

Correlation between Physical Activity and Premenstrual Syndrome: A Narrative Review

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Abstract

Background: Premenstrual syndrome (PMS) is a prevalent condition among sexually active women that manifests itself through a variety of physical, emotional, and behavioral symptoms during the end of the secretory phase of the menstrual cycle. **Aim:** This study aims to review studies that correlate physical activity with PMS. **Materials and Methods:** The literature search took place in four databases from the year 2000 to 2019. **Results:** Eight studies reported a positive correlation between physical activity, exercises, and PMS, while two reported a negative correlation. **Conclusion:** Physical exercise and PMS have a favorable association, according to the examined papers.

Keywords: Aerobic exercises, physical activity, premenstrual syndrome

INTRODUCTION

Premenstrual syndrome (PMS) is an umbrella term for a collection of recurrent clinical manifestations that appear between the termination of the secretory phase (five to seven days prior to menstrual periods) and the follicular phase of the monthly cycle (two to four days after menstrual periods).^[1] PMS manifests as a collection of physical, psychological, and behavioral issues that impair a woman's life quality.^[2,3] Despondency, tantrums, cantankerousness, weeping, spells, apprehension, bewilderment, social withdrawal, difficulty concentrating, sleep disturbance, tummy spasms, weariness, bowel bloating, breast discomfort and tenderness, pimples; back, head, joint, and muscular pain; weight increase, energy deficiencies, reduced appetite, constipation, and an increased heart rate are all possible symptoms of PMS.^[4,5] PMS may be experienced at any point in the reproductive ages with the mild or severe presentation but ceases after menopause. Only a minority of women fulfill the clinical diagnostic requirements. The condition is diagnosed by the recurrence of manifestations for a minimum of two successive monthly cycles.^[6]

The prevalence of PMS ranges from 48% to 90%, with varying intensities.^[7] Significant determinants of PMS are

factors such as lifestyle, behavior, maturity level, physical activity, diet, and associated disorders.^[1] PMSs actual etiology is unknown.^[8] Nevertheless, conditions such as continuously changing estrogen and progesterone concentration, complexity of the estrogen binding sites, neuroendocrine abnormalities, prostaglandin formulation, increased water retainment, elevated blood prolactin level, pyridoxine inadequacy, low blood sugar, prostaglandin shortfall, androgen hormone anaphylaxis, psychogenic physical manifestations, higher plasma aldosterone and renin activity, thyroid issues, and serotonin inadequacy, as well as environmental influences such as alcohol and tension are suspected to be involved in the development of PMS.^[9,10] Poor education, a sedentary lifestyle, a lack of exercise, smoking, sugary meals, and caffeine-containing beverages are all risk factors for the condition.^[6]

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However, the existing research results on the association between bodily exercise and premenstrual conditions are contradictory. While some writers observed a protective benefit,^[11-14] others reported no association.^[15] In contrast, others indicated that women who exercised more had more premenstrual symptoms than those who exercised less frequently or even not.^[16] As such, the aim of this investigation was to conduct a critical assessment of studies that linked physical activity to PMS in order to synthesize information that might be used in clinical practice.

MATERIALS AND METHODS

A literature search, covering between the years 2000 and 2019, was conducted using the following keywords: PMS, physical activity, and aerobic workouts in four electronic databases: PubMed (19 articles), CINAHL (14 articles), Pedro (2 articles), and Google Scholar (6 articles). The condition of interest's search phrases (conditions before menstruation, PMS, and tension before menstruation) was coupled with the intervention terms (physical activity and exercise). The search of the literature was in English. There were a total of 41 articles discovered; however, only ten matched the inclusion requirements.

Study design

This study's design is a narrative review.

Study population

The ages of the study population were between 11 and 48 years.

Study criteria

Inclusion criteria

1. Studies that explored the connection between bodily activity/exercise/aerobic exercise and PMS alone or along with other possible factors
2. Publications between 2000 and 2019
3. English-language publications.

Criteria for exclusion

1. Review articles
2. Studies published before the year 2000.

Data analysis

The synthesis correlation coefficient was used in this review to measure the connection between PMS and physical activity. To do this, we transformed odds ratios, mean difference, and Chi-square to the form used by Wilson^[17] and Bonett.^[18] We estimated PMS and physical activity using a meta-analysis with a random-effects model. The meta-analysis was done using comprehensive meta-analysis, with the significance level set at 0.05.

