

Association Between Junk Food Consumption Patterns and The Severity of Premenstrual Syndrome

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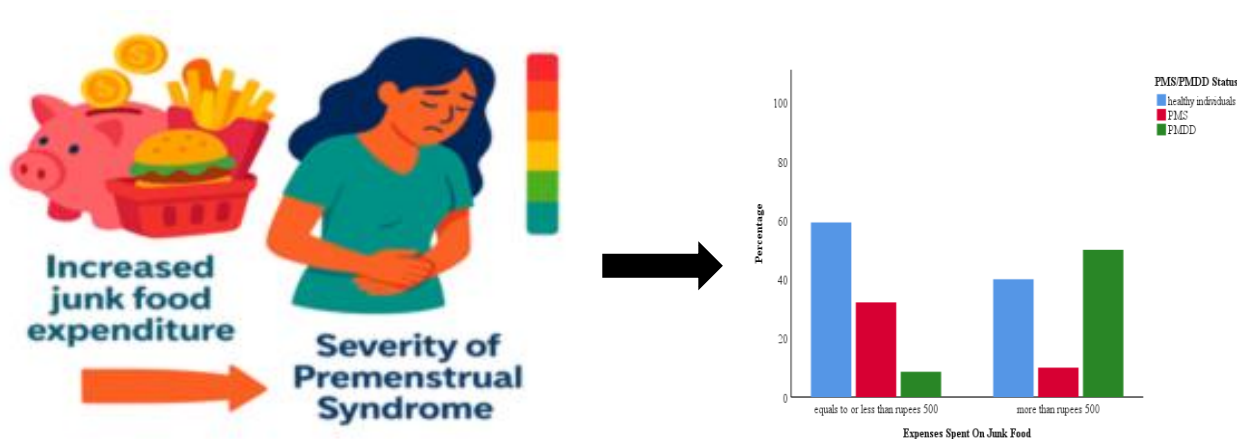
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Premenstrual syndrome (PMS) and premenstrual dysphoric disorder (PMDD) affect mainly women of reproductive age (15-49 years), characterized by a set of physical and psychological symptoms. The present study aims to determine the interrelationship between the consumption patterns and expenditure on junk food and the severity of PMS among 150 female university students in West Bengal, India. The Premenstrual Symptoms Screening Tool (PSST) was used to evaluate PMS severity, and the participants were categorized into 87 healthy, 46 PMS, and 17 PMDD. Data were collected through a structured questionnaire encompassing food frequency, types of food consumed, timing of junk food intake, and monthly expenditure on junk food. All the statistical analyses were performed in SPSS version 25 using chi-square tests, with a significance level of $p \leq 0.05$. No statistical significance was found between the frequency of junk food consumption and the severity of PMS/PMDD. Conversely, monthly expenditure on junk food exhibited a substantial relation with PMS severity ($p=0.000$). 50% of individuals with PMDD indicated spending more than ₹500 monthly on junk foods, compared to just 8.6% among individuals with lower spending. Henceforth, from the present study, we can conclude that instead of consumption frequency, expenditure on junk food may serve as a potential behavioural indicator of increased risk for PMS and PMDD.

Graphical Abstract:



1. Introduction

Premenstrual Syndrome (PMS) is an umbrella term encompassing several physiological and psychological disorders affecting women of reproductive age (15-49 years), occurring 2-3 days before menstruation over 3-4 consecutive months. Epidemiological studies suggest that 80% of women with PMS experience various symptoms, 20–40% suffer from functional impairment, and 2.5–5% endure severe dysfunction [1]. Worldwide, the prevalence rate of PMS is 47.8%, and 20% of them suffer severely [2]. The most common symptoms of PMS include loss of appetite, weight gain, abdominal pain, low back pain, headache, swelling and tenderness of the breasts, nausea, constipation, anxiety, irritability, anger, fatigue, restlessness, mood swings, and crying. According to the Diagnostic and Statistical Manual-V (DSM-V) scale, the severe form of PMS is Premenstrual Dysphoric Disorder (PMDD), and it is more of a psychiatric disorder rather than a physical one [3]. However, the exact aetiology of PMS is still elusive.

