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The magnitude of Premenstrual Syndrome (PMS) among young females and its association with body composition and lifestyle factors: A study from West Bengal

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Abstract

Premenstrual syndrome (PMS) encompasses clinically significant somatic and psychological manifestations during the luteal phase of the menstrual cycle, leading to substantial distress and impairment in functional capacity which disappear within a few days of the onset of menstruation. It affects day-to-day functioning including interference with an individual's interpersonal relationships, social interactions, occupational activities and productivity. Premenstrual dysphoric disorder (PMDD) is a much more severe form of premenstrual syndrome (PMS). The present cross-sectional descriptive study includes females aged $18 - 25$ years studying at an University of West Bengal. The study used a questionnaire, followed by a interview about lifestyle factors, anthropometric measurements. Caffeine and extra salt consumption had a significant association with PMS $(p < 0.0005)$. Variations in body fat were found in severe cases. Factors like diet alcohol and smoking were associated with menstrual problems. There was a severe impact of PMS on social life and daily activities. The analyzed factors on PMS could serve as a valuable resource to suggest lifestyle modifications as an interventional program to treat PMS in young women. Suitable health education strategies must be implemented to curb this dysphoria.

Keywords: Premenstrual Syndrome; Menstrual disorders; Physical activity; Dietary pattern; Nutritional status; Body fat; Quality of life

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1. Introduction

1.1. Premenstrual Syndrome and Menstrual Disorders: An Overview

Premenstrual Syndrome (PMS) comprises the most common issues which are a collection of physical and psychological symptoms that most women experience during the late luteal phase of each menstrual cycle is a more serious form of PMS. The World Health Organization (WHO) has classified PMS under the 10th revision of the International Classification of Diseases (ICD-10). PMS is described as 'A condition that manifests with an array of predictable physical, emotional, cognitive, affective and behavioural symptoms, in the absence of organic or underlying psychiatric disease, that occurs cyclically during the Luteal Phase of the menstrual cycle and resolves quickly at or within four days of the onset of menstruation as defined by Royal College of Obstetricians and Gynaecologists (RCOG), London in 2016. According to (Halbreich and Monacelli, 2004), if there are predominant mental symptoms or if the symptoms are severe and impairment associated, then, the patient is termed to have Premenstrual Dysphoric Disorder (PMDD), which in other terms can be referred to as the severe sub-type of PMS. Many women feel different a week or before they get their periods. Up to 75% of women who have their periods may have mild PMS, but PMDD is much less common, 2–8% of women experience PMDD within their lifespan.

A woman's menstrual cycle lasts an average of 28 days. Ovulation, the period when an egg is released from the ovaries, occurs on day 14 of the cycle. Menstruation, or bleeding, occurs on day 28 of the cycle. The cause of PMS is somewhat unknown, but many researchers believe that it is related to a change in both sex hormone and serotonin levels at the beginning of the menstrual cycle.

Common symptoms are tenderness of the breast, weight gain, fatigue, bloating, joint and muscle pain, headache and pain in the pelvis, and abdomen pain. Difficulty in concentrating, out-of-control feelings or becoming overwhelmed are cognitive symptoms. Also, other common symptoms include acne, depression, emotional outbursts, crying etc., although more than 200 symptoms can be seen as PMS. PMDD symptoms include depression, thoughts of suicide, panic attacks, extreme anxiety, anger with severe mood swings, crying spells, a lack of interest in daily activities, insomnia, binge eating, and painful cramping. The distortion in the normal day-to-day activities of a woman which comprises of her sexual functioning, occupational, social and interpersonal life is not attributed to any functional or organic disease, instead, it is disrupted by these symptoms (Mahesh et al., 2011).

