

Assessment of changes in premenstrual syndrome (PMS) before and after menstruation: A cross sectional study in Tangail, Bangladesh

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ABSTRACT

Premenstrual syndrome (PMS) is a common condition affecting a significant number of women worldwide, characterized by various physical, emotional, and behavioral symptoms that occur in the luteal phase of the menstrual cycle and resolve after menstruation begins. This study aimed to assess the prevalence, severity and changes of PMS and its association with demographic and dietary factors among 400 women of childbearing age of 18-45 years, selected through purposive sampling in Tangail, Bangladesh. Data were collected using a structured questionnaire that included demographic information, dietary habits and various PMS symptoms. Participants reported on the frequency and intensity of multiple common PMS symptoms across three categories: psychological, behavioral, and physical. Psychological symptoms were prevalent, with irritability (62.81%), depression (53.90%), anxiety (43.84%) and blubbering (57.82%) being common. Behavioral symptoms included tiredness (71.32%), fatigue (59.61%), lack of concentration (53.11%) and insomnia (49.08%). Physical symptoms like abdominal pain (66.90%), nausea & vomiting (52.10%) and headache (44.81%) were also widespread. Statistical analysis demonstrated significant reductions ($p < 0.05$) in symptoms such as psychological (irritability, nervousness, blubbering), behavioral (increased appetite, insomnia, tiredness), and physical (headache, back pain) symptoms in post-menstruation, indicating hormonal influences on symptom severity. Logistic regression analyses indicated that older age (AOR=1.03, 95%CI: 1.00-1.06) and higher BMI (AOR=1.02, 95%CI: 1.00-1.05) significantly increased the odds of severe irritation, while higher educational levels were protective. Excessive sugar and fat intake were linked to increased severity of irritation (AOR=2.26, 95%CI: 1.27-4.01 & AOR=1.61, 95%CI: 0.98-2.65) and tension (AOR=1.63, 95%CI: 1.05-2.53 & AOR=1.36, 95%CI: 0.86-2.14). In contrast, multi-nutrient supplements showed a protective effect against severe irritation, suggesting a complex relationship with PMS. Overall, it is recommended that public health initiatives incorporate targeted nutritional interventions, such as promoting balanced diets rich in essential nutrients, and raising awareness about PMS management is necessary to improve women's health outcomes.

Keywords:

premenstrual syndrome, psychological symptoms, behavioral symptoms, physical symptoms, dietary habits

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INTRODUCTION

Premenstrual Syndrome (PMS) is a common condition affecting a significant proportion of women of reproductive age, characterized by a variety of physical, psychological, and behavioral symptoms that occur cyclically during the luteal phase of the menstrual cycle and resolve with the onset of menstruation.¹ Many women encounter a range of symptoms in the week or two leading up to their menstrual cycle. These symptoms, collectively known as premenstrual syndrome (PMS), are globally prevalent, with nearly 47.8% of women experiencing issues such as bloating, headaches, and mood swings during this time.² The typical symptoms experienced before menstruation include irritability, depression, bloating, cramps, breast tenderness, body aches, nausea, vomiting, fatigue, reduced concentration, mood swings, headaches, anxiety, and changes in appetite. These symptoms can significantly impact social and interpersonal relationships, quality of life related to health, academic performance, and daily activities, and may lead to increased visits to healthcare facilities.³ For some women, the onset of menstruation may bring minimal or absent PMS symptoms, while others may struggle with severe symptoms that hinder their daily activities.⁴ These symptoms typically begin in adolescence and tend to worsen with age.⁵ Most women in their childbearing years have reported experiencing premenstrual syndrome, as indicated by an epidemiological study.⁶ According to epidemiological studies, approximately 80–90% of women consistently experience PMS symptoms, with about 5% encountering symptoms so severe that they significantly impair or entirely prevent their daily functioning. These severe symptoms can pose considerable challenges, making it extremely difficult for affected women to

manage daily activities or rendering them unable to function altogether.⁷ The prevalence and severity of PMS are affected by diverse demographic, lifestyle, and dietary factors, highlighting its complexity as a public health issue. Research has shown varying rates of PMS across different countries: 34% in China, 80% in Pakistan, and ranging from 14.3% to 74.4% in India.⁸ A study in the capital of Bangladesh, Dhaka reported that about 45.06% of women experienced PMS whereas in the study region it was about 60% with several psychological, physical, clinical and behavioral symptoms.⁹ In Bangladesh, the cultural, religious, and socio-economic factors add complexity to understanding and addressing PMS. Due to limited research on PMS in the Bangladesh, there is a pressing need for more studies. These studies would aid in better diagnosing PMS, understanding its nature, and identifying associated risk factors. Thus, the objective of this study was to evaluate the occurrence and intensity of PMS both before and after menstruation, and to investigate how demographic factors and dietary habits correlate with the severity of different symptoms among women of childbearing age in Tangail, Bangladesh.

