



Original Article



Association Between Meal Skipping and Premenstrual Syndrome Among Young Females

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ABSTRACT

Premenstrual syndrome (PMS) is the combination of physical, emotional, psychological and behavioural issues related to many symptoms. Due to which female are unable to perform their tasks. Somehow, PMS is linked with poor eating patterns and lifestyle. Modification in these things has seen lower prevalence in young female. **Objective:** To check the association between meal skipping and PMS in young females. **Methods:** A cross-sectional study was conducted among young female of the age group 18 to 30 at different educational institutions in Lahore. The target sample size of the study was 400 female. The data were gathered using a questionnaire sampling technique. A self-administered meal skipping questionnaire was used to check the dietary pattern, while the Premenstrual Syndrome Scale (PMSS) was used to examine the presence of PMS symptoms. After data collection, statistical analysis was done to find the results. **Results:** The p-value was 0.016, which was a significant level that indicates a positive association between PMS and meal skipping. Research revealed a significant link ($p=0.016$) between skipping meals and the severity of PMS symptoms, implying that dietary habits may influence symptom intensity. **Conclusions:** It was concluded that young adults, especially female, skip meals more frequently due to various reasons, which causes major health issues. It was seen that female who skip meals regularly have a more prominent association with premenstrual syndrome.

INTRODUCTION

Nutrition plays a major role throughout the life cycle, but it plays a crucial part in proper growth and development during the early years of life. That is why there is an increased demand in the adolescent phase due to body changes and the development of adult features. A healthy life is important for both male and female, but female nourished body is much more essential in later life stages [1]. A physically and mentally well woman is essential in building a healthy and fit generation, so they are required to consume all the necessary macro and micro nutrients, as in their later lives they have to give birth, for which more nutrients will be needed [2]. Menstruation occurs when a female hits their puberty age. It is defined as a periodic monthly cycle where there is blood discharge and cellular debris of the mucosal lining of the uterus in female. The

normal and healthy length of menstruation is usually 21 to 35 days. Periods usually last for 2 to 7 days, respectively, with the signs and symptoms of cramps (especially in the abdominal region), bloating (puffy belly), breakouts (getting pimples), feeling tired and having mood swings, which are common during the menstruation phase. These signs and symptoms vary from one female to the other. Some women have extreme pain and discomfort [3]. While others do not experience anything. This cycle lasts for more than 7 days or less than 2 days can be a sign of a problem in the body. The main reason among them can be their dietary and lifestyle patterns [4]. Females with more active and healthier lifestyles are less likely to have such symptoms, whereas female who are mentally and physically inactive are more prone to develop these complications/problems



[5]. Premenstrual syndrome (PMS) is a multiple-disease disorder including physical, psychological and emotional symptoms that starts 7-14 days before menstruation. Most women experience some kind of discomfort before having their periods and which becomes intense enough to interfere with daily routine activities and drains their energy [6, 7]. Premenstrual syndrome (PMS) occurs during the luteal phase of the menstrual cycle. While the direct cause is unknown, hormonal imbalances, nutritional deficiencies, and physiological factors are suspected contributors. Meal skipping can intensify nutritional deficiencies, including low levels of magnesium, zinc, vitamin B, vitamin D, and calcium. These deficiencies can, in turn, influence hormonal imbalances. Research suggests that micronutrient supplements may help alleviate PMS symptoms [8, 9]. Meal skipping means an individual who fails to have any of the major meals (i.e. breakfast, lunch or dinner) in a whole day. Teenagers tend to skip any of the major meals throughout the day, which is the main reason our next generation is more susceptible to chronic diseases. Poor dietary lifestyle is the leading cause of many disorders like non-communicable diseases (NCDs) among young individuals than in older adults. Moreover, these behaviour changes also affect the reproductive system of human beings [10]. Daily eating patterns mark an important point in the overall health of an individual, but they play a significant part in menstruation health of young women. Many menstruation problems are linked with dietary habits and lifestyle activities [11]. PMS is also associated with the poor nutritional status of the body. Female with nutrient deficiencies are at higher risk of having such problems. That's why a huge difference is seen between the girls with balanced and imbalanced diets in experiencing these menstruation complications. Major meal skippers have more irregular and painful periods than those who eat regularly. Therefore, a questionnaire was developed to check the rate of premenstrual syndrome among those females who skip their meals regularly for any reason [12]. The prevalence of premenstrual syndrome (PMS) is increasing among young female, coinciding with rising rates of meal skipping due to factors like busy lifestyle routines and weight management patterns.

