PREVALENCE AND CORRELATES OF PREMENSTRUAL SYMPTOMS AMONG REPRODUCTIVE-AGE WOMEN IN KANCHEEPURAM, TAMIL NADU: A CROSS-SECTIONAL STUDY

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INTRODUCTION

Premenstrual Syndrome (PMS) encompasses a range of emotional, physical, and psychological disturbances that occur after ovulation, emerging 2–10 days before menstruation, and typically subside with the onset of menstruation. While more than 90% of women experience some symptoms, clinically significant PMS affects 20-30%, with literature revealing severity increasing in women in their 40s, while some stating higher in the college age groups(1–3). Symptoms vary widely, including mood disturbances such as irritability, anxiety, mood swings, and depression, as well as physical discomforts like bloating, fatigue, breast tenderness, acne, headaches, and digestive issues(1,4). The most severe form, Premenstrual Dysphoric Disorder (PMDD), is characterized by intense emotional symptoms, significantly impairing daily life(1,2).

The hormonal basis of PMS is linked to fluctuations in estrogen and serotonin, which regulate mood and cognitive functions. Low estrogen levels lead to norepinephrine release, reducing neurotransmitters like dopamine, serotonin, and acetylcholine, contributing to symptoms such as insomnia, fatigue, and depression(5). Studies indicate that 80–90% of women report at least one PMS symptom, while 2.5–3% experience severe PMDD(6). Symptoms generally worsen a week before menstruation and peak two days prior to onset(7,8). Given the wide impact of PMS on quality of life, work productivity, and healthcare costs, comprehensive education and structured management strategies are essential for effective symptom control(9). Additionally, women with PMS face disruptions in sleep patterns, with a 1.7-fold greater risk of sleep disorders, compared to those unaffected by PMS. Dietary changes, particularly altered appetite and eating behavior, also play a crucial role(10–12).

The purpose of this study was to assess the prevalence and severity of premenstrual symptoms (PMS) among reproductive-age women and identify key physiological, behavioral, and psychological factors influencing symptom severity. Specifically, it aimed to determine the proportion of women affected by moderate to severe PMS, evaluate the associations between PMS and variables such as BMI, age, menstrual patterns, pain characteristics, physical activity, and depressive symptoms, and explore the impact of PMS on daily functioning.

METHODOLOGY

This was a cross-sectional study conducted among reproductive-age women to assess the prevalence of premenstrual symptoms (PMS) and associated factors. The study targeted women aged 18-45 years who experienced menstrual cycles, excluding those with pregnancy, menopause, or known psychological or gynecological disorders (such as polycystic ovary syndrome or endometriosis). The study was conducted among the doctors of a tertiary care centre in Kancheepuram for a period of 3 months using a structured pretested questionnaire. The Premenstrual Syndrome Scale (PMSS) was utilized to evaluate the presence and severity of premenstrual syndrome during the week preceding menstruation, while the PHQ-9 questionnaire was administered to assess depressive symptoms among the study participants.

Participants were recruited randomly through consecutive recruitment. The sample size was determined using prevalence estimates from prior studies, assuming a confidence level of 95% and margin of error of 5%. Considering the prevalence of the PMS form existing literature to be 43%(13) and the sample of 392 participants were required to achieve statistical significance. A validated questionnaire comprising sections on sociodemographic details, menstrual history, pain characteristics, physical activity, and psychological symptoms was used. Data collection was conducted via self-administered forms, ensuring anonymity and confidentiality.

The study was approved by the Institutional Ethics Committee, and informed consent was obtained from all participants before data collection. Confidentiality was maintained by and participants had the right to withdraw at any stage was explained clearly.

RESULTS

Among the study participants, moderate to severe Premenstrual Syndrome (PMS) symptoms were observed in 51.2%, with the highest prevalence noted among women aged 25-35 years. PMS severity demonstrated significant associations with various physiological and behavioral factors. Obese and overweight individuals exhibited greater PMS symptom severity compared to those with normal BMI (p=0.039), reinforcing the established link between metabolic health and hormonal fluctuations affecting menstrual symptoms. Additionally, menstrual cycle irregularity was strongly correlated with severe PMS symptoms (p<0.0001), with short (<25 days) and long (>35 days) cycles leading to exacerbation in symptom severity, possibly due to disruptions in hormonal balance.

