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# Effect of Aerobic Exercise Training with Lifestyle Modification in College Going Students with Premenstrual Syndrome

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***Abstract***

***Background:*** *Premenstrual Syndrome (PMS) is a frequently occurring cyclical condition in young women, marked by a range of physical, emotional, and behavioral symptoms that interfere with academic performance and daily functioning. Non-drug interventions such as aerobic exercise and lifestyle modification are increasingly recognized as effective, low-cost, and safe strategies for symptom relief.*

***Objective:*** *The present study aimed to determine the effectiveness of aerobic exercise in combination with lifestyle changes for reducing PMS symptoms among college-going female students.*

***Methods:*** *An experimental design was adopted with 60 participants aged 18–25 years, clinically diagnosed with moderate to severe PMS using a standardized PMS checklist. Students were randomly divided into two groups: Group A received an 8-week structured aerobic training program (30 minutes/day, 5 days/week) along with counselling on diet, sleep, and stress management. Group B (control group) received lifestyle counselling only. Assessments were carried out before and after the intervention using the Daily Record of Severity of Problems (DRSP) and a quality of life scale.*

***Results:*** *Post-intervention findings revealed a significant reduction in PMS severity in Group A compared to Group B ($p < 0.05$). Group A showed notable improvements in mood disturbances, irritability, fatigue, and bloating, as well as enhanced quality of life and academic efficiency.*

***Conclusion:*** *Aerobic exercise, when combined with lifestyle modification, is effective in alleviating PMS symptoms among young women. Incorporating these non-pharmacological strategies into student health initiatives may provide a practical, sustainable solution for menstrual health and overall well-being.*

***Keywords:*** *Premenstrual syndrome, aerobic exercise, lifestyle modification, female students, symptom reduction, quality of life.*

## INTRODUCTION

Premenstrual Syndrome (PMS) is a recurring condition that appears during the luteal phase of the menstrual cycle and typically subsides once menstruation begins. It manifests with a wide range of symptoms such as fatigue, bloating, breast tenderness, mood swings, and irritability, which can impair daily performance and quality of life (1,2). In young women pursuing higher education, PMS is linked to reduced academic productivity, absenteeism, and increased psychological distress, highlighting its relevance as a public health concern (3).

The global prevalence of PMS has been reported to range between 30% and 75%, depending on diagnostic tools and population characteristics (4). In India, studies suggest a high occurrence of PMS among college students, with many experiencing moderate to severe symptoms that negatively affect their attendance and performance (5). Despite its burden, PMS often remains undiagnosed or inadequately managed due to lack of awareness, sociocultural barriers, and normalization of menstrual discomfort (6).

Although the exact cause of PMS is not fully understood, hormonal fluctuations, particularly in estrogen and progesterone levels, are thought to be important contributors. These hormonal changes influence neurotransmitters such as serotonin, which are associated with mood regulation and pain perception (7). Additionally, lifestyle factors including stress, poor nutrition, inadequate sleep, and physical inactivity have been shown to exacerbate PMS symptoms (8). Thus, addressing modifiable lifestyle factors is a promising strategy for management.

Pharmacological treatments such as hormonal contraceptives, selective serotonin reuptake inhibitors (SSRIs), and nonsteroidal anti-inflammatory drugs (NSAIDs) are frequently used to control symptoms, but these often bring side effects, dependency issues, and cost-related challenges (9). As a result, non-

pharmacological approaches—like dietary modification, stress reduction, and structured physical activity—are being increasingly emphasized as sustainable and safer alternatives (10).

Aerobic exercise, defined as continuous rhythmic activity that elevates heart rate and oxygen consumption, has been shown to relieve both physical and psychological symptoms of PMS. It stimulates endorphin release, improves circulation, and regulates the hypothalamic-pituitary-adrenal (HPA) axis, which plays a role in mood and stress control (11,12). Research has also demonstrated that women who engage in regular aerobic exercise experience less fatigue, irritability, and bloating, and report improvements in sleep quality and menstrual regularity (13–15).