However, variations of symptoms and their severity can be noticed by changes in months of the same individual or different individuals. Many factors like genetic, psychological, social and biological factors are associated to play a role in the etiology of PMS. Young women, women with longer menstrual cycles and women who are black having dark complexion are prone to develop PMS eventually according to the study conducted by (Deuster et al., 1999). As PMDD is a more severe depiction of PMS, it is marked with characteristic premenstrual mood disturbance which is associated with mood irritability and reactivity. It has been reported that PMS is multifactorial. Several factors are found to be associated with PMS including social

factors (ethnicity and culture), socioeconomic status, dietary habits, stress, exercise, smoking, alcohol consumption, genetic, hormonal, psychological, and biological. Genetics plays an important role. Women with a history of PMS in mothers are more likely to report PMS (70%) in comparison to women with negative family history (37%).

(Kamat et al., 2019) showed the prevalence of moderate to severe PMS was 19.3% and PMDD was 4.6%. Almost all (94.8%) girls had at least one PMS symptom with 65.7% having moderate to severe symptoms. They found dysmenorrhoea in 71.2% of girls and menorrhagia in 15.2%. Physical symptoms were reported by 53.5%, disruption of daily activities by 41.7%, while 25.1% had to miss school/college. Older age, dysmenorrhoea, menorrhagia, high levels of stress and PMS in mothers are significantly associated with PMS. In addition to these, lower age at menarche and junk food significantly contributed to PMDD.

(Sankar et al., 2015) conducted a study in Kolkata city, ward number 35 in three higher secondary girls' schools, among 278 students. The result shows that 54% of girls reported having PMS, depression, anger, irritability, confusion, abdominal distension, breast pain, headache and swelling limbs are the most common syndromes among them. A cross-sectional study on the prevalence of Premenstrual Syndrome (PMS) among nursing school and college students of Kalyani, Nadia, West Bengal, India by (Mandal et al., 2021). As a result, nearly 44.74% of the respondents were found to have moderate symptoms of PMS about 22.63% of the respondent's moderate PMS and 1.58% were assessed to have severe forms of PMS.

1.2. Relation Between Body Fat and Menstrual Disorders

Females with PMS have higher BMI values. However, obesity indices vary and various indicators of body fat distribution may differently correlate to hormonal status. In some studies, it was observed that PMS were higher in females with obesity, another study revealed no significant difference in the amount of body fat between healthy females and the ones with PMS. So, the present study aims to find out if BMI, body fat composition and nutritional status whether related to PMS and other menstrual problems and their severity.

A study conducted by (Bertone-Johnson et al., 2010) on 1968 women aged 27–44 found a strong linear relationship between BMI at baseline and risk of incident PMS, with each 1 kg/m^2 increase in BMI associated with a significant 3% increase in PMS risk (95% confidence interval 1.01–1.05). After adjustment for age, smoking, physical activity, and other factors, women with BMI 27.5 kg/m^2 at baseline had significantly higher risks of PMS than women with BMI, findings suggest that maintaining a healthy body mass may be important for preventing the development of PMS.

Another research on the relationship between body mass index, body composition and premenstrual syndrome prevalence in 476 girls in Poland by (Mizgier et al., 2019) showed women with normal BMI suffered from PMS twice as often as women with BMI $\geq$ 25 kg/m^2. This shows PMS is more frequent in patients with BMI $<$ 25, and less frequent in patients with higher FM (kg) and FM (%).

A study on the relationship between obesity and menstrual disorders was done on 19–23 years old obese graduate and undergraduate 750 girls in Bangladesh by (Sen et al., 2018)

showed that the most commonly observed menstrual disorders among obese students were dysmenorrhea (47.1%), irregular menstruation (11.4%), menorrhagia (1.4%) and oligomenorrhea (11%).

A study on the prevalence of menstrual irregularities in correlation with body fat among students of selected colleges in a district of Tamil Nadu, India by (Deborah, 2017) on 399 female students from three colleges found the prevalence of menstrual irregularities was high in obesity compared with those with normal body fat and particularly oligomenorrhea, amenorrhea, and hypomenorrhea had statistically significant increase in obese students.