RESULTS

The findings of this study were achieved by the use of a variety of approaches, including randomized controlled trials (RCTs), cross-sectional studies, observation case-control studies, quasi-experimental studies, descriptive correlational studies, and prospective studies. The studies were conducted in Iran,

the United States of America, Indonesia, Poland, Saudi Arabia, and Turkey. The study population varied in age from 11 to 48 years. The findings are summarized in Table 1.

Dehnavi *et al.*^[19] conducted a randomized controlled experiment on 65 students aged 16–22 years who lived at Mashhad University of Medical Sciences' student boarding houses in Iran to ascertain the impact of 8 weeks of outdoor workout on the severity of PMS physical signs. The samples for the control and treatment categories were drawn at random. The manipulable group completed 8 weeks of aerobic workouts thrice a week for 20 min per round. The instruments used were the unit identification tool, midwifery and personal items, provisional diagnosis of conditions before menstruation, Baeck Depression, documented daily signs of conditions before menstruation, and the Borg Scale. The treatment group had a marked reduction in physical signs of PMS. As a result of the study's findings, aerobic exercise can treat conditions before menstruation and help alleviate the condition's physical symptoms.

Kamalifard *et al.*^[20] investigated the efficacy of yoga on PMS in 62 women aged 20–45 years in Tabriz, Iran. The study utilized a RCT design, with individuals randomly assigned to one of two groups: 31 yoga practitioners or 31 controls who completed the Premenstrual Symptom Screening Tools (PSST) questionnaire. For nearly two months, thrice a week, for 30 min, the yoga groups were invited to participate in aerobic training. Each workout session began with a five min warm-up and ended with a five-min cool-down. The control group documented their daily activities during the same 8-week period without participating in any exercise programs. They were equally urged to complete the questionnaire twice a week by the researcher through phone calls. Between the yoga and control groups, there was a substantial difference in emotional, physical, and behavioral factors. This study indicated that yoga workouts alleviate the symptoms of PMS in women who experience them during their normal cycle of reproduction.

Çiçek^[21] compared the PMS symptoms of active women to those of inactive women in Turkey. The RCT included 100 women who exercised frequently and had a mean age of 23.07 ± 4.76 years, as well as 120 women who did not exercise regularly and had an average age of 23.05 ± 4.77 years. Data collection was conducted using the Menstrual Distress Questionnaire (MDQ). The exercising group walked-ran three to five days a week for an hour every session for four months. The results indicated that the nonexercising group had considerably higher PMS ratings than the exercising group. In the premenstrual phase, the nonexercising group scored considerably higher on water retention, unfavorable impact, poor concentration, behavioral change, arousal, and control measures than the exercising group. The study concluded that some PMS symptoms occur less frequently in women who exercise consistently and at a lower intensity than those who are inactive. As a result, physical exercise may be prescribed to lower the intensity of menstruation symptoms.

