The Effect of Physical Activity on Premenstrual Syndrome: A Systematic Review

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Abstract

Background: Physical, emotional, and behavioural symptoms that can significantly impact daily life are the hallmarks of premenstrual syndrome (PMS), a common illness affecting women of reproductive age. There are many different ways to manage PMS, and there is mounting evidence that physical activity may be helpful in reducing symptoms. With an emphasis on different exercise modalities such as weight training, yoga, and aerobic activity, this systematic review attempts to investigate how physical activity affects the management of PMS symptoms.

Summary: A systematic review of studies published between 2009 and 2023 was conducted, adhering to PRISMA guidelines. Articles from PubMed, Embase, and the Cochrane Library were evaluated based on inclusion criteria focusing on the effects of physical activity on PMS symptoms. The findings indicate that regular participation in exercises such as weight training, yoga, and aerobic activities significantly reduces fatigue, improves mood regulation, and alleviates physical discomfort associated with PMS. These results highlight the benefits of exercise as an effective, non-pharmacological intervention for managing PMS symptoms.

Key Messages: Incorporating regular physical activity into daily routines can serve as a practical and sustainable approach to managing PMS symptoms. Women suffering from PMS can experience improved physical and psychological well-being through diverse forms of exercise, including yoga and aerobic workouts. This underscores the role of exercise as a holistic and accessible intervention for enhancing women's health.

Keywords

Physiology, clinical neuroscience, behaviour, function

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Key messages

Physical activity as therapy: Research suggests that regular exercise, especially yoga, resistance training, and aerobic exercises, can help reduce PMS symptoms naturally without the need for prescription drugs.

Benefits for holistic health: These exercises enhance mood, lessen physical discomfort, and cut down on exhaustion, all of which enhance mental and physical health.

Non-pharmacological approach: Exercise presents a strong substitute for medication-induced therapies, offering a natural means of managing PMS and enhancing women's quality of life.

Keynote

Premenstrual syndrome, Physical Activity, Exercise, Aerobic exercise, Yoga, Resistance training, Menstrual Health, Symptom management, Women's health, non-pharmacological intervention.

Introduction

In the 1930s, Dr. Robert Frank[1] initially reported the cyclical occurrence of symptoms in women, leading to the diagnosis of premenstrual syndrome (PMS). The knowledge of PMS has developed throughout the years, drawing on knowledge from psychiatry, endocrinology, and gynaecology.

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PMS is a group of symptoms that coincide with the menstrual cycle and include psychological, physical, and behavioural aspects.[2] According to studies, up to 75% of women may at some point in their lives experience PMS symptoms.[3] When women visit their primary care physician, they frequently bring acute PMS symptoms, decreased productivity at work, and marital problems.[4] Furthermore, there might be a relationship between PMS and diseases including depression and hypertension.[5]

Numerous therapies are advised for managing PMS symptoms. Both the (National Institute for Health and Care Excellence) and the (Royal College of Obstetricians and Gynaecologists) suggest that exercise should be considered as a primary treatment, in addition to medications like selective serotonin reuptake inhibitors and the combined oral contraceptive pill.[6]

Pharmacological treatments are frequently effective but carry the risk of side effects such as fatigue, nausea, and potential impact on pregnancy. Women may also actively seek alternative therapies.[7] Physical activity can elevate endorphin levels, assist in balancing progesterone and oestrogen production, and stimulate the body's natural anti-inflammatory substance synthesis. Furthermore, exercising offers additional advantages like enhanced general health, chances for social interaction, and the possibility of alleviating feelings of depression and anxiety.[8,9]

Thus, in conclusion on the basis of many reviews of literature the impact of physical activity on PMS symptoms. The revised version is concise and provides a clear understanding of how physical activity relates to PMS, along with the nuances involved in the research. It's well-written and conveys the essential points from each study while linking them to the broader summary of PMS management through physical activity.