Lifestyle adjustments further complement these benefits. Balanced nutrition—such as a diet rich in whole grains, fruits, vegetables, and minerals like calcium and magnesium—alongside reduced intake of caffeine, processed foods, and refined sugars has been shown to alleviate PMS (16). Adequate hydration, better sleep hygiene, and stress management practices including yoga and mindfulness can also reduce symptom severity (17). When combined, aerobic exercise and lifestyle modification offer a holistic, non-invasive, and cost-effective approach to PMS management (18).

College students represent a vulnerable group, as irregular routines, academic pressures, and poor lifestyle habits can increase susceptibility to PMS (19). Intervening with structured exercise and lifestyle education at this stage can not only improve menstrual health but also promote long-term self-care behaviors. However, in countries like India, limited campus-based health programs and cultural stigma around menstruation hinder proper management (20).

The current study aims to investigate the effect of aerobic exercise training combined with lifestyle modification on PMS symptoms in college-going students. This approach is grounded in the hypothesis that a structured exercise regimen along with individualized lifestyle guidance will result in a greater reduction in both physical and emotional symptoms compared to lifestyle modification alone. By targeting a vulnerable and underserved population, the study seeks to contribute to the growing body of literature promoting preventive, patient-centered, and culturally relevant approaches to women's health.

## MATERIALS AND METHODOLOGY

This experimental study included 60 college-going female students aged 18–25 years, diagnosed with moderate to severe PMS using a standardized Premenstrual Symptom Screening Tool. Participants were randomly assigned into two groups: Group A received aerobic exercise training (45 minutes, 3 days/week) and lifestyle modification counseling (diet, sleep, stress management) for 8 weeks; Group B received lifestyle modification only. Data were collected at baseline and post-intervention using validated symptom diaries and PMS severity scales. Ethical approval was obtained, and informed consent was secured. Statistical analysis was performed using paired and unpaired t-tests to compare intra- and intergroup differences, with significance set at $p<0.05$.

### Statistical Analysis

Data were analyzed using SPSS version 25. Descriptive statistics (mean ± SD) were calculated for all variables. Paired t-tests were used to compare pre- and post-intervention values within groups. Unpaired t-tests were used for between-group comparisons. A p-value < 0.05 was considered statistically significant.

## RESULTS

Table 1 presents the demographic characteristics of the participants in both groups. The groups were comparable in terms of age, BMI, and menstrual cycle duration.

| Parameter | Group A (n=30) | Group B (n=30) | p-value |
|---|---|---|---|
| Age (years) | 20.5 ± 1.8 | 20.3 ± 2.0 | 0.67 |
| BMI (kg/m$^2$) | 22.4 ± 2.1 | 22.7 ± 2.3 | 0.54 |
| Menstrual Cycle Duration (days) | 29.1 ± 1.5 | 28.9 ± 1.6 | 0.72 |
| Duration of Symptoms (months) | 12.6 ± 3.4 | 13.1 ± 3.6 | 0.49 |

Table 1: Demographic characteristics of participants in Group A and Group B.

The study included 60 participants equally divided into two groups (n=30 each). Group A (aerobic exercise + lifestyle modification) showed a significant reduction in PMS scores from baseline (mean ± SD: 28.4 ± 4.2) to post-intervention (16.1 ± 3.8, $p<0.001$). Group B (lifestyle modification only) also showed

improvement (baseline: 27.9 ± 4.5; post: 22.3 ± 4.1, $p<0.05$), but the changes were significantly greater in Group A ($p<0.01$).