METHODS

Study Design and sample frame

A community based cross-sectional study was conducted among 400 women of childbearing ages (15-39 years) in Tangail, Bangladesh using a purposive sampling technique. The sampling frame was based on data obtained from local communities of the study areas where eligible participants were identified and approached for inclusion in the study. We employed purposive sampling to ensure representation across different socio-economic strata, thereby, capturing a

diverse demographic profile. This approach allowed assessing the prevalence and

severity of PMS symptoms across various segments of the population.

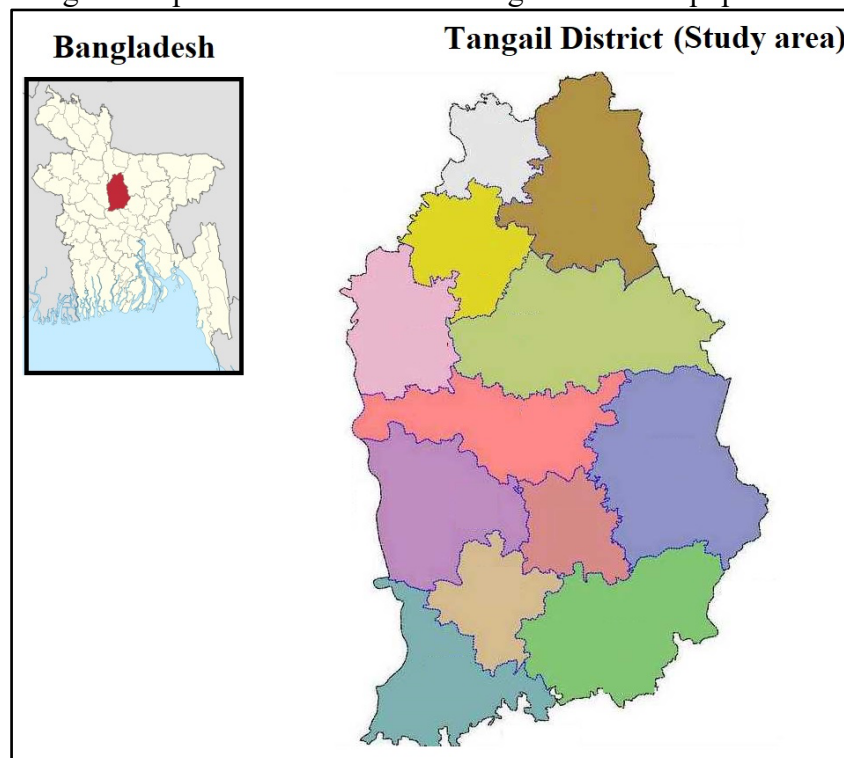


Figure 1: Study area

Sample Size

Sample size was calculated using the following formula¹⁰

$$n = \frac{Z^2 \times pq}{d^2} \dots \dots \dots (1)$$

Where, n = Sample size, P = Estimate of the expected proportion (Expected rate 0.5), Q= (1-P)= (1-0.5)= 0.5, d = 5% level of confidence interval= 0.05, Z= 1.96; value of the normal variable, which is equal to 1.96 at 5% level of significance. Although the minimum sample size was calculated to be 385 households, a total of 400 respondents were interviewed, considering a 5% non-response rate.

Inclusion criteria

Women with a regular menstrual cycle that occurred within 28-30 days of duration and those who were willing to participate in the study by signing informed consent were included in this study.

Exclusion criteria

Respondents with amenorrhea, irregular menstrual cycle and polycystic ovarian disease (PCOD) were excluded from the study.

Ethical consideration

Ethical clearance was obtained from the Dept. of Food Technology and Nutritional Science, Mawlana Bhashani Science and Technology University, Tangail, Bangladesh for data collection. Written informed consent was obtained from all participants.

Data collection tool and procedure

A validated, semi-structured self-administered questionnaire was utilized to gather data from the targeted women of childbearing age in the study areas. A pilot survey was conducted before the final data collection. After receiving approval from the relevant authorities, the participants were provided with a brief explanation of

the study, and informed consent was obtained. Data collection was conducted using the self-administered questionnaire, which included sections on socio-demographic characteristics, symptoms of PMS, and some selected dietary habits.