Methods

The purpose of this systematic review is to assess how well physical activity works to lessen premenstrual symptoms. This was performed through searches across key electronic databases, such as PubMed, Google Scholar, and Scopus (Figure 1). Research that examines the effects of any kind of physical activity intervention on

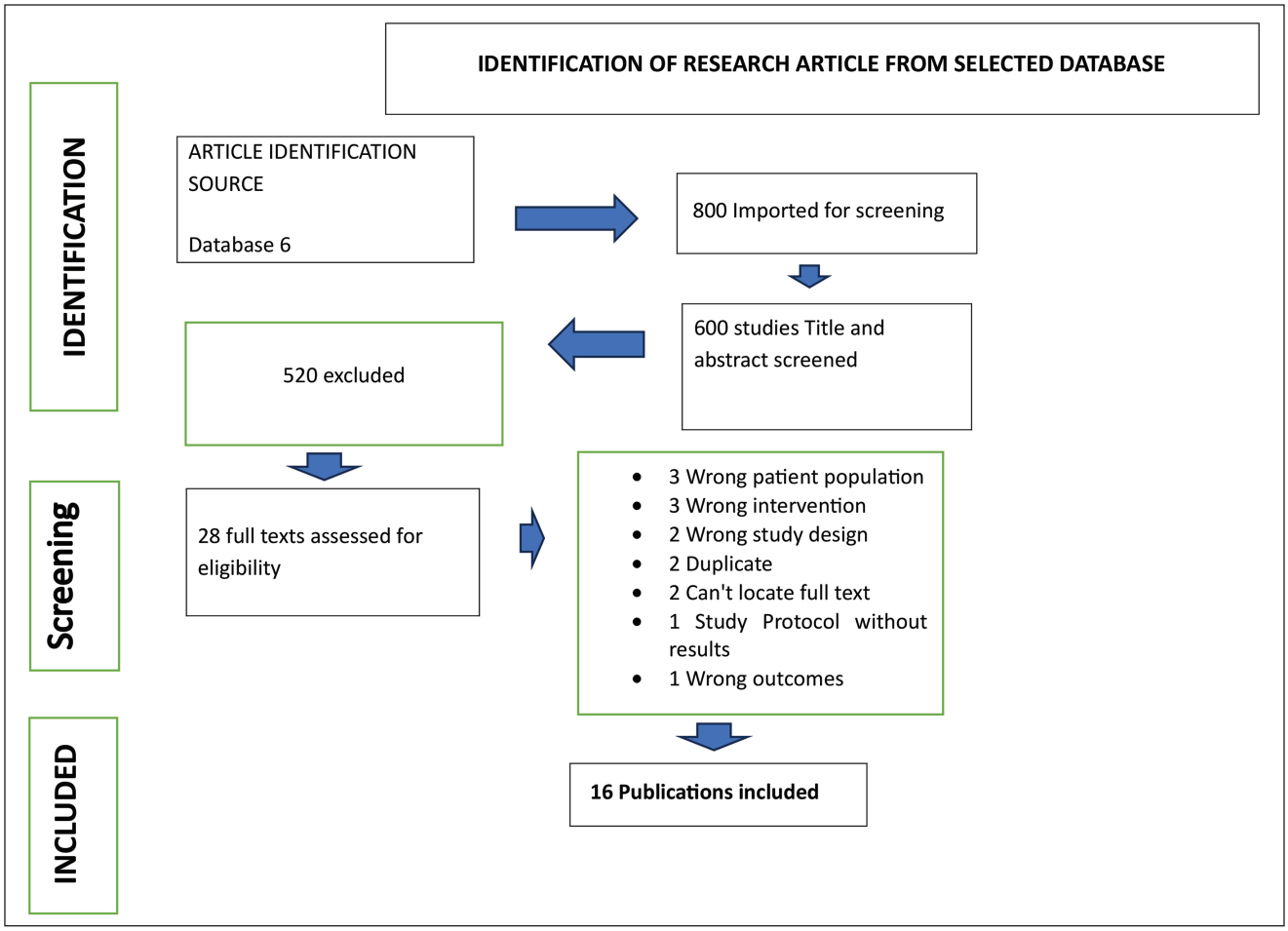

Figure 1. PRISMA Flow Chart.

Table 1. Search Strategy and Formula Employed for Various Database.

