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Premenstrual Syndrome among Adolescent Girls at a Secondary School in Tanahun, Nepal: A Cross-Sectional Study

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ABSTRACT

Background

Premenstrual syndrome (PMS) is characterized by a range of physical, cognitive, affective, and behavioral symptoms that occur cyclically during the luteal phase of the menstrual cycle, typically resolving at the onset of menstruation. This study aimed to assess the prevalence and impact of Premenstrual syndrome among adolescent girls at a school in Tanahun.

Methods

A descriptive cross-sectional study was conducted among 119 adolescent girls studying in grades 8, 9, and 10 at a school in Tanahun, Nepal, from July to September 2023. A self-administered structured questionnaire was used for data collection. The school and classes were selected using non-probability purposive sampling, and participants were selected using proportionate stratified sampling. Data were entered into EpiData version 4.6 and analyzed using SPSS version 16.0. Descriptive statistics and the Chi-square test were applied at a 5% level of significance.

Results

PMS was prevalent among 64.7% of participants, with 55.8% having mild and 44.2% moderate PMS. Among those affected, the most common impacts were impaired friendships (42.0%), reduced individual work performance (42.9%), reduced social activities (39.5%), and school absenteeism (31.9%). Only 4.2% reported low academic grades. A significant association was found between PMS and educational grade ($p = 0.006$), while no significant associations were observed with other socio-demographic or menstrual variables.

Conclusions

PMS is common among adolescent girls and affects interpersonal relationships and educational activities. Health education, counseling, and coping strategies may improve quality of life during the premenstrual period.

Keywords: Adolescent; Menstruation disturbances; Premenstrual syndrome; Schools; Students.

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INTRODUCTION

Premenstrual syndrome (PMS) is a cyclic disorder causing physical, emotional, and behavioral symptoms before menstruation that affect daily life.[1] PMS is a major global health issue, affecting nearly half of reproductive-aged women. Cases increased from 652.5 million in 1990 to 956.0 million in 2019.[2] Furthermore, 80-90% of women experience at least one premenstrual symptom, and about 20% have symptoms that interfere with daily activities.[3] The prevalence of PMS varies widely across regions, with a pooled global prevalence of 47.8%, ranging from 12% in France to 98% in Iran, and regional estimates of 40% in Europe, 85% in Africa, 46% in Asia, 60% in South America, and 30% in the United Kingdom.[4] In Nepal, PMS prevalence among adolescent girls is high, with reported rates ranging from 57.7% to 84.0%.[5,6] Most studies in Nepal are urban-based and may not reflect rural schools. Therefore, this study assessed the prevalence and impact of PMS among adolescent girls in a secondary school in Tanahun, Nepal.

METHODS

Study Area

Study was conducted at Panchamunidev Secondary School, Tanahun, Nepal.

Study Design

A descriptive cross-sectional study.

Sample size and sampling

The sample size was calculated using Cochran's formula based on an 84% prevalence of PMS among adolescent girls in Kathmandu, Nepal.[6] The school and classes were selected purposively, while participants were chosen using proportionate stratified sampling and lottery method. Eligible participants were menstruating girls who were present at the time of data collection and willing to participate.

Data Collection

The study was conducted from July to September 2023. Data were collected using a self-administered structured questionnaire consisting of 16 items on PMS symptoms and 7 items on its impact. Severity was categorized as mild, moderate, and severe based on total scores; mild (<33%), moderate (33%-66%), and severe (66%).[7]

The content validity of the instrument was assessed through five expert reviews in nursing, research and statistics using a four point relevance scale. Item-Level Content Validity Index (I-CVI) for individual items ranged from 0.80 to 1.00, and the Scale-Level Content Validity Index using average method (S-CVI/Ave) was computed. The S-CVI value was 0.90 indicating excellent content validity of instruments. Reliability of the instrument was calculated by using Karl Pearson's correlation coefficient test by adopting Split Half technique where the r value was 0.76 which is considered reliable.

Pre-testing of the instrument was done among 10% of the total sample size (i.e. 12) in Shree Janakalyan Secondary School, Shuklagandaki-5, Tanahun. After pre-testing, required modifications were done. Ethical approval was obtained from the Institutional Review Committee (IRC) of Pokhara University (Ref. No. 190-079/080) for the study. The purpose of the study was explained and assent was obtained from participants and consent forms were sent to their parents/guardians. After obtaining consent from the parents as well as participants, data was collected on the next day in a separate classroom by the means of self-administered structured questionnaire. Participants received clear instructions and confidentiality was maintained using codes instead of names. About 30 minutes was given to complete the questionnaire.

Data Analysis

Data were entered into EpiData 4.6 and analyzed using SPSS 16. Descriptive statistics and Chi-square test were used, with $p < 0.05$ considered significant.

RESULTS

Among 119 participants, 63.0% were aged 14-15 years. More than half (55.5%) had normal body mass index. Nearly half (48.7%) belonged to Brahmin/Chhetri ethnicity, and 89.1% followed Hindu

religion. Participants from grade 10 accounted for 37.8%. Regarding menstrual characteristics, 69.7% of the participants attained menarche before the age of 12 years, with a mean age at menarche of 11.88±0.993 years. Regular menstrual cycles were reported by 76.5% of the participants. Menstrual flow lasting five days or less was reported by 58.8%, while 80.7% reported a normal amount of menstrual bleeding. Dysmenorrhea was reported by 74.8% of the participants. Among the participants, 26.1% engaged in regular physical exercise. A majority (76.5%) reported frequent consumption of junk food. Daily consumption of coffee and tea was reported by 12.6% and 31.9% of the participants, respectively. Sleep duration of 6-10 hours per day was reported by 58.8% of the participants. A family history of PMS was present in 27.7% of the participants (Table 1).

Table 1: Background information of the participants (n=119).

Variable	Frequency n (%)
Age (years)	
12-13	31 (26.1)
14-15	75 (63.0))
16-17	13 (10.9)
BMI	
Underweight	46 (38.6)
Normal	66 (55.5)
Overweight	7 (5.9)
Ethnicity	
Brahmin/Chhetri	58 (48.8)
Dalit	13 (10.9)
Janajati	47 (39.5)
Madhesi	1 (0,8)
Religion	
Hindu	106 (89.1)
Buddhist	7 (5.9)
Christian	6 (5,0)
Education	
Class 8	36 (30.3)
Class 9	38 (31.9)
Class 10	45 (37.8)
Menstrual Pattern	
Age at menarche(in completed years)	
<12	36 (30.3)
≥12	83 (69.7)
Regularity of cycle	
Regular	91 (76.5)
Irregular	28 (23.5)
Duration of menstrual flow	
≤5 days	70 (58.8)
>5 days	49 (41.2)
Amount of menstrual flow	
Heavy	14 (11.8)
Normal	97 (81.5)
Scanty	8 (6.7)
Dysmenorrhea	
Yes	89 (74.8)
No	30 (25.2)
Life Style Pattern	
Regular physical exercise	
Yes	31 (26.1)
No	88 (73.9)
Junk food consumption	
More frequent (≥2 times a week)	91(76.5)
Less frequent (≤1 times a week)	28 (23.5)
Daily coffee intake	
Yes	15 (12.6)
No	104 (87.4)
Daily tea intake	
Yes	38 (31.9)
No	81 (68.1)
Hours of sleep (hours)	
< 6	41 (34.5)
6-10	70 (58.8)
>10	8 (6.7)
Family history of PMS	
Yes	33 (27.7)
No	86 (72.3)

The most common premenstrual symptoms experienced by the respondents was easy fatigability or marked lack of energy (86.6%) followed by overeating or food craving (85.8%) and anger or irritability (82.4%). Least experienced symptoms were swelling of hands and feet that accounts for only (3.4%) followed by depressed mood (5.9%) and nausea and vomiting (19%). All respondents (100%) experienced at least one premenstrual symptom (Table 2).

Nearly two-thirds (64.7%) of the participants were found to have PMS. Of these, 55.8% experienced a mild form, and 44.2% had a moderate form (Table 3).

Table 2: Distribution of the Respondents based on Premenstrual Symptoms (n=119).

Symptoms	Severity of symptoms		
	Mild n (%)	Moderate n (%)	Severe n (%)
Mood swings, tearful or increased susceptibility to rejection	58 (48.7)	23 (19.3)	3 (2.5)
Anger or irritability	45 (37.8)	37 (31.1)	16 (13.4)
Marked anxiety or tension	25 (21.0)	7 (5.9)	1 (0.8)
Depressed mood, feelings of hopelessness	6 (5.0)	1 (0.8)	-
Decreased interest in usual activities	47 (39.5)	25 (21.0)	9 (7.6)
Easily fatigability or marked lack of energy	61 (51.3)	27 (22.7)	15 (12.6)
Difficulty in concentration	40 (33.6)	20 (16.8)	14 (11.8)
Overeating or food craving	32 (26.9)	29 (24.4)	41 (34.5)
Hypersomnia	40 (33.6)	26 (21.8)	16 (13.4)
Insomnia	21 (17.6)	2 (1.7)	0 (0)
Breast tenderness and swelling	47 (39.5)	7 (5.9)	1 (0.8)
Swelling of hands and feet	3 (2.5)	1 (0.8)	0 (0)
Joint or muscle pain	40 (33.6)	7 (5.9)	3 (2.5)
Abdominal bloating	33 (27.7)	11 (9.2)	3 (2.5)
Nausea/vomiting	12 (10.1)	3 (2.5)	4 (3.4)

Table 3: Prevalence and severity of PMS (n=119).

PMS	Frequency n (%)
Prevalence (n= 119)	
Yes	77 (64.7)
No	42 (35.3)
Severity (n= 77)	
Mild PMS	43 (55.8)
Moderate PMS	34 (44.2)

Impact of Premenstrual Syndrome

Among the 77 participants who experienced PMS, noticeable effects were observed on both interpersonal relationships and educational activities. Regarding interpersonal relationships, 42.0% reported impaired relationships with friends, while 39.5% experienced impairment in social life activities. Impaired relationships with family members were reported by 10.9% of the participants. In relation to educational activities, 42.9% of the participants reported poor individual work performance, 31.9% experienced increased school absenteeism, and 16.0% reported poor collaborative work performance. However, only 4.2% of the participants reported scoring low grades due to PMS.

A statistically significant association was found between PMS and educational grade (p=0.006). No statistically significant association was observed between PMS and other variables (Table 4).

Table 4: Association between PMS and Background Variables (n=119).

Variables	Prevalence		χ^2	P value
	Yes (%)	No (%)		
Socio-demographic Information				
Age (years)				
12-14	40 (59.7)	27 (40.3)	1.681	0.195
15-17	37 (71.2)	15 (28.8)		
BMI				
Underweight	28 (60.9)	18 (39.1)		
Normal	43 (65.2)	23 (34.8)	1.655	0.437#
Overweight	6 (85.7)	1 (14.3)		
Religion				
Hindu	67 (63.2)	39 (36.8)	0.954	0.378#
Others	10 (76.9)	3 (23.1)		

Ethnicity				
Brahmin/Chhetri	35 (60.3)	23 (39.7)	0.942	0.332
Others	42 (68.9)	19 (31.1)		
Education				
Class 8	28 (77.8)	8 (22.2)		
Class 9	17 (44.7)	21 (55.3)	10.137	0.006*
Class 10	32 (71.1)	13 (28.9)		
Age of menarche (years)				
<12	21 (58.3)	15 (41.7)	0.918	0.338
≥12	56 (67.5)	27 (32.5)		
Regularity of menstrual cycle				
Regular	56 (61.5)	35 (38.5)	1.699	0.192
Irregular	21 (75.0)	7 (25.0)		
Duration of menstrual flow				
≤5 days	50 (71.4)	20 (28.6)	3.364	0.067
>5days	27 (55.1)	22 (44.9)		
Amount of menstrual flow				
Normal or low	70 (67.3)	34 (32.7)	2.446	0.118
Heavy	8 (10.4)	7 (16.7)		
Dysmenorrhea				
Yes	57 (64.0)	32 (36.0)	0.068	0.795
No	20 (66.7)	10 (33.3)		
Regular physical exercise				
Yes	12 (66.7)	6 (33.3)	0.523	0.47
No	7 (53.8)	6 (46.2)		
Junk food Consumption				
More frequent (≥2 times a week)	60 (65.9)	31 (34.1)	0.255	0.613
Less frequent (≤1 times a week)	17 (60.7)	11 (39.3)		
Daily coffee intake				
Yes	11 (73.3)	4 (26.7)	0.559	0.455
No	66 (63.5)	38 (36.5)		
Daily tea intake				
Yes	25 (65.8)	13 (34.2)	0.029	0.865
No	52 (64.2)	29 (35.8)		
Hours of sleep				
<6 hours	28 (68.3)	13 (31.7)		
6-10 hours	46 (65.7)	24 (34.3)	2.855	0.24
>10 hours	3 (37.5)	5 (62.5)		

**p-value significant = < 0.05 at 95% CI, *statistically significant, # fisher exact test*

DISCUSSION

This study examined the prevalence, pattern, and impact of premenstrual syndrome (PMS) among adolescent school girls in Tanahun, Nepal. The mean age at menarche was 11.88 ± 0.993 years, which is consistent with findings from studies conducted in Kathmandu, Nepal, where the mean age at menarche was 12.9 ± 0.07 years.[8] This consistency suggests that adolescent girls in different parts of Nepal may share similar developmental and nutritional profiles that influence the timing of menarche. The present study found that the majority (76.5%) of participants had a regular menstrual cycle. This finding is consistent with studies conducted among adolescent girls in Nepal and Malaysia, which reported that

most participants experienced regular menstrual cycles.[6, 9] More than half (58.8%) experienced menstrual bleeding lasting five days or less, again closely matching results from Morang, Nepal, which reported that 63.8% of the participants experienced a bleeding phase of 2 to 5 days.[10] These similarities suggest relatively stable menstrual characteristics among adolescent populations in similar socio-cultural settings.

