, KARNATAKA: A CROSS- SECTIONAL STUDY

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ABSTRACT

Background: Premenstrual syndrome (PMS) is a group of condition with physical, emotional, cognitive, affective and behavioural symptoms, in absence of organic or underlying psychiatric disease, that occur cyclically during luteal phase of the menstrual cycle and resolve quickly at or within a few days of the onset of menstruation. In India prevalence of PMS ranges from 14.3%–74.4% and these symptoms affect social and interpersonal relationship, health related quality of life, academic performances, daily living activities, occupational productivity. **Objectives:** To estimate the prevalence and assess the risk factors of PMS among medical undergraduates, GIMS, Kalaburagi.
Materials and Methods: This was a cross-sectional study conducted among 240 girl students of Gulbarga institute of medical sciences, Kalaburagi using simple random sampling from May to December 2023. Data were collected using self-administered questionnaire and PMS was assessed by Premenstrual Symptoms Screening Tool (PSST). Data were entered in Microsoft excel sheet and analysed using SPSS version 20.
Results: The prevalence of PMS and PMDD was found to be 38% and 7% respectively. Irregular menstrual cycle, dysmenorrhea, family h/o PMS/PMMD, tobacco and alcohol consumption, frequent experience of stress, experience of emotional or physical abuse and BMI were significantly associated with PMS.
Conclusion: Incorporating educational modules will aid in providing accurate information, emotional, and medical assistance for women's menstrual health issues and improve their health seeking behaviour and quality of life.
Keywords: Premenstrual syndrome, PMS, PMDD, PSST.

INTRODUCTION

For women in reproductive age, menstrual cycle is a normal physiological phenomenon with a variety of bio-psychosocial mechanisms. Menstruation related health problems affect a large proportion of female population. Premenstrual syndrome (PMS) is a cyclic phenomenon occurring during the late luteal phase of the menstrual cycle. PMS is characterized by a group of physical, emotional, psychological symptoms of varying severity which begins a week before the onset of the menstruation and ends after the onset of menstruation.[1] According to American College of Obstetrics and Gynaecology (ACOG) criteria, one of the following affective symptoms (depression, angry outbursts, irritability, anxiety, confusion, and social withdrawal) and any one of somatic symptoms (breast tenderness, abdominal bloating, headache, and swelling of extremities) with an adverse impact on daily life activities,

markedly affecting interpersonal relationships are required for diagnosis of Premenstrual syndrome. These cluster of symptoms should be present five days before start of periods in three previous cycles and settled by four days after onset of menstrual bleeding.[2,3] Premenstrual dysphoric disorder (PMDD) or severe PMS is the extreme, predominantly psychological end of PMS.[4]

According to epidemiological survey almost 75% suffer from symptoms of PMS and 3–8% suffer from PMDD. [1] The prevalence of PMS was found to be different in different countries, in China it was found to be 34%, 71% in turkey, 80% in Pakistan and 92% in Jordan. [2] In India a range of 14.3%–74.4% is the reported prevalence estimate of PMS.[5] There is an enormous amount of variation in the prevalence of PMS found in various studies, which can be attributed to the lack of an accepted definition and the fact that existing ones change according on the type of research. A number of diagnostic criteria, including the Premenstrual Symptoms Screening Tool (PSST) and the Daily Record of Severity of Problems (DRSP) by DSM-IV (1994), may have contributed to the varied results, in addition to differences in ethnicity, geography, and cultural backgrounds. A number of studies have found that the ACOG criteria, PSST/PSST-A, the Daily Record of Severity of Problems (DRSP), and other diagnostic criteria are reliable and validated tools.[6,7]

Research indicates that a woman with PMS may have a catastrophic impact on her family, coworkers, and herself.[8] The scenario for female medical students would be worse because the medical curriculum requires a high degree of focus, cognitive function, and ability to grasp vital life-saving skills.[9] Due to the higher prevalence of anxiety and depression in women with PMS, this disease in young women is a serious public health concern. Such disorders may have an indirect economic impact to society in the form of suicide, frequent hospital stays, and absenteeism from work.[10]

Despite being a normal biological process, menstruation is viewed as "unclean" or a "problem" in many parts of India, and there are various taboos surrounding it. These stigmas present an important barrier for women to seek treatment for their emotional and physical distress. While menstruation and managing menstrual hygiene have received a lot of attention in research, PMS, which is more significant, has received very little attention. Majority of students in medical undergraduate studies are females in our country, high prevalence of PMS among them may affect their performance if left undiagnosed and untreated. Therefore, objective of the study was to estimate the prevalence and its associated risk factors among medical undergraduate students of GIMS, Kalaburagi, Karnataka.