Database Articles Identified	Keywords
Google Scholar 131	Exercise + psychological symptoms + PMS
Scopus 141	Irritability + Anxiety + Dizziness + Menstrual symptoms
Shodhganga 178	Menstrual cycles + menarche + gynaecological health
PubMed 150	Behavioural symptoms + Relationship challenges

the severity of PMS symptoms and includes women with a diagnosis of PMS or premenstrual dysphoric disorder will be considered.

This study was operated through the guidelines of Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) for reporting the systematic literature reviews of articles relating to physical activity and PMS. The outlined 27-item PRISMA checklist was followed for the planning, conducting, organising, evaluating, analysing, and reporting of the literature reviewed. The extracted reviews were analysed and organised using various sources such as Google Docs and Excel spreadsheets. The research articles were selected on pre-defined criteria. The study was conducted through the various stages discussed in the following sub-sections (Table 1).

Organising the Review

A guide for doing a systematic review was developed using the PRISMA checklist paradigm, incorporating the recommendations made by Pascoe et al. To address the research topic within the allotted time frame, a meticulous design for the study was developed in compliance with the suggested 15-step process. The following information was documented in the draft outline:

1. Domain for the study: Role of physical activity in PMS.
2. Objective of study: The focus of the study was premised on the exploration of the impact of physical activity on premenstrual symptoms.
3. Implications: The investigation into the role of physical activity in PMS would highlight the interactional relationship between physical activity and psychological and physical symptoms among women.

Research Questions

RQ: Whether there would be any role of physical activity on PMS.

Inclusion criteria:

- Studies published in peer-reviewed and indexed journals.
- Articles based on empirical evidence, qualitative inquiries, review articles, and mixed-method approaches.
- Studies focusing on the aetiology, diagnosis, or management of PMS.
- Research involving human subjects.

Exclusion criteria:

- Studies not focusing on PMS.
- Non-peer-reviewed articles.
- Animal studies.

The articles underwent a final screening process that took into account both the inclusion and exclusion criteria. The articles' titles and abstracts were assessed for informational value and substance in order to support their inclusion in the research. supporting their inclusion in the research. The database was cleared of duplicate research.

Conducting the Review

For the evaluation of reviews, all of the writers worked together to organise and filter the studies. In accordance with the proposed research questions, the articles were screened in two sections. One Excel sheet had the studies that reflected the context of PMS, while the other portion was used for studies on physical activity and PMS. Theses, dissertations, and research articles on the relevant context were included in the study. A total of 600 studies had their titles and abstracts assessed for relevancy. The analysis also included the abstracts of the articles for which the complete text was not available (Table 1). To reduce the possibility of bias, mistakes, and duplication, all the writers further validated the articles that had been screened for possible inclusion.

Results and Findings

The search strategy identified eligible studies, involving a total of 600. Physical activity shows a significant reduction in PMS symptoms such as slow walking, brisk walking, and mild stretching. The exercise interventions included a variety of modalities, such as aerobic training, resistance exercises, and yoga.

The search strategy identified 16 eligible studies, involving a total. The physical activity included a variety of modalities, such as aerobic training (e.g., brisk walking, jogging, cycling), resistance exercises (e.g., strength training with weights or resistance bands), and yoga (encompassing physical postures, breathing techniques, and meditation). The studies examined the impact of these diverse physical activity programmes on the severity of premenstrual disorder symptoms, including both psychological (e.g., mood changes,

Table 2. Demographic Description of the Articles Included in the Review.