Likert chart

PMS criteria were categorized into four severity levels using a Likert-style scale. A four-point Likert scale was used, with cut-off points such as none being equal to 0, mild being equal to 1, moderate being equal to 2, and severe being equal to 3. Premenstrual syndrome (PMS) is defined as a condition in which, over the past three months or so, individuals may have experienced the following premenstrual symptoms, including: restlessness, irritability, anxiety, depression or sadness, blubbery, feeling of isolation, tiredness, fatigue, insomnia, difficulties in concentration, increased appetite, decreased appetite, nausea and vomiting, headache, breast tenderness, breast swelling, heavy backache, abdominal pain, weight gain, swelling of extremities, muscle stiffness, and change in body temperature.

Operational definitions¹¹

1. Mild symptoms: Symptoms are present but do not disrupt daily activities.
2. Moderate symptoms: Noticeable symptoms that interfere with daily activities.
3. Severe symptoms: Symptoms significantly hinder daily activities.

Data analysis

The collected data was first entered into MS Excel and checked for completeness. It was then coded and imported into SPSS software version 23.0 for analysis. The analyzed data was presented in terms of frequency and percentage. Logistic regression analysis was performed at a 95% confidence interval.

RESULTS

Demographic characteristics of the respondents

Table 1 presents the demographic and socioeconomic data of the respondents, with an average age of 22.08 years. About 66% (n=264) of the respondents were aged 18-29 years, predominantly Muslim (n=359 & 89.75%), and highly educated, with 51.75% (n=207) holding graduate degrees. Most were students (n=328 & 82%), and a majority had a healthy BMI (n=279 & 69.75%). Menstruation typically began between the ages of 10-15 (n=384 & 96%), with an average onset at 12.75 years. The majority were unmarried (n=325 & 81.25%). Monthly incomes primarily fell between BDT 15,000-20,000 (n=306 & 76.50%), and food expenditures were mainly ranged from BDT 5,000-10,000 (n=193 & 48.25%). Medicine expenditures also followed this pattern, with 76.50% (n=306) spending BDT 1,000-5,000.

Table 1. Demographic characteristics of study population (n=400)

Characteristics	n	%
Age (years)		
15-17	112	28.00
18-29	264	66.00
30-39	24	6.00
Average age	Mean±SD = 22.08±5.05/year Min-16, Max-39	

Characteristics	n	%
Religion		
Islam	359	89.75
Hindu	41	10.25
Education		
Primary level	5	1.25
SSC level	66	16.50
HSC level	106	26.50
Graduate level	207	51.75
Post Graduate level	16	4.00
Occupation		
Student	328	82.00
Home maker	64	16.00
Business	2	0.50
Others	6	1.50
BMI		
<18.5	42	10.50
18.5-24.9	279	69.75
25-29.9	79	19.75
Average BMI	Mean±SD = 22.50± 3.37	
Starting age of Menstruation		
<10	12	3.00
10-15	384	96.00
15-20	4	1.00
Average age of starting Menstruation	Mean±SD= 12.75±1.27	
Marital status		
Married	75	18.75
Unmarried	325	81.25
Monthly income (BDT)		
10000-15000	57	14.25
15000-20000	306	76.50
20000-25000	34	8.50
25000-30000	3	0.75
Monthly food expenditure (BDT)		
<5000	3	0.75
5000-10000	193	48.25
10000-15000	97	24.25
15000-20000	86	21.50
>20000	21	5.25
Monthly medicine expenditure		
<1000	57	14.25
1000-50000	306	76.50
5000-10000	34	8.50
>10000	3	0.75

BDT= Bangladeshi Taka

Selected dietary behaviors of the respondents

Table 2 outlines the dietary habits of the respondents, highlighting the prevalence of various dietary behaviors

where only 11.46% (n=46) of respondents reported receiving multi-nutrient supplements, while a significant majority (n=354 & 88.54%) did not. Excessive salt intake was reported by 15.75% (n=63) of

respondents, whereas 84.25% (n=337) did not report excessive salt consumption. Excessive sugar consumption was reported

by 10.70% (n=43) of respondents, with 89.30% (n=357) not engaging in this behavior.

Table 2. Selected dietary behaviors of the respondents (n=400)

Indicators	Response	
	Yes	No
	n (%)	
Receive multi-nutrient supplement	46 (11.46)	354 (88.54)
Consume excessive salt	63 (15.75)	337 (84.25)
Consume excessive sugar	43 (10.70)	357 (89.30)
Consume excessive fat	59 (14.75)	341 (85.25)
Tobacco usage	4 (1.00)	396 (99.00)
Existence of food allergy	66 (16.90)	334 (83.10)

About 14.75% (n=59) of respondents reported excessive fat consumption, while 85.25% (n=341) did not. Tobacco usage was reported by a mere 1.00% of respondents, with an overwhelming 99.00% (n=396) not using tobacco. The presence of food allergies was reported by 16.90% (n=66) of respondents, while 83.10% (n=334) reported no food allergies.