MATERIAL AND METHODS

Following approval from our institutional ethical committee, we did an institutional based cross-sectional study among the undergraduate MBBS girl students of Gulbarga Institute of Medical Sciences, Kalaburagi from May to December 2023.

Sample Size Calculation

Sample size was found to be 236 (rounded to 240), using formula $n=z^2\ pq/d^2$. Prevalence of PMS was taken as 19%, based on a study done by Kamat SV et.al and precision set at 5% with confidence level of 95%.[6]

Sampling Method: 60 students were selected by simple random sampling from each of the four professional years. Girls with the age group of 18 to 25 years were taken as inclusion criteria and students with high blood pressure, heart disease, hypothyroidism, diabetes, migraine, epilepsy, pelvic inflammatory diseases, PCOD, endometriosis, amenorrhea, chronic sickness, present anxiety, depression, and any other psychiatric illnesses were excluded from study.

Data Collection Procedure

The study participants were given pretested and semi-structured questionnaire after obtaining informed consent. The questionnaire consisted of five sections, socio-demographic details, menstrual history, dietary habits, anthropometric details and Premenstrual Symptoms Screening Tool (PSST). PSST is developed by Steiner et al,[11] to assess PMS and consists of total 19 items, divided in 2 domains. The first domain has 14 symptoms including four core symptoms and ten other symptoms regarding decreased interest in daily activity, behavioural signs and physical symptoms. The five variables of second domain consists of the interference with daily activity. It has four-point Likert scale, that is, “not at all,” “mild,” “moderate,” or “severe” in last 12 months during their most of the cycles. A positive participant for PMDD would need to show (i) at least five symptoms of the first domain with a score 2; and (ii) at least one of the first four core symptoms must be rated as severe (score = 3); and (iii) at least one of five variables was rated as severe (score = 3) in the second domain. Positive PMS screening would require the same (i), (ii), and (iii) criteria as PMDD. However, the level of the four core symptoms and functional impacts (second domain) ranged from moderate to severe.[12] When compared with the diagnostic criteria of the DSM-V, PSST showed high sensitivity (66.3% to 79.0%) and varied specificity (33.3% to 85.6%).[13] Based on the scorings, participants were categorized into 3 categories which are “mild/no PMS”, “moderate to severe PMS” and “PMDD”. During data collection, privacy and confidentiality of participants were strictly maintained.

Statistical Analysis

Data was entered into M.S. Excel and checked for its completeness, then coded and entered into the

SPSS software 20.0 version for analysis. Descriptive statistics [mean, standard deviation (SD), frequency (%)] were used to depict the baseline characteristics and clinical profile of the study population. The associations between variables were determined by the Chi-square/t-test. All statistical analyses were carried out at 5% level of significance and $p<0.05$ was considered statistically significant.