1.3. Attitude and need for health-seeking behaviour Regarding Menstrual Disorders

Women's attitude towards menstrual disorders plays a significant role in their health-seeking behaviour. Negative attitudes such as perceiving menstrual disorders as a normal part of life or being embarrassed to discuss symptoms, can prevent women from seeking medical attention. Understanding it is essential for developing effective strategies to promote adequate healthcare seeking. A nationwide survey conducted in 2011 on Spanish women aged 15 to 49 years, by Lete et al., found a total of 73.7% of women complained during the last 12 menstrual cycles, and only 18.7% of women had sought medical advice. Women suffering from PMS or PMDD do not usually seek medical advice and among those seeking medical care, in many cases, an adequate response to their demands is not obtained. A study on premenstrual syndrome existence, knowledge and attitude among female university students in Karachi done by Mohib et al., found that the majority of students were aware of PMS, while only 19% knew about PMDD. 49.4% of women didn't take treatment for their PMS, and 60.4% of the participants reported PMS disturbed their normal routine. The majority (81.3%) felt that PMS was a normal part of menstruation and 53.0% reported moderate to severe stress (Kamat et al., 2019).

1.4. Menstrual disorders and quality of life

Epidemiological surveys report that 80% of women in the reproductive age group report some symptoms attributed to a premenstrual phase of the menstrual cycle. Though it affects such a vast majority of women in the reproductive age group, the degree of distress varies with each individual. About 75–80% of women report a mild degree of distress, 20–40% report a moderate degree of distress and in 3–8% of women, distress is severe enough subsequent in poor quality of life. Previous Indian studies have found a 20% prevalence of PMS in the general population and among those with PMS, 8% had severe symptoms. The PMS symptoms could impact an individual's interpersonal relationships, social interactions, occupational activities and productivity for her entire reproductive age. PMS affects not only women but also families and societies, as it causes impairment in efficiency at school/work, impaired relations with friends, colleagues and family members, poor social life activities, and home responsibilities.

This syndrome in young women is a public health problem, as increased incidence of depression and anxiety disorders were found in women suffering from PMS, which could economically burden society indirectly in the form of absenteeism at work, frequent hospitalization and suicides when it is severe. A study done on Premenstrual Syndrome and quality of life in

Iranian Medical Students by Urmia, (2014) found that 56 out of 142 female medical students (39.4%) have PMS, among them 60.4% had mild, 25.1% moderate and 14.2% had severe PMS, the result shows PMS is common in medical students and this adversely affects some domains of the quality of life.

(Durairaj et al., 2018) show the prevalence of moderate to severe PMS was 14.3% and PMDD was 3.7%. The commonest were fatigue or lack of energy (82.5%), anger or irritability (96%), anxiety or tension (97.4%), and difficulty in concentration (94.75). PMS and PMDD are prevalent among a substantial proportion of college girls with a significant negative influence on academic performance, emotional well-being and behaviour. PMS and PMDD are very common problems among medical students affecting their educational and social activities (Shamnani et al., 2018).

Tarannum et al., (2021), show the prevalence of PMS is in general high among school-going adolescent girls in AMU, Uttar Pradesh with a prevalence of 37.7%, PMS with abdominal bloating (35.2%), social withdrawal (69.2%) are the most common symptoms, it effects the educational social and emotional well-being of young adolescent girls (Tarannum et al., 2021).

1.5. Lifestyle Factors Influencing Premenstrual Syndromes

Lifestyle factors including diet, physical activity, sleep and stress play a crucial role in the development of premenstrual syndromes and menstrual disorders. Understanding the interplay between lifestyle factors and menstrual health is important for developing effective prevention and strategies. Dietary factors like caffeine, sugar, and salt, intake, and physical activities like exercise, yoga, cycling, running, and walking are important lifestyle factors. Also sleep quality, sleep duration, stress, and emotional factors are important indicators. Smoking and alcohol consumption are important factors which can cause menstrual disorders.

A cross-sectional study done by (Yoshimi et al., 2015) on lifestyle factors associated with PMS among Japanese high school students found the rates of moderate to severe PMS and PMDD were 9.7% and 2.2% respectively. Sleep, dietary habits, and sports affect PMS among high school students. Studies have identified a substantially high prevalence of PMS and other menstrual disorders in worldwide and India. In light of the aforementioned, the following objectives were established for the current study:

1. To investigate the prevalence of Premenstrual Syndrome (PMS) and other menstrual disorders, while highlighting the severity of the associated symptoms.

2. To examine the correlation between Body Mass Index (BMI), body fat composition, nutritional status, and socio-demographic factors with PMS and other menstrual issues.

2. Material and Methodology

2.1. Area & People

This study was conducted in West Bengal, among female undergraduate and postgraduate students of Sidho-Kanho-Birsha University, Purulia district. A total of 110 young adults in the

age group of 18–25 years were included in this study.

2.2. Sample Size

The sample size was determined by using a single proportional formula assuming the prevalence rate of Premenstrual Syndrome (PMS) to be 47.8% based on a study by (Modzelewski et al., 2024). So, the minimum estimated sample size is 96, by adding 10% it went to be 106.

2.3. Study Design

This descriptive cross-sectional study has considered both urban and rural parts of the Purulia district in West Bengal, India.

2.4. Sampling Method

The purposive sampling method was used in this present study.

2.5. Data Collection Methods

In this research, data were collected with the help of a semi-structured interview, and a structured questionnaire including some anthropometric measurements.

This semi-structured interview method was done to collect data in case any of the questions needed further explanation. Data were collected at first by a semi-structured interview method which consisted of the categories – Sociodemographic data (age, educational status, place of residence, caste certificate, house type, fuel, education, occupation of father and mother, total family member and income), Menstrual pattern (age at menarche, days of bleeding during the menstrual cycle, the interval between two cycles, and problems related to the length of the menstrual cycle, menstrual regularity, menstrual hygiene), Family history (family history of the menstrual problem and blood pressure) dietary habits (frequency and consumption of coffee, alcohol, chocolate, extra dietary salt etc.). Whereas a close-ended questionnaire has been used to collect data about the prevalence and severity of the PMS.

Each participant was given approx. 20 minutes to complete the questionnaire and interview. Each subject has been interviewed one-on-one. After taking data the definition of PMS, its risk factors, and how to minimize or control its symptoms through lifestyle modification were discussed.

Anthropometric measurements taken: Height, Weight, MUAC (mid-upper arm circumference), Abdominal Circumference, Waist and Hip Circumferences.

Then with the height and weight measurement nutritional status was assessed by calculating BMI.

For body composition four skinfold thickness was measured like tricep, bicep, subscapular, and suprailiac.

Blood pressure of each subject was measured by using a blood pressure monitor.

2.6. Assessment of Nutritional Status among Adults

Body mass index calculated using the standard formula:

$$\text{BMI (kg/m}^2) = \frac{\text{Weight (kg)}}{\text{height (m}^2)}$$

Nutritional status has been evaluated using internationally accepted World Health Organization (1995, 2000) BMI guidelines for International and Asia-Pacific populations. The following cut-off points are used:

Table 1: Classification of Nutritional Status Based on WHO Cut-off (1995)

Nutritional status	**WHO Cut-off (1995)**
CED grade III	BMI < 16.0
CED grade II	BMI = 16.0–16.9
CED grade I	BMI = 17.0–18.4
Normal	BMI = 18.5–24.9
Overweight	BMI ≥ 25.0

2.7. 2.7. Assessment of Body Composition

Body density is computed from four skinfolds (biceps, triceps, sub scapula, suprailiac) based sex specific standard equation (Womersly and Durnin, 1974)

$$\text{Density (Female)} = 1.1567 - 0.0717 \times \log(\sum 4 \text{ skinfolds})$$