This study aims to investigate the pattern and symptoms of PMS and its impact on the lifestyle among habitual meal skippers in young female of 18 to 30 years, extending existing research that primarily focused on breakfast skipping.

METHODS

A cross-sectional study has been conducted within 6 months, starting from 4 December 2023 to 4 June 2024, to check the ratio of Premenstrual syndrome among young female who skipped their meals regularly under the IRB. No. USA-RW/DR/2023/04/064. For this purpose, female of the

age group 18 to 30 years was selected from various educational institutions, including the University of South Asia, the University of Lahore, the University of Management and Technology and Superior University in Lahore. The age group 18 to 30 years' female was chosen as the sample because this age group is most commonly found in educational institutions, making them the target population for the study. A convenience sampling technique was used to collect the data. This type of study design helps to gather data from many students over a short period. The use of a general self-administered meal skipping questionnaire to check the dietary pattern and Premenstrual syndrome scale (PMSS), a standard tool, was done to examine the presence of PMS symptoms in young females. The reliability of self-administered questionnaire was checked by doing a pilot study on around 50 to 60 female, and 0.81 was the calculated result using the Cronbach Alpha test. The PMSS score was a numerical scoring assessment which evaluated the presence of PMS symptoms (i.e. physiological, psychological and behavioural ones). The score ranges from 1 to 5, with 1 for never and 5 for always. The method was very quick and less time-consuming than others. It was an inexpensive way among all the methods. This was easy to perform and the most effective way for those young females who hesitate to communicate about menstruation. The target sample size of the study was 400 females, which was calculated using Rao Software by using the Cochran formula. Moderate effect size (0.5) and desired power (0.8), a post hoc power analysis suggests that a sample size of 400 provides 0.85 power, which determines that the study has 85% power to detect statistically significant effects. It included young female aged 18 to 30 years who were unmarried with no disease. While the excluded female was of age <18 and >30 years, married with diseases like hypertension, diabetes, asthma, etc. Students were asked if they skipped a meal or had any disease before being them in the research. All participants were given the questionnaires that were available at that point to be filled out with their permission. Personal space was given for their ease. After data collection, the PMSS scoring was used to evaluate the collected sample. The gathered data were entered and stored in the researcher's IBM software called the Statistical Package for Social Sciences (SPSS version 21.0). All the collected information was analyzed there. Chi-square tests and ordinal logistic regression to examine and model the relationship between meal skipping and PMS severity, considering their ordinal nature. Statistical significance was determined using a threshold of $p < 0.05$, where p -values less than 0.05 were considered statistically significant.

RESULTS

The standard PMSS tool used in the questionnaire comprised three sections: physiological, psychological and behavioural symptoms. After data collection, abdominal bloating, irritability and impaired work

performance were identified as the symptoms with relatively higher frequencies than others, so they were added to the results category respectively. We conducted a post. Hoc analysis using the Bonferroni correction to adjust for multiple comparisons. After applying the Bonferroni correction, our results show that the association between meal skipping and PMS remains statistically significant, which would strengthen the validity of our findings. Most of the girl's experience abdominal bloating (a physiological symptom) during or before their periods. Around 41.3% never complain of abdominal bloating, while 20.8% say they rarely experience this. 20.5% sometimes and 9.5% often undergo this experience. Only 8% encounter abdominal bloating all the time (Figure 1).

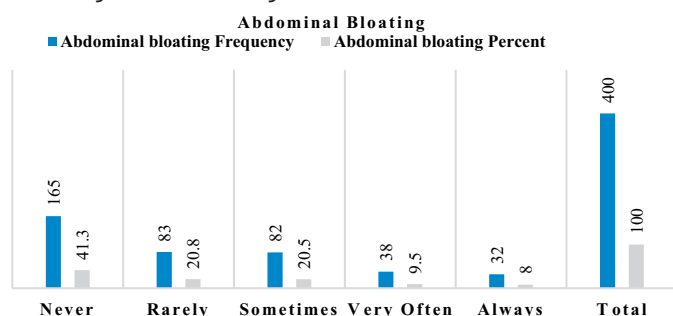


Figure 1: Abdominal Bloating Among Female

Irritability is a psychological symptom of premenstrual syndrome. On analyzing the data, it was indicated that 11.5% of women never experience irritability, 26.3% rarely and 41.8 % sometimes were irritable. 6.3% were those who often while 14.3 always experience irritable nature around their monthly cycle (Figure 2).

