# Association of Premenstrual Syndrome with Body Mass Index among Young Female Adults in a Dental College of Kathmandu

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## ABSTRACT

**Introduction:** Premenstrual syndrome (PMS) is a cyclical symptom affecting female during the luteal phase of menstrual cycle. Body mass index (BMI) plays an important role in reproductive health of women. This study aims to see the prevalence of PMS and its association with BMI among the participants.

**Methods:** This cross sectional study among 239 female undergraduate dental students was conducted in Kantipur Dental College Teaching Hospital and Research Centre from February to June 2020 with convenience sampling. The participants between 18-26 years of age without endocrine, psychological or gynecological disorders were given a self rated questionnaire based on Pre-Menstrual Symptom screening tool to fill. The height and weight of the participants were measured in the standardized way. The data was analyzed using SPSS-16 software.

**Results:** The prevalence of moderate to severe PMS was 39% and mild to none PMS was 61%. The participants with moderate to severe PMS were more in BMI II category (42.6%) followed by BMI III (35.7%). The most prevalent changes seen among participants in moderate to severe PMS were interferences in relationship with co-workers (167) and interference with family (141). The mean weight, height and BMI of the participants with moderate to severe PMS were 51.48±6.61kg, 154.80±6.52 cm and 21.39±2.43 kg/m² and the mean comparison of BMI between mild to none PMS and moderate to severe PMS category was found to be statistically insignificant ( P=0.95).

**Conclusion:** The premenstrual syndrome mostly associated with interferences in daily activities was prevalent among the undergraduate dental students of Nepal. The development of premenstrual syndrome had no association with body mass index of the participants in this study.

**Keywords :** Body mass index; Premenstrual Syndrome; Young adults.

## INTRODUCTION

Premenstrual syndrome (PMS) is defined as a recurring pattern of symptoms which occur during the premenstrual phase and decline soon after the start of menses.[1] It includes physical, affective, and behavioral symptoms that significantly impair the daily lives of female, including work and personal activities, during the luteal phase.[2] The American Psychiatric Association in 1987 has defined PMS as the Luteal Dysfunctional Disorders. The physical symptoms in PMS include painful tenderness of the breast, flatulence, abdominal pain, weight gain, edema, headache, back pain, nausea, bowel movements, acne, and psychotic symptoms include irritability, anxiety, nervousness, depression, excessive tiredness and weakness, confusion, changes in mood, sleep pattern, and appetite.[3-5] These symptoms cause impairment in physical health, mental health, and severe functional impairment in women's social and occupational contexts.[4] In students, it may negatively affect the academic performance and their social interactions. It has been found that adolescents with PMS are in poor health.[6] It has been reported that 80% of the Nepalese students have PMS symptoms in moderate to severe category.[7] The severe form of premenstrual syndromes with greater psychological symptoms is Premenstrual dysphoric disorder (PMDD) affecting 3-8% of menstruating women.[8,9] The severe PMS and PMDD in adolescents can be diagnosed with the help of Premenstrual Symptoms screening tool (PSST).[10] Apart from the

hormonal fluctuations as a causative agent for PMS, obesity itself has been found to have great impact on menstrual disorders.[11] The studies have claimed that the prevalence of PMS was higher in underweight, overweight and obese groups than in healthy groups.[12,13] Similarly, many studies have claimed the positive effect of abdominal obesity not the Body Mass Index (BMI) to have effect on PMS.[14] This study would thus explore the link between BMI and PMS among Nepalese students.

## METHODS

The study is a cross sectional analytical study conducted among undergraduate dental students in department of Physiology, Kantipur Dental College Teaching Hospital & Research Centre, Basundhara, Kathmandu. The sample size was 239 which was calculated based on the prevalence rate of PMS among students in a teaching hospital, Chhauni.[15] The convenience sampling technique was used and the undergraduate dental students between 18 to 26 years of age who are considered as young adults were recruited.[16] The inclusion criteria were female with initiation and continuation of menstrual cycles and with no history of diagnosed gynecological, psychological or endocrine disorders. The anthropometric measure which included Body Mass Index was calculated by weight in Kg divided by height in square meter after taking the variables with weighing scale and height in stadiometer in a standardized way. BMI less than $18.5 kg/m^2$ was considered as underweight, $18.5-24.9 kg/m^2$ as normal weight, $25-29.9$ $kg/m^2$ as overweight and more than $30kg/m^2$ as obese.[17]

Premenstrual Symptoms Screening Test assessment among the participants included self-filling of questionnaires.[18] It consists of list of symptoms and it's affect in daily life in different categories (not at all, mild, moderate, severe). The PSST used is based on the questions as depicted in Table 1. The scoring criteria would be presence of at least one symptom from 1,2,3,4 (moderate to severe category), at least 4 symptoms from 1-14 (moderate to severe category) and at least one from last 5 interferences in activities (moderate to severe category) as a diagnosis for moderate to severe PMS.[19] If similar criteria is fulfilled but in severe category, it serves as a diagnosis for PMDD.[18] The data were analyzed with SPSS-16 version and descriptive statistics of the participants were studied followed by inferential statistics to see association of BMI with different categories of PMS. The confidence interval of 95% was considered and P value if less than 0.05 was statistically significant.

## RESULTS

The total number of participants was 239 between 18

years and 29 years of age. The Pre-menstrual syndrome was divided into 2 groups as mild to none and moderate to severe categories as per Pre-menstrual syndrome screening test diagnosis criteria. The prevalence of moderate to severe PMS was 39% and mild to none PMS was 61% among the participants. None of the participants had Pre-menstrual Dysmorphic disorder (Figure 1). The maximum number of participants had interferences with relationship of co-workers (n=167) and interference with family (n=141) in moderate to severe category. This was followed by interference with home responsibilities (n=114) and interference with social life activities (n=108) in moderate to severe category. Similarly, lack of energy/fatigue (n=120), overeating/ food cravings (n=111), difficulty concentrating (n=107 anger/n=105 irritability) and decrease in work activities (109) were seen in moderate to severe category as well (Table 1). Table 2 shows that the percentage distribution of the participants with moderate to severe symptoms of PMS was largest in BMI II category (42.6%) followed by BMI III (35.7%) and BMI I (30.3%) respectively with least distribution in BMI IV category (12.5%). Table 3 shows that the mean weight in kg was 53.03± 8.29, mean height was 156.58±11.61 cm and mean BMI was $21.40±3.23$ $kg/m^2$ among the participants. The mean weight, height and BMI of the participants with moderate with severe PMS were 51.48±6.61kg, 154.80±6.52 cm and $21.39±2.43$ $kg/m^2$ and the mean comparison of BMI between mild to none PMS category with moderate to severe category was found to be statistically insignificant with P value more than 0.05 (Table 3).
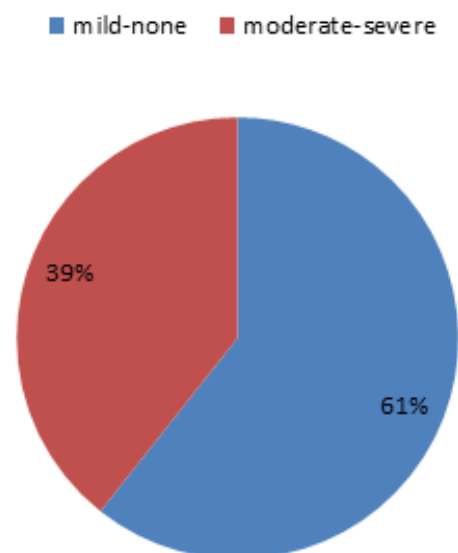


**Figure 1: Prevalence of PMS among the participants.**

## Table 1: Distribution of participants among symptoms as per Pre menstrual Screening Tool

| S.N | Symptoms | None to mild | Moderate to severe |
|---|---|---|---|
| 1. | Anger/ Irritability | 134 | 105 |
| 2. | Anxiety/ Tension | 141 | 98 |
| 3. | Tearful/ increased sensitivity to rejection | 147 | 92 |
| 4. | Depressed mood/ hopelessness | 159 | 80 |
| 5. | Decreased interest in work activities | 130 | 109 |
| 6. | Decreased interest in home activities | 146 | 93 |
| 7. | Decreased interest in social activities | 146 | 93 |
| 8. | Difficulty concentrating | 132 | 107 |
| 9. | Fatigue/ Lack of energy | 119 | 120 |
| 10. | Overeating/ food cravings | 128 | 111 |
| 11. | Insomnia | 207 | 32 |
| 12. | Hypersomnia (more sleep) | 183 | 56 |
| 13. | Feeling overwhelmed or out of control | 176 | 63 |
| 14. | Physical symptoms (Breast tenderness, headaches, joint/muscle pain, bloating, weight gain) | 154 | 85 |
| 15. | Interference with work efficiency or productivity | 152 | 87 |
| 16. | Interference with relationship with co workers | 72 | 167 |
| 17. | Interference with family | 98 | 141 |
| 18. | Interference with social life activities | 131 | 108 |
| 19. | Interference with home responsibilities | 125 | 114 |

## Table 2: Body Mass Index distribution (BMI) in different categories of Pre Menstrual Syndrome

| BMI categories | Pre Menstrual Syndrome | |
|---|---|---|
| | Moderate-severe N (%) | Mild to none N (%) |
| BMI-I (33) | 10 (30.3%) | 23 (69.7%) |
| BMI-II (184) | 78 (42.6%) | 106 (57.4%) |
| BMI-III (14) | 5 (35.7%) | 9 (64.3%) |
| BMI-IV (8) | 1(12.5%) | 7 (87.5%) |

## Table 3: Mean comparison of anthropometric measures in different categories of Pre Menstrual Syndrome

| Anthropometric measures | Total (Mean±S.D) | Pre-menstrual Syndrome | | P value |
|---|---|---|---|---|
| | | Moderate-severe (Mean± S.D) | Mild-none (Mean± S.D) | |
| Weight (kg) | 53.03±8.29 | 51.48±6.61 | 54.04±9.10 | 0.019* |
| Height (cm) | 156.58±11.61 | 154.80±6.52 | 158.54±7.16 | 0.000* |
| BMI (kg/m2) | 21.40±3.23 | 21.39±2.43 | 21.41±3.67 | 0.959 |

Test used: Independent T test

'*' *Indicates the statistically significance at 95% CI*

## DISCUSSION

This study has shown that the prevalence of Premenstrual Syndrome among the participants was 39% in moderate to severe category. Most of the symptoms in moderate to severe category belonged to interferences with co-workers, family, social life activities and home responsibilities. Insomnia and hypersomnia were mostly observed among participants in none to mild category. The percentage wise distribution of participants in moderate to severe category PMS was mostly found in BMI II and III categories. Similar study was conducted among the undergraduate students in a teaching hospital with similar tool in Nepal which reported only 17.2% participants fulfilled the criteria for moderate to severe PMS with 2.1% having Premenstrual dimorphic disorder.[7] A study done in Japanese high school students had reported prevalence of PMDD 2.6% and moderate to severe PMS in 11.2%.[20] Similarly, a recent study conducted among 266 healthy female students in a medical college, Nepal has reported the prevalence of PMDD to be 3.8% which is found to be higher than other similar studies conducted in Nepal.[9]

It has been found that the cyclic estrogen and progesterone fluctuations clearly contribute to the onset of PMS, as treatments suppressing ovulation are effective at preventing PMS symptoms.[21] A deposit of a variety of hormonal, neural, and behavioral mechanism may probably be related to PMS and several studies have found women with PMS or menstrual symptoms are more likely to be overweight and obese than women without PMS.[22] The literature has found that the obesity had three fold increased risk for PMS than non obese white women between 18-44 years of age.[23] A prospective cohort study conducted among nurses aged 27-44 years has also found a strong linear relationship between BMI

at baseline and risk of incident PMS, with each $1kg/m^2$ increase in BMI associated with a significant 3% increase in PMS risk.[24] However, our study has found that there was no statistical difference of mean BMI when compared with groups with mild to none PMS and moderate to severe PMS. Similarly, the percentage wise distribution of participants in moderate to severe category of PMS had not increased proportionately with increase in BMI. The study being a cross sectional one with no follow up together with inclusion of healthy dental students of a young adult age group from 18-26 years[16] could be a potential factor which could be considered for the difference of result in this study. There is lack of study related with BMI and PMS in this particular age group. Thus, it is recommended for similar studies to be done in this particular age group to understand the role of BMI in different age groups for development of PMS.

## CONCLUSION

The premenstrual syndrome is prevalent among the undergraduate dental students of Nepal. The interferences among the activities of the participants during luteal phase of menstrual cycle were the most common in moderate to severe category of PMS. The development of premenstrual syndrome had no association with body mass index of the participants in this study.

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