Table 1: Summary of included articles

Study (authors year)	Country	Participant description	Study aim	Study design	Outcome measures	Results	Conclusion
Dehnavi <i>et al.</i> , 2018	Iran	65 students Mean age control group 24/06±4/71 intervention group 25/22±4/41	To ascertain the impact of 8 weeks of outdoor physical activity on the intensity of PMS manifestations	RCT	The questionnaires of temporary determination of PMS, Beck depression questionnaires, documented everyday manifestations of PMS using Borg Scale	Marked improvement in the manifestations of PMS in the treatment population	Every woman who can still give birth, particularly those who suffer from PMS, should engage in a consistent fitness routine
Kamalifard <i>et al.</i> , 2017	Iran	62 women Age: 20-40 years Mean age: 34.4±5.3 (Yoga) 30.1±6.2 (Control)	To measure the impact of yoga practice on PMS	RCT	PSST	There was no big variation in "effect of PMS on life" between the yoga and control groups prior to intervention; however, there were wide disparities following intervention ($P=0.001$)	Yoga practice alleviated PMS manifestations in women who experienced them during their normal monthly period
Çiçek, 2018	Turkey	100 exercising and 120 nonexercising women Mean age for exercise group: 23.07±4.76 Mean age for nonexercising group: 23.05±4.77	To compare the PMS manifestations of physically active women with those who are inactive	RCT	The MDQ	The physically inactive group had considerably higher PMS ratings than the active one	Women who exercise consistently experience fewer and milder PMS manifestations than women who are inactive
Kroll-Desrosiers, <i>et al.</i> , 2017	Massachusetts Amherst, USA	80 females with average to severe premenstrual manifestations and 89 women without premenstrual manifestations served as controls 18-31 years of age; mean age of 21.0±2.6 years	To identify the connection between regular exercise and PMS and complaints	Cross-sectional study	Calendar of premenstrual encounters with modifications	Physical exercise had no statistically significant relationship with the total, emotional, or overt premenstrual clinical sign scores	Physical exercise has no correlation with either premenstrual ratings or the occurrence of premenstrual symptoms
Tambing, 2017	Purwokerto, Indonesia	At public high school, there are 148 female students in Grades X and XI Age range: 11-15 years on average; 12.8±0.90 years	The connection between physical exercise and the prevalence of premenstrual disorders	Observational, case control study	The SPAF, IPAQ, threaded form Recall, Cohen Perceived Stress Scale, counterweight stampede (seca)	A statistically marked link exists between physical training and Premenstrual disorders	Minimal physical workout increases risk for the incidence of PMS
Aboushady <i>et al.</i> , 2016	Shaqra city, Saudi Arabia	80 dysmenorrheal students Age: 16-21 years Mean age: 18.1±2.34 years	To determine the effect of doing home-based stretching activities and menstrual care on lowering the intensity of discomfort associated with primary difficulty menstruation and premenstrual complaints	Quasi-experimental	Female adolescents structured interviewing questionnaire, menstruation assessment questionnaire, and VAS	The outcomes indicated that two months of frequent stretching activities in addition to routine menstrual care were beneficial at minimizing the seriousness of discomforts associated with primary difficulty menstruation and premenstrual complaints	PMS reduces after the practice of stretching exercises and also reduced the pain intensity during menstruation

Contd...

Table 1: Contd...

Study (authors year)	Country	Participant description	Study aim	Study design	Outcome measures	Results	Conclusion
Ghanbari <i>et al.</i> , 2008	Tehran, Iran	91 volunteer women Nonexercised (n=48), Exercised (n=43) Age: 16-48 years Mean age for exercised group: 31.4±7.5 Mean age for control group: 26.32±5.9	To investigate the effect of three months of consistent outdoor workout on premenstrual complaints	Quasi experimental study	MMDQ	Electrolyte, neurovegetative, and cognitive symptoms were markedly distinct before and after exercise	3 months of consistent aeration workout successfully alleviates premenstrual complaints
Sabaei, <i>et al.</i> , 2015	Tehran, Iran	40 female high school students Age: 15-17 years Mean age: 15.60±0.77 years	To examine the link between PMS and physical exercise, aerobic capacity, and anaerobic capacity	Descriptive correlational study	Baecke Physical Activity Questionnaire, A self-report questionnaire, and a submaximal 1-mile track jog test	A positive correlation between PMS and physical activity	Consistent physical exercise, particularly outdoor activities, has been shown to be useful in lowering PMS complaints
Safarzadeh, <i>et al.</i> , 2016	Iran	160 university students Age: Below 30 years Mean average age: 21.06±2.19 years	To examine the link between workout and PMS	Descriptive analytical study	The PSST standard questionnaire	There was a significant relationship between PMS and sports	Regular and continuous sport exercises can be of a great effect on PMS prevention
Czajkowska, <i>et al.</i> , 2015	Poland	125 girls and young women involved in athletics Age: 16-22 years	To examine the menstruation periods, menstrual issues, and manifestations before menstruation/dysphoric problem among teenage athletics	Prospective study	A questionnaire developed specifically for this purpose, as well as a daily track of PMS and PMDD complaints	While the frequency of PMDD was not substantially different across the groups, PMS was considerably more prevalent in athletes than in controls (49.33% vs. 32%, P=5.045) and was more prevalent in older sports persons and females with a later sexual maturity age	Competitive sports, a later average age, an advanced age at sexual maturity, a longer athletic career, and a higher level of training extent all point to discomfort

