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THE PREVALENCE OF PREMENSTRUAL SYNDROME AMONG COLLEGE STUDENTS AGED 18 TO 30 IN JAMNAGAR WITH LIFESTYLE FACTORS: A CROSS-SECTIONAL STUDY

[1]*Reshma M., [2]Swati N. Khandale, [3]A. S. Baghel and [4]Shilpa B. Donga

[1]Ph.D. Scholar, Dept. of Kriya Sharira, ITRA, Jamnagar, Gujarat, India.

[2]Assistant Professor, Dept. of Kriya Sharira, ITRA, Jamnagar, Gujarat, India.

[3]H.O.D(I/C), Dept. of Kriya Sharira, ITRA, Jamnagar, Gujarat, India.

[4]H.O.D, Dept. of Prasuthi Tantra & Stree Roga, ITRA, Jamnagar, Gujarat, India.

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***Corresponding Author**
Dr. Reshma M.
Ph.D. Scholar, Dept. of Kriya Sharira, ITRA, Jamnagar, Gujarat, India.

ABSTRACT

Background: Premenstrual Syndrome (PMS) is a common condition affecting women, characterised by physical, psychological, and behavioural symptoms. This study aims to assess the prevalence of PMS among college students in Jamnagar and explore how lifestyle factors influence its severity. **Methods:** A cross-sectional study was conducted with 236 college women aged 18-30 years. Data were collected using structured questionnaires that assessed PMS symptoms across psychological, somatic, and behavioural domains. Information on lifestyle factors, including diet, physical activity, sleep patterns, and body weight, was also recorded. Statistical analyses determined the association between lifestyle factors and PMS severity. **Results:** Of the participants, 73.31% reported PMS, with 56.65% experiencing mild symptoms, 31.21% moderate, and 10.99% severe symptoms. Common symptoms included fatigue (47.39%), breast tenderness (47.39%), and mood swings (64.16%). Lifestyle factors significantly influence PMS severity. A vegetarian diet was associated with lower PMS severity (OR = 0.495, $p = 0.02$), while high fast-food consumption increased severity (OR = 2.67, $p < 0.05$). Regular physical activity reduced PMS severity (OR = 0.29, $p = 0.033$), while disturbed sleep and overweight increased severity (OR = 2.51, $p = 0.04$; OR = 2.14, $p < 0.05$, respectively). **Discussion:** The study highlights the high prevalence of PMS among college women, with lifestyle factors such as diet, physical activity, and sleep playing a significant role in symptom severity. Vegetarian

diets, physical activity, and good sleep hygiene were associated with reduced severity, while poor dietary habits and disturbed sleep patterns exacerbated symptoms. **Conclusion:** This study underscores the importance of lifestyle interventions, including diet modification, physical activity, and sleep hygiene, to manage PMS symptoms. Future health programs should focus on these factors to improve the quality of life for women with PMS. Further research is needed to explore long-term effects and underlying mechanisms.

INTRODUCTION

Premenstrual Syndrome (PMS) is a common condition that affects many menstruating individuals. It encompasses a range of physical, emotional, and behavioural symptoms that typically occur in the luteal phase of the menstrual cycle (the time between ovulation and menstruation) and usually resolve with the onset of menstruation.[1]

The exact cause of PMS is not fully understood. Still, several factors may contribute as hormonal Fluctuations, neurotransmitter variations, and lifestyle factors like stress, lack of exercise, poor diet, and insufficient sleep, which can exacerbate symptoms. A family history of PMS or related conditions may increase the likelihood of experiencing PMS.[2,3]

Global Estimates that between 50% to 80% of individuals who menstruate experience some form of PMS. About 3% to 8% of individuals may suffer from Premenstrual Dysphoric Disorder (PMDD)[4], a more severe form of PMS. In Demographic Variations, PMS is most commonly reported among individuals in their 20s and 30s.[5] Symptoms may change or diminish with age, particularly after the age of 40 or during perimenopause. The prevalence of PMS can be influenced by factors such as stress levels, physical activity, diet, and overall health. Those with high stress levels or poor diet may experience more severe symptoms.[6] Cultural attitudes toward menstruation and symptom reporting can influence the perceived prevalence. In some cultures, there may be less discussion about PMS, affecting reporting rates.[7] Prevalence rates might vary based on geographical regions due to differences in healthcare access, awareness, and cultural norms. Historical data suggest that PMS has been recognised for decades, but awareness and diagnostic criteria have evolved. Improved understanding and medical terminology have increased recognition and reporting in recent years.