Percent Body Fat (PBF) is computed following the equation of Siri (1956). These equations are valid for use among Indians and other South Asian populations. The following equation is used to calculate body composition:

$$\text{PBF (\%)} = \left\{ \left(\frac{4.95}{\text{density}} \right) - 4.5 \right\} \times 100$$

$$\text{Fat Mass (FM, kg)} = \text{Body Weight (Kg)} \times \left[\frac{\text{PBF}}{100} \right]$$

$$\text{Fat Mass Index (FMI, Kg/m}^2) = \frac{\text{FM (Kg)}}{\text{Height (m}^2)}$$

$$\text{Fat Free Mass (FFM, Kg)} = \text{Body Weight (Kg)} - \text{FM (Kg)}$$

$$\text{Fat Free Mass Index (FFMI, Kg/m}^2) = \frac{\text{FFM (Kg)}}{\text{Height (m}^2)}$$

2.8. 2.8. Statistical Analysis

All statistical analyses were performed by using the SPSS statistical package version 25.

3. 3. Results

A total of 110 students were studied. Majority of the total participants 103 (93%) were pursuing postgraduate studies and the remaining 7 (6.4%) were studying at the undergraduate level. The mean age of the study participants was 21.85 ± 1.09 years (with a range of 18–25 years). The mean height was 153.85 ± 5.53 cm (with a range of 145.08–170.07 cm) and the mean weight was 49.51 ± 9.73 kg (with a range of 34–81 kg). The mean Body Mass Index was found to be 20.87 ± 3.64 kg/m^2 (with a range of 14.09–30.51 kg/m^2).

Table 2: Socio-demographic characteristics of the studied population

Characteristics	**n (%)**
Education	
Undergraduate	7 (6.4%)
Post Graduation	103 (93%)
Marital Status	
Married	3 (2.7%)
Unmarried	107 (97.3%)
Type of Residence	
Urban	30 (27.3%)
Rural	80 (72.7%)
Category	
General	42 (38.2%)
OBC	32 (29.1%)
Scheduled Caste	18 (18.4%)
Scheduled Tribe	18 (18.4%)
House Type	
Pucca	84 (76.4%)
Kaccha	15 (13.6%)
Semi pucca	11 (10.0%)
Fuel used for cooking	
Gas	94 (85.5%)
Wood	16 (14.5%)

Characteristics	n (%)
Morbidity	
Any illness	41 (37.3%)
No	69 (62.7%)
Mother's Occupation	
House Wife	96 (87.3%)
Other	14 (12.7%)
Mother's Education	
Illiterate	15 (13.6%)
Can sign only	2 (1.8%)
Primary	34 (30.9%)
Secondary & Higher Secondary	40 (36.4%)
Higher Education	19 (17.3%)
Father's Education	
Illiterate	3 (2.7%)
Can sign only	3 (2.7%)
Primary	28 (25.5%)
Secondary & Higher Secondary	41 (37.3%)
Higher Education	35 (31.8%)

The above table presents the socio-demographic profile of the studied population. Of the 110 respondents, 80 (72.73%) resided in rural areas, while the remaining 30 (27.27%) were from urban areas. With regard to maternal education, 13.6% of the mothers were illiterate, 30.9% had attained primary-level education, and 53.7% had achieved secondary or higher levels of education. Only 12.7% of the mothers were engaged in employment such as ICDS helpers, health workers, or teachers. Most fathers of the participants had attained secondary and higher secondary education (37.3%). In terms of cooking fuel usage, 85.45% of households used gas, whereas 14.55% relied on firewood. Furthermore, 37.27% of the studied young adults were reported to have morbidities such as PCOD, PCOS, allergies, and anaemia.