Among menstrual health parameters, dysmenorrhea was reported by 58.9% of participants, with higher pain intensity and multi-site pain strongly linked to increased PMS severity (p<0.0001). Participants experiencing intense pain and multi-site pain were disproportionately affected, suggesting that underlying inflammatory or neurophysiological mechanisms contribute to PMS symptom burden. Furthermore, PMS symptoms were found to interfere with daily activities, with individuals reporting frequent activity limitations showing greater PMS severity, highlighting the broader impact of these symptoms on work productivity and quality of life. Physical activity levels emerged as a significant modifier, where individuals engaging in low physical activity (<3 days/week or never exercising) exhibited higher PMS severity (p<0.0001).

A strong association was observed between PMS and depression, with higher PMS symptom severity linked to increased levels of depression (p<0.0001). Notably, minimal to mild depression was reported among 74% of individuals with moderate PMS symptoms, whereas severe depression was exclusively observed in those experiencing severe PMS symptoms.

Age and BMI accounted for only 1.3% of the variance in PMS severity (R²= 0.013, p= 0.073), indicating weak predictive value. While age showed a small but significant decrease in symptoms (B= -0.721, p= 0.031), BMI was positively associated but not significant (B= 0.754, p= 0.085). Additionally, older women (>35 years) had significantly higher PMS severity (Mean = 85.34, SD= 19.97) compared to younger women (<25 years, Mean= 76.30, SD= 25.09, t= -2.270, p= 0.025). Levene's test confirmed unequal variance (F = 12.180, p = 0.001), indicating variability in symptom intensity across age groups. The mean difference of -9.04 and 95% confidence interval (-16.921, -1.159) suggest that PMS severity increases with age.

The findings highlight key physiological and behavioral factors contributing to PMS severity, warranting further investigation into potential interventions and management strategies.

Table 1: Baseline characteristic of the study participants

Baseline characters		Frequency	Percentage
Age	<25 years	57	14.5
	25-35 years	264	67.3
	>35 years	71	18.2
BMI	Normal	162	41.3
	Overweight	143	36.5
	Obese	87	22.2
Age of menarche	<12 years	20	5.1
	12-15 years	359	91.6
	>15 years	13	3.3
Regular cycle	Yes	313	79.8
	No	79	20.2
Cycle	<25 days	20	5.1
	25-35 days	278	70.9
	>35 days	94	24
Days of bleeding	<3 days	66	16.8
	3-7 days	319	81.4
	>7 days	7	1.8
Passage of clots	Yes	114	29.1
	No	278	70.9
Dysemnorrhoea	Yes	231	58.9
	No	161	41.1
Physical activity	<3 days/week	155	39.5

| | >3 days/week | 48 | 12.3 |
| | Never workout | 189 | 48.2 |

Table 2: Menstrual pain characteristics among the study participants

Characters		Frequency	Percentage
Days of pain	0 days	62	15.8
	1-2 days	287	73.2
	2-4 days	36	9.2
	>5 days	7	1.8
Intensity of pain	Doesn't hurt	61	15.6
	Hurts little bit	164	41.8
	Hurts a little more	121	30.9
	Hurts worse	46	11.7
Pain location	1 site	168	42.8
	2-3 sites	148	37.8
	None	76	19.4
Activity limitation during mensus	Almost always	122	31.1
	Always	40	10.2
	None	92	23.5
	Almost never	138	35.2

Table 3: Severity of premenstrual symptoms among the study participants

Severity of premenstrual symptoms		Frequency	Percentage
PMS	No symptoms	7	1.8
	Mild symptoms	143	36.5
	Moderate symptom	175	44.6
	Severe	26	6.6
	Very severe	41	10.5

Table 4: Prevalence of depression among the study participants

Severity of depression			Percentage
PHQ-9	Mild depression	119	30.4
	Minimal depression	171	43.6
	Moderate depression	57	14.5
	Moderately severe depression	39	9.9
	Severe depression	6	1.5