Symptoms associated with PMS among respondents

Table 3 reveals various symptoms associated with PMS among respondents, with psychological or mood symptoms being notably prevalent. Common symptoms included irritability (n=251 & 62.81%), blubbering (n=231 & 57.82%), restlessness (n=221 & 55.25%), and depression or sadness (n=216 & 53.90%).

Table 3. Various symptoms associated with PMS among respondents (n=400)

Variables		Yes	No
		n (%)	n (%)
Psychological or mood symptoms	Restlessness	221 (55.25)	179 (44.75)
	Irritability	251 (62.81)	149 (37.19)
	Anxiety	175 (43.84)	225 (56.16)
	Depression or Sadness	216 (53.90)	184 (46.10)
	Blubbering	231 (57.82)	169 (42.18)
	Feeling of Isolation	205 (51.37)	195 (48.63)
Behavioral symptoms	Tiredness	285 (71.32)	115 (28.68)
	Fatigue	238 (59.61)	162 (40.39)
	Insomnia	196 (49.08)	204 (50.92)
	Difficulties in concentration	212 (53.11)	188 (46.89)
	Increased appetite	109 (27.15)	291 (72.85)
	Decreased appetite	94 (23.46)	306 (76.54)
Physical and clinical symptoms	Nausea and vomiting	208 (52.10)	192 (47.90)
	Headache	179 (44.81)	221 (55.19)
	Breast tenderness	121 (30.22)	279 (69.78)
	Breast swelling or heavy	112 (28.10)	288 (71.90)
	Backache	154 (38.52)	246 (61.48)
	Abdominal pain	268 (66.90)	132 (33.10)

Variables	Yes	No
	n (%)	n (%)
Weight gain	92 (22.91)	308 (77.09)
Swelling of extremities	81 (20.35)	319 (79.65)
Muscle Stiffness	72 (18.01)	328 (81.99)
Change in body temperature	170 (42.47)	230 (57.53)

Behavioral symptoms were also significant, with tiredness (n=285 & 71.32%) and fatigue (n=238 & 59.61%) being the most commonly reported. Insomnia affected nearly half of the participants (n=196 & 49.08%), while increased and decreased appetites were less common (n=109 & 27.15% and n=94 & 23.46%, respectively). Among physical and clinical symptoms, abdominal pain was the most frequent (n=268 & 66.90%), followed by nausea and vomiting (n=208 & 52.10%) and headache (n=179 & 44.81%). Less common physical symptoms included muscle stiffness (n=72 & 18.01%) and swelling of extremities (n=81 & 20.35%).

Distribution of psychological symptoms

Table 4 reports that irritation was notably higher before menstruation (n=130 & 32.55%) compared to after (n=49 &

12.23%), with severity ranging from mild to severe ($p<0.01$). Tension was more prevalent before menstruation (n=180 & 45.05%) than after (n=120 & 29.94%), but without significant severity differences ($p>0.05$). Mood swings were extremely common before menstruation (n=368 & 91.93%), with a significant drop post-menstruation (n=103 & 25.78%). Nervousness showed a slight increase before menstruation (n=56 & 14.06%) compared to after (n=50 & 12.50%), with significant severity differences ($p<0.01$). Blubbering was substantially higher before menstruation (n=226 & 56.51%) than after (n=63 & 15.65%), with significant severity differences ($p<0.01$). Depression was more frequent before menstruation (n=217 & 54.17%) compared to after (n=45 & 11.20%), though severity differences are not significant ($p>0.05$).

Table 4. Distribution of psychological symptoms with duration of menstruation (n=400)

Symptom	Duration of menstruation	Reported n (%)	Severity n (%)		<i>p value</i>
Irritation	Before	130 (32.55)	Mild	57 (14.32)	<0.01
			Moderate	40 (9.90)	
			Severe	33 (8.33)	
	After	49 (12.23)	Mild	22 (5.46)	>0.05
			Moderate	16 (3.90)	
			Severe	11 (2.86)	
Tension	Before	180 (45.05)	Mild	104 (26.04)	>0.05
			Moderate	48 (11.98)	
			Severe	28 (7.03)	
	After	120 (29.94)	Mild	62 (15.62)	>0.05
			Moderate	42 (10.41)	
			Severe	16 (3.91)	
Mood swing	Before	368 (91.93)	Mild	122 (30.47)	>0.05
			Moderate	154 (38.54)	
			Severe	92 (22.92)	
	After	103 (25.78)	Mild	55 (13.80)	>0.05
			Moderate	34 (8.59)	
			Severe	14 (3.49)	