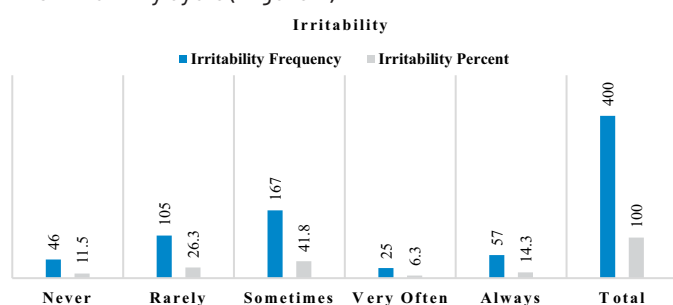


Figure 2: Irritability Among Female

Female might face difficulty before or between their menstrual cycles. To check this behavioural symptom among female, the data were interpreted, which showed that 19% never and 31.5% rarely faced difficulty in performing their tasks. 29.8% sometimes, whereas 11% often had impaired work performance. 8.8% was from those who always face such a problem (Figure 3).

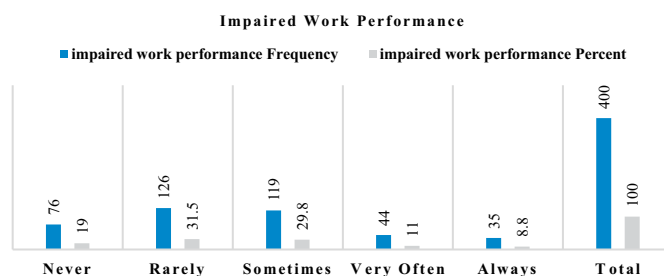


Figure 3: Impaired Work Performance Among Female

After gathering all the data, the final score for each sample was calculated, which showed that only 0.3% had no symptoms of PMS as they skipped a meal. 10% were those who experienced some mild symptoms, whereas 45.3% were those who moderately reported such symptoms. There were 40.8% female who experienced severe while 3.8% complained of very severe symptoms of PMS when they skipped a meal (Figure 4).

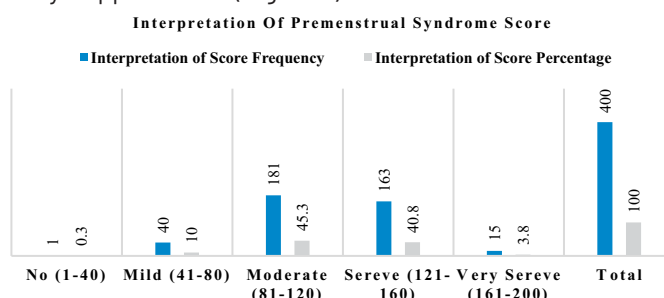


Figure 4: Interpretation of Premenstrual Syndrome Score Among Young Female

The study encompassed 400 participants, investigating the relationship between meal skipping and PMS symptoms among female. Results revealed varying degrees of symptom severity: 2.8% experienced mild symptoms, 6.8% moderate, 6.8% severe, and 1% very severe with occasional meal skipping; while those who sometimes skipped meals reported 0.3% no symptoms, 3.8% mild, 22.3% moderate, 17.3% severe, and 0.5% very severe symptoms. Frequent meal skippers reported 1.5% mild, 7.8% moderate, 12.3% severe, and 1.8% very severe symptoms. Overall, 10% reported mild symptoms, 45.3% moderate, 40.8% severe, and 3.8% very severe symptoms. A statistically significant association ($p=0.016$) was found between meal skipping and PMS symptoms, suggesting a potential impact of dietary habits on symptom severity (Table 1).

Table 1: Relationship Between Meal Skipping and PMS Symptoms Among Female

Meal Skipping Symptoms	No (1-40)	Mild (41-80)	Moderate (81-120)	Severe (121-160)	Very Severe (161-200)	Total	p-value
Frequency (%)							
Rarely	0 (0%)	8 (2%)	34 (8.5%)	18 (4.5%)	2 (0.5%)	12.62 (15.5%)	0.016
Occasionally	0 (0%)	11 (2.75%)	27 (6.75%)	27 (6.75%)	4 (1%)	69 (17.25%)	
Sometimes	1 (0.25%)	15 (3.75%)	89 (22.25%)	69 (17.25%)	2 (0.5%)	176 (44%)	
Frequently	0 (0%)	6 (1.5%)	31 (7.75%)	49 (12.25%)	7 (1.75%)	93 (23.25%)	
Total	1 (0.25%)	40 (10%)	181 (45.25%)	163 (40.75%)	15 (3.75%)	400 (100%)	

$\chi^2(df=1)=5.73, p=0.016$

Out of a total 400 sample size, 67% of the females were in the 18 to 21 age group, 32.25% were in the 22 to 26 age group, and 0.75% were in the 27 to 30 age group. Participants were asked to indicate their social status: 1.5% were from lower-class families, 79% were from middle-class families, and 19.5% were from upper-class families. Body mass index (BMI) was calculated using the formula: weight (kg)/height (m²). Among the participants, 31.25% were underweight, 46% were of normal weight, 8.75% were overweight, and 14% were obese. Female who were overweight or obese are at higher risk of developing chronic diseases, while those who are underweight are more likely to be malnourished (Table 2).