Authors	Publication Year	Population	Diagnosis	Scale Used	Population Studies	Research Method	Country
Ashraf Direkvand et al.[9]	2009	Adolescence to middle age	PMS	–	9049	Meta-Analysis	Iran
Kroll-Desrosiers et al.[10]	2017	Young adult women	PMS	COPE	414	Cross-sectional	US
Morino S. et al.[11]	2016	University students	PMS	PSST	64	Cross-sectional	Japan
Lustyk MK. et al.[12]	2004	Adult women	PMS	DRSP	84	Cross-sectional	US
Shi Y. et al.[13]	2023	Female college students	PMS	PSST	1,108	Cross-sectional	China
Kroll AR[14]	2010	18 to 24 aged	PMS	DRSP	414	Cross-sectional	US
Mohebbi Z. et al.[15]	2018	Adolescent	PMS	PSST	70	Pre and post	Iran
Nam SJ. et al.[16]	2020	University students	PMS	PSST	45	Quasi-experimental	South Korea
Liguori F. et al.[17]	2023	Adult women	PMDD	SF-36 Health Survey	217	Cross-sectional	Italy
Aeli Ryu et al.[18]	2015	Adult trainee	PMDD	DRSP	–	A mini-review	Korea
Nattapong Buddha et al.[19]	2017	High school student	PMS	–	–	Quantitative research	Thailand
Michelle Vichnin MD et al.[20]	2006	Adolescence	PMS	DRPS	105	Quantitative research	USA
Lori M. Dickerson et al.[20]	2003	–	PMS	–	20	Qualitative research	USA
Safitri DE[21]	2020	–	PMS	DRS	–	Meta-Analysis	USA
Liguori F.[22]	2023	–	PMS	–	–	Observational research design	Italy

irritability) and physical (e.g., bloating, cramps) symptoms experienced by the participants.

The systematic review revealed a significant reduction in PMS symptom severity among women who engaged in physical activity. Subgroup analyses further suggested that certain types of exercise, such as aerobic training, may be more effective than others in alleviating PMS symptoms. Physical activity was found to be useful in reducing the intensity of premenstrual symptoms, including mood disruptions, physical discomfort, and behavioural changes,[23] according to a systematic review of the literature on the subject. The results have important implications for primary care professionals, who often encounter women presenting with acute PMS symptoms. By offering physical activity-based interventions, clinicians may be able to help their patients manage PMS without providing medications that carry the risk of side effects.

Discussion

This systematic review provides evidence that physical activity can effectively reduce the severity of premenstrual disorder symptoms. The findings support the recommendation by major clinical guidelines to consider physical activity as a primary prevention and treatment for PMS, alongside other management strategies.

However, the included studies were limited by small sample sizes and varying exercise protocols. Future research should aim to elucidate the optimal type, frequency, and duration of physical activity for PMS symptom relief. Physical activity has been found to have a significant impact on the management of PMS. Recent research suggests that engaging in regular physical activity can help alleviate the symptoms associated with PMS, including mood changes, physical discomfort, and cognitive difficulties (Table 2).[24]

Studies have shown that physical activity can have a positive effect on mood, reducing symptoms of depression and anxiety that are often experienced during the premenstrual phase.[25] Additionally, physical activity has been found to improve sleep quality, which can be disrupted during the premenstrual period.[26] The release of endorphins and other hormones during physical activity can also help to reduce physical symptoms such as cramps, bloating, and headaches.[27]

Furthermore, research indicates that different types of physical activity may have varying effects on premenstrual symptoms (see Table 2).

For example, a study found that aerobic exercise was more effective in reducing mood-related symptoms, while yoga and mindfulness-based activities were more beneficial for reducing physical symptoms.

Conclusion

The findings have important implications for primary care professionals in providing holistic, non-pharmacological approaches to managing PMS in their patients.

The review cites previous studies[2] to support the effectiveness of physical activity in reducing premenstrual disorder symptoms (Table 2).

Physical activity can elevate endorphin levels, assist in balancing hormone production, and stimulate the body's natural anti-inflammatory processes, all of which can contribute to alleviating PMS symptoms. Additionally, exercise provides broader benefits such as enhanced general health, opportunities for social interaction, and the potential to alleviate feelings of depression and anxiety that may accompany premenstrual disorders (see Table 2).

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The implications of these findings are particularly relevant for primary care professionals, who often encounter women presenting with acute PMS symptoms. By offering exercise-based interventions, clinicians may be able to help their patients manage PMS without resorting to medications that carry the risk of side effects.

