

Prevalence of Premenstrual Syndrome in High School Girls of Delhi and Its Relationship with the Level of Physical Activity

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ABSTRACT

Background: Premenstrual syndrome (PMS) is a common disorder experienced by teenage girls between the ages of 11 and 15 years, characterised by physical and emotional symptoms. The prevalence of PMS worldwide varies from 20 to 90%. Premenstrual syndrome can affect physical, emotional and psychological well-being, impacting their daily activities and overall quality of life. Premenstrual syndrome can lead to depression, anxiety and cardiovascular disease in the long run.

Materials and methods: One hundred female students aged 13–18 years from private schools in Delhi were included in the study. Data were collected using a premenstrual symptom screening tool for adolescents and a physical activity questionnaire.

Results: The results show a prevalence of regular physical activity in 15.2%, no physical activity at all in 21.2% and 34.3% showed physical activity sometimes. The study also found a negative correlation between physical activity and PMS ($r = -0.04$).

Conclusion: The study concludes there is a higher incidence of PMS in less physically active teenage girls.

Keywords: High school girls, Physical activity, Premenstrual.

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INTRODUCTION

Premenstrual syndrome (PMS), common in women of reproductive age, causes physical, emotional and psychological symptoms before menstruation. Symptoms vary widely, including bloating, mood swings and fatigue, affecting daily life and potentially leading to long-term health issues. Prevalence ranges from 20 to 90% globally, with symptoms impacting quality of life.¹

The specific cause of PMS is uncertain, but it's thought to result from various factors, including hormonal fluctuations in oestrogen and progesterone, along with changes in neurotransmitter levels like serotonin, affecting mood-related symptoms.²

Various treatments exist for addressing PMS symptoms, including lifestyle adjustments and medication. For others, symptoms might be reduced by lifestyle adjustments to their sleep, stress levels, food and exercise routines. Non-steroidal anti-inflammatory medicines or NSAIDs, help ease physical symptoms including cramping and discomfort in the breasts.³

Selective serotonin reuptake inhibitors (SSRIs), a class of antidepressant, controls the serotonin level of brain and effectively treat the emotional and psychological components of PMS.

Hormonal interventions like oral contraceptives containing drospirenone can stabilise hormone levels, reducing symptoms.⁴ Although complementary therapies, such as chaste berry, have shown promise, further research is required to verify their efficacy and safety. Because of their changing bodies and minds, high school girls are more susceptible to PMS because of their hormones and way of life.⁵ Menstrual abnormalities and PMS severity are positively impacted by physical activity. However, not much research has been done on the connection between physical activity and PMS in high school girls.⁶

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Exercise can alleviate PMS symptoms by elevating mood, lowering stress and producing endorphins. Despite being common in this age group, its impact on adolescent females with PMS hasn't been thoroughly studied, which raises serious public health concerns. The psychosocial impacts of PMS and its prevalence in Western teenage populations have been studied in the past.⁷ The symptoms of PMS improve physical activity by influencing hormone levels through the hypothalamic pituitary adrenal (HPA) axis, impacting various bodily processes.⁸ Hypothalamic pituitary adrenal axis responses during symptomatic periods, have been altered with women of PMS as suggested by researchers thereby potentially exacerbating symptoms. Physical activity can also

Table 1: Descriptive statistics of age, height and weight

<i>n</i> = 99	Mean	Standard deviation
Age	15.52	1.373
Height	157.76	6.8299
Weight	45.33	8.236

reduce cortisol levels, affecting stress reactions. Additionally, it may lower estrogen levels, impacting neurotransmitters like serotonin and gamma aminobutyric acid (GABA).⁹

AIM

To find the prevalence of PMS in high school girls of Delhi and correlate it with the level of physical activity.

MATERIALS AND METHODS

A cross-sectional prevalence study was carried out on 100 female high school students of Delhi. A convenience sampling method was used and female school students aged 13–18 years old and private school students with a regular menstrual cycle (defined as a menstrual cycle of 21–35 days ± 7 days) were included in the study.

Participants, who had gynaecological problems and those taking medications that alter neurotransmitter secretion – such as oral contraceptives, antidepressants and other psychiatric drugs – in the 3 months before the study were not allowed to participate.

Intervention

Participants were briefed regarding the study and a consent form was signed. The data capturing form was used to capture demographic characteristics such as gender, age, highest educational qualification and level of competition. A physical activity questionnaire and premenstrual symptom screening tool were used to collect information related to physical activity and the presence of premenstrual symptoms.

RESULTS

Data from 99 participants who filled out the questionnaire were analysed. One participant dropped out of the study failing to understand the questionnaires. Demographic data are represented in Table 1. The physical activity in the past 7 days is presented in Figure 1.

A Pearson correlation coefficient was performed to evaluate the relationship between the level of physical activity and premenstrual syndrome. There was a negative relation between the level of physical activity and premenstrual syndrome, $R(99) = -0.044$, p -value = 0.66]. So, the result states that physical activity would decrease premenstrual syndrome (Table 2).

DISCUSSION

In this cross-sectional study of 100 premenstrual teenage girls, a negative association of physical activity with premenstrual syndrome was found but it was not found to be significant. Unlike prior studies, this found a significant decrease in the risk of PMS in girls who were more physically active compared to girls who were not physically active or who were less physically active.

