

## A CROSS-SECTIONAL STUDY CONDUCTED FOR THE ASSESSMENT OF PREMENSTRUAL SYMPTOMS AMONG THE ADOLESCENT SCHOOL GIRLS OF MEHSANA CITY

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### ABSTRACT

**Objectives:** The objective is to study menstrual patterns. To study the prevalence of pre-menstrual symptoms among high school girls.

**Methods:** It is a cross-sectional, observational, and prospective study. A total of 384 adolescent girls were randomly enrolled in the study as per inclusion and exclusion criteria. Girls were belonging to higher secondary standards. Confidentiality was assured, and written informed consent was obtained. A data collection form was formed to conduct the survey. Ethical approval was obtained. The data were analyzed in MS Excel 2019. A descriptive analysis was done.

**Results:** A total of 384 high school girls with an age of  $15.65 \pm 1.16$  years were enrolled in the study. The calculated mean body mass index (BMI) was  $18.82 \pm 2.93$ . 40.4% had an underweight BMI. The majority of the adolescent girls had regular menstrual cycles, and a few had irregular menstrual cycles every month. More than half (60.41%) did not know about premenstrual syndrome. Physical premenstrual symptoms were a downward dragging sensation (58.78%), lower back pain (55.53%), acne flare-ups (44.63%), diffuse headaches (37.72%), and painful periods (33.88%). Psychological symptoms in hierarchy are anger or irritability (52.16%), less interest in usual activities (44.03%), pelvic cramping (45%), cravings for sweets (42.88%), and mood swings (41.53%).

**Conclusion:** The prevalence of premenstrual symptoms was higher for physical and psychological symptoms. Physical symptoms can affect routine activities, and psychological symptoms affect girls' behavior and mental status.

**Keywords:** Menstrual patterns, Premenstrual symptoms, Adolescents.

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### INTRODUCTION

Premenstrual syndrome (PMS) is characterized by a wide variety of emotional and physical symptoms and behavioral changes, occurring before the menstruation phase of the menstrual cycle and subsiding after the beginning of the menstrual period. It is classified as a physical disease in the 10<sup>th</sup> revision list of International Classification of Disease [1]. The major abnormalities are dysmenorrhea, PMS, and menstrual irregularities. These conditions may lead to problems in routine activities such as academic and sports performance, and sometimes, it lead to a loss of self-confidence. Female reproductive cycles are directly or indirectly influenced by diet, physical work, and mental stress [2].

### METHODS

#### Study design and duration

It is a cross-sectional, observational, and prospective study conducted between May 2022 and December 2022.

#### Sample size and study population

Sample size was calculated with a 95% confidence interval for P that was expected to be about 50% (0.5) with a margin of error (d) no more than 0.05,  $n = (1.96^2) (0.50) (1 - 0.50) / (0.05^2)$ ,  $n = 384$ . A total of 384 adolescent girls were randomly enrolled in the study as per inclusion and exclusion criteria. Girls were belonging to higher secondary standards. Confidentiality was assured, and written informed consent was obtained.

#### Instrument preparation and data collection

A data collection form was made to conduct the survey. It contains demographics, three questions regarding menstrual patterns, and

four questions regarding pre-menstrual symptoms. The instrument also contains a list of premenstrual symptoms that can be plausible to happen during, before, and after the menstrual cycle. It was translated into a vernacular language. Data collection was done from May 2022 to December 2022 as per randomly enrolled schoolgirls. Data were collected after a detailed explanation of the instrument with a personal interview.

#### Ethical consideration

Ethical approval was obtained before data collection by submitting all relevant documents for the study to the local Independent Ethics Committee located in Mehsana City. This study was conducted in accordance with good clinical practice guidelines.

#### Data analysis

The collected data were analyzed in MS Excel 2019 and SPSS version 20. Descriptive analysis was done, and results were represented in terms of percentages and frequencies, as shown in tables and graphs. Pearson's correlation coefficient was run to determine the correlation between body mass index (BMI) and PMS.

### RESULTS

A total of 384 high school girls aged  $15.65 \pm 1.16$  years were enrolled in the study. For the BMI category, each girl's height and weight were measured during data collection. The average height was  $153.11 \pm 8.12$  cm and the average weight was  $44.01 \pm 6.90$  kg. The calculated mean BMI was  $18.82 \pm 2.93$ . Table 1 represents the percentage and frequency of the respondents according to their BMI categories.