Table 3: Anthropometric characteristics and blood pressure measurements

Characteristics / Measurements (N = 110)	Mean	SD
Anthropometric		
Weight (kg)	49.51	9.73
Height (cm)	153.85	5.53

Characteristics / Measurements (N = 110)	Mean	SD
MUAC (cm)	24.38	3.10
WC (cm)	67.55	12.05
HC (cm)	88.91	7.72
WHR (cm)	0.76	0.11
AC (cm)	76.56	11.21
Biceps (mm)	8.11	3.67
Triceps (mm)	16.36	4.71
Suprailliac (mm)	14.35	10.46
Subscapular (mm)	14.41	5.43
SUMSF (mm)	53.25	19.85
Blood pressure (mmHg)		
Systolic	105.73	13.85
Diastolic	65.80	11.10

Table 2 reflects the anthropometric characteristics and blood pressure values of the 110 studied females. The mean MUAC was 24.38 $\pm$ 3.10 cm (range: 17.5–34.8 cm), and the mean waist circumference was 67.55 $\pm$ 12.05 cm (range: 28.6–88.6 cm). The mean hip circumference was 88.91 $\pm$ 7.72 cm (range: 72.2–118 cm). Accordingly, the mean waist–hip ratio was found to be 0.76 $\pm$ 0.11. The mean abdominal circumference was 76.56 $\pm$ 11.21 cm (range: 57.4–98.50 cm). The mean sum of all skinfold thickness measurements was 53.25 $\pm$ 19.85 mm.

The mean systolic blood pressure was 105.73 $\pm$ 13.85 mmHg (range: 84–140 mmHg), while the mean diastolic blood pressure was 65.80 $\pm$ 11.10 mmHg (range: 42–90 mmHg). Significant differences were observed in weight, BMI, triceps, subscapular, and suprailiac skinfold thicknesses, as well as in the total sum of skinfold measurements. Participants with lower circumferences and skinfold thicknesses experienced milder PMS symptoms compared to those categorized under severe PMS. Table 3 shows the means and standard deviations of all body

Table 4: Body composition characteristics of the studied population

Body composition (N = 110)	Mean	SD
BMI (kg/m^2)	20.87	3.64
Body Fat (%)	21.43	5.19
FM (kg)	11.00	4.49
FFM (kg)	38.50	5.73
FMI (kg/m^2)	4.62	1.81
FFMI (kg/m^2)	16.24	2.01

composition characteristics, including percent body fat (PBF), fat mass (FM), fat-free mass (FFM), fat mass index (FMI), and fat-free mass index (FFMI). Table 4 shows the nutritional

Table 5: Nutritional status of subjects based on BMI (WHO 1995)

Nutritional status (N = 110)	**Frequency**	**Percentage**
CED-III	9	8.2%
CED-II	4	3.6%
CED-I	14	12.7%
Normal	64	58.2%
Overweight	18	16.4%
Obese	1	0.9%

status based on BMI of the studied population, classified according to WHO's (1995) classification of body mass index. A total of 16.4% of the studied females were overweight. The prevalence of Chronic Energy Deficiency (CED) was 24.5% among the studied young adults. Only one participant (0.9%) was found to be obese.

Table 6: Distribution of studied students according to PMS score

PMS score (N = 110)	**N**	**%**
No	10	9.09%
Mild	23	20.91%
Moderate	60	54.55%
Severe	17	15.45%

Table 5 presents the prevalence of PMS among the respondents and were classified into moderate to severe PMS depending on the set criteria. Accordingly, it was found that 54.55% of the females had moderate PMS. A total of 15.45% suffered from severe PMS, and 20.91% of students experienced mild PMS. Only one student was found to have PMDD.

Table 7: Relation between nutritional status and PMS

PMS	**Nutritional status**			**Total**
	CED	**Normal**	**Overweight/Obese**	
No	2 (20.0%)	6 (60.0%)	2 (20.0%)	10 (9.1%)
Mild	4 (17.4%)	17 (73.9%)	2 (8.7%)	23 (20.9%)
Moderate	9 (15.0%)	34 (56.7%)	17 (28.3%)	60 (54.5%)
Severe	4 (23.5%)	7 (41.2%)	6 (35.3%)	17 (15.5%)
Total	27 (24.5%)	64 (58.2%)	19 (17.3%)	110 (100%)

Chi-squared = 7.173, df = 6, $p = 0.3054$

According to Table 6, majority of the severe cases were found among females with normal BMI (41.2%) followed by females who were overweight or obese (31.3%). Females with normal BMI were also found to have moderate cases (56.7%) of PMS. Majority of mild cases were found among normal participants (73.9%) while only 8.7% mild cases were found from

overweight. Although variations were found but no statistically significant relationship was found.