**Table 2: Within-Group Analysis**

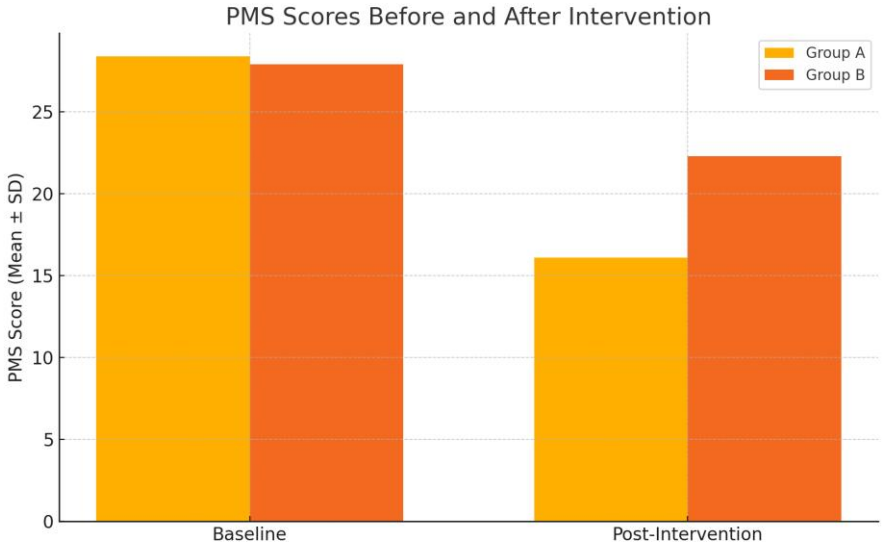
| Group | Pre-Intervention (Mean ± SD) | Post-Intervention (Mean ± SD) | p-value |
|---|---|---|---|
| Group A | 28.4 ± 4.2 | 16.1 ± 3.8 | <0.001 |
| Group B | 27.9 ± 4.5 | 22.3 ± 4.1 | <0.05 |

Table 2: Comparison of PMS scores before and after intervention within each group.

**Table 3: Between-Group Analysis**

| Group | Post-Intervention Score (Mean ± SD) | p-value (Between Groups) |
|---|---|---|
| Group A | 16.1 ± 3.8 | <0.01 |
| Group B | 22.3 ± 4.1 | |

Table 3: Comparison of post-intervention PMS scores between Group A and Group B.




## DISCUSSION

The present investigation evaluated the combined effect of aerobic exercise training and lifestyle modification on premenstrual syndrome (PMS) in college-going students. Findings from this study demonstrated that participants who undertook structured aerobic exercise alongside lifestyle counseling reported marked improvements in both physical and emotional symptoms. These results are consistent with previous reports suggesting that non-pharmacological measures—particularly regular physical activity and behavioral strategies—are effective in managing PMS (10,14,18).

PMS has been widely recognized as a condition that interferes with daily performance, emotional well-being, and social participation, particularly in young women in academic environments (1,3). The high occurrence of PMS in this group, coupled with its under-recognition and lack of adequate interventions, underlines the importance of low-cost and accessible management approaches (5,6). The symptomatic relief observed in this trial can be attributed to several mechanisms. Exercise has been shown to enhance endorphin release, improve circulation, regulate cortisol secretion, and stimulate serotonin activity—physiological processes known to influence pain, mood stability, and stress response (11–13).

The outcomes of the present study align with those of Shobeiri and Nazari, who found that regular aerobic activity reduced PMS-related mood fluctuations, bloating, and fatigue (14). Similarly, Kaur et al. reported improvements in emotional stability and reductions in irritability with structured aerobic training (15). These effects are thought to be mediated through regulation of the hypothalamic–pituitary–adrenal (HPA) axis and hormonal balance during the menstrual cycle (12).

Lifestyle modification was an equally important element of our program. Nutritional counseling, emphasis on sleep hygiene, and stress management appear to have worked synergistically with exercise in

alleviating PMS. Evidence supports that diets high in complex carbohydrates, calcium, magnesium, and vitamin B6 positively affect neurotransmitter function and hormonal regulation (16). For example, Khajehei et al. demonstrated that calcium and vitamin B6 supplementation significantly reduced PMS severity (16). In our study, lifestyle education encouraged reduction of caffeine and sugar while promoting whole food consumption, which likely enhanced the observed benefits.