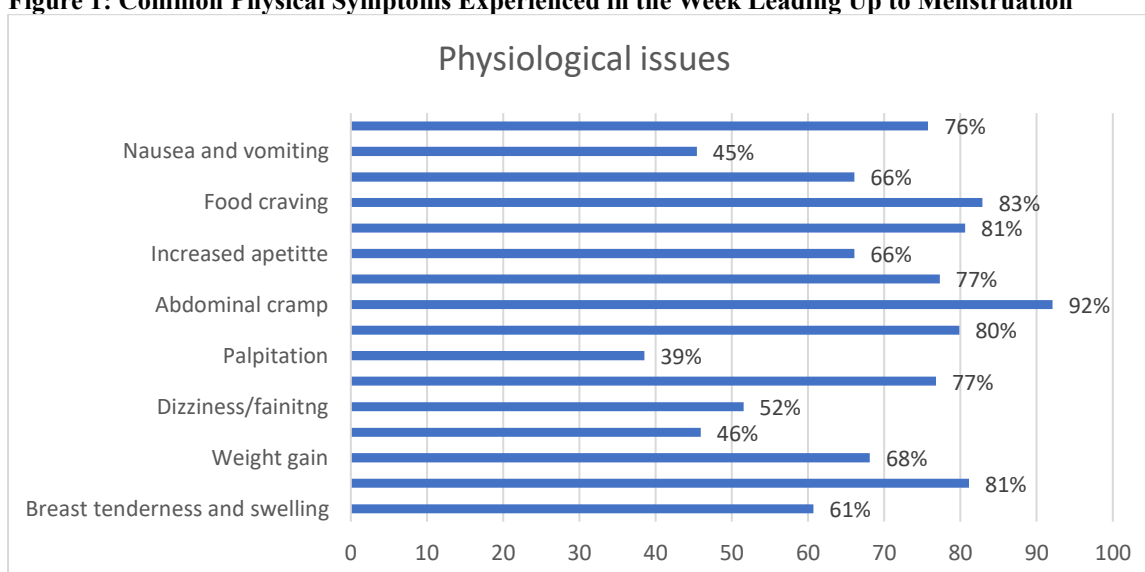**Figure 1: Common Physical Symptoms Experienced in the Week Leading Up to Menstruation**

Physiological issues

- Nausea and vomiting — 76%, 45%
- 66%
- Food craving — 83%, 81%
- Increased apetitte — 66%, 77%
- Abdominal cramp — 92%, 80%
- Palpitation — 39%, 77%
- Dizziness/fainitng — 52%, 46%
- Weight gain — 68%, 81%
- Breast tenderness and swelling — 61%

Figure 2: Emotional and Psychological Disturbances Reported Before Menstrual Onset

Psychological issues

Symptom	Value
Hopelessness	64%
Aggression	63%
Confusion	58%
Sleep changes	71%
Crying	75%
Forgetfulness	64%
Depression	75%
Loss of concentration	72%
Mood swings	96%
Tension	85%
Anxiety	78%
Irritability	96%
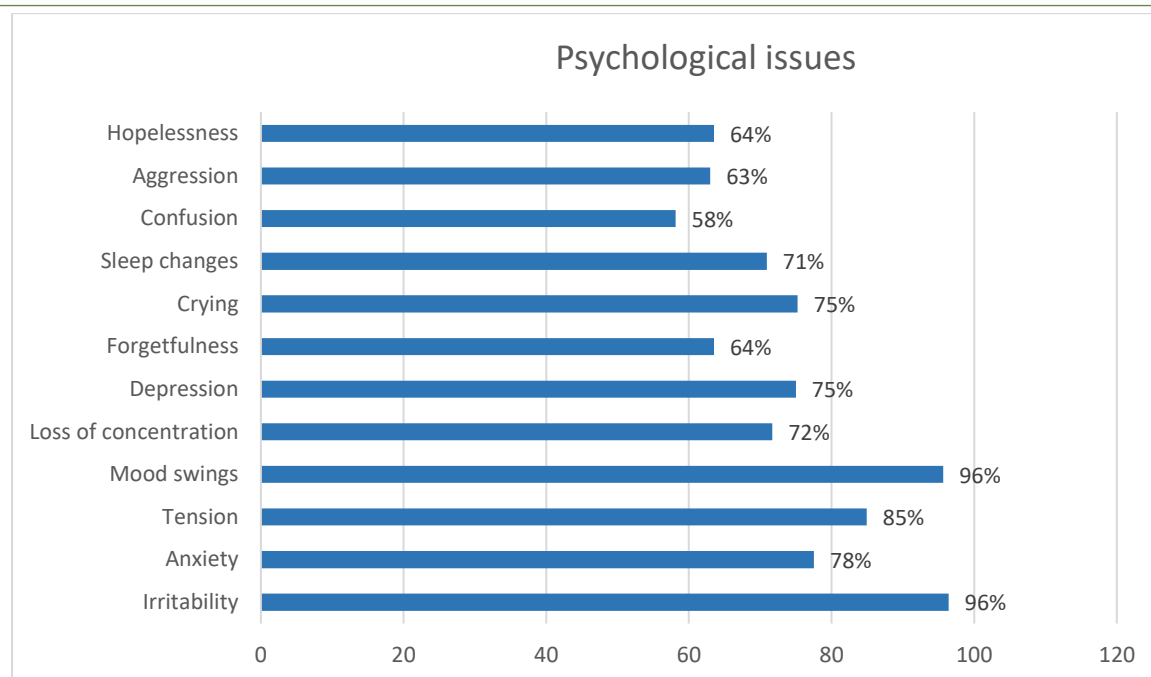
Figure 3: Changes in Behaviour and Social Interaction Observed Pre-Menstruation