Table 2: Demographics Profile of study participants

Variables	Frequency (%)
Age in Years	
18 to 21	268 (67%)
22 to 26	129 (32.25%)
27 to 30	3 (0.75%)
Total	400 (100%)
Social Group	
Lower Class	6 (1.5%)
Middle Class	316 (79%)
Upper Class	78 (19.5%)
Total	400 (100%)

BMI in kg/m²	
Normal (18.5-22.9 kg/m ²)	125 (31.25%)
Underweight (<18.5kg/m ²)	184 (46%)
Overweight (23-24.9 kg/m ²)	35 (8.75%)
Obese(>25kg/m ²)	56 (14%)
Total	400 (100%)

The model fitness was assessed using the chi-square test. The chi square value was 254.718 and the p value was less than 0.05. This proves that there is significant association between the dependent and independent variable in the final model (Table 3).

Table 3: Model Fitting Test

Model	Model Fitting Criteria			Likelihood Ratio Tests		
	/AC	BIC	2 Log Likelihood	Chi- Square	Df	Sig.
Intercept Only Final	466.108	478.752	460.108	254.718	9	0.000
	229.390	279.965	205.390			

Among the participants who skipped meals daily, premenstrual syndrome symptoms had a significant impact on the health of the participants. As per the interpretation, mild symptoms ($b=-7.006$, $Wald=39.061$, $p<0.05$), moderate symptoms ($b=-9.234$, $Wald=34.451$, $p<0.05$), severe symptoms ($b=-8.567$, $Wald=56.892$, $p<0.05$) and very severe symptoms ($b=-7.174$, $Wald=45.579$, $p<0.05$). From all the data given below, this was concluded that there is a link between meal skipping and premenstrual syndrome. According to the results, female who frequently skip meals have severe to very severe symptoms of premenstrual syndrome, while female who occasionally skip their meal have mild to moderate symptoms of premenstrual score scale interpretation (Table 4).

Table 4: Logistic Regression Test

Premenstrual Syndrome Scale		B	Std. Error	Wald	Df	Sig.	Exp (B)	95% Confidence Interval for Exp (B)	
								Lower Bound	Upper Bound
Mild Symptoms	Intercept	-7.006	1.121	39.061	1	0.000	—	—	—
	Rarely	0.230	0.304	2.234	1	0.87	2.460	0.433	12.214
	Occasionally	1.150	0.609	3.567	1	0.059	3.160	0.957	10.428
	Sometimes	0.328	0.481	0.466	1	0.495	1.388	0.541	3.561
	Frequently	3.778	0.807	21.932	1	0.000	43.711	8.995	212.423
Moderate Symptoms	Intercept	-9.234	1.313	34.451	1	0.000	—	—	—
	Rarely	1.211	0.331	3.312	1	0.000	4.012	2.21	4.11
	Occasionally	1.522	0.340	5.432	1	0.001	4.024	1.110	11.222

	Sometimes	0.451	0.231	2.813	1	0.002	3.241	2.341	3.213
	Frequently	2.042	0.455	7.403	1	0.000	12.421	2.233	52.302
Severe Symptoms	Intercept	-8.567	1.136	56.892	1	0.000	—	—	—
	Rarely	2.422	0.361	5.532	1	0.000	3.024	3.12	8.22
	Occasionally	1.954	0.590	10.965	1	0.001	7.059	2.220	22.444
	Sometimes	0.993	0.451	4.836	1	0.028	2.698	1.114	6.536
	Frequently	3.084	0.799	14.906	1	0.333	21.853	4.566	104.602
Very Severe Symptoms	Intercept	-7.174	1.063	45.579	1	0.000	—	—	—
	Rarely	1.211	0.641	3.141	1	0.005	5.421	1.321	5.432
	Occasionally	1.311	0.571	5.271	1	0.022	3.711	1.211	11.366
	Sometimes	1.477	0.433	11.642	1	0.001	4.381	1.875	10.235
	Frequently	3.147	0.770	16.683	1	0.000	23.255	5.138	105.254