RESULTS

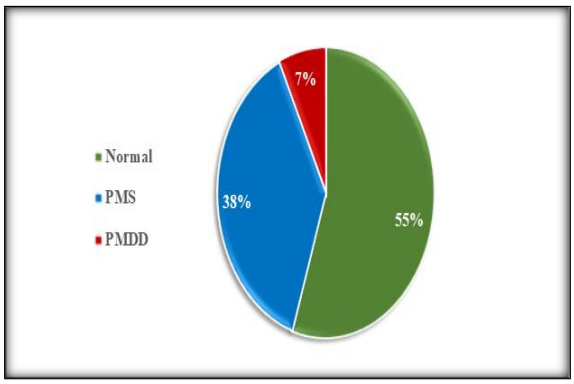

Figure 1: Prevalence of PMS

In our study, the students participated were between the age group of 18 to 23 years. The mean age of the participants was 20±1.2 SD. The mean age of menarche was 13± 1.3 SD and the mean BMI of participants was 22±3.5 SD. The prevalence of PMS and PMDD was found to be 37.9% (91) and 7.1% (17) respectively. [Figure 1] Irregular menstrual cycle, dysmenorrhea and participants with family h/o PMS/PMMD were found more commonly among participants with PMS and PMDD and this association was statistically significant. Even though participants with altered menstrual cycle and increased duration of bleeding had more prevalence of PMS, the association was not statistically significant. [Table 2] It was observed that participants with habit of consumption of fast food had higher prevalence of PMS. Higher rate of PMS was observed among those with sleep duration <6 hours and not on regular exercise, but these were not supported statistically. Factors such as tobacco, alcohol consumption, frequent experience of stress, experience of emotional or physical abuse and higher BMI were significantly associated with PMS. [Table 3]

Table 1: Socio-demographic and Menstrual and Lifestyle characteristics of the participants

S. No	Variables	N, (%)	S. No	Variables	N, (%)
Socio-demographic characteristics			**Menstrual characteristics**		
1.	**Age**		**1.**	**Menarche**	
	18-19 years	55 (22.9)		≤ 10 years	5 (2.1)
	20-21 years	129 (53.7)		11-14 years	202 (84.2)
	22-23 years	56 (23.3)		≥ 15 years	33 (13.7)
2.	**Stay**		**2.**	**Regular menstruation**	
	Home	108 (45)		No	34 (14.2)
	Hostel	132 (55)		Yes	206 (85.8)
3.	**Socioeconomic status**		**3.**	**Menstrual cycle length**	
	Upper class	84 (35)		<21 days	4 (1.7)
	Upper middle	77 (32.1)		21-35 days	218 (90.8)
	Middle	59 (24.6)		>35 days	18 (7.5)
	Lower middle	18 (7.5)			
	Lower class	2 (0.8)	**4.**	**Menstrual bleeding duration**	
4.	**Family type**			<3 days	37 (15.4)
	Nuclear	199 (82.9)		3-5 days	156 (65)
	Joint	41 (17.1)		>5 days	47 (19.6)
5.	**Mother's education**				
	Non formal education	5 (2.1)	**5.**	**Abdominal pain**	
	Schooling	84 (35)		Yes	165 (68.7)
	Diploma	29 (12.1)		No	75 (31.3)
	Graduate and above	122 (50.8)			
6.	**Mother's occupation**		**6.**	**Family h/o PMS/PMDD/Menstrual problems**	
	Homemaker	164 (68.3)		Yes	41 (17.1)
	Employed	76 (31.7)		No	199 (82.9)
Lifestyle characteristics of the participants					
1.	**Diet**		**7.**	**Exercise**	
	Vegetarian	99 (41.3)		Yes	121 (50.4)
	Mixed	141 (58.7)		No	119 (49.6)
2.	**Coffee**		**8.**	**Stress**	
	Yes	136 (56.4)		Not at all	7 (2.9)
	No	104 (43.3)		Rarely	121 (50.5)
3.	**Sweet food**			Frequently	98 (40.8)
	Yes	199 (82.9)		Always	14 (5.8)
	No	41 (17.1)			
4.	**Fast food**		**9.**	**Abuse (Emotional/Physical)**	
	Yes	210 (87.5)		Yes	12 (5)
	No	30 (12.5)		No	228 (95)

5.	**Tobacco**				
	Yes	16 (6.6)	**10.**	**BMI category**	
	No	224 (93.4)		Underweight	31 (12.9)
6.	**Alcohol**			Normal	121 (50.4)
	Yes	22 (9.2)		Overweight	46 (19.2)
	No	218 (90.8)		Obesity	42 (17.5)
	TOTAL	**240 (100%)**		**TOTAL**	**240 (100%)**

