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The Effect of Physical Activity on Symptoms Associated with Premenstrual Syndrome: A Critically Appraised Topic

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An estimated 80-90% of menstruating individuals experience premenstrual syndrome (PMS) and up to 95% experience symptoms that may limit daily activities. There are a wide range of treatment options ranging from over-the-counter medications, prescription medication and hormonal birth control, all of which could have adverse effects. The purpose of this study is to assess if physical activity could help reduce PMS symptoms. Across three studies, all with different types of physical activity, there was a significant improvement in PMS symptoms compared to a control group. Physical activity has shown to be an effective intervention for symptoms associated with PMS.

***Keywords**: exercise, menstruation, quality of life*

Introduction/Clinical Scenario

Premenstrual syndrome (PMS) is characterized by emotional, behavioral and physical symptoms that occur around menstruation, including the late luteal and early follicular phases.[1-3] An estimated 80-90% of menstruating individuals experience PMS and up to 95% experience symptoms that may limit daily activities and affect quality of life.[1,4,5] These symptoms fall into 3 different groups, emotional (e.g., irritability), physical (e.g., breast pain) and behavioral (e.g., appetite changes/food cravings), and range from mild to moderate to severe.[3-5] Recognition and treatment of these symptoms is important to those affected to improve quality of life.[1-4] Symptoms can be monitored with the Premenstrual Symptoms Screen Tool (PSST), a patient-rated outcome measure, which includes questions regarding all premenstrual symptoms and a measure of impairment.[3,6]

People experiencing PMS have a wide range of treatment options, including over-the-counter pain medications (e.g., acetaminophen), prescriptions to treat specific symptoms (e.g., selective serotonin reuptake inhibitors for anxiety and depression related symptoms) and hormonal birth control.[3-5] While these treatments can be effective many try to avoid the contraindications, high cost and side effects of these medications.[1,3] Exhaustion, insomnia,

headache, menstrual dysfunction, decreased sexual ability, gastrointestinal disturbances, nausea and vomiting, which are common side effects with prescription treatments, may impede one's ability to focus on daily tasks and could affect daily quality of life.[3,7] These side effects, along with personal preference, may result in an unwillingness to take these medications.[1,3]

Another consideration for improving and managing PMS symptoms is physical activity as a treatment.[1-5,8] The type of physical activity can vary according to the individual, is based on an individual's level of comfort and physical ability and can include varying types of activities (e.g., yoga, aerobic, anaerobic).[2-4] The use of exercise is in line with the American College of Sports Medicine's (ACSM) "Exercise is Medicine" initiative.[9] This includes setting a goal of implementing physical activity assessment and exercise prescription as a standard part of disease prevention and treatment paradigm for patients.[9] Prescriptive exercise has been shown to improve physical and mental health in both healthy individuals and those with medical conditions.[9] The ACSM does not have specific guidelines for managing PMS symptoms; however, individuals are recommend to regularly participate in moderate aerobic physical activity between 150 and 300 minutes per week, or vigorous aerobic physical activity between 75 and 150 minutes per week.[10] Additionally, the American College of Obstetricians and Gynecologists (ACOG) recommends 30 minutes of exercise most days of the week to help relieve PMS symptoms[11], however, this recommendation lacks the support of high-quality evidence.[2]

Focused Clinical Question

In those who experience PMS, does physical activity help reduce PMS symptoms?

Search Strategy

A search was conducted in June of 2023 through August of 2023 of PubMed and Medline using a PICO strategy to evaluate the question.

- **P**atient group: Individuals who experience PMS
- **I**ntervention/assessment: Physical activity
- **C**omparison: No physical activity
- **O**utcome: PMS symptoms and/or severity

The search was conducted using the Boolean phrases (PMS) AND (physical activity), as well as (Premenstrual syndrome) AND (physical activity). The articles were included if the study participants met the following criteria: had a diagnosis of PMS and had not reached menopause. Additionally, studies were included if they were randomized control trials and published in the last 7 years. Potential articles were excluded if the studies included participants that had been diagnosed with Female Athlete Triad, as these individually may have a disrupted menstrual cycle making tracking of symptoms through their cycle difficult. Furthermore, studies with participants who had been diagnosed with PCOS, endometriosis, uterine fibroids, or other gynecological disorders were also excluded. These exclusions were due to a higher amount of and severity of symptoms.