DISCUSSION

The main aim of this study was to find out the association between PMS and meal skipping among females of reproductive age. Due to a fast-paced lifestyle, meal skipping, especially major meals, has become a common habit nowadays, leading to poor nutrition and a lack of essential micronutrients like vitamins and minerals. This pattern results in various deficiencies as well as an increased risk of chronic diseases at a very young age. Meal skippers are often less productive, physically inactive and more susceptible to health issues compared to non-skippers [13]. According to the current research, the majority of female consume only two meals per day. The main reason for meal skipping was a lack of hunger, and they were not guilty about their actions, nor did they make any effort to compensate for the missed meals. This habit of meal skipping can lead to various problems, including physical and cognitive dysfunction. An Australian student study included performed supported this, showing that regular meal skipping is common due to factors like lack of time, decreased appetite, or other reasons [10]. Some individuals skipped meals because of consumed more calorie-dense snacks throughout the day to save time. In comparison to males, females need more nourishment to maintain proper body function. Good nutritional support, along with physical activity, a better lifestyle and mental peace, helps to regulate a proper menstrual cycle [14]. The study results indicated that female who neglect their eating habits are more likely to experience various nutritional deficiencies. A Nigerian cross-sectional study involving adolescent girls found that meal skipping can lead to micronutrient deficiencies such as calcium, zinc, iron and vitamin B6 [15]. The study findings also showed that some females frequently skipped meals, either without any reason or to lose weight. According to a study in Japan, women who often skip meals tend to be more deficient in calcium and iron, leading to anemia and other health problems [16]. It is observed that many undernourished females with low hemoglobin (Hb) levels suffer from gynecological disorders such as premenstrual syndrome, amenorrhea, dysmenorrhea, oligomenorrhea,

polymenorrhea, and menorrhagia [17]. Female who follow a healthy lifestyle, including good dietary habits and regular physical activity patterns, are less likely to experience such issues. Transition from adolescence to adulthood brings about prominent changes in an individual's physical appearance, behaviour and social life. During this period, individuals may engage in certain behaviours due to peer pressure. Some might eat unhealthily or skip meals in an attempt to enhance their body image. According to the current study, female who frequently skip meals are more likely to experience psychological issues such as aggression, anxiety, depression, confusion and other related symptoms. This was supported by a cross-sectional study conducted in China that included teenagers [18]. The study concluded that this habit of meal skipping can affect female in several ways. For instance, their menstrual cycles may become irregular or more painful, and they may experience severe symptoms before or during menstruation due to poor eating. Additionally, these individuals tend to choose meals which are more calorie-dense than nutrient-dense ones [19]. Female who skip meals regularly suffer from more depressive symptoms compared to non-skippers, and their cognitive abilities are adversely affected [20]. There are many reasons why female suffer from PMS. These symptoms are a mixture of emotional and physical distress that can be intense enough to interfere with daily life activities. The study findings indicated that most meal skippers experience symptoms before having their periods. Some authors have noted in previous studies that these PMS symptoms may be due to inadequate lifestyle patterns, such as low physical activity levels or the consumption of calorie-dense food [21] rather than nutrient-dense [22]. Physiological symptoms of PMS may include abdominal cramps, bloating, generalized aches, cravings, acne, fatigue, and more. The current study concluded that females who frequently skip their meals are more likely to suffer from malnutrition, which can lead to disruptions in their menstrual cycle, as evidenced by a previous case-control study [23]. Most of the female reported

experiencing these physiological issues before their menstruation. As for psychological issues like anxiety and depression, female often complain of experiencing such symptoms in their bodies. Behavioural issues include social withdrawal, lack of interest, clumsiness, poor judgment and others. Women report a strong association with these signs [24, 25]. As highlighted by Al-Shahrani et al., PMS symptoms can have a significant impact on daily life and well-being [26]. Our study's findings suggest that meal skipping may exacerbate these symptoms, which is consistent with Halime and Kaplan, recommendation for lifestyle modification, including dietary changes as a treatment approach for PMS [27]. The findings from the entire questionnaire suggested that the majority of the females with inappropriate eating patterns and a sedentary lifestyle experience moderate to severe symptoms that significantly disrupt their daily life activities. Based on the study, it was concluded that there is a significant positive association between meal skipping and premenstrual syndrome among young female.

CONCLUSIONS

It was concluded that young adults, especially female who skip meals regularly, have a more prominent association with premenstrual syndrome. After calculating the results, the p-value was 0.016, which is a significant level that indicates a positive association between PMS and meal skipping.

Authors Contribution

Conceptualization: RM

Methodology: RM, IA

Formal analysis: MI

Writing review and editing: RM, IA, MI

All authors have read and agreed to the published version of the manuscript

Conflicts of Interest

All the authors declare no conflict of interest.

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