Symptom	Duration of menstruation	Reported n (%)	Severity n (%)		p value
Nervousness	Before	56 (14.06)	Severe	14 (3.39)	<0.01
			Mild	25 (6.25)	
			Moderate	19 (4.69)	
	After	50 (12.50)	Severe	12 (3.12)	
			Mild	22 (5.73)	
			Moderate	14 (3.39)	
Blubbering	Before	226 (56.51)	Severe	14 (3.39)	<0.01
			Mild	116 (28.91)	
			Moderate	78 (19.53)	
	After	63 (15.65)	Severe	32 (8.07)	
			Mild	37 (9.13)	
			Moderate	20 (4.96)	
Depression	Before	217 (54.17)	Severe	6 (1.57)	>0.05
			Mild	117 (29.17)	
			Moderate	73 (18.23)	
	After	45 (11.20)	Severe	27 (6.77)	
			Mild	27 (6.77)	
			Moderate	15 (3.65)	
			Severe	3 (0.78)	

Distribution of behavioral symptoms

Table 5 reveals the distribution and severity of behavioral symptoms associated with menstruation among respondents. Increased appetite was reported more frequently before menstruation (n=103 & 25.78%) compared to after (n=34 & 8.59%), with varying severity levels (p<0.01). Insomnia was also more common before menstruation (n=36 & 9.11%) than after (n=27 & 6.77%), with significant

differences in severity (p<0.01). Tiredness was reported by a higher proportion of respondents before menstruation (n=113 & 28.13%) compared to after (n=35 & 8.85%), with severity differences being statistically significant (p<0.01). Though the differences in intensity were not statistically significant (p>0.05), dizziness was experienced more frequently before menstruation (n=101 & 25.26%) than after (n=47 & 11.72%).

Table 5. Distribution of behavioral symptoms with duration of menstruation (n=400)

Symptom	Duration of menstruation	Reported n (%)	Severity n (%)		p value
More appetite	Before	103 (25.78)	Mild	59 (14.84)	<0.01
			Moderate	22 (5.47)	
			Severe	22 (5.47)	
	After	34 (8.59)	Mild	18 (4.43)	
			Moderate	13 (3.38)	
			Severe	3 (0.78)	
Insomnia	Before	36 (9.11)	Mild	28 (7.03)	<0.01
			Moderate	5 (1.30)	
			Severe	3 (0.78)	
	After	27 (6.77)	Mild	20 (4.95)	

Symptom	Duration of menstruation	Reported n (%)	Severity n (%)	<i>p value</i>
Tiredness	Before	113 (28.13)	Moderate	7 (1.82)
			Severe	00 (0.0)
			Mild	54 (13.54)
	After	35 (8.85)	Moderate	38 (9.38)
			Severe	21 (5.21)
			Mild	22 (5.47)
Dizziness	Before	101 (25.26)	Moderate	10 (2.60)
			Severe	3 (0.78)
			Mild	52 (13.02)
	After	47 (11.72)	Moderate	40 (9.90)
			Severe	9 (2.34)
			Mild	29 (7.30)
			Moderate	11 (2.61)
			Severe	7 (1.82)

Distribution of physical and clinical symptoms

Table 6 outlines the distribution and severity of physical and clinical symptoms related to menstruation among respondents. Headaches were more frequent before menstruation (n=77 & 19.27%) compared to after (n=38 & 9.38%), with significant severity differences ($p<0.01$). Breast sensitivity was higher before menstruation (n=218 & 54.69%) versus after (n=41 & 10.16%), though severity differences were not significant ($p>0.05$). Abdominal swelling was reported more frequently

before menstruation (n=183 & 45.83%) than after (n=32 & 8.07%), with no significant severity differences ($p>0.05$). Oily skin was common before (n=286 & 71.61%) and after menstruation (n=256 & 64.06%). Similarly, pimples were prevalent both before (n=303 & 75.78%) and after menstruation (n=230 & 57.55%), with no significant severity differences ($p>0.05$). Back pain also occurred more frequently before menstruation (n=130 & 32.55%) compared to after (n=22 & 5.47%), with significant severity differences ($p<0.05$).