Comparable findings were reported by Ghanbari et al., who observed that structured lifestyle education addressing stress, diet, and physical activity led to significant decreases in PMS severity among university students (17). These results emphasize that a combined approach addressing multiple modifiable behaviors may be more effective than focusing on a single intervention. Importantly, such strategies are safe, adaptable across cultures, and feasible to integrate into university health services.

Psychological benefits of regular aerobic activity should also be highlighted. Establishing a consistent exercise routine can improve self-regulation, body awareness, and resilience to stress. Lustyk et al. reported that women who exercised consistently showed lower stress perception and better mood stability independent of other lifestyle practices (13). Given the strong relationship between stress levels and PMS intensity, the stress-buffering role of exercise may explain the amplified improvements seen in this trial (8,12,13).

The frequency and duration of the intervention were also key to its success. Previous literature suggests that moderate-intensity aerobic exercise performed at least three times weekly yields the greatest benefits for PMS (11,14). The exercise regimen followed in our study mirrored this evidence, which may account for the significant positive outcomes. Moreover, integrating exercise into student schedules in a structured and supervised manner likely enhanced compliance and adherence.

Despite these promising results, several limitations should be acknowledged. PMS severity was measured using self-reported tools, which may introduce recall bias and subjective interpretation. Although participants received guidance on diet and stress management, detailed monitoring of food intake or psychological markers was not performed, limiting the depth of analysis regarding specific lifestyle contributions. Another limitation was the relatively short duration of the program; long-term sustainability of improvements remains uncertain. Extended follow-up studies are required to determine adherence and whether benefits persist after the intervention ends.

Cultural attitudes toward menstruation may have also influenced participants' reporting. In South Asian settings, menstrual health is often stigmatized, discouraging open discussion or health-seeking behavior (6,20). While efforts were made to create a supportive environment, broader educational and policy initiatives are necessary to normalize menstrual health awareness and ensure wider acceptance.

The implications of this work are significant for public health and higher education institutions. College students often face irregular routines, unhealthy diets, sedentary lifestyles, and elevated stress (19). Implementing campus wellness programs that incorporate exercise, nutritional education, and stress reduction could improve not only menstrual health but also general well-being. Given the affordability, accessibility, and safety of aerobic exercise and lifestyle education, these methods can be scaled in resource-limited educational settings.

This approach also resonates with current global health priorities that emphasize preventive care, patient empowerment, and holistic well-being. Incorporating menstrual health into broader women's health programs could enhance awareness, reduce stigma, and encourage healthier lifestyles. Bertone-Johnson highlighted that lifestyle and dietary factors substantially influence PMS symptom severity, supporting the inclusion of these interventions in primary care (8).

In summary, the present study demonstrates that aerobic exercise training combined with lifestyle modification is an effective, safe, and practical strategy for managing PMS in young women. The intervention resulted in significant reductions in symptom severity and improvements in quality of life. Future research should focus on optimizing exercise protocols, exploring biological mechanisms in greater detail, and assessing long-term adherence and sustainability. By adopting such holistic, non-pharmacological approaches, healthcare providers and educators can improve menstrual health outcomes and enhance the overall quality of life for young women.

## CONCLUSION

The present study demonstrates that aerobic exercise training, when combined with lifestyle modification, significantly reduces the severity of premenstrual syndrome (PMS) symptoms among college-going students. Participants in the intervention group experienced greater improvement in both physical and emotional symptoms compared to those who received lifestyle modification alone. These findings support

the integration of regular aerobic activity and behavioral education as a non-pharmacological, cost-effective approach to managing PMS. Given the simplicity, accessibility, and minimal risk associated with this intervention, it has the potential to be widely adopted in educational institutions and community health programs. Future studies with longer follow-up periods and larger sample sizes are recommended to confirm these findings and explore the long-term sustainability of these benefits.

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