Behavioural issues

Symptom	Value
Over sensitive	72%
Irrational thoughts	58%
Compulsive behaviour	36%
Obsessional thoughts	41%
Impaired work performance	56%
Poor judgement	57%
Lack of interest in usual activity	75%
Clumsiness	47%
Guilty	63%
Lack of self control	55%
Restlessness	74%
Social withdrawal	58%
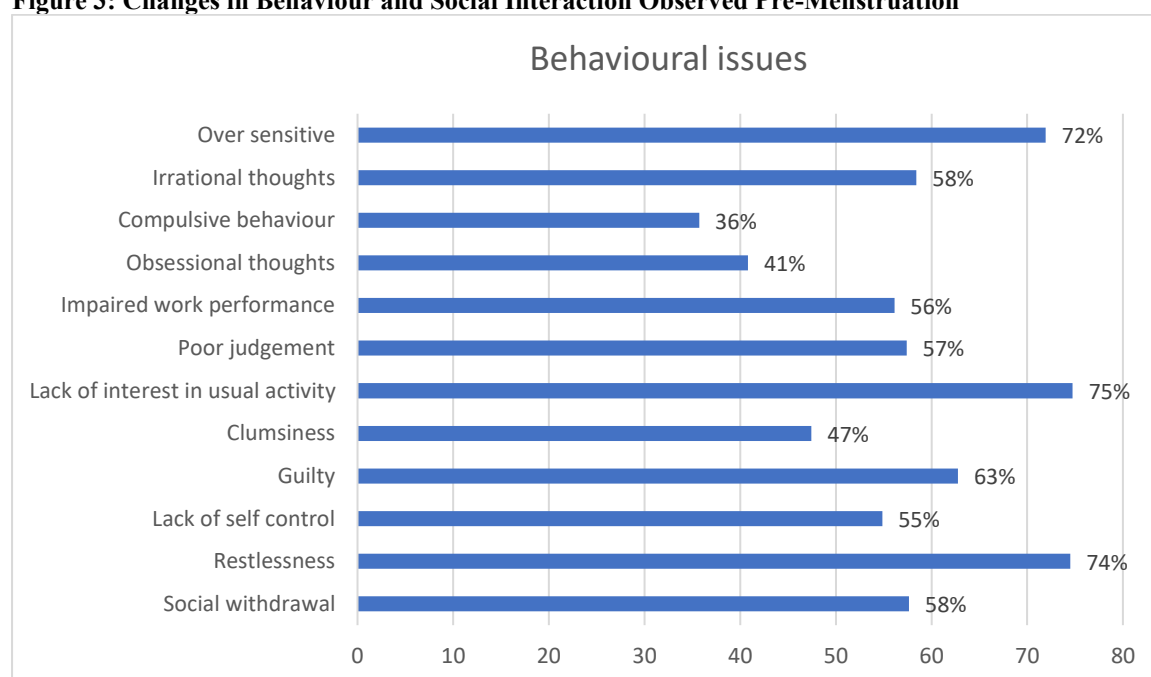
DISCUSSION

This study revealed that 99.2% of participants experienced at least one premenstrual symptom, with 51.2% reporting moderate to severe PMS, consistent with global estimates ranging from 40–70% (14–16) and closely aligned with prevalence rates reported in Ethiopia (66.7%)and Turkey (67.7%). The most frequently reported symptoms included mood swings (96%), abdominal cramps (92%), food cravings (83%), bloating (81%), and generalized aches (80%), mirroring symptom profiles observed in other regional studies (14–18)

Physiological and Behavioural Correlates

PMS severity was significantly associated with BMI, menstrual cycle irregularity, dysmenorrhea, and physical inactivity. Obese and overweight individuals exhibited greater symptom burden, consistent with findings that increased adiposity contributes to systemic inflammation and hormonal dysregulation(15,18,19). A 1-point increase in BMI was shown to raise PMS odds by 7%, and both underweight and obese women demonstrated

higher rates of menstrual disorders(16). Higher BMI was linked to increased inflammation, potentially worsening PMS symptoms, indicating a need for weight management strategies through diet and exercise.