Table 8: Relationship between dietary habit and PMS

Food	**No**	**Mild**	**Moderate**	**Severe**	χ^2 **with p**	
	n (%)	n (%)	n (%)	n (%)		
Chocolate					2.827	p = 0.4191
Frequently	7 (70.00)	20 (86.96)	45 (75.00)	15 (88.24)		
No & less frequent	3 (30.00)	3 (13.04)	15 (25.00)	2 (11.76)		
Extra Salt					10.181	p = 0.0171
Frequently	6 (60.00)	13 (56.52)	41 (68.31)	16 (94.12)		
No & less frequent	4 (40.00)	10 (43.48)	19 (33.67)	1 (5.88)		
Oily Food					1.54	p = 0.6730
Frequently	6 (60.00)	18 (78.26)	42 (70.00)	14 (82.35)		
No & less frequent	3 (30.00)	5 (21.74)	18 (30.00)	3 (17.65)		
Fat					10.051	p = 0.0181
Frequently	2 (20.00)	7 (30.43)	36 (60.00)	10 (58.82)		
No & less frequent	8 (80.00)	16 (69.57)	24 (40.00)	7 (41.18)		
Alcohol & Smoke					11.144	p = 0.0110
Frequently	0 (0.00)	0 (0.00)	0 (0.00)	2 (11.76)		
No & less frequent	10 (100.00)	23 (100.00)	60 (100.00)	15 (88.24)		
Sweet					15.614	p = 0.0014
Frequently	7 (70.00)	12 (52.17)	39 (65.00)	16 (94.12)		
No & less frequent	3 (30.00)	11 (47.83)	29 (48.33)	1 (5.88)		

*P significant at 5% level

Assessment of the dietary habits revealed that 88.2% of the students were nonvegetarians, and 11.8% were vegetarians. Table 7 shows that extra salt and fat were found significantly associated with PMS. Smoking and alcohol consuming can be a reason for some symptoms.

Figure 1 shows the frequency of all premenstrual symptoms; the most common symptoms seen in the respondents were irritability and anger (52.73%), mood swings (46.36%), and social withdrawal (50.91%). Many of the respondents ($n = 23$, 20.9%) had mild symptoms, while more than half ($n = 77$, 70.0%) had moderate to severe symptoms. The second most common symptoms were physical symptoms, which included muscle and joint pain (44.45%), breast tenderness, weight gain, and bloating. The other common symptom was fatigue/lack of energy. Many of the respondents (46.36%) had mild fatigue/lack of energy, while only some (15.45%) had no symptom of fatigue at all. The majority of respondents (40.91%) had no symptoms of insomnia, while around only 12.73% had mild symptoms.