Evidence Quality Assessment

The Physiotherapy Evidence Database (PEDro) Scale was used to critically appraise each article.[12] The PEDro Scale consists of 10 yes or no items, such as whether subjects were

randomly allocated into groups, if the allocation was concealed, if subjects were similar as baseline, and if there was blinding of both the subjects and researchers.[11] Each criteria is scored (0) for absent and (1) for present. A higher score indicates higher methodology quality.[12]

Results of Search: Summary of Search, "Best Evidence" Appraised, and Key Findings

In total, this search yielded 266 articles from PubMed and Medline. Each article was reviewed for the inclusion and exclusionary criteria, resulting in 3 articles included (see Table 1).[2-4] All three articles compared an exercise intervention (i.e., swimming, aerobic exercise, yoga) to control groups who had no activity and the duration of the exercise intervention ranged from 2 to 3 months.[2-4] Overall, there were significant improvements in symptoms from pre-intervention to post-intervention in the physical activity groups, while the control group did not experience significant reduction in symptoms.[2-4]

Table 1.
Summary of Included Studies

Author(s)	Maged et al.[2]	Dehnavi et al.[4]	Kamalifard et al.[3]
Study Title	Effect of swimming exercise on premenstrual syndrome	The effect of 8 weeks aerobic exercise on severity of physical symptoms of premenstrual syndrome: a clinical trial study	The effect of yoga on women's premenstrual syndrome: A randomized controlled clinical trial
Study Participants	70 women recruited from El Gezira Youth Center and clubs related to Ministry of Sports after full examination at Specialized Sports Medicine Center in Nasr City from April 2016 to May 2017 with a premenstrual syndrome (PMS) diagnosis	65 women at Mashhad University of Medical Sciences, with symptoms of PMS. 30 were randomly assigned to the control group, and 35 to the intervention	Starting with 150 females that had been referred to private obstetrics and gynecology clinics in Tabriz, Iran from April to October 2015. Using the premenstrual symptom screening test (PSST) questionnaire for 2 months to track their PMS symptoms, 62 subjects with PMS entered the study. Randomly assigned into 2 groups. 31 in the yoga group, 31 in the control group
Inclusion Criteria	All participants were virgins. Their age ranged from 18 - 25 years, and their Body Mass Index ranged from 18 to 25 kg/m2. They were clinically and medically stable	Regular menstrual cycles (cycles of 21-35 days with a bleeding time of 3 - 10 days), PMS (according to the interim screening questionnaire, having 4 of 11 The question mark) and Score below 40 from	20 - 45 years old, having PMS according to the PSST questionnaire, having regular menstrual periods, being non-athletic for duration of 3 months, not being under any treatment with

	during the study with regular menstrual cycle of 23 - 35 day duration	Beck Depression questionnaire	chemical/herbal medications or oral contraceptives, having no depression and genital tract diseases, not drinking alcohol or smoking cigarettes, not to be a tobacco or illicit drug user, not having any joint diseases, rheumatoid arthritis, or surgeries that could affect yoga exercise, not to be a caffeine user (expressed by subjects) and have a willingness to participate in the study
Exclusion Criteria	Excluded were those with cardiopulmonary or orthopedic problems, women taking any hormonal drugs or drugs that affect hormones as antidepressant during the preceding 3 months before participation in the study, and any abnormality in ovulation or those with pelvic inflammatory diseases (PID). Women with endocrine abnormality as thyroid, pituitary, or ovarian disorders were also excluded	Prior to study exclusion included pregnancy, participation in other sports programs, continuous use of medication, chronic disease, Women with neurological, psychological disorders, women under hormonal treatment, women with endocrinological diseases, women with local lesions causing pain as PID, severe depression (according to the depression questionnaire having a score above 40), the incidence of adverse events in the last 3 months. During the study exclusion included dissatisfaction with the continuation of the research, pregnancy during the study, changes in menstrual cycle during study, the failure to complete the questionnaire (3 consecutive days and 5 days interrupted) and any adverse or stressful feelings	Not willing to continue the investigation and/or have had experienced yoga exercise before