Extensive literature review suggests that nutrition plays a significant role in women's reproductive health [4]. Numerous studies have revealed that young adults are more inclined to street foods, junk foods, and deep-fried foods, which are high in carbohydrates, fats, and salt. Higher intake of these foods is linked to increased menstrual distress. A higher risk of PMS is reported in individuals who regularly consume foods rich in simple carbohydrates and fats. A consistent positive correlation exists between the severity of PMS and the consumption of calorie-rich foods, sweets, and fatty and salty snacks [5, 6]. Not only carbohydrates, fats, and salt, but also increased levels of protein intake are interrelated with the severity of PMS. Several reports opine that increased protein intake is entwined with an elevated oestrogen/oestradiol level [7].

To date, no treatment has been universally considered effective against PMS. However, in some cases, women seeking relief from the symptoms of PMS turn to therapeutic approaches outside conventional medicines [8, 9]. Diet therapy is one of them, which can alleviate the symptoms of PMS. An extensive literature survey indicates that traditional and healthy dietary patterns (rich in eggs, fruits, red meat, dried fruits, spices, and nuts) are more beneficial than Western dietary patterns, which are high in fast foods, carbonated drinks, and processed meats.

Henceforth, this empirical study seeks to explore the relationship between junk food consumption patterns, associated expenditure, and the severity of PMS, while proposing alternative approaches to support a healthier and more productive lifestyle.

2. Methods

2.1 Participants & procedure

The present study was a cross-sectional one conducted in online and offline mediums. Data was collected between March 2023 and October 2023. The measurement techniques and questionnaires used were standardized. For the present study, 18-25-year-old female college/university students were selected from several parts of West Bengal. The inclusion criteria were 18-25-year-old young adult women with a history of menstrual cycle-related problems who were willing to participate in this survey. On the other hand, those who were unwilling to participate and had a history of genetic disorders were eliminated from the study. A total of 150 female students participated in this survey. All the responses to the questionnaire were collected in Google Forms. The present study was approved (HMC/IEC/DEPT/2024/4) by the human ethical committee of the Postgraduate Department of Hooghly Mohsin College, Chinsurah, University of Burdwan, West Bengal, India.

2.2 Data collection procedure

Data were collected through a Google Forms questionnaire comprising items focused on dietary habits, particularly junk food consumption and related expenses. The Premenstrual Symptoms Screening Tool (PSST) was employed to classify participants into Healthy, PMS, and PMDD categories. A detailed overview of the standardized questionnaire utilized in this study is provided in the subsequent sections.

2.3 Consumption & Expenditure on Junk Food

A validated and standardized questionnaire containing various dimensions of junk food consumption including frequency of intake of: residential food, outside food, fast food, sugary snacks, soda drinks, chips, processed food, deep-fried food, sugar cereal, junk food, preferred lunch types, timing of consumption, favourite junk food and monthly expenses spent on junk food were assessed to evaluate consumption patterns among college and university students.

2.4 Premenstrual Symptoms Screening Tool (PSST)

The PSST tool was used to identify women suffering from premenstrual syndrome (PMS) or premenstrual dysphoric Disorder (PMDD). The questionnaire had 19 questions that assessed the severity of the symptoms in PMS/PMDD individuals. The scale was developed by M. Steiner in 2003, which is easy to implement and less time-consuming [10].

3. Result

In the present study, among 150 female college and/or university students aged between 18-25 years, 87 had no symptoms of Premenstrual Syndrome (PMS), 46 were suffering from PMS, and 17 had symptoms of Premenstrual Dysphoric Disorder (PMDD). A chi-square

Table 1: Correlation between the frequency of intake of junk foods and the expenses spent on junk foods

Variable	Category	Total no. of Subjects (n=150)	Healthy Individuals (n=87)	PMS (n=46)	PMDD (n=17)	P-value (significance level: $p \leq 0.05$)
Frequency of intake of residential foods	Regular	105	60 (57.1%)	32 (30.5%)	13 (12.4%)	0.824
	Weekly	45	27 (60%)	14 (31.1%)	4 (8.9%)	
	monthly	-	-	-	-	
Frequency of intake of outside foods	Regular	31	17 (54.8%)	8 (25.8%)	6 (19.4%)	0.407
	Weekly	76	43 (56.6%)	27 (35.5%)	6 (7.9%)	
	Monthly	43	27 (62.8%)	11 (25.6%)	5 (11.6%)	
Frequency of intake of fast foods	Regular	25	15 (60%)	5 (20%)	5 (20%)	0.131
	Weekly	78	40 (51.3%)	28 (35.9%)	10 (12.8%)	
	Monthly	47	32 (68.1%)	13 (27.7%)	2 (4.3%)	
Frequency of intake of sugary snacks	Regular	37	18 (48.6%)	15 (40.5%)	4 (10.8%)	0.396
	Weekly	85	52 (61.2%)	25 (29.4%)	8 (9.4%)	
	Monthly	25	17 (60.7%)	6 (21.4%)	5 (17.9%)	
Frequency of intake of soda drinks	Regular	15	8 (53.3%)	3 (20%)	4 (26.7%)	0.375
	Weekly	67	39 (58.2%)	22 (32.8%)	6 (9%)	
	Monthly	68	40 (58.8%)	21 (30.9%)	7 (10.3%)	
Frequency of intake of chips	Regular	30	14 (46.7%)	10 (33.3%)	6 (20%)	0.311
	Weekly	75	46 (61.3%)	24 (32%)	5 (6.7%)	
	Monthly	45	27 (60%)	12 (26.7%)	6 (13.3%)	
Frequency of intake of processed foods	Regular	24	12 (50%)	7 (29.2%)	5 (20.8%)	0.581
	Weekly	67	39 (58.2%)	22 (32.8%)	6 (9%)	
	Monthly	59	36 (61%)	17 (28.8%)	6 (10.2%)	
Frequency of intake of deep-fried foods	Regular	21	10 (47.6%)	7 (33.3%)	4 (19%)	0.664
	Weekly	66	38 (57.6%)	20 (30.3%)	8 (12.1%)	
	Monthly	63	39 (61.9%)	19 (30.2%)	5 (7.9%)	
Frequency of intake of sugar cereal	Regular	16	9 (56.3%)	4 (25%)	3 (18.8%)	0.396
	Weekly	54	27 (50%)	19 (35.2%)	8 (14.8%)	
	Monthly	80	51 (63.7%)	23 (28.7%)	6 (7.5%)	
Frequency of intake of junk foods	Regular	18	11 (61.1%)	4 (22.2%)	3 (16.7%)	0.900
	Weekly	88	51 (58%)	28 (31.8%)	9 (10.2%)	
	Monthly	44	25 (56.8%)	14 (31.8%)	5 (11.4%)	
Types of lunch taken	Home cooked	78	45 (57.7%)	22 (28.2%)	11 (14.1%)	0.435
	College canteen	23	15 (65.2%)	8 (34.8%)	0	
	Outside (restaurants)	49	27 (55.1%)	16 (32.7%)	6 (12.2%)	
Time of junk food intake	Breakfast	6	3 (50%)	1 (16.7%)	2 (33.3%)	0.573
	Lunch	20	10 (50%)	7 (35%)	3 (15%)	
	Snacks	112	68 (60.7%)	34 (30.4%)	10 (8.9%)	
	Dinner	12	6 (50%)	4 (33.3%)	2 (16.7%)	
Favourite junk foods	Fast foods	46	24 (52.2%)	20 (43.5%)	2 (4.3%)	0.238
	Sugary snacks	11	9 (81.8%)	1 (9.1%)	1 (9.1%)	
	Soda drinks	26	16 (61.5%)	8 (30.8%)	2 (7.7%)	
	Chips	39	21 (53.8%)	11 (28.2%)	7 (17.9%)	
	Processed foods	18	13 (72.2%)	3 (16.7%)	2 (11.1%)	
	Deep-fried foods	7	3 (42.9%)	2 (28.6%)	2 (28.6%)	
	Sugar cereals	3	1 (33.3%)	1 (33.3%)	1 (33.3%)	
Expenses spent on junk food (monthly)	Less than or equal to Rs.500/-	140	83 (59.3%)	45 (32.1%)	12 (8.6%)	0.000*
	More than Rs.500/-	10	4 (40%)	1 (10%)	5 (50%)	

analysis was performed to evaluate the association between the consumption pattern and the expenditure on junk food with the severity of PMS, considering the significance level at $p \leq 0.05$. Table 1 indicates the correlation between the frequency of intake of junk food and the expenses spent on junk food. Chi-square analysis revealed an association only between the monthly expenditure on junk food and the severity of premenstrual syndrome disorder.