**Table 1: Description of BMI categories**

BMI categories	BMI range	Frequency	Percentage
Underweight	<18.5	155	40.4
Normal	18.5-24.9	217	56.6
Overweight	25-29.9	12	3.1
Obese	30-34.9	00	00

BMI: Body mass index

**Table 2: Description of menstrual patterns**

Question asked	Options	Answered by respondents % (n=384)
How would you describe your menstrual cycle?	Regular	73.17 (281)
	Irregular	26.82 (103)
What is the interval between two consecutive menstrual cycle?	<28 days	33.33 (128)
	29-31 days	48.17 (185)
	32-34 days	15.10 (58)
Rate the duration of bleeding during menstrual cycle.	More than 35 days	3.38 (13)
	2-3 days	15.62 (60)
	4-5 days	54.48 (210)
	6-7 days	26.56 (102)
	More than 7 days	1.56 (6)
	<2 days	1.56 (6)

**Table 3: Description of PMS Pattens**

Question asked	Options	Answered by respondents % (n=384)
Do you know about PMS?	Yes	39.58 (152)
	No	60.41 (232)
Do you experience PMS symptoms?	Yes	40.62 (156)
	No	23.95 (192)
	Sometimes	35.41 (136)
How many days do you experience symptoms of PMS?	0 days	25.78 (99)
	1 to 3 days	66.92 (257)
	4 to 7 days	6.25 (24)
	More than 7 days	1.04 (4)
What is the onset time of your PMS symptoms?	Before menstruation	49.47 (190)
	During menstruation	43.48 (167)
	After menstruation	7.03 (27)

PMS: Premenstrual syndrome

Table 2 represents the questions asked regarding menstrual patterns. The majority (73.17%, 281), of the adolescent girls have a regular menstrual cycle, and some 26.82% (103) have an irregular menstrual cycle every month. Respondents suggested different answers about the length of the menstrual cycle, as follows: (185) 48.17% nearly half of the respondents suggest an interval of two consecutive menstrual cycles of 29-31 days, followed by 33.33% (128) rated <28 days, and nearly 18.48% (71) have a menstrual cycle length of more than 32 days. Most 54.68% (210) respondents suggested 4-5 days as their cycle length, followed by 26.56% (102) who answered 6-7 days, 2-3 days for menstrual bleeding, conclude by 26.56% (102), and 15.62% (60), respectively. Very few people 1.56% (6) have menorrhagia or menstrual bleeding for more than 7 days. 1.56% (6) rated <2 days as menstrual bleeding days.

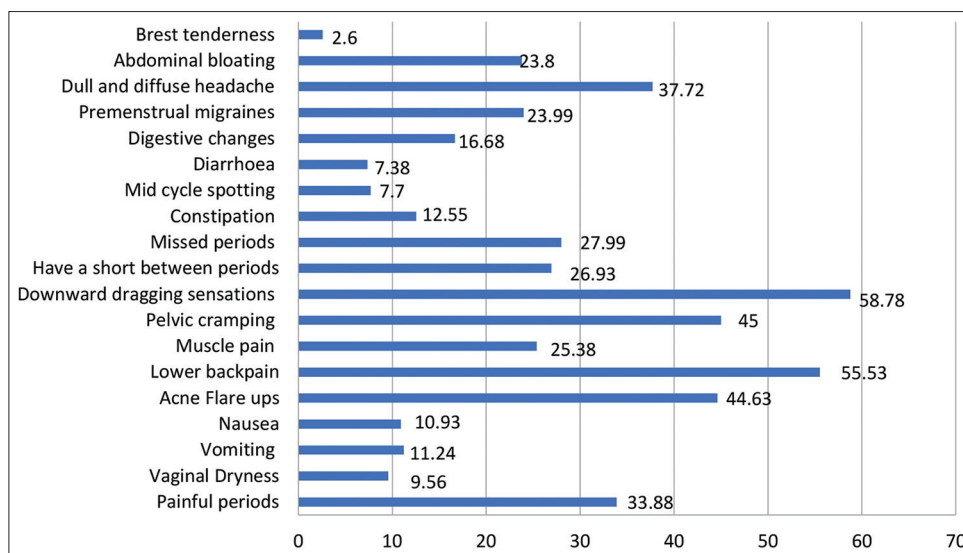
Table 3 reveals information about PMS-related questions. More than half (60.41%, 232) did not know about PMS. 40.62% (156) of the girls experienced PMS every month. Nearly 35.41% (136) of girls were sometimes having PMS. Fewer than 23.95% (92) were not experiencing PMS. The majority of 66.92% (257) of the respondents have PMS for 1-3 days. 6.25% (24) rated 4-7 days for PMS. Only 1.05% (4) faced PMS for more than 7 days. Nearly half (49.47%, 190) of the respondents had suffered from PMS before menstruation, 43.48% (167) suggested it during menstruation, and 7.03% (27) suggested it after menstruation.

Fig. 1 represents the bars of the physical symptoms. Following are physical symptoms suggested by the respondents: downward dragging sensation (58.78%), lower back pain (55.53%), acne flare-ups (44.63%), dull and diffuse headache (37.72%), and painful periods (33.88%).

Fig. 2 represents psychological symptoms in hierarchy: anger without any reason (52.16%), less interest in usual activities (44.03%), pelvic cramping (45%), cravings for sweet food items (42.88%), and mood swings (41.53%).

Table 4 represents a detailed description of the psychological and physical symptoms and their severity among girl respondents.

Table 5 contains information regarding vaginal discharge. Are girls experiencing any vaginal discharge. 39.3% (151) of respondents answered positively, and 32.8% (105) suggested that sometimes they were experiencing vaginal discharge. Among them all, only 20% (80) felt a specific odor from vaginal discharge. They have answered that different conditions are correlated with different colors, as follows:



**Fig. 1: Represents physical premenstrual syndrome symptoms**

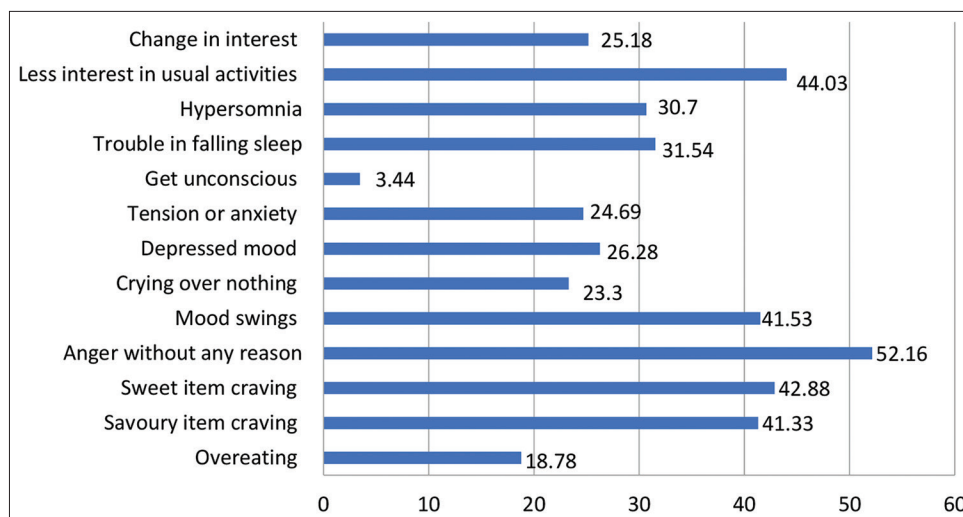


Fig. 2: Represents psychological premenstrual syndrome symptoms

Table 4: Premenstrual symptoms with severity

PMS	None	Mild	Moderate	Sever	Very sever
Psychological symptoms (n=384) (%)					
Overeating	308 (80.2)	53 (13.8)	18 (4.7)	2 (0.5)	3 (0.8)
Savoury item craving	227 (59.1)	89 (23.2)	46 (12)	10 (2.6)	12 (3.1)
Sweet item craving	213 (55.5)	92 (24)	50 (13)	12 (3.1)	17 (4.4)
Anger without any reason	220 (57.3)	90 (23.4)	35 (9.1)	20 (5.2)	19 (4.9)
Mood swings	273 (71.1)	60 (15.6)	38 (9.9)	4 (1.0)	9 (2.3)
Crying over nothing	315 (82)	39 (10.2)	12 (3.1)	9 (2.3)	9 (2.3)
Depressed mood	208 (54.2)	105 (27.3)	48 (12.5)	10 (2.6)	13 (3.4)
Tension or anxiety	301 (78.4)	58 (15.1)	19 (4.9)	4 (1)	2 (0.5)
Get unconscious	368 (95.8)	13 (3.4)	1 (0.3)	1 (0.3)	1 (0.3)
Trouble in falling sleep	265 (69)	60 (15.6)	39 (10.2)	9 (2.3)	11 (2.9)
Hypersomnia	280 (72.9)	56 (14.6)	36 (9.4)	6 (1.6)	6 (1.6)
Less interest in usual activities	249 (64.8)	79 (20.6)	43 (11.2)	8 (2.1)	5 (1.3)
Change in interest	309 (80.5)	51 (13.3)	20 (5.2)	1 (0.3)	3 (0.8)
Physical symptoms (n=384)					
Painful periods	293 (76.3)	50 (13)	26 (6.8)	10 (2.6)	5 (1.3)
Vaginal dryness	359 (93.5)	16 (4.2)	6 (1.6)	1 (0.3)	2 (0.5)
Vomiting	348 (90.6)	27 (7)	7 (1.8)	-	2 (0.5)
Nausea	343 (89.3)	27 (7)	9 (2.3)	1 (0.3)	4 (1)
Acne flare ups	225 (58.6)	87 (22.7)	38 (9.9)	16 (4.2)	18 (4.7)
Lower backpain	179 (46.6)	116 (30.2)	50 (13)	21 (5.5)	18 (4.7)
Muscle pain	294 (76.6)	57 (14.8)	24 (6.3)	5 (1.3)	4 (1)
Pelvic cramping	243 (63.3)	66 (17.2)	48 (12.5)	16 (4.2)	11 (2.9)
Downward dragging sensations	158 (41.1)	123 (32)	64 (16.7)	23 (6)	16 (4.2)
Have a short between periods	287 (74.7)	67 (17.4)	24 (6.3)	3 (0.8)	3 (0.8)
Missed periods	282 (73.4)	71 (18.5)	27 (7)	2 (0.5)	2 (0.5)
Constipation	337 (87.8)	29 (7.6)	14 (3.6)	3 (0.8)	1 (0.3)
Mid cycle spotting	357 (93)	19 (4.9)	6 (1.6)	1 (0.3)	1 (0.3)
Diarrhea	353 (91.9)	24 (6.3)	6 (1.6)	-	1 (0.3)
Digestive changes	329 (85.7)	40 (10.4)	12 (3.1)	1 (0.3)	2 (0.5)
Premenstrual migraines	301 (78.4)	58 (15.1)	17 (4.4)	2 (0.5)	6 (1.6)
Dull and diffuse headache	237 (61.7)	103 (26.8)	31 (8.1)	6 (1.6)	7 (1.8)
Abdominal bloating	333 (86.7)	38 (9.9)	11 (2.9)	1 (0.3)	1 (0.3)
Brest tenderness	358 (93.2)	19 (4.9)	3 (0.8)	1 (0.3)	3 (0.8)

PMS: Premenstrual syndrome

28.4% (109) are brown or bloody, 39.1% (150) are white, 7.8% (30) are yellow, 1.3% (5) are dark yellow, and 0.5% (2) are green.

Table 6 represents data on the correlation established between BMI and premenstrual symptoms.  $p < 0.05$  will be considered as significant. Out of all different physical and psychological PMS, the following PMS has found a significant correlation with BMI: abdominal bloating (0.058), pelvic cramping (0.004), depressed mood (0.037), anger without any reason (0.034), savory craving (0.030), and less interest in usual activities (0.030).

## DISCUSSION

In the present study, the age of the respondents was observed at  $15.66 \pm 1.16$  years, which was in line with the study conducted at Ratnagiri, Maharashtra [3]. The BMI category was calculated after observing the height and weight of the high school girls. Most of the girls were belonging to normal weight as compared to few had overweight category. Nearly 40.4% of the high school girls were in the underweight category. One study performed by Bhuvanewari *et al.* in Turkey suggested that low body mass index is the reason for the risk of PMS among young girls [4].

**Table 5: Vaginal discharge frequency**

Question asked	Options	Answered by respondents % (n=384)
Do you experience any fluid coming out of vagina?	No	32.8 (126)
	Sometimes	27.3 (105)
	Yes	39.3 (151)
Do you smell any odor in vaginal fluid?	No	56.3 (216)
	Sometimes	22.1 (85)
	Yes	20.8 (80)
Rate color of your vaginal fluid.	Brown or bloody	28.4 (109)
	Dark Yellow	1.3 (5)
	Green	0.5 (2)
	White	39.1 (150)
	Yellow	7.8 (30)

**Table 6: Correlation between BMI and pre-menstrual symptoms**

Premenstrual symptoms	Pearson's coefficient	p-value
Abdominal bloating	0.097	0.058*
Dull and diffuse headache	0.040	0.434
Premenstrual migraines	0.034	0.514
Digestive changes	-0.001	0.985
Diarrhea	-0.028	0.592
Constipation	0.083	0.106
Mid-cycle spotting	0.040	0.442
Missed periods	0.007	0.886
Have short breaks	0.30	0.563
Downward dragging sensation	0.056	0.276
Pelvic cramping	0.148	0.004*
Lower back pain	0.088	0.086
Muscle or joint pain	0.008	0.869
Nausea	0.007	0.897
Vomiting	0.009	0.869
Gets unconscious	0.006	0.906
Vaginal dryness	0.035	0.500
Painful periods	0.49	0.337
Tension or anxiety	0.088	0.088
Depressed mood	0.107	0.037*
Crying over nothing	0.063	0.217
Mood swings	0.090	0.080
Anger without any reason	0.109	0.034*
Sweet craving	0.077	0.132
Savory craving	0.112	0.030*
Overeating	-0.080	0.120
Trouble in falling sleep	0.024	0.642
Hypersomnia	0.003	0.950
Less interest in usual activities	0.112	0.030*
Change in interest	0.044	0.391
Acne flare ups	0.024	0.646
Breast tenderness	-0.009	0.868

p-value containing \* is considered as significant

Out of all, nearly 28.82% of the high school girls experienced an irregular menstrual cycle for each consecutive month. Similar findings are suggested by author Priyanka Negi from the study she performed at Garhwal, U.P. [5] Almost 64% of the respondents suggested a 29 to 34 days interval between two consecutive menstrual cycle; these findings were in line with the study performed in Bhavnagar, Gujarat.[6] Among all high school girls, only 1.56% were experiencing menorrhagia, which reveals bleeding days more than 7 days. One more study performed by Shruti *et al.* explained that 15.2% had menorrhagia, which was quite high as compared to the present study findings [7]. Other high school girls had normal blood flow during their menstrual cycle.

About 60.41% of the girls did not know the term PMS or what it was, but the majority of them were suffered from premenstrual symptoms during their menstrual cycle. Out of all of them, most were experiencing

premenstrual symptoms for 1–3 days, which were initiated before and during the menstrual cycle. This study's findings reveal physical and psychological premenstrual symptoms that can easily affect routine day-to-day activities. Almost 58.78% of the high school girls suggested a downward dragging sensation, followed by lower back pain (55.53%), pelvic cramping (45%), and acne flare-ups (44.63%). Half of the high school girls were experiencing anger without any reason or irritability following less interest in usual activities (44.03%), sweet item cravings (42.88%), and mood swings (41.53%). Similar findings were also concluded by different authors performed at different locations-[1-5,8-11] 65% of the high school girls had vaginal discharge, and among them, few felt a specific odor from vaginal fluid. Vaginal discharge could be a reason for the different infections, which can be diagnosed with the help of a specific odor, color, and its consistency.

Different studies concluded that low body mass index, food habits, junk food, early menarche, disturbed sleep patterns, consumption of caffeine and alcohol, etc. are responsible factors for the risk of premenstrual symptoms among younger girls [2,4,5,8,12–14]. However, this study suggested there might be a correlation between BMI and premenstrual symptoms. This study also helps to reveal the prevalence of PMS in terms of physical and psychological symptoms that affect the day-to-day activities of females.

**CONCLUSION**

The prevalence of premenstrual symptoms was higher for physical and psychological symptoms. Physical symptoms can affect routine activities, and psychological symptoms affect girls' behavior and mental status. BMI can be a risk factor for certain physical and emotional premenstrual symptoms.

**DECLARATION OF INTEREST STATEMENT:**

There is no conflict of interest.

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**AUTHORS' CONTRIBUTIONS**

Authors contributed to the design and implementation of the research, to the analysis of the results and to the writing of the manuscript.

**COMPETING INTERESTS**

There is no conflict of interest.

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