Timeline	Each group completed 3 months of initial assessment of PMS symptoms. A 3 month period followed where the intervention group completed the swimming protocol and the control group had no intervention. PMS symptoms were tracked in both groups in this phase	2 months prior to intervention daily PMS symptom questionnaire completed by both control and intervention groups followed by a 2-month period where the intervention group completed exercise and a control group did not. All completed the PMS questionnaire	2 consecutive months prior to intervention PSST issued to both control and intervention groups to ensure participants were eligible for the study followed by a 10-week yoga program for the intervention group. All participants completed the PSST at the end of the 10-week intervention period
Intervention Physical Activity Parameters	Duration of 3 months. Completed a moderate intensity (aerobic) swimming workout 3 times per week for 30 minutes per session. Weekly total: 90 minutes	Duration of 8 weeks. Completed a moderate intensity aerobic exercise 3 times per week for 20 minutes per session. Weekly Total: 60 minutes	Duration of 10 weeks. Completed a non-aerobic yoga exercise 3 times per week for 20 minutes per session. Weekly Total: 60 minutes
Outcome Measures	Number of participants experiencing PMS symptoms in 17 categories pre- and post- intervention in each group. Mann-Whitney U test was used to compare the groups. Statistical significance was set at $p<0.05$	Pre- and post- symptom severity means, as well as pre- and post- difference in 11 categories were compared between groups pre- and post-intervention. Multiple independent t-tests were used to compare pre-, post- and difference scores between groups. Statistical significance was set at $p<0.05$	PSST means were compared between and within groups. An ANCOVA was used to compare between group effects and a paired samples -test was used to examine within group effects. Statistical significance was set at $p<0.05$
Results	The intervention group showed significant improvements compared to the control in 14/17 symptoms assessed. See Table 2 for further details.	The intervention group showed lower symptoms severity scores post-intervention compared to the control in 4/11 categories. The intervention group experienced a significant within group change compared to the control in 4/11 categories. See Table 3 for further details.	The intervention group showed significant post-intervention PSST score compared to the control in all 3 categories. The intervention group also experienced a significant decrease pre- to post- in all 3 PSST categories that was not observed in the control group. See Table 4 for further details

Evidence Quality Score	8/10	8/10	10/10
Support for the Answer	Yes	Yes	Yes

Results of Evidence Quality Assessment

The three articles in this critically appraised topic each have a Strength Of ReccomendationTaxonomy level of evidence of a 1.[13] All studies were randomized control trials, which had consistent findings across relevant populations. Maged et al[2] and Dehnavi et al[4] both received a rating of 8/10 on the PEDro scale. Points were deducted for the studies not blinding participants or assessors. Kamalifard et al[3] had a rating of 10/10. All three studies included participants who were similar at baseline and randomly assigned to the intervention and control groups. Key outcomes were based on symptoms experienced surrounding premenstrual syndrome.

Clinical Bottom Line: Strength of Recommendation

There is consistent evidence across all three studies that physical activity is effective to reduce PMS symptoms. Physical, emotional, and behavioral symptoms were reduced following physical activity interventions in the three studies.[2-4] Regardless of physical activity intervention, PMS symptoms improved with exercise.[2-4] Each study differed in their approach to physical activity. In Maged et al,[2] the intervention group participated in a moderate aerobic swimming intervention of 30 minutes 3 times a week (90 minutes/week) for 3 months. Kamalifard et al[3] had their intervention group participate in non-aerobic yoga intervention 3 times a week for 20 minutes each session (60 minutes/week) over 10 weeks. Lastly, Dehnavi et al[4] had the intervention group engage in a moderate aerobic activity for 30 minutes, 3 times a week (90 minutes/week) for 8 weeks. While the studies did not reach the ACSM guidelines for physical activity,[10] nor the ACOG's physical activity recommendation[11] to help with PMS, there was still a marked improvement in the intervention groups compared to the control groups.

All three studies showed improvements in multiple PMS symptom categories. Maged et al[2] and Dehnavi et al[4] looked at specific symptoms chosen by each individual study (see Tables 2 and 3). Kamalifard et al[3] used the Premenstrual Symptom Screening Tool (PSST) to examine the effects of physical activity on emotional, physical, and behavioral symptom subscales (see Table 4). With the significant findings across all three studies, physical activity as an intervention for patients experiencing PMS is effective at reducing physical, emotional, and behavioral symptoms. The Strength of Recommendation Taxonomy[12] grade for this research is an A.