Table 6. Distribution of physical and clinical symptoms with duration of menstruation (n=400)

Symptom	Duration of menstruation	Reported n (%)	Severity n (%)	<i>p value</i>
Headache	Before	77 (19.27)	Mild	43 (10.68)
			Moderate	18 (4.43)
			Severe	16 (4.17)
	After	38 (9.38)	Mild	21 (5.21)
			Moderate	10 (2.35)
			Severe	7 (1.82)
Breast sensitivity	Before	218 (54.69)	Mild	114 (28.65)
			Moderate	79 (19.79)
			Severe	25 (6.25)
	After	41 (10.16)	Mild	30 (7.55)
			Moderate	8 (1.82)
			Severe	3 (0.78)

Symptom	Duration of menstruation	Reported n (%)	Severity n (%)	p value
Swelling of abdomen	Before	183 (45.83)	Mild	>0.05
			Moderate	
			Severe	
	After	32 (8.07)	Mild	
			Moderate	
			Severe	
Oily skin	Before	286 (71.61)	Mild	>0.05
			Moderate	
			Severe	
	After	256 (64.06)	Mild	
			Moderate	
			Severe	
Pimples	Before	303 (75.78)	Mild	>0.05
			Moderate	
			Severe	
	After	230 (57.55)	Mild	
			Moderate	
			Severe	
Back pain	Before	130 (32.55)	Mild	<0.05
			Moderate	
			Severe	
	After	22 (5.47)	Mild	
			Moderate	
			Severe	

Logistic regression analysis

Table 7 presents the logistic regression analysis results for factors associated with various symptoms related to menstruation. Age was significantly associated with irritation (AOR=1.03, $p<0.05$), but not with tension, mood swings, or nervousness. BMI showed a significant association with irritation (AOR=1.02, $p<0.05$) but not with other symptoms. Education level appeared protective against several symptoms: SSC level significantly reduced the odds of irritation (AOR=0.63, $p<0.01$), tension (AOR=0.74, $p<0.05$), and

mood swings (AOR=0.70, $p<0.05$). Both HSC and graduate levels also reduced the odds of irritation significantly. Excessive sugar intake increased the odds of irritation (AOR=2.26, $p<0.01$) and tension (AOR=1.63, $p<0.05$) but appeared to reduce mood swings (AOR=0.78, $p<0.05$). Excessive fat intake showed no significant associations. Multi-nutrient supplement use was associated with lower odds of irritation (AOR=0.53, $p<0.05$). The presence of food allergies significantly increased the odds of irritation (AOR=1.74, $p<0.05$) but did not significantly affect other symptoms.

Table 7. Logistic regression analysis

Variables	Irritation		Tension		Mood Swing		Nervousness	
	AOR (95% CI)	p-value	AOR (95% CI)	p-value	AOR (95% CI)	p-value	AOR (95% CI)	p-value
Age	1.03 (1.00-1.06)	<0.05	0.98 (0.96-1.00)	>0.05	0.97 (0.94-1.00)	>0.05	1.01 (0.98-1.03)	>0.05

Variables	Irritation		Tension		Mood Swing		Nervousness	
	AOR (95% CI)	p-value	AOR (95% CI)	p-value	AOR (95% CI)	p-value	AOR (95% CI)	p-value
BMI	1.02 (1.00-1.05)	<0.05	1.01 (0.99-1.03)	>0.05	1.01 (0.99-1.04)	>0.05	1.02 (0.99-1.04)	>0.05
Education Level								
SSC level	0.63 (0.45-0.89)	<0.01	0.74 (0.56-0.97)	<0.05	0.70 (0.50-0.96)	<0.05	0.78 (0.47-1.28)	>0.05
HSC level	0.68 (0.50-0.93)	<0.05	0.78 (0.60-1.01)	>0.05	0.74 (0.55-1.00)	>0.05	0.82 (0.50-1.33)	>0.05
Graduate level	0.73 (0.56-0.96)	<0.05	0.81 (0.64-1.02)	>0.05	0.77 (0.58-1.03)	>0.05	0.84 (0.51-1.36)	>0.05
Post Graduate level	0.79 (0.62-1.01)	>0.05	0.83 (0.66-1.04)	>0.05	0.80 (0.62-1.02)	>0.05	0.87 (0.55-1.37)	>0.05
Excessive Sugar	2.26 (1.27-4.01)	<0.01	1.63 (1.05-2.53)	<0.05	0.78 (0.29-1.01)	<0.05	1.12 (0.73-1.67)	>0.05
Excessive Fat	1.61 (0.98-2.65)	>0.05	1.36 (0.86-2.14)	>0.05	1.57 (0.99-2.49)	>0.05	1.28 (0.83-1.97)	>0.05
Multi-nutrient Supplement	0.53 (0.31-0.90)	<0.05	1.50 (0.98-2.31)	>0.05	0.60 (0.35-1.02)	>0.05	0.69 (0.45-1.06)	>0.05
Existence of Food Allergy	1.74 (1.08-2.79)	<0.05	0.66 (0.41-1.04)	>0.05	1.61 (0.98-2.65)	>0.05	1.31 (0.85-2.01)	>0.05