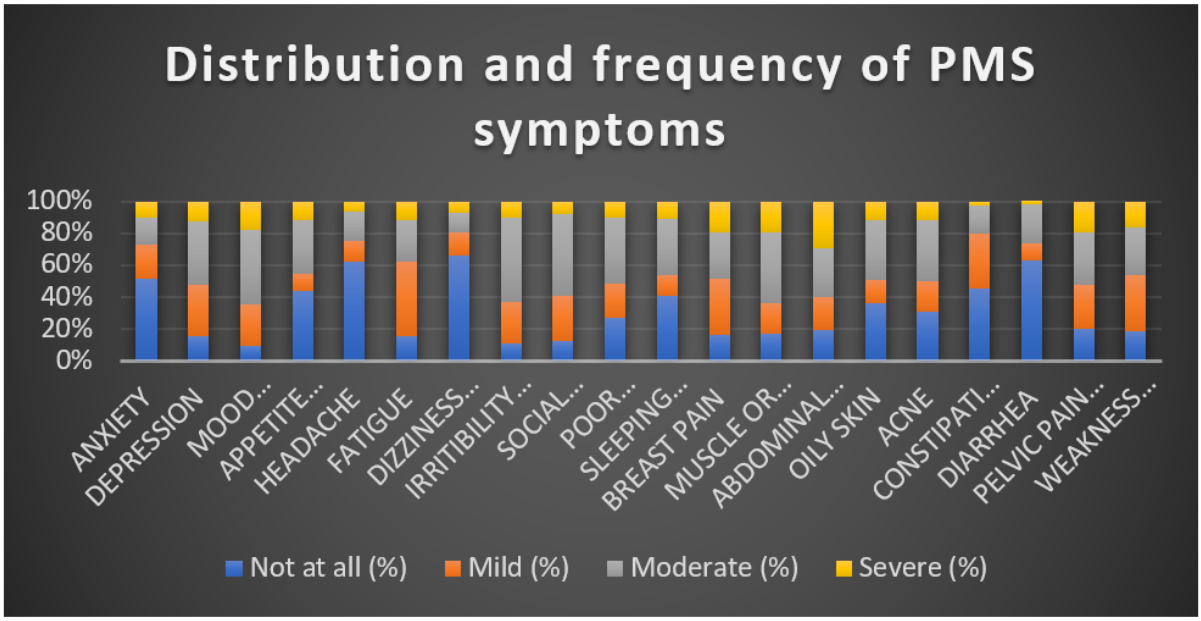

Figure 1: Distribution and frequency of PMS symptoms among the respondents

4. Discussion

Among the 110 total studied students, 58.2% of the students were with the normal body fat percentage, 24.5% were overweight and 17.3% were obese. Most of the obese and overweight respondents were found among the general category (26.2%), whereas underweight respondents were more found among the OBC category (40.6%). Among total 110 studied young adults, moderate to severe PMS were found among 54.55% and 15.45% respectively. It was found that severe cases (15.5%) were more experienced by the students under normal and overweight category. In case of physical factors, regularity of menstrual cycle shows significant association with PMS, whereas the number of menstrual days shows no significant association with PMS.

Among the total respondents, other than PMS there are some other symptoms those were found like oligomenorrhea 23.64% (menstrual irregularity), menorrhagia 22.73% (heavy menstruation), and hypomenorrhea 17.27% (light menstruation). A significant relationship was found between family history of menstrual disorders and PMS. Also, effect of PMS on social life and daily activities were significant. In case of more severe cases, there were more treatment seeking attitude among them. Many of them have consulted doctors and took medicines to get relief from the pain. In moderate cases there were treatment seeking attitude among almost half of them (46.7%), where 51.6% did not show any treatment seeking attitude. There was a significant relationship between occurring PMS and other menstrual problems with dietary habit. There was more frequency of fat intake among severe cases.

5. Conclusion

The present study significantly associated with amount of blood flow during menstruation and dysmenorrhea. Proper medication should be sought earlier for this problem in case of severe cases. This will help them to get rid of PMS so that they can utilize the formative years of life at its most. Nutrient intake, body composition parameters, and body fat influence women's health. Anthropometric indices demonstrated that body fat percentage and WHR were varying among severe cases. The consumption of green vegetables was linked to a reduced incidence of PMS. These findings highlight the importance of awareness of a balanced diet and healthy lifestyle.

These observations are limited to young women in the age group of 18–25 years. Prospective studies with middle-aged women would add to the existing knowledge. The findings have established the influence of the analyzed factors on PMS and could serve as a valuable resource to suggest lifestyle modifications as an interventional program to treat PMS in young women. Suitable health education strategies must be implemented to curb this dysphoria.

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