In India, where this study is based, the prevalence and impact of PMS among young women in urban settings like Jamnagar are not well-documented, despite the growing awareness of

the condition. College students, in particular, represent a vulnerable group, often balancing academic pressures, social life, and personal well-being, which can exacerbate PMS symptoms.[8] This study aims to assess the prevalence of PMS among college women aged 18 to 30 years in Jamnagar and to explore the relationship between lifestyle factors such as physical activity, diet, sleep, and stress and the severity of PMS symptoms.

Understanding the role of lifestyle in the manifestation of PMS could offer valuable insights for developing effective prevention and management strategies. These strategies could involve lifestyle interventions, such as increased physical activity, improved dietary habits, stress management techniques, and sleep hygiene, to help alleviate the burden of PMS on young women. Additionally, traditional practices such as Ayurveda, which emphasize a holistic approach to health, may also provide alternative or complementary solutions. By exploring these lifestyle connections, this study aims to contribute to a better understanding of PMS and its impact on college students, as well as potential interventions for improving their quality of life.

There is a growing awareness and acknowledgment of menstrual health issues in India, partly due to increased advocacy and educational initiatives.[9] This may lead to more accurate reporting and a better understanding of PMS.

AIM

The primary aim of this study was to determine the prevalence rate of premenstrual syndrome (PMS) and identify the symptoms associated with PMS in young college-going students aged 18-30 in Jamnagar**,** focusing on understanding the influence of lifestyle factors**.**

METHODS AND MATERIALS

This cross-sectional study was conducted with 236 female students aged 18 to 30 from Gujarat Ayurveda University in Jamnagar. Participants were selected based on specific inclusion criteria, which included female students with normal menstrual cycles who were mentally fit. Exclusion criteria included pregnant and lactating women, individuals with serious medical conditions, and those undergoing hormonal or psychiatric treatments. Participants were also excluded if they had used any pharmacological therapy, hormone therapy, or substance use (drugs or alcohol) during the study period.

To assess the presence of Premenstrual Syndrome (PMS), the study followed the American College of Obstetricians and Gynecologists (ACOG) criteria for PMS diagnosis.[10] These criteria require the presence of at least one affective symptom (such as depression, anger, irritability, anxiety, confusion, or social withdrawal) and one somatic symptom (such as breast tenderness, abdominal bloating, headache, or swelling of extremities) during the five days before menstruation. These symptoms must appear in three consecutive menstrual cycles, be relieved within four days after the onset of menses, and not recur until at least cycle day 13. Additionally, these symptoms must cause identifiable dysfunction in social or economic performance and occur reproducibly over two menstrual cycles.

PMS was assessed using the Premenstrual Syndrome Scale[11] (PMSS), a 5-point Likert-type scale consisting of 40 items that assess both psychological and somatic aspects of PMS. In addition to the PMS symptom assessment, the study also incorporated lifestyle factors into the questionnaire to explore their potential impact on the severity of PMS symptoms. The lifestyle factors like physical activity, dietary habits, sleep patterns and Addictions were included.

Data were compiled using Microsoft Excel and analysed using SPSS version 20. Descriptive statistics were used to report the prevalence and severity of PMS symptoms, while bivariate analysis was conducted to explore the relationship between lifestyle factors (physical activity, diet, sleep, and addiction and the severity of PMS symptoms. This analysis helped identify potential lifestyle factors that might influence the manifestation of PMS among college students.

Ethical clearance was obtained from the institutional ethical committee of institute of Teaching and Research in Ayurveda, Jamnagar with reference number PGT/7/-A/Ethics/2023-24/760 dated 03/07/2023.

RESULTS AND OBSERVATIONS

The study included 236 participants. The majority of female participants were 18-24 years old (66.5%) and unmarried (56.5%). The demographic data of the participants are presented in Table 01.

Table 01: Demographic data of Participants.

S.I No.	Demographic data	Percentage
1.	Age group	18-24 years – 66.52% 25-30 years – 33.47%
2.	Marriage	Unmarried - 56.5% Married – 43.5%
3.	Economic status	Poor – 10.5% Middle - 89.5%
4.	Religion	Hindu – 75.42% Muslim – 24.5% Others – 2.03%
5.	Habitat	Rural – 56% Urban – 44%

The study provides valuable insights into menstrual health among participants. A significant 73.31% experienced some level of premenstrual syndrome (PMS), while 26.69% reported no symptoms at all. Among those affected, the severity of symptoms varied: 56.65% experienced mild symptoms, 31.21% had moderate symptoms, and 10.99% suffered from severe symptoms.

The mean age of menarche was 13 years (± 0.7). Participants reported that 17.79% attained menarche between 9 and 11, 65.25% between 12 and 14, and 16.95% between 15 and 17. In terms of menstrual cycle regularity, 77.97% had regular cycles, while 22.04% experienced irregularity. A significant portion (50.42%) reported a menstrual interval of 21 to 30 days. Among the 236 participants, 71.19% experienced bleeding for 3 to 5 days, and 79.66% reported moderate bleeding. Additionally, 57.2% experienced clotting alongside their bleeding.

Dysmenorrhea was notably prevalent, with 71.18% of participants affected, and 41.53% reported moderate dysmenorrhea, rated as grade 4 on the Visual Analog Scale (VAS). Overall, this study highlights the high prevalence of PMS and dysmenorrhea, as well as the variations in menstrual patterns among participants, emphasizing the importance of understanding menstrual health in this population. A descriptive analysis of Menstrual patterns and prevalence of PMS is presented in Table 02. Figure 02 represented the severity of the PMS Symptoms by PMS Scale.

Table 02: Distribution of pattern of menstrual cycle.

S.I. No.	The pattern of Menstrual cycle	
1.	Menarche	17.79% (9-11yrs) 65.25% (12-14yrs) 16.94%(15-17yrs)
2.	Frequency	Regular (77.97%) Irregular (22.03%)
3.	Interval	12.29%(15—20days); 50.42%(21-30yrs); 29.24%(31-35yrs); 8.05% (>35yrs)
4.	Duration	≤2 days – 7.20% 3-5days – 71.19% 5-7days – 18.22% >7days – 3.39%
5.	Amount	Spotting- 2.9% Scanty –12.28 % Moderate- 79.66% Severe- 4.67%
6.	Clot	Present- 57.2% Absent –42.79%
7.	Dysmenorrhoea	Present- 71.18% Absent-28.82%
8.	Severity of dysmenorrhoea	Mild – 26.78% Moderate- 58.33% Severe- 14.88%
9.	Premenstrual syndrome	Present – 73.31% Absent- 26.69%
10.	Severity of PMS	Mild-56.65% Moderate- 31.21% Severe- 10.99%

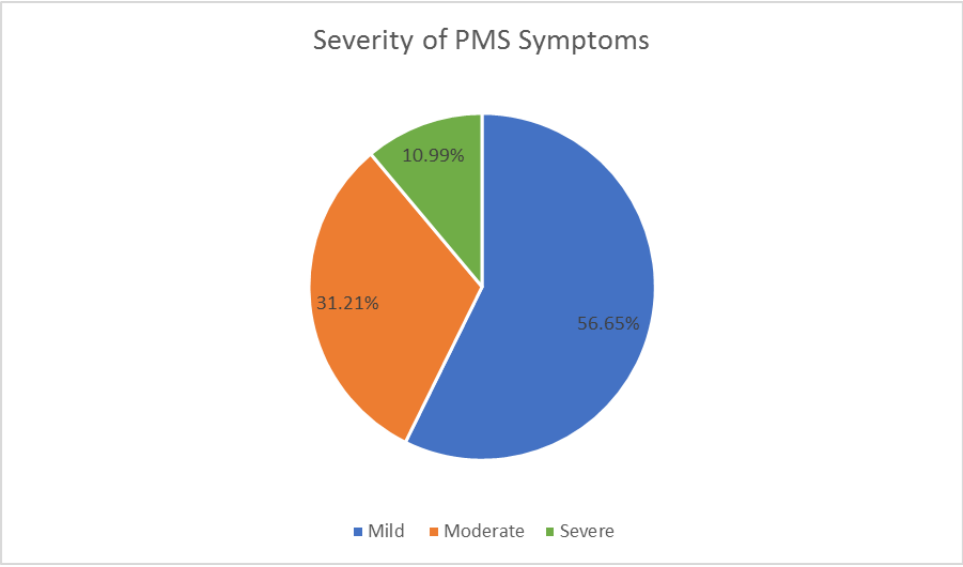

Figure 01: Graphic Distribution of Severity of PMS Symptoms.

The percentage of different symptoms in Premenstrual Syndrome in this study was presented in Table 03 & Figure 01.

A significant number of girls reported physical symptoms as part of their PMS, as follows: 38.73% reported headaches, 47.39% reported fatigue, 19.65% reported weight gain due to fluid retention, 36.42% reported abdominal bloating, 47.39% reported breast tenderness, 33.53% reported constipation, 49.71% reported skin changes, and 42.77% reported generalized aches and pains. Additionally, 27.74% reported nausea and vomiting.

Among the participants experiencing PMS, the psychological symptoms identified in this study were as follows: 64.16% reported mood swings, 42.77% reported a loss of concentration, 45.66% reported feelings of depression, 51.45% reported episodes of easy crying, 32.37% reported irrational thoughts, 24.28% reported a lack of self-control, 27.75% described themselves as overly sensitive, and 18.49% experienced restlessness.

Table 03: Distribution of symptoms of premenstrual syndrome.

S.I. No.	Symptoms of Premenstrual syndrome	Present (%)
1.	Headache	38.73
2.	Breast tenderness	47.39
3.	Abdominal bloating	36.42
4.	Constipation	33.53
5.	Generalized ache	42.77
6.	Skin changes and pimples	49.71
7.	Nausea and vomiting	27.74
8.	Fatigue	34.10
9.	Weight gain	19.65
10.	Anxiety	38.73
11.	Mood swing	64.16
12.	Depression	45.66
13.	Loss of concentration	42.77
14.	Easy crying	51.45
15.	Irritational thoughts	32.37
16.	Lack of self-control	24.28
17.	Being over-sensitive	27.75
18.	Restlessness	18.49

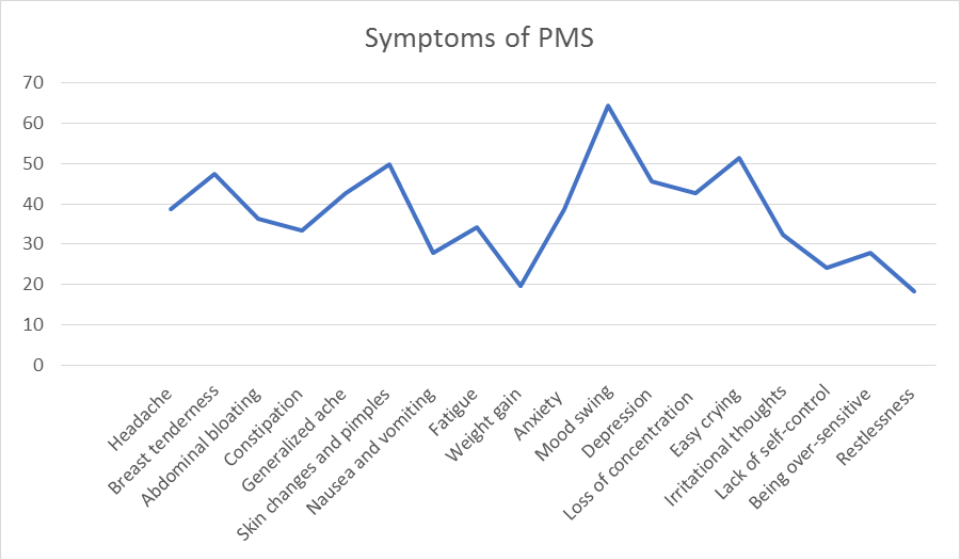

Figure 02: Graphic distribution of different PMS symptoms.

The study examined the relationship between lifestyle factors and the presence and severity of PMS. The data revealed significant correlations between certain lifestyle factors and the severity of PMS symptoms:

Diet: The majority of participants followed a vegetarian diet (87.5%), with only 12.5% reporting a mixed diet. Participants with a vegetarian diet reported significantly lower PMS severity (67.45%) than those on a mixed diet (33.63%). Additionally, a high intake of fast food (46.18%) and spicy food (29.24%) was associated with a higher prevalence and severity of PMS symptoms. A significant association between a vegetarian diet and the likelihood of experiencing PMS was found. Individuals following a vegetarian diet had lower odds of developing PMS (OR = 0.495, $p = 0.02$) than those following a mixed or non-vegetarian diet. In contrast, consumption of fast food was associated with a higher likelihood of PMS. Participants who frequently consumed fast food had significantly higher odds of experiencing PMS (OR = 2.67, $p < 0.05$).

Physical activity: Participants who exercised regularly (34%) had a significantly lower prevalence and severity of PMS symptoms compared to those who were irregularly active (96%). Regular physical activity appeared to reduce the intensity of both psychological and physical symptoms, while irregular or sedentary lifestyles were associated with higher PMS symptom severity. Regular physical activity was associated with a decreased likelihood of PMS. Those engaging in regular physical activity had significantly lower odds of PMS (OR = 0.29, $p = 0.033$) compared to those with irregular physical activity patterns.

Weight: Normal BMI (41.5%) was linked with a lower prevalence of severe PMS, while overweight participants (34.75%) reported more severe PMS symptoms. Underweight participants (23.7%) also showed a moderate prevalence of PMS, although the impact was less pronounced than in overweight individuals. Participants with a normal BMI were more likely to experience PMS compared to those who were underweight, with an odds ratio of 1.67 ($p < 0.05$). Conversely, individuals with an overweight BMI had significantly higher odds of developing PMS compared to those with a normal BMI (OR = 2.14, $p < 0.05$).

Sleep: Participants with disturbed sleep patterns (38.56%) reported significantly more severe PMS symptoms compared to those with normal sleep patterns (61.44%). Poor sleep quality was particularly associated with more pronounced psychological symptoms, such as mood swings, irritability, and anxiety. A disturbed sleep pattern was strongly associated with PMS. Participants reporting disturbed sleep had significantly higher odds of experiencing PMS (OR = 2.51, $p = 0.04$) compared to those with a normal sleep pattern.

Table 04: Distribution of PMS with lifestyle factors.

S.I. No	Lifestyle factor		n (%)	Premenstrual Syndrome		p-value[1]
				Absent	Present	
1.	Diet	Vegetarian	159 (67.45%)	47	112	0.02
		Mixed	77 (33.63%)	16	61	
		Regular	89 (37.7%)	32	57	
		Irregular	147 (65.33%)	21	116	
		Fast food	109 (46.18%)	35	74	
		Bakery items	88 (24.58%)	38	50	
		Spicy food	69 (29.24%)	23	46	
2.	Physical activity	Regular	44	25	29	0.033
		Irregular	192	38	154	
3.	Weight (BMI)	Normal	98	29	69	0.048
		underweight	56	23	33	
		Overweight	82	11	56	
4.	Sleep pattern	Normal	145 (61.44%)	48	97	0.04
		Disturbed	91 (38.56%)	15	76	
5.	Addiction	Tea/ coffee (>4glass)	67 (	32	35	0.0784

[1] Chi-square

DISCUSSION

Menstruation is a fundamental aspect of reproductive health, yet it remains shrouded in stigma and misunderstanding. The implications of this are particularly evident in the context

of Premenstrual Syndrome (PMS), a condition that significantly affects many who menstruate. This study highlights the striking prevalence of PMS among college students in Jamnagar, with 73.31% reporting symptoms. This finding underscores the urgent need for increased awareness and education surrounding menstrual health.

PMS encompasses a range of symptoms that can vary significantly in severity from mild to severe. This variability makes it challenging to standardize prevalence estimates. However, PMS is widely recognized as a common condition affecting a substantial portion of the population who menstruate. The prevalence of PMS can differ based on numerous factors, including hormonal fluctuations, lifestyle, and stress levels.[12] Given its widespread impact, PMS warrants attention and appropriate management.

The variability in PMS symptoms from mood swings and fatigue to physical discomfort reflects the diverse experiences of those affected. In our cohort, mood swings emerged as the most frequently reported symptom, affecting 64.16% of participants, while physical symptoms like abdominal bloating and skin changes also featured prominently. This pattern is consistent with findings from other studies, suggesting that psychological symptoms often have a greater impact on daily life than physical ones. By emphasizing the psychological dimensions of PMS, we can better understand the holistic nature of this condition and its effects on mental well-being.

Furthermore, the demographic characteristics of our participants reveal important insights. With 66.52% aged 18-24 years and a significant portion identifying as unmarried and vegetarian, we see how lifestyle choices and social contexts intersect with health experiences. The high prevalence of PMS among this age group highlights the need for targeted interventions that address the unique challenges faced by young women.

Several studies conducted across different regions have reported varying prevalence rates for PMS. For instance, a cross-sectional study among professional women in South India found a 48% prevalence rate of PMS among working women.[13] In Karnataka, the prevalence among college-going girls aged 18-25 years was reported to be 86%.[14] Among medical students in North India, 65% were found to have PMS.[15] These discrepancies can be attributed to several factors, including lifestyle differences, cultural attitudes towards menstruation, and varying stress levels. Understanding these nuances is crucial for developing effective management strategies tailored to specific populations.

Adopting a healthy lifestyle, including stress reduction, a balanced diet, regular exercise, and proper sleep, can alleviate PMS symptoms. Understanding the prevalence and symptom distribution of PMS is essential for assessing its severity and impact on women's quality of life. Research indicates that PMS significantly affects academic performance and daily functioning.[16] The symptoms of PMS, which can begin in the teenage years, may have a profound effect on quality of life, leading to feelings of dissatisfaction and inadequacy.

Comparative analysis of psychological and physical symptoms reveals that psychological symptoms such as anxiety, easy crying, and mood swings tend to have a more substantial impact than physical symptoms like skin changes, generalised aches, abdominal bloating, and breast tenderness. Timely education and identification of these symptoms are crucial for reducing stigma, minimising dysfunction, and enhancing the overall quality of life for women.

Ultimately, the impact of PMS extends beyond individual experiences; it affects academic performance, social interactions, and overall quality of life.[18] Therefore, timely identification and intervention are vital. By fostering an environment of open dialogue and support, we can dismantle the stigma surrounding PMS and menstruation, enabling individuals to seek help without hesitation.

This study reinforces the importance of recognising PMS as a significant health issue. By prioritizing education, awareness, and research, we can pave the way for improved healthcare responses and policies that truly support those affected by this condition. Together, we can create a more informed and compassionate society that values menstrual health and the well-being of all individuals who menstruate.

A key strength of this study is its exploration of the relationship between various lifestyle factors and the severity of PMS symptoms. The analysis revealed significant associations between lifestyle habits such as diet, exercise, sleep, and BMI and the severity of PMS.

Diet: Participants following a vegetarian diet reported significantly lower PMS severity compared to those on a mixed diet.[18,19] This aligns with other studies suggesting that plant-based diets may have anti-inflammatory and hormonal-regulating effects that could alleviate PMS symptoms. The study also found that a high intake of fast foods and spicy foods was associated with higher PMS severity. These findings support the growing body of evidence

linking poor dietary habits to exacerbated PMS symptoms. A diet rich in whole foods, fruits, and vegetables, and low in processed foods may help mitigate PMS severity by reducing inflammation and balancing hormones.

Physical activity: Regular physical activity was strongly linked to reduced PMS severity. Participants who exercised regularly (34%) had significantly lower PMS symptoms compared to those with sedentary lifestyles. Exercise is known to enhance endorphin release, improve mood, and regulate hormonal cycles, all of which could explain the lower prevalence and severity of PMS symptoms in more physically active individuals.[20,21] In contrast, participants with irregular or minimal physical activity (96%) reported more severe PMS, suggesting that lifestyle interventions that promote exercise could be beneficial for managing PMS symptoms.

Weight/BMI: The relationship between BMI and PMS severity was also noteworthy. Participants with a normal BMI (41.5%) reported lower PMS severity compared to overweight (34.75%) and underweight (23.7%) participants. Overweight individuals, in particular, reported more severe PMS symptoms. This finding is consistent with studies that suggest excess body weight, especially abdominal fat, may contribute to hormonal imbalances, insulin resistance, and inflammation, all of which could exacerbate PMS symptoms. Maintaining a healthy weight could therefore play an important role in alleviating PMS.

Sleep: Sleep disturbances were found to be strongly associated with more severe PMS symptoms. Participants with disturbed sleep patterns (38.56%) reported significantly higher levels of PMS symptoms, particularly psychological ones like mood swings and anxiety. Poor sleep quality disrupts the body's ability to regulate stress hormones and recovery, likely contributing to the increased intensity of PMS. These results emphasize the importance of sleep hygiene in managing PMS.

The findings from this study highlight the potential for lifestyle modifications to reduce the severity of PMS. Given the significant role of diet, exercise, sleep, and weight in influencing PMS severity, public health initiatives and clinical practices could incorporate lifestyle counselling as part of PMS management. Encouraging a vegetarian diet, regular physical activity, weight management, and better sleep hygiene may help reduce the burden of PMS symptoms in women, particularly in the young adult population.

Additionally, healthcare providers should be mindful of the psychological impact of PMS and consider including mental health support, such as counselling or stress management techniques, as part of the treatment plan for women with severe PMS symptoms.

Limitations and Future Directions

While this study provides valuable insights into the prevalence and lifestyle factors associated with PMS, there are some limitations. The study's cross-sectional design means that it cannot establish causality, and the self-reported nature of the data may be subject to biases. Furthermore, the study was conducted in a specific population of young women from Gujarat, which may limit the generalizability of the findings to other regions or age groups.

Future research could include longitudinal studies to better understand the causal relationships between lifestyle factors and PMS. Additionally, further investigation into the specific dietary components and types of exercise most effective for alleviating PMS symptoms would be beneficial.

CONCLUSION

This study provides important insights into the prevalence of premenstrual syndrome (PMS) among college students aged 18 to 30 years in Jamnagar, revealing a high prevalence of PMS symptoms (73.31%) within this population. The severity of PMS varied, with most participants experiencing mild to moderate symptoms, while a smaller proportion faced severe distress. Key physical symptoms, such as fatigue, breast tenderness, and generalized aches, along with psychological symptoms like mood swings, anxiety, and irritability, were prevalent, highlighting the multifaceted nature of PMS.

Furthermore, this study underscores the significant role of lifestyle factors in modulating the severity of PMS. Regular physical activity, a vegetarian diet, normal BMI, and good sleep hygiene were associated with lower PMS severity, while poor diet, irregular exercise, disturbed sleep, and being overweight were linked to higher symptom intensity. These findings suggest that lifestyle modifications—such as improving diet, increasing physical activity, maintaining a healthy weight, and ensuring adequate sleep—can potentially reduce PMS symptoms and improve overall well-being.

Given the high prevalence of PMS and its impact on daily functioning, particularly in a college setting, it is crucial to integrate lifestyle counselling and health promotion strategies

into university health programs. Promoting healthier habits could significantly enhance the quality of life for young women experiencing PMS. Future studies should explore the long-term effects of lifestyle interventions and further investigate the underlying mechanisms connecting lifestyle factors with PMS symptom severity.

Conflict of interest

There is no conflict of interest.

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