DISCUSSION

The comprehensive analysis of the manifestations of premenstrual syndrome (PMS) and the diverse array of factors impacting symptoms underscored the complex interplay of physiological, psychological, and lifestyle variables in its expression. The dietary behavior of the respondents did not involve excessive consumption of salt, sugar, or fat, nor did they use tobacco, though a notable proportion reported food allergies. Excessive salt intake can cause bloating and water retention, while high sugar and fat consumption can lead to mood swings and fatigue, all of which can exacerbate PMS symptoms.¹² High sugar intake can lead to blood sugar fluctuations, contributing to mood swings and irritability associated with PMS.¹³ Diets high in unhealthy fats can increase inflammation and negatively impact hormonal balance, potentially worsening PMS symptoms.¹⁴ Siminiuc and Turcanu highlighted that dietary patterns rich in high-fat and high-sugar foods are associated with an increased risk of severe PMS symptoms.¹⁵ Furthermore, the low usage of multi-nutrient supplements suggests a gap in nutritional intake that could potentially exacerbate PMS symptoms as adequate intake of vitamins and minerals, such as calcium, magnesium, and vitamin B6, is crucial for managing PMS symptoms effectively.¹⁶ Ebrahimi et al. found that magnesium and vitamin B6

supplements significantly reduce PMS-related symptoms such as mood swings, irritability, and depression.¹⁷ Food allergies can trigger inflammatory responses that may worsen PMS, as inflammation is linked to increased menstrual pain and emotional symptoms.¹⁸ Thus, addressing these dietary factors can help in managing and reducing PMS severity.

A substantial proportion of respondents experienced psychological, behavioral, and physical symptoms associated with PMS, such as restlessness, irritability, tiredness, abdominal pain, and nausea. These symptoms can significantly affect daily functioning, leading to reduced quality of life and productivity. The prevalence of irritability and mood swings suggests the potential for heightened interpersonal conflicts and emotional distress.¹⁹ These findings align with existing research that links PMS to significant psychological distress, which can exacerbate conditions such as anxiety and depression.²⁰ Psychological symptoms are basically linked to the effects of estrogen and progesterone on neurotransmitters like serotonin and GABA, which regulate mood.²¹ As estrogen drops in the luteal phase, serotonin levels decrease, contributing to mood instability, while progesterone's influence on the GABAergic system may increase emotional sensitivity.²² The high rate of tiredness suggests that PMS significantly affects energy levels and daily functioning,

which is supported by studies showing that fatigue is a major concern for women with PMS.⁶ Progesterone can induce fatigue or disrupt sleep, while estrogen affects glucose metabolism and appetite-regulating hormones like leptin and ghrelin.²³ The high incidence of physical symptoms such as abdominal pain and backache is consistent with studies showing that PMS often manifests with both psychological and somatic symptoms, which can be debilitating.²⁴ The physical symptoms are also caused by hormonal shifts, particularly the rise in prostaglandins that trigger uterine contractions and the effects of progesterone on fluid retention and body temperature.²⁵ Similar physical symptoms were also reported by Bhuvaneswari et al., with back pain, muscle pain and breast sensitivity being the most frequent complaints among the respondents.²⁶ Addressing these symptoms through lifestyle modifications, dietary adjustments, and possibly pharmacological interventions could alleviate their impact. Previous studies have shown that regular physical activity and dietary changes can reduce PMS severity.²⁷ The findings underscore the need for comprehensive management strategies that consider the multifaceted nature of PMS to improve overall well-being and daily functioning.

The distribution of psychological symptoms such as irritation, tension, mood swings, nervousness, blubbery, and depression showed that these symptoms are more severe and frequent before menstruation than after. This pattern aligns with established research indicating that hormonal fluctuations before menstruation can exacerbate psychological symptoms.²⁸ The heightened irritability and mood swings before menstruation could lead to significant interpersonal and professional disruptions. The severity of the irritation was found to be less than the previous results (27.6-64.9%) reported by Bansel et

al.²⁹ The pronounced nervousness and blubbery before menstruation underscore the need for effective management strategies to mitigate these impacts on mental health. This finding is consistent with studies suggesting that premenstrual phase hormonal changes significantly influence mood and behavior.²⁸ Consequently, implementing interventions like cognitive-behavioral therapy, stress management techniques, and possibly pharmacological treatments can help alleviate these symptoms. Similar severity levels of symptoms were also reported by Abirami and Ambika, where they found that 26%, 55% and 19% of girls of childbearing age experienced mild, moderate and severe PMS induced psychological symptoms, respectively.³⁰