Irregular menstrual cycles were strongly linked to PMS severity (p<0.0001), supporting the hypothesis that hormonal instability exacerbates symptom expression. Measures like cycle tracking and hormonal assessments can facilitate early intervention(13,16). Dysmenorrhea and multi-site pain were also significant predictors of PMS intensity, suggesting a role for inflammatory and neurophysiological mechanisms. These findings underscore the need for multimodal pain management strategies, including pharmacological and non-pharmacological approaches such as yoga and acupuncture(13).

Physical Activity and Lifestyle

Low physical activity (<3 days/week or none) was significantly associated with increased PMS severity (p<0.0001), reinforcing evidence that regular exercise mitigates hormonal fluctuations and alleviates both physical and psychological symptoms(8,15,16,18,19). Divya et al. reported that moderate physical activity was linked to the lowest rate of menstrual disorders (39.3%), while both low and high activity levels were associated with increased symptom burden. Reduced physical activity and sedentary behavior are linked to greater PMS severity, while regular exercise serves as a protective factor by helping regulate hormonal fluctuations and alleviate symptoms underscoring the need for early screening and lifestyle-based interventions to reduce the overall burden(5,13,18).

Psychological Distress and Depression

A robust association was observed between PMS and depression, with severe depressive symptoms exclusively present among those with severe PMS highlighting the value of routine mental health screening to identify those at risk(2,19). This aligns with prior studies indicating that women with PMS are 1.7 times more likely to exhibit depressive symptoms. Hormonal fluctuations during the luteal phase may heighten stress sensitivity, contributing to mood dysregulation. Although PMS-related depressive features are typically short-lived, their cyclical nature calls for ongoing mental health monitoring and early intervention strategies(2,14). The strong association between PMS and depression suggesting shared neurobiological pathways particularly involving serotonin and oxidative stress suggest potential for integrated interventions targeting both PMS and mental health(5,14,16,20).

Dietary and Sociocultural Influences

High intake of sweets, fried foods, and processed snacks was positively correlated with PMS severity(18). These dietary patterns may amplify oxidative stress and mood disturbances, as supported by evidence linking poor antioxidant intake to negative emotional states during the menstrual cycle(5). Despite high prevalence of moderate to severe PMS in our study, many women may not seek help due to normalization of symptoms and stigma, may hinder help-seeking behavior, as observed in both this study and prior research(20). Smartphone-based interventions and cognitive-behavioral therapy (CBT) have shown promise in improving symptom tracking and psychological support, enhance adherence and outcomes, particularly in underserved populations(9). Our study suggest that stigma and lack of awareness may hinder timely intervention and support(20). The consistent findings across regions highlight the importance of culturally sensitive education, early screening, and lifestyle-based interventions to reduce PMS burden and improve quality of life(16)

Public Health Implications

The significant interference of PMS with daily functioning and work productivity calls for workplace accommodations and culturally sensitive health education. Addressing PMS through workplace policies and educational accommodations could improve daily functioning and overall well-being(13,20). Early screening, lifestyle-based interventions, and mental health integration are essential to reduce the burden of PMS and improve quality of life. Personalized treatment strategies ranging from lifestyle modifications to pharmacological options like SSRIs should be tailored to symptom severity(21).

CONCLUSION

PMS is common and influenced by many factors like irregular periods, pain, mood changes, body weight, and lack of exercise. These findings show the need for early detection and simple, culturally sensitive solutions such as healthy lifestyle changes, pain relief, and mental health support to reduce symptoms and improve women's well-being. Future studies should look into how hormones, diet, stress, and social factors affect PMS, and test practical treatments that fit different levels of symptom severity, especially in low-resource settings.

REFERENCES

1. MedicineNet [Internet]. [cited 2025 Jun 3]. Premenstrual Syndrome (PMS): 37 Symptoms, Definition, Treatment. Available from: https://www.medicinenet.com/premenstrual_syndrome/article.htm
2. Yi SJ, Kim M, Park I. Investigating influencing factors on premenstrual syndrome (PMS) among female college students. BMC Womens Health. 2023 Nov 10;23(1):592.