During the premenstrual phase, women often experience cyclical changes in sex hormones, along with bloating and fluid retention. Exercise-induced muscle contractions help release the fluid that contributes to bloating and tenderness. This process, in turn, enhances circulation, which aids in the better absorption of excess fluid. Out of 10 studies that examined bloating and fluid retention, seven indicated that exercise led to noticeable improvements while three found no significant effects. Additionally, six studies specifically looked at breast tenderness associated with bloating and fluid retention, and all concluded that exercise effectively reduces breast sensitivity (see Table 2).

Limitations

The present study explored the extant literature for the research on physical activity on PMS. The study was conducted on the premises of PRISMA guidelines for systematic literature, keeping in view the intricacies of the procedure. Despite rigorous methodology, few limitations exist for the systematic review conducted. The limitations of the study could be capitulated as:

- The review was conducted through open-access databases primarily; thus, it limited the domain of other published literature.
- The impact of physical activity on PMS was included in the study.
- The studies included in the review were in the English language only. Published literature in other languages could also be included in future research.

Abbreviations

PMS: Premenstrual Syndrome; PMS: Premenstrual symptoms; PMDD: Premenstrual dysphoric disorder; PMS COPE: Premenstrual Change Coping Inventory; PSST: Premenstrual Symptoms Screening Tool; DRSP: Daily Record of Severity of Problems.

Author' Contribution

All authors contributed to the study's conception and design. Research conceptualization, data sorting, analysis, and duplication checks were performed. The first draft of the manuscript was written by SA Research conceptualization, data sorting, analysis, and duplication checks and MA and VS commented on previous versions of the manuscript. AA, Assisted in the preparation and formatting of the manuscript according to journal submission requirements. All authors read and approved the final manuscript.

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ICMJE Statement

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Statement of Ethics

Ethical permission was not required for the systematic review research article.