Behavioral symptoms such as increased appetite, insomnia, and tiredness were more prevalent and severe before menstruation compared to after. This pattern supports the understanding that hormonal changes in the luteal phase of the menstrual cycle contribute to significant behavioral disturbances.²⁰ Increased appetite and food cravings, often linked to fluctuations in serotonin levels, can lead to unhealthy eating patterns and weight gain, potentially exacerbating PMS symptoms.³¹ Insomnia and tiredness before menstruation can severely impact daily activities, reducing overall productivity and quality of life. The significant reduction in tiredness post-menstruation suggests that premenstrual hormonal fluctuations, particularly in progesterone levels, might contribute to increased fatigue and decreased energy levels.³² These findings are consistent with other research showing that sleep disturbances are a common premenstrual complaint that affects daytime functioning and emotional well-being.³³ Similar behavioral symptoms with higher severity were also reported by Bansel et al., which were higher than the

results of the current study.²⁹ Addressing these symptoms through lifestyle changes, such as improved sleep hygiene, a balanced diet, and possibly pharmacological treatments like SSRIs, can mitigate their adverse effects.

Different physical and clinical symptoms, such as headaches, breast sensitivity, abdominal swelling, oily skin, pimples, and back pain, were significantly more pronounced before menstruation compared to after. These symptoms are commonly associated with the hormonal fluctuations of the luteal phase, particularly the rise and fall of estrogen and progesterone levels, which can exacerbate physical discomfort.³⁴ The increased prevalence of headaches and back pain before menstruation aligns with findings from Bäckström et al., who noted that these symptoms are often linked to hormonal changes premenstrually.³⁵ Breast sensitivity and abdominal swelling were also more severe premenstrually, which can cause significant physical discomfort and impact daily functioning.²⁴ Additionally, the increase in oily skin and pimples before menstruation is consistent with the role of hormonal changes that influence sebaceous gland activity, leading to acne flare-ups.³⁶ Different targeted interventions such as NSAIDs for pain, topical treatments for acne, and lifestyle modifications can alleviate their impact.

The logistic regression analysis of factors influencing psychological symptoms like irritation, tension, mood swings, and nervousness in relation to PMS showed that age and BMI significantly impact irritation, indicating that older individuals and those with higher BMI are more likely to experience this symptom. This finding aligns with research suggesting that age and obesity exacerbate PMS symptoms due to hormonal imbalances.³⁷ Higher education levels, particularly SSC, HSC, and Graduate levels, are associated with reduced odds of experiencing these symptoms,

underscoring the potential role of education in enhancing coping mechanisms and stress management.³⁸ Excessive sugar consumption significantly increased the likelihood of irritation and tension, highlighting the role of diet in PMS.¹³ Multi-nutrient supplementation appeared to reduce irritation, suggesting nutritional support can mitigate PMS symptoms.³⁹ Food allergies also increased the risk of irritation, indicating that inflammatory responses might exacerbate PMS.¹⁵ These findings suggest that lifestyle modifications, including dietary changes and nutritional supplementation, alongside educational interventions, could effectively manage PMS symptoms, improving the overall well-being of affected individuals. In spite of having several strengths of this study including a large sample size, detailed statistical analysis through logistic regression, and comprehensive exploration of various symptoms and factors influencing PMS; the current study also has some limitations including potential recall bias in self-reported data and limited generalizability due to specific demographic characteristics of the sample.

CONCLUSION AND RECOMMENDATIONS

In conclusion, the prevalence of PMS symptoms is striking, with psychological, behavioral and physical symptoms highlighting the broad impact of PMS on daily functioning and quality of life. Importantly, the severity and prevalence of such symptoms significantly decrease after menstruation begins, reflecting the cyclical nature of PMS. Dietary behaviors reveal suboptimal nutritional practices, with low rates of multi-nutrient supplementation and varying levels of salt, sugar, and fat intake among respondents. These dietary patterns could potentially exacerbate PMS symptoms, emphasizing the need for nutritional education and interventions tailored to this

population. The study's findings underscore the multifaceted nature of PMS and its profound impact on women's physical, emotional, and behavioral health in Tangail City. As recommendations, interventions focused on promoting a balanced diet rich in essential micronutrients can be beneficial. Additionally, health education programs and holistic public health policies are crucial for raising awareness about the importance of vitamin and mineral intake, especially for at-risk groups. Finally, further research is necessary to explore the long-term effects of dietary interventions in minimizing the adverse effects of PMS symptoms.

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CONFLICTS OF INTERESTS

The authors declare no conflict of interest in this study.

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