Among several junk food categories, namely fast food, sugary snacks, soda drinks, chips, processed foods, deep-fried foods, and sugary cereals, revealed no significant relationship with the severity of PMS/PMDD. Even the types, time, and preferred junk foods didn't show any association. In contrast, a significant connotation was observed between junk food expenditure and the severity of PMS. Table 1 indicates that individuals spending more than ₹500 per month on junk food are at a higher risk of developing PMS, with 50% of this group experiencing PMDD, in contrast to only 8.6% in the lower expenditure (less than or equal to ₹500/-) group (Figure 1).

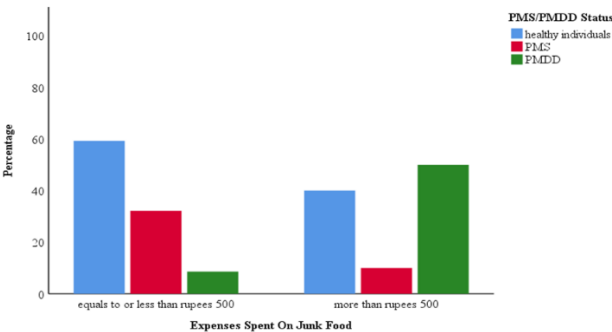


Figure 1 Monthly expenses spent on junk food, between the two groups

4. Discussion

The present study revealed that expenditure on junk food may serve as a potential predictor of PMS/PMDD severity. Despite representing just 11% of the total cohort, individuals with the highest expenditure on junk food accounted for 50% of PMDD cases, underscoring a pronounced link between greater financial outlay on junk food and the severity of premenstrual disturbances.

Emerging evidence suggests that Western dietary patterns are positively associated with the acuity of PMS, whereas healthy and traditional food habits are inversely proportional to PMS [11]. Cravings for food items such as chips, junk foods, and sugary snacks in the luteal phase of the menstrual cycle are quite common in women [12, 13]. Again, serotonin levels are reported to decline in individuals with PMS, and the excessive consumption of sugars, chocolates, and sweets helps to recover from the symptoms [14].

Food items rich in sugar content are reported to enhance mood and mitigate the effects of stress through brain opioidergic and dopaminergic neurotransmission [15]. Since frequent and repeated consumption of simple carbohydrates and sweets improves the mood when feeling low, anxious, or irritated, junk food was a strong predictor of the severity of PMS in the present study.

Research indicates that serotonin levels decline during the premenstrual phase, and that increased sugar consumption may temporarily mitigate symptom severity. In other words, sugar cravings might be a physiological reaction to serotonin deficit. Though excess intake of simple carbohydrates and junk foods gives temporary relief, in the long term, it is harmful to the body [15]. Apart from neurotransmitters, hormones are also related to disordered eating in PMS. Cross-sectional studies opine that alterations in the oestrogen and progesterone levels are linked to emotional eating throughout the PMS disorder [16].

In summary, we can conclude that a balanced diet with a proper amount of carbohydrates and adequate amounts of unsaturated fats and proteins enhances serotonin production along with tryptophan. This, in turn, restores brain serotonin levels and works as a self-medication therapy in PMS individuals. Moreover, intermittent fasting decreases cortisol levels in young women, mirroring an anti-stress effect during the luteal phase [17-18].

Conclusion

The conclusion of this empirical study indicated that while general eating patterns remain relatively consistent among individuals, higher spending on junk food is specifically linked to PMS and PMDD. Targeted strategies to curb junk food expenditure may prove beneficial in alleviating the intensity of premenstrual symptoms.

Conflict of Interest

The author(s) declared no conflict of interest.

Ethical Compliance Standard

The present study was approved (HMC/IEC/DEPT/2024/4) by the human ethical committee of the Postgraduate Department of Hooghly Mohsin College, Chinsurah, University of Burdwan, West Bengal, India.

Credit author statement

DS, PC, AKS: Conceptualization; DS, PC Methodology; DS, PC: Software; DS, AKS: Validation; AKS: Formal analysis; DS, PC, AKS: Investigation; DS, PC: Resources; DS, PC: Data Curation; DS, PC: Writing -

Original Draft; DS, AKS: Writing - Review & Editing; AKS: Visualization; DS, AKS: Supervision; AKS: Project administration

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