Table 2: Association between menstrual characteristics of participants and PMS

S. No	Variables	Normal N, (%)	PMS N, (%)	Total (N=240)	Chi Square	P value
1	**Menarche**				0.23	0.892
	≤ 10 years	3 (60)	2 (40)	5		
	11-14 years	112 (55.4)	90 (44.6)	202		
	≥ 15 years	17 (51.5)	**16 (48.5)**	33		
2	**Regular menstruation**				6.22	0.013
	Yes	120 (58.3)	86 (41.7)	206		
	No	12 (35.3)	**22 (64.7)**	34		
3	**Menstrual cycle length**				3.65	0.161
	<21 days	1 (25)	**3 (75)**	4		
	21-35 days	124 (56.9)	94 (43.1)	218		
	>35 days	7 (38.9)	**11 (61.1)**	18		
4	**Menstrual bleeding duration**				5.39	0.068
	<3 days	20 (54.1)	17 (45.9)	37		
	3-5 days	93 (59.6)	63 (40.4)	156		
	>5 days	19 (40.4)	**28 (59.6)**	47		
5	**Abdominal pain**				17.05	0.000
	Yes	76 (46.1)	**89 (53.9)**	165		
	No	56 (74.7)	19 (25.3)	75		
6	**Family h/o PMS/PMDD/Menstrual problems**				8.69	0.003
	Yes	14 (34.1)	**27 (65.9)**	41		
	No	118 (59.3)	81 (40.7)	199		
	Total	**132**	**108**	**240**		

Table 3: Association between Lifestyle characteristics of the participants and PMS

S. No	Variables	Normal N, (%)	PMS N, (%)	Total (N=240)	Chi Square	P value
1	**Diet**				0.87	0.349
	Vegetarian	58 (58.6)	41 (41.4)	99		
	Mixed	74 (52.5)	67 (47.5)	141		
2	**Coffee**				0.53	0.463
	yes	72 (52.9)	64 (47.1)	136		
	No	60 (57.7)	44 (42.3)	104		
3	**Sweet food**				0.03	0.850
	Yes	110 (55.3)	89 (44.7)	199		
	No	22 (53.7)	19 (46.3)	41		
4	**Fast food**				0.96	0.327
	Yes	113 (53.8)	97 (46.2)	210		
	No	19 (63.3)	11 (36.7)	30		
5	**Sleep**				3.33	0.189
	<6 hours	11 (39.3)	17 (60.7)	28		
	6-8 hours	117 (57.4)	87 (42.6)	204		
	>8 hours	4 (50)	4 (50)	8		
6	**Exercise**				0.44	0.508
	Yes	81 (66.9)	40 (33.1)	121		
	No	68 (57.1)	51 (42.9)	119		
7	**Tobacco**				6.23	0.013
	Yes	4 (25)	12 (75)	16		
	No	128 (57.1)	96 (42.9)	224		
8	**Alcohol**				10.19	0.001
	Yes	5 (22.7)	17 (77.3)	22		
	No	127 (58.3)	91 (41.7)	218		
9	**Stress**				33.45	0.000
	Not at all	6 (85.7)	1 (14.3)	7		
	Rarely	86 (71.1)	35 (28.9)	121		
	Frequently	37 (37.8)	61 (62.2)	98		
	Always	3 (21.4)	11 (78.6)	14		
10	**Abuse (Emotional/Physical)**				11.11	0.001
	Yes	1 (8.3)	11 (91.7)	12		
	No	131 (57.5)	97 (42.5)	228		
11	**BMI category**					

	Underweight	20 (64.5)	11 (35.5)	31	7.95	0.047
	Normal	74 (61.2)	47 (38.8)	121		
	Overweight	20 (43.5)	26 (56.5)	46		
	Obesity	18 (42.9)	24 (57.1)	42		
	Total	**132**	**108**	**240**		

DISCUSSION

In our study, the prevalence of PMS was 37.9% and its severe form PMDD was 7.08%. Lower rates were reported by Anitha et al (14.3%) and Murlidhar et al (21.3%) and the results were almost consistent with Rumana et al (31.1%) and Bansal et al (35.9%).[14-17] However, Sarkar et al (61.5%) and Bhuvaneshwari et al (62.7%) reported much higher prevalence rates.[18,19] The difference can be attributed to cultural, societal variabilities, lifestyle characteristics and using different scales to assess PMS. A systematic review conducted by Dutta A et al., revealed that prevalence rates of PMS ranges from 14.3% to 35.9% using PSST scale and by using ACOG criteria the prevalence rates were found to be between 39.6% to 61.5%.[5]