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3. Kim MO. A study on the premenstrual syndrome and health promoting behavior in female college students. J Korean Data Anal Soc JKDAS. 2018 Jun;20(3):1565–77.

4. Rapkin AJ, Akopians AL. Pathophysiology of premenstrual syndrome and premenstrual dysphoric disorder. Menopause Int. 2012 Jun 1;18(2):52–9.

5. Negative Mood Is Associated with Diet and Dietary Antioxidants in University Students During the Menstrual Cycle: A Cross-Sectional Study from Guangzhou, China - PMC [Internet]. [cited 2025 Jun 3]. Available from: https://pmc.ncbi.nlm.nih.gov/articles/PMC7023165/

6. Fatemi M, Allahdadian M, Bahadorani M. Comparison of serum level of some trace elements and vitamin D between patients with premenstrual syndrome and normal controls: A cross-sectional study. Int J Reprod Biomed. 2019 Sep 22;17(9):647–52.

7. Premenstrual Syndrome - StatPearls - NCBI Bookshelf [Internet]. [cited 2025 Jun 3]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK560698/

8. Yesildere Saglam H, Orsal O. Effect of exercise on premenstrual symptoms: A systematic review. Complement Ther Med. 2020 Jan;48:102272.

9. Chai N, Wu Y, Zhang M, Wu WB, Zhang H, Kong FW, et al. Remote intervention using smartphone for rural women suffering from premenstrual syndrome. Medicine (Baltimore). 2018 Jul 20;97(29):e11629.

10. Xing X, Xue P, Li SX, Zhou J, Tang X. Sleep disturbance is associated with an increased risk of menstrual problems in female Chinese university students. Sleep Breath. 2020 Dec 1;24(4):1719–27.

11. Yoshimi K, Shiina M, Takeda T. Lifestyle Factors Associated with Premenstrual Syndrome: A Cross-sectional Study of Japanese High School Students. J Pediatr Adolesc Gynecol. 2019 Dec 1;32(6):590–5.

12. Yen JY, Liu TL, Chen IJ, Chen SY, Ko CH. Premenstrual appetite and emotional responses to foods among women with premenstrual dysphoric disorder. Appetite. 2018 Jun 1;125:18–23.

13. Tiranini L, Nappi RE. Recent advances in understanding/management of premenstrual dysphoric disorder/premenstrual syndrome. Fac Rev [Internet]. 2022 Apr 28 [cited 2025 Jun 9];11. Available from: https://facultyopinions.com/prime/reports/b/11/11/

14. Lee H, Choi KS, Rhee Y. Prevalence of premenstrual syndrome and its relationship to depression among Korean adolescents: A nationwide cross-sectional study. Taiwan J Obstet Gynecol. 2025 Mar 1;64(2):319–24.

15. Dwivedi D, Singh N, Gupta U. Prevalence of Menstrual Disorder in Women and Its Correlation to Body Mass Index and Physical Activity. J Obstet Gynaecol India. 2024 Feb;74(1):80–7.

16. Azadi H, Madani S, Payahoo L, Khodayari MT. Exploring the Factors Influencing Premenstrual Syndrome and Its Severity: The Role of Lifestyle Determinants. J Reprod Infertil. 2024;25(4):264–71.

17. Ça D, Yilmaz FÇ, Pirinççio AG. Are premenstrual syndrome and aggression related to body mass index in adolescents?

18. Thakur H, Pareek P, Sayyad MG, Otiv S. Association of Premenstrual Syndrome with Adiposity and Nutrient Intake Among Young Indian Women. Int J Womens Health. 2022 May 4;14:665–75.

19. Dózsa-Juhász O, Makai A, Prémusz V, Ács P, Hock M. Investigation of premenstrual syndrome in connection with physical activity, perceived stress level, and mental status—a cross-sectional study. Front Public Health. 2023 Aug 3;11:1223787.

20. Heinemann LAJ, Minh TD, Heinemann K, Lindemann M, Filonenko A. Intercountry assessment of the impact of severe premenstrual disorders on work and daily activities. Health Care Women Int. 2012;33(2):109–24.

21. Gudipally PR, Sharma GK. Premenstrual Syndrome. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 [cited 2025 Jun 22]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK560698/