It has been demonstrated that exercise affects hormonal balance, which is directly related to PMS symptoms. Matsumoto et al.'s study which found that aerobic exercise decreased levels of

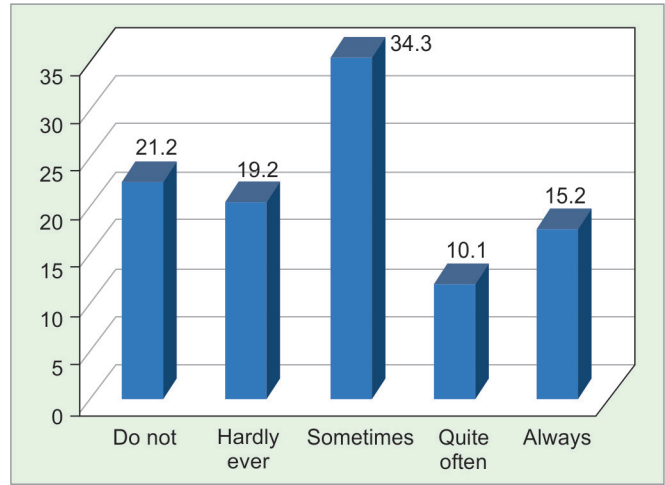


Fig. 1: Physical activity during the last seven days

Table 2: Correlation between physical activity and premenstrual screening test

	Physical activity total score	Total score of PSST-A
Physical activity total score	Pearson correlation	1
	Sig. (2-tailed)	-0.044
	<i>n</i>	0.66
		99

progesterone and estrogen – two important hormones involved in the menstrual cycle – confirmed our findings.⁹ By modulating hormone levels, exercise may help mitigate the intensity of PMS symptoms. There has been a prevalence in previous studies that found an increased risk in active vs inactive women due to PMS. If comparison is given, then Deuster et al. found that 10% of highly active girls experienced PMS compared to 4.7% of inactive girls, and inactive girls had a significant 60% reduction in PMS symptoms.¹⁰ Based on a self-reported questionnaire on symptom intensity, Rasheed and Al-Sowielem¹¹ found that 45.3% of physically active women and 30.6% of sedentary girls had high premenstrual symptom ratings. Both of these studies did not support my result in any way.¹² The contribution to feelings of well-being and happiness is triggered by the release of endorphins. These endorphins act as natural mood boosters and may help counteract the negative emotional symptoms associated with PMS. A study conducted by Sanchez et al. demonstrated that aerobic exercise significantly improved mood and reduced symptoms of depression and anxiety in women with PMS.¹³ Physical activity stimulates blood circulation, which may aid in reducing symptoms such as bloating and fluid retention commonly experienced during PMS. Improved blood flow helps eliminate excess water and sodium from the body, potentially reducing the severity of bloating and discomfort. Regular exercise is known to have numerous psychological benefits, including stress reduction and improved mood. A study by Daley demonstrated that physical activity had a positive impact on emotional well-being and overall quality of life in women with PMS.¹⁴ Engaging in exercise can contribute to enhanced mood stability, decreased irritability and better sleep quality, which are frequently affected by PMS. Premenstrual syndrome symptoms, such as fatigue, bloating and

mood swings, may discourage women from engaging in regular exercise.¹⁵ According to a study by Bertone-Johnson et al., women with moderate to severe PMS symptoms were less likely than those with milder symptoms to engage in physical exercise. A study that looks at this beneficial correlation may be able to identify the obstacles preventing women with PMS from exercising, which would enable the development of specialised interventions and support. Exercise is frequently recommended as a way to reduce PMS symptoms, but it's vital to take into account situations in which physical activity could make some symptoms worse.⁵ A study by O'Connor et al. reported that some women experienced increased pain, fatigue and breast tenderness after exercise during the premenstrual phase. By examining this positive correlation, a study could provide insights into the potential triggers and mechanisms behind worsened PMS symptoms due to exercise. The hormonal fluctuations which occur during the menstrual cycle, including the premenstrual phase, can affect physical performance and exercise tolerance.¹⁶ A study by Lebrun et al. revealed that hormonal variations during the menstrual cycle can lead to decreased endurance, strength and coordination in women. Understanding the positive correlation between PMS and exercise performance could help to tailor exercise programs to accommodate these hormonal changes and optimise training outcomes.¹² Psychological factors, such as mood disturbances and stress, can influence exercise compliance among women with PMS. Examining the positive correlation between PMS and exercise compliance can provide insights into the psychological barriers that impact women's ability to maintain regular exercise routines.¹ Previous studies indicated that light intensity physical activity (LPA) had a positive effect on physical health outcomes such as cardiometabolic health and mortality. Light intensity physical activity results in some risk reduction relative to inactivity and PA of any intensity should be encouraged in all inactive or insufficiently active persons. However, greater levels of exercise achieve a greater reduction in risk.¹⁷

It is thought that the activation of duration-specific pathways may mediate the positive effects of LPA. Few research, meanwhile, have looked at how LPA affects PMS, and our investigation did not discover a link between the two. Our study advises increased moderate physical activity (MPA) and moderate to vigorous physical activity (MVPA) to reduce PMS symptoms. According to Jalali-Farahani et al., extended sleep deprivation is a significant health risk for students in Tehran. In 2019, an additional study revealed that 42.5% of women in the exercise group had pain during their menstrual cycle, while 60% of women in the sedentary group said the same.¹¹

The limitations of the study were less sample size, high range of physical activity and not considering specific menstrual symptoms. Further studies in the form of RCTs may be conducted to explain this correlation.

CONCLUSION

This study found a negative association between physical activity and the occurrence of PMS. It is possible that our cross-sectional design led to several biases. The relationship between physical activity and PMS remains clear. It suggests that engaging in regular physical activity can potentially alleviate the symptoms associated with PMS and the potential benefits of exercises on hormonal regulation and neurotransmitter release. Further research in the

form of prospective studies and randomised trials should be conducted in this area to minimise biases associated with cross-sectional studies before concluding that physical activity and PMS are associated.

Ethical Clearance

Since this was a non-invasive observational study, ethical clearance was obtained from the Institutional Ethical Committee (15/6/24) and Ref id is KRMU/IRB/06/2024/15.

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