PMS: Premenstrual syndrome, RCT: Randomized controlled trial, MDQ: Menstrual Distress Questionnaire, SPAF: Shortened Premenstrual Assessment Form, IPAQ: International Physical Activity Questionnaire, VAS: Visual Analog Scale, MMDQ: Modified Menstrual Distress Questionnaire, PMDD: Premenstrual dysphoric disorder, PSST: Premenstrual symptom screening tool

Kroll-Desrosiers *et al.*^[22] examined the link between bodily exercise and manifestations before menstruation in 414 women between the ages of 18 and 31 years at the Massachusetts University, Amherst in the United States of America. The typical premenstrual symptom experience assessment was led by a modified version of the calendar of premenstrual events. The total of bodily and emotional ratings of manifestations before menstruation was calculated for each participant, and self-reported physical activity, nutrition, and lifestyle data were collected. Physical activity was quantified using a self-revealing instrument in which participants indicated the average weekly duration of specific activities such as trekking, marching, sprinting, jogging, biking, aerobics or dance, tennis or other racket games, swimming, yoga or pilates, and weight management exercise over the preceding month. The metabolic equivalent task hours per week were calculated using responses to the questionnaire. Physical exercise was shown to be unrelated to total, emotional, or premenstrual bodily discomfort scores.

Taming^[23] examined the link between bodily exercise and premenstrual condition incidence in female students in classes X and XI at Purwokerto's Public High School 1 (SMAN 1) and Vocational High School 3 (SMK 3). The outcomes of the study demonstrated a robust correlation between bodily exercise and manifestations before menstruation. Teenagers who did not engage in rigorous bodily activity had a 2.8-fold greater risk of getting manifestations before menstruation compared to those who did.

Aboushady *et al.*^[24] evaluated the impact of residence-based stretching trainings and menstruation management on the degree of discomfort related with primary dysmenorrhea and premenstrual manifestations in adolescent girls aged 16–21 years in Shaqra, Saudi Arabia. The researchers enrolled eighty students with dysmenorrhoea using a quasi-experimental method. A structured interviewing form for adolescent females, a menstruation appraisal instrument, and a Visual Analogue Scale were used to collect the data. Two months of frequent stretching exercises combined with routine menstrual care dramatically reduced the level of discomfort connected to primary painful menstruation and manifestations before menstruation.

Ghanbari *et al.*^[25] used a quasi-experimental approach to investigate the effects of three months of consistent aerobic training on manifestations before menstruation. Ninety-one volunteer women from Tehran University of Medical Sciences in Iran, ranging from 16 to 48 years, participated (48 were nonexercisers and 43 were). The Modified MDQ was utilized as the end measure (MMDQ). The exercise program consists of a five-min warm-up, a 45-min extremity and torso quick workout, and a 10-min cool-down. It is designed to be completed three times a week for three months. Electrolytic, neurovegetative, and mental manifestations were significantly different before and after exercise. From the study's findings, three months of consistent aerobic activities successfully minimize premenstrual manifestations' intensity.

Sabaei *et al.*^[6] examined the relationship between before-menstruation syndrome and physical activity, aerobic capacity, and anaerobic capacity in female postprimary school students. The study was conducted in Tehran's district five on 40 volunteers aged 15–17 years. The Baecke Physical Activity Questionnaire and a submaximal 1-mile track jog were utilized to measure physical activity, PMS, and aerobic power. The study discovered a striking unfavorable association between PMS and physical training and aerobic ability. The conclusion of the study is that frequent physical exercise, particularly aerobic activity, can help lower PMS symptoms.

Safarzadeh *et al.*^[26] examined the link between exercise and PMS in descriptive-analytic research. The research enrolled 160 students from Zahedan University of Medical Sciences in Iran under the age of 30 years. The standard PSST questionnaire was utilized to collect the data. The subjects performed physical activities such as trekking, riding, swimming, and gentle jogging. Eighty-six participants exercised not up to twice per week, 44 participants exercised between two and four days per week, and 30 subjects exercised more than 4 times each week. The study's primary conclusion was that there was a substantial correlation between PMS and athletics. From the study's findings, the researchers conclusion was that regular physical activity and continuous sport might help avoid PMS. Czajkowska *et al.*^[27] investigated the menstruation periods, menstrual issues, and before-menstruation syndrome/ before-menstruation dysphoric problem symptoms in Polish girls and young females who participated in competitive sports, as well as the impact of PMS/PMDD manifestations on their life quality. The research enrolled 125 girls and young women aged 16–22 years, 75 were middle- and long-distance sprinters, and 50 were healthy (control). The exercise level was mild to moderate, with a minimum of forty-two hours training sessions each week. The participants were evaluated over two consecutive menstrual periods using a purpose-built instrument, a daily documentation of PMS manifestations according to the principles of the American College of Obstetricians and Gynecologists, and a daily documentation of PMDD manifestations according to the diagnostic requirements in the fourth edition of the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders. According to the findings, the prevalence of PMDD was not substantially different across the groups. PMS was much more frequent in athletes than in controls and was more prevalent in older athletes and those with a later menarche age. The study indicated that sports involving competition, an older mean age, older age at menarche, a longer athletic career, and increased training intensity all contribute to the development of PMS. PMS prevalence increases in direct proportion to the duration and intensity of competitive physical activities.

DISCUSSION

The purpose of this study is to examine the relationship between physical activity, exercise, and, more precisely, physical activity, and PMS. Eight research found an association

between physical activity, workouts, and manifestations before menstruation. One research found no statistically marked difference,^[27] while another found a negative link between physical activity, workouts, and PMS.^[22] The statistically significant link seen in these researches might be attributed to the kind, duration, and extent of physical activities and exercise. It is unsurprising, considering the literature's evidence for the function of exercise in the production of endorphins—a chemical compound recognized for its feel-good factor and pain-relieving properties.^[28] In addition, activities alleviate stress, promote sleep, and alleviate sadness through their effect on endorphins and catecholamines.^[29]

According to Kamalifard *et al.*,^[20] yoga alleviates PMS symptoms such as worry, tension, and elevated heart rate. The mind-body connection might explain this finding that this form of physical activity engenders. Yoga is a collection of breathing, mental, and physical techniques that promote relaxation, develop positive consciousness, and slow the pulse rate. This fact corroborates the findings of Dvivedi *et al.*^[30]

Despite the apparent unanimity about the efficacy of aerobic exercise in alleviating PMS, Kroll-Desrosiers *et al.*^[22] hypothesized that the study's negligible association might be due to the study's design and instrument. Physical training was quantified using a self-report instrument in which participants indicated the mean duration of specific physical training such as trekking, marching, trotting, jogging, cycling, aerobics or rock climbing, tennis or certain other racket sporting events, swimming, yoga, or Pilates, and fitness exercises over the preceding month. The answer often fluctuates from zero min to around 11 hrs every week. It is conceivable that women under- or over-reported their physical activity, omitted particular training, or engaged in more occupational or lifestyle physical activity than a leisure activity.

Czajkowska *et al.*^[27] discovered no statistically significant difference between the intervention and control groups. In addition, PMS was shown to be more common among sportswomen and most among those of older age than in females of delayed menarche age. The minor finding might be due to a failure to account for the role of self-esteem, athlete adaptation to high-impact sports, menstrual expectations, and state-trait stress extent.

Limitations of the study

Most of the reviewed studies recruited a small sample size for their study. None of the research investigated the participants' clinical/mental health condition, although young females with mental problems frequently exhibit clinical manifestations that coincide with those of PMS. Furthermore, some studies did not include apparent intervention assessment made. Some studies measured physical activity through a self-reporting questionnaire, and all the participants' responses were considered accurate. Participants would have under-reported or over-reported their physical activity. Finally, there was no follow-up on all the studies.

CONCLUSION

According to the studies analyzed, PMS is favorably linked to physical training. Therefore, women with premenstrual symptoms should be encouraged to perform exercises to improve their premenstrual symptoms.

Implication of the study

This narrative review found that physical activity and aerobic exercises may be a practical treatment goal for managing PMS. Health professionals who wish to advise the patient on using physical activity and aerobic exercises as a treatment goal for managing PMS should do so with caution until more evidence occurs.

Recommendation

The awareness of physical training and workout in reducing PMS should be emphasized among women, and an adequate and proper prescription should be made for effectiveness in the management of PMS.

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Conflicts of interest

There are no conflicts of interest.

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