In this study, there was no significant association between PMS and age of menarche. Similarly, few other studies,[14,20] reported that individuals with early menarche appeared to be affected more by PMS, but these results were not statistically significant. Study done by Lu D et al., and Czajkowska et al., found a significant inverse relationship with age at menarche and PMS. It is possible that persons with early menarche have a higher cumulative number of ovulatory cycles and more exposure to cyclic hormone changes by a certain age, making them more prone to pre-menstrual problems than those with late menarche.[21,22] In our study, there was strong association of dysmenorrhoea with PMS which is similar to the studies done by Kamat SV et al,[6] and Osman OT et al.[23] In present study, participants with oligomenorrhea, polymenorrhea and those with more than 5 days of menstrual bleeding were found to experience more PMS symptoms than other participants, but this association was not statistically significant.

We found a significant association of PMS with irregular cycles which is in contrast with study done by Suboohi S et.al,[24] who found that regular cycles were associated with PMS. On the contrary, Sarkar AP et al,[18] did not report any association between PMS and regularity of menstrual cycle. 17.1% of the participants had a family history of PMS, and it was statistically significant, which is supported by various other studies.[25,26] There was no significant association found between coffee, sweet food intake and PMS. This is similar to a study done by Shah RS et al,[27] but some other studies which found a significant positive effect on PMS severity by total intake of coffee and caffeinated beverages.[19,28] Previous study reported that caffeine could reduce serotonin synthesis and worsen PMS symptoms.[29]

In our study participants with less physical activity experienced more premenstrual symptoms than others but significant association was not found. Riddhi Sahu et al,[25] had similar findings. Physical activity may alleviate the PMS symptoms by secretion of endorphins and improvement in mental and physiological health.[30] Out of 240 subjects, 16 participants smoked, but the percentage of participants with PMS among them was high at 75% and 22 participants had the habit of consuming alcohol, among which 77.3% had PMS which had a statistically significant association. Hashim MS et al,[9] and Upadhyay M et al,[31] found similar association. Sakai and Ohashi reported that in comparison to men, women's metabolism of nicotine is accelerated by oestrogen, and during the luteal phase of their cycle, women smoke more cigarettes than the follicular phase.[32]

In this study, PMS was more common among those experiencing stress, which is consistent with previous research indicating a strong link between poor physical health and psychological discomfort.[6,33] One noteworthy outcome of our study was the statistically significant link between PMS and women's experiences with emotional and physical abuse. This is aligned with the findings of Nazish Fathima et al,[20] and Elizabeth et al,[34] who discovered that early-life emotional, physical, or sexual abuse increased the chance of PMS in the middle to late reproductive years considerably. Women who were overweight and obese had a higher prevalence of PMS and it was statistically significant. Murlidhar et al,[15] discovered similar relationship between BMI and PMS.

CONCLUSION

In our study there were considerably high levels of PMS & PMDD among college going girls. Dysmenorrhea, Family H/o PMS/PMDD/Menstrual abnormality, tobacco & alcohol consumption, stress and experience of emotional/physical abuse and high BMI were significantly associated with PMS. Primary health care physicians are the first ones to encounter menstrual problems and PMS symptoms. So, they can identify patients with these symptoms and educate them on these associations and how lifestyle changes can improve their conditions. And we can recommend keeping a PMS Journal which will aid in diagnosis, weight reduction in obese patients, reducing stress and other life style modifications.

Apart from this, incorporating a reproductive health component into school and college health education programs can provide students with current and accurate knowledge on reproduction and

menstruation issues. This may increase the health seeking behaviours of girls on their menstrual problems which can increase their quality of life, activities of daily living and academic performances. Additionally, screening for PMS can be done at institutions and treatment can be given if necessary.

Limitations

Assessment of stress was self-reported and bias cannot be ruled out. We didn't use any scale to assess stress, the reported stress was totally subjective. We used PSST questionnaire a screening tool instead of the DRSP that is used to diagnose PMS/PMDD for a period of two consecutive symptomatic cycles.

Ethical Approval

Ethical clearance was obtained from Institutional Ethical and Research Committee, Gulbarga institute of medical sciences, Kalaburagi, Karnataka.

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Declaration of Competing Interest

No conflict of interests.

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