The prevalence of PMS in this study was 64.7%, indicating that more than half of the participants experience noticeable premenstrual symptoms. This aligns with findings from Morang (57.7%) and Türkiye (61.2%).[5, 11] but it is lower than the prevalence reported in Kathmandu, Nepal (84.0%).[6] The variations in findings may be due to differences in socio-demographic characteristics, lifestyle factors and study settings.

Regarding severity, most participants experienced mild (55.8%) to moderate (44.2%) PMS, with no severe cases reported. This distribution is consistent with findings from Lumbini Medical College Teaching Hospital, Palpa, Nepal, where 56.1% had mild PMS, 43.9% had moderate PMS, and none had severe PMS.[12] However, the findings differ from a study among high school students in Iran, which reported the prevalence of moderate severe PMS was 33.9%.[13] Similarly, a study from Eastern India found 30.6%) students were diagnosed with moderate-to-severe PMS.[14] This variation may reflect differences in stress levels, lifestyle patterns, academic pressure, or even awareness and reporting of symptoms among adolescents.

The most frequently reported symptom in this study was easy fatigability or lack of energy (86.6%), followed by food cravings (85.8%) and irritability (82.4%).These findings are consistent with studies from India, Malaysia, and Türkiye, where emotional and energy-related symptoms were also most prominent.[9, 11, 15] This pattern suggests that PMS is not just a physical condition but is strongly linked with emotional and psychological changes during the luteal phase.

Sleep disturbances (hypersomnia: 68.9%) and difficulties in concentration (62.2%) were also highly prevalent in this study. These findings are consistent with previous study of North Borneo, Malaysia indicating that PMS adversely affects cognitive performance and sleep regulation in adolescents.[9] Hormonal fluctuations during the luteal phase may contribute to fatigue, sleep disturbances, and reduced concentration.

Physical symptoms such as breast tenderness (46.2%), muscle or joint pain (40.2%), and abdominal bloating (39.5%) were also frequently reported in the present study. Similar symptom patterns have been observed among adolescent girls in India, where somatic symptoms such as breast discomfort, abdominal bloating, and musculoskeletal pain were frequently reported.[15] These somatic manifestations reflect systemic physiological responses to hormonal fluctuations during the luteal phase.

In the present study, swelling of hands and feet (3.4%) was the least reported symptom, consistent with findings from West Bengal, India, where, swelling of limbs reported by 5% of girls.[16] Likewise, a study of Puducherry, India, also indicated that edema-related symptoms are generally mild or absent in most adolescents.[17] The consistency of these findings across different settings suggests that edema-related symptoms are less prevalent among adolescents than emotional and behavioral symptoms.

This study found that school absenteeism due to PMS was 31.9%, and low academic performance was reported by 4.2% of participants. Similar findings were reported in Northern Ethiopia, where 28.3% of students missed classes due to PMS and 8.1% experienced poor academic performance.[18] These findings emphasize that PMS may extend beyond physical discomfort and have meaningful consequences for educational participation and everyday life.

In the present study, a significant association is observed between PMS and the educational grade of the participants (p value<0.05) This result aligns with the study of Aligarh, Uttar Pradesh, India.[19] However, no significant associations were observed with other socio-demographic or lifestyle factors.

Limitations

This study was conducted in a single school with a relatively small sample size; therefore, the findings may have limited generalizability. The cross-sectional design restricts causal inference, and self-reported data may be subject to recall bias.

Conclusions

The study revealed that nearly two-thirds of participants experienced mild to moderate PMS. Over one-third reported negative impacts on their friendships, social life, work performance, and school attendance. An association was found between educational grade and PMS. The study recommends early health education, counseling, and coping strategies, beginning in adolescence, to improve quality of life.

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Ethics approval: Ethical approval was obtained from the Institutional Review Committee (IRC) of Pokhara University (Ref. No. 190-079/080) for the study.

Conflict of interest: The authors declare that they have no conflict of interest.

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Availability of data and materials: All data analysed during this study will be made available upon reasonable request from the corresponding author.

Author contributions

Conceptualization: Smriti Adhikari, Sharada Paudel
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