Table 2.
Change in Number of Participants Reporting Premenstrual Symptoms from Maged et al.[2]

Symptom	Variable	Intervention Participants Reporting	Control Participants Reporting	P Value
Anxiety	Pre	3	5	0.16
	Post	0	5	0.0001*
	% change pre to post	-33.3%	0%	0.0001*

Irritability	Pre	0	0	0.92
	Post	0	0	0.86
	% change pre to post	0	0	0.98
Depression	Pre	14	10	0.06
	Post	3	12	0.0001*
	% change pre to post	-79.29%	15.56%	0.0001*
Tension	Pre	15	12	0.07
	Post	3	12	0.0001*
	% change pre to post	− 81.18%	− 6.79%	0.0001*
Mood	Pre	3	6	0.84
	Post	0	7	0.001*
	% change pre to post	-33.3%	0%	0.01*
Feeling Out of Control	Pre	5	7	0.88
	Post	0	7	0.0001*
	% change pre to post	-91.67%	0%	0.002*
Poor Coordination	Pre	11	12	0.46
	Post	0	10	0.0001*
	% change pre to post	100%	-9.55%	0.0001*
Insomnia	Pre	2	0	0.13
	Post	0	0	0.79
	% change pre to post	− 71.43%	0%	0.0001*
Confusion	Pre	10	11	0.55
	Post	2	9	0.0001*
	% change pre to post	− 84.17%	− 9.55%	0.0001*
Headache	Pre	14	17	0.12
	Post	3	15	0.0001*
	% change pre to post	− 77.78%	− 6.94%	0.0001*
Crying	Pre	0	0	0.86
	Post	0	0	0.27
	% change pre to post	0%	0%	0.26

Fatigue	Pre	14	12	0.39
	Post	4	12	0.0001*
	% change pre to post	− 65.69%	0%	0.0001*
Aches	Pre	15	14	0.24
	Post	5	11	0.0001*
	% change pre to post	− 65.83%	− 8.93%	0.0001*
Breast Tenderness	Pre	10	8	0.37
	Post	2	8	0.0001*
	% change pre to post	− 87.87%	4.55	0.0001*
Cramps	Pre	15	18	0.88
	Post	6	17	0.0001*
	% change pre to post	− 60.77%	4.55%	0.0001*
Swelling	Pre	11	7	0.004
	Post	4	6	0.27
	% change pre to post	− 55.05%	− 8.33%	0.0001*
Food Cravings/Increased Appetite	Pre	0	0	>0.99
	Post	0	0	0.94
	% change pre to post	0%	0%	0.92

*Note: * denotes significance at P ≤ 0.05. P values are from the Mann-Whitney U test comparing groups at pre-, post- and % change pre to post. Intervention n = 35, Control n = 35*

Table 3.
Changes in Severity of Premenstrual Symptoms from Dehnavi et al.[4]

Symptom	**Variable**	**Intervention Severity**	**Control Severity**	**P Value**
Headache	Pre	1.48 ± 1.50	1.93 ± 1.36	0.21
	Post	0.85 ± 0.74	1.6 ± 1.3	0.001*
	Within Group Difference	-0.42±0.69	-0.5 ± 0.82	0.7
Fatigue	Pre	1.51 ± 1.37	1.56 ±1.4	0.88
	Post	1.14 ± 1.16	1.16 ± 1.17	0.8
	Within Group Difference	-0.6 ± 0.84	-0.3 ± 0.74	0.13
Breast Tenderness	Pre	2.74 ± 0.65	2.56 ± 0.81	0.33
	Post	1.80 ± 0.93	1.90 ± 0.95	0.7
	Within Group Difference	-1.05 ± 0.9	-0.7 ± 0.98	0.13
Breast Swelling	Pre	1.42 ± 1.31	1.56 ± 1.38	0.68
	Post	0.98 ± 0.97	1.36 ± 1.32	0.001*