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References

1. Choi PYL. The psychological benefits of physical exercise: Implications for women and the menstrual cycle. *J Reprod Infant Psychol* 1992; 10(2): 111–115. DOI: 10.1080/02646839208403943
2. Daley A. Exercise and premenstrual symptomatology: A comprehensive review. *J Womens Health (Larchmt)* 2009; 18(6): 895–899. DOI: 10.1089/jwh.2008.1098.
3. Dózsa-Juhász O, Makai A, Prémusz V, et al. Investigation of premenstrual syndrome in connection with physical activity, perceived stress level, and mental status—A cross-sectional study. *Front Public Health* 2023; 11: 1223787. DOI: 10.3389/fpubh.2023.1223787
4. Kroll-Desrosiers AR, Ronnenberg AG, Zagarins SE, et al. Recreational physical activity and premenstrual syndrome in young adult women: A cross-sectional study. *PLoS One*. 2017; 12(1): e0169728. DOI: 10.1371/journal.pone.0169728
5. Miller M, McGowen KR, Miller B, et al. Lessons learned about research on premenstrual syndrome. *J Womens Health (Larchmt)* 1999; 8(7): 989–993. DOI: 10.1089/jwh.1.1999.8.989
6. Mohebbi-Dehnavi Z, Jafarnejad F and Goghary SS. The effect of 8 weeks aerobic exercise on severity of physical symptoms of premenstrual syndrome: A clinical trial study. *BMC Womens Health* 2018; 18(1): 56. DOI: 10.1186/s12905-018-0565-5
7. Pearce E, Jolly K, Jones L, et al. Exercise for premenstrual syndrome: A systematic review and meta-analysis of randomised controlled trials. *BJGP Open* 2020; 4(3): bjgpopen20X101032. DOI: 10.3399/bjgpopen20x101032
8. Pokharel P, Rana J, Moutchia J, et al. Effect of exercise on symptoms of premenstrual syndrome in low and middle-income countries: A protocol for systematic review and meta-analysis. *BMJ Open* 2020; 10(9): e039274. DOI: 10.1136/bmjopen-2020-039274.
9. Samadi Z, Taghian F and Valiani M. The effects of 8 weeks of regular aerobic exercise on the symptoms of premenstrual syndrome in non-athlete girls. *Iran J Nurs Midwifery Res* 2013; 18(1): 14–19. PMID: 23983722.
10. Direkvand-Moghadam A, Sayehmiri K, Delpisheh A, et al. Epidemiology of premenstrual syndrome (PMS)—a systematic review and meta-analysis study. *J Clin Diagn Res* 2014; 8(2): 106. DOI: 10.7860/JCDR/2014/8024.4021
11. Ryu A and Kim TH. Premenstrual syndrome: A mini review. *Maturitas* 2015; 82(4): 436–440. DOI: 10.1016/j.maturitas.2015.08.010
12. Buddhabunyakan N, Kaewrudee S, Chongsomchai C, et al. Premenstrual syndrome (PMS) among high school students. *Int J Womens Health* 2017; 9: 501–505. DOI: 10.2147/IJWH.S140145
13. Vichnin M, Freeman EW, Lin H, et al. Premenstrual syndrome (PMS) in adolescents: Severity and impairment. *J Pediatr Adolesc Gynecol* 2006; 19(6): 397–402. DOI: 10.1016/j.jpag.2006.06.015
14. Biggs WS, Demuth RH. Premenstrual syndrome and premenstrual dysphoric disorder. *Am Fam Physician* 2011; 84(8): 918–924. PMID: 22010769.
15. Dickerson LM, Mazyck PJ and Hunter MH. Premenstrual syndrome. *Am Fam Physician* 2003; 67(8): 1743–1752. PMID: 12725453.
16. Freeman EW, Halberstadt SM, Rickels K, et al. Core symptoms that discriminate premenstrual syndrome. *J Womens Health (Larchmt)* 2011; 20(1): 29–35. DOI: 10.1089/jwh.2010.2061
17. Steiner M, Peer M, Palova E, et al. The Premenstrual Symptoms Screening Tool revised for adolescents (PSST-A): prevalence of severe PMS and premenstrual dysphoric disorder in adolescents. *Arch Womens Ment Health* 2011; 14(1): 77–81. DOI: 10.1007/s00737-010-0193-2
18. Saglam HY, Orsal O. Effect of exercise on premenstrual symptoms: A systematic review. *Complement Ther Med* 2020; 48: 102272. DOI: 10.1016/j.ctim.2019.102272
19. Kwan I and Onwude JL. Premenstrual syndrome. *BMJ Clin Evid* 2015; 2015: 0813. PMID: 25939468.
20. Kroll AR, Ronnenberg AG, Zagarins SE, et al. Recreational physical activity and premenstrual syndrome in college-aged women. *PLoS One* 2017; 12(1): e0169728. DOI: 10.1371/journal.pone.0169728
21. Morino S, Egawa M, Hirata H, et al. Association between premenstrual syndrome and daily physical activity levels. *J Womens Health Issues Care* 2016; 5(2): 2. DOI: 10.4172/2325-9795.1000225
22. Jurgens T and Whelan AM. Advising patients on the use of natural health products to treat premenstrual syndrome. *Can Pharm J (Ott)* 2009; 142(5): 228–233. DOI: 10.3821/1913-701x-142.5.228
23. Lustyk MK, Widman L, Paschane A, et al. Stress, quality of life and physical activity in women with varying degrees of premenstrual symptomatology. *Women Health* 2004; 39(3): 35–44. DOI: 10.1300/J013v39n03_03
24. Shi Y, Shi M, Liu C, et al. Associations with physical activity, sedentary behavior, and premenstrual syndrome among Chinese female college students. *BMC Womens Health* 2023; 23(1): 173. DOI: 10.1186/s12905-023-02439-w
25. Liguori F, Saraiello E and Calella P. Premenstrual syndrome and premenstrual dysphoric disorder's impact on quality of life, and the role of physical activity. *Medicina (Kaunas)* 2023; 59(11): 2044. DOI: 10.3390/medicina59112044
26. Nam SJ, Cha C. Effects of social-media-based support on premenstrual syndrome and physical activity among female university students in South Korea. *J Psychosom Obstet Gynaecol* 2020; 41(1): 47–53. DOI: 10.1080/0167482X.2019.1575125
27. Rahayu NS, Safitri DE. The meta-analysis of the effect of physical activity on premenstrual syndrome. *J Dunia Gizi* 2020; 3(1): 01–8. DOI: 10.33085/jdg.v3i1.536