	Within Group Difference	-1.00 ± 0.71	-0.33 ± 0.71	0.002*
Food Cravings/Increased Appetite	Pre	1.97 ± 1.36	2.00 ± 1.25	0.93
	Post	1.34 ± 0.99	1.7 ± 1.05	0.1
	Within Group Difference	−0.91± 0.88	-0.36 ± 0.71	0.008*
Acne	Pre	1.85 ± 1.26	1.9 ± 1.37	0.89
	Post	1.11 ± 0.9	1.26 ± 1.08	0.09*
	Within Group Difference	-0.82 ± 1.04	−0.66± 0.92	0.5
Bloating	Pre	1.34 ± 0.88	1.34 ± 0.66	0.5
	Post	0.53 ± 0.32	0.89 ± 0.43	0.08
	Within Group Difference	-0.54 ± 0.88	-0.26 ± 0.63	0.01*
Dizziness	Pre	1.44 ± 1.57	2.23 ± 1.19	0.06
	Post	1.20 ± 1.25	1.7 ± 1.16	0.06
	Within Group Difference	-0.4 ± 0.73	-0.4 ± 0.77	0.7
Flushing	Pre	1.77 ± 1.37	2.02 ± 1.21	0.42
	Post	1.31 ± 1.20	1.83 ± 1.17	0.08
	Within Group Difference	-0.8 ± 0.99	-0.36 ± 0.71	0.04*
Nausea, Diarrhea, Constipation	Pre	1.68 ± 1.45	1.90 ± 1.39	.054
	Post	1.01 ± 0.91	1.6 ± 1.24	0.01*
	Within Group Difference	-0.45 ± 0.78	-0.43 ± 0.89	0.9
Heartbeat (Palpations)	Pre	1.08 ± 2.34	1.8 ± 1.27	0.17
	Post	1.4 ± 0.97	1.4 ± 1.1	0.09
	Within Group Difference	-0.91 ± 0.98	-0.5 ± 1.00	0.12

*Note: * denotes significance at P ≤ 0.05. P values are from the independent samples t-test performed between groups at pre-, post- and within group difference. Intervention n = 35, Control n = 30*

Table 4.
Changes in Premenstrual Symptom Screening Tool Means from Kamalifard et al.3

PSST Subscale	Variable	Intervention Group (M±SD)	Control Group (M±SD)	Between Groups P Value
Emotional	Pre	62.34 ± 16.26	54.32 ± 19.16	0.11
	Post	26.28 ± 16.54	54.91 ± 21.31	<0.001*
	P Value (Within Group)	<0.001*	0.856	
Physical	Pre	71.15 ± 22.39	78.57 ± 14.95	0.155
	Post	32.69 ± 20.81	72.01 ± 22.24	<0.001*
	P Value (Within Group)	<0.001*	0.077	
Behavioral	Pre	45.51 ± 19.89	44.04 ± 18.54	0.078
	Post	10.90 ± 14.10	44.05 ± 22.32	<0.001*
	P Value (Within Group)	<0.001*	1	

*Note: * denotes significance at P ≤ 0.05. Between group P values are from the ANCOVA. The PSST scale ranges from 0-100, with lower scores indicating lower symptom experience and severity. Within group P values for each PSST scale are from paired samples t-tests. Intervention n = 31, Control n = 31*

Implications for Practice, Education, and Further Research

Individuals who experience PMS can suffer from symptoms that affect their daily quality of life through emotional, physical, and behavioral symptoms. These symptoms can be treated with over-the-counter medications, prescription medications and hormonal birth control. The side effects or lack of desire to take medications has led to research around other more holistic approaches to treating and reducing the severity of PMS symptoms. Physical activity is not only easily accessible in many forms but can be catered to the individual and their abilities, creating a more patient-centered treatment option. Research evidence supports that physical activity helps reduce the symptoms associated with PMS in menstruating individuals.[1-4]

All three studies evaluated in this CAT showed improvement in PMS symptoms following the intervention activities as compared to the control groups.[2-4] These study findings combined also show that different types of physical activity interventions can help decrease symptoms. Each of the studies implemented exercise interventions ranging from non-aerobic to moderate aerobic activity.[2-4] Dehnavi et al was the only group who monitored physical activity intensity with the Borg Scale, as participants were instructed to stay within the range of moderate intensity.[4] While none of the studies met the ACSM physical activity guidelines[10] or the ACOG[11] recommendation, the physical activity interventions still helped individuals with their PMS symptoms. Since all participants in the studies were individuals who were not currently active, even some physical activity over none could be considered as an effective intervention.[2-4] These findings may be helpful in encouraging lower-level physical activity in those who may be hesitant to exercise and experience PMS symptoms.

Each study used different screening methods and there were some common themes to how PMS symptoms were screened and compared. Kamalifard et al[3] administered the PSST with their study participants and compared pre- and post- scores between groups with an ANCOVA, as well as within group differences with a paired samples t-test. The PSST is a reliable and validated patient rated outcome measure designed to assess individuals'

emotional, physical, and behavioral PMS symptoms.[3,6,14] Instead of using the PSST, the other researchers used longer questionaires.[2,4] Maged et al.[2] used the Daily Symptoms report, where participants indicated each day the severity (0 indicating no symptom to 4 indicated overwhelming/unable to carry out daily routine) of 17 different symptoms. A Mann-Whitney U test was used to compare the number of participants in the control and intervention groups who reported symptoms in those 17 categories pre- and post- intervention (Table 2).[2] Dehnavi et al.[4] had their participants record the severity of 11 daily PMS symptoms, however, they did not provide a scale to interpret the numbers. These pre- and post- values, as well as changes in score, were compared via an independent t-test between the control and intervention groups (Table 3).[4] Although each study used a different approach, the symptoms captured on each scale addressed physical, emotional, and behavioral components.

All three studies showed fewer PMS symptoms in the intervention groups compared to the control post-exercise.[2-4] In Maged et al, the number of participants who experienced symptoms significantly decreased in the intervention group compared to the control in 12 of the 17 symptoms (Table 2).[2] The percent reduction in the intervention group ranged from 33 to 88%, while the differences in the control group ranged from a 10% reduction to a 15% increase in those same symptoms.[2] Dehnavi et al[4] observed significantly lower post-intervention symptom severity scores, including breast swelling, food cravings, bloating, and flushing, in the intervention group as compared to the control (Table 3). Additionally, Dehnavi et al[4] found a significant difference in post-scores symptom severity, with the intervention group scoring lower than the control group in headache, swollen breast, acne, and nausea. However, due the using a t-test over a repeated measures ANOVA, we are unable to determine if this was a true interaction effect between group and time. Finally, Kamalifard et al[3] saw a significant interaction effect, with the intervention group reporting a significant reduction in all symptom scales of the PSST compared to the control group (Table 4). Additionally, the intervention group experienced a highly significant reduction in their post-intervention PSST scores, which was not observed in the control group. With all three studies seeing the similar results, even with different screening tools and with different types of physical activity, bolsters the results that physical activity can be effective in reducing PMS symptoms.

While the evidence across these three studies supports the use of physical activity as a method to reduce PMS symptoms, more information is still needed. Since all individuals in these studies were not active individuals at the start of the study, we cannot extrapolate these findings to those who are already physically active. There could also be concern for a ceiling effect in which usual physical activity may no longer provide symptom relief/reduction. Future studies should include an active population, as well as examine if different methods of exercise or altering a person's usual physical activity can provide PMS symptom relief. Furthermore, since all exercise protocols were below the ACSM guidelines and ACOG recommendations, future studies should explore if symptoms can improve even more with increased activity. Finally, researchers should use the PSST over other scales, as it can provide more details about PMS symptom severity, as well as quality of life.

CAT Kill Date: August 2026

CATs have a limited life and should be revisited approximately 2 years after publication.

Statement of Contributions

LH designed and directed the project. All authors provided critical feedback and helped shape the clinical question, literature search, analysis, and manuscript.

References

1. Kawabe, R., Chen, C. Y., Morino, S., Mukaiyama, K., Shinohara, Y., Kato, M., Shimizu, H., Shimoura, K., Nagai-Tanima, M., & Aoyama, T. (2022). The relationship between high physical activity and premenstrual syndrome in Japanese female college students. BMC Sports Science, Medicine & Rehabilitation, 14(1), 175. https://doi.org/10.1186/s13102-022-00569-0
2. Maged, A. M., Abbassy, A. H., Sakr, H. R. S., Elsawah, H., Wagih, H., Ogila, A. I., & Kotb, A. (2018). Effect of swimming exercise on premenstrual syndrome. Archives of Gynecology and Obstetrics, 297(4), 951–959. https://doi.org/10.1007/s00404-018-4664-1
3. Kamalifard, M., Yavari, A., Asghari-Jafarabadi, M., Ghaffarilaleh, G., & Kasb-Khah, A. (2017). The Effect of Yoga on Women's Premenstrual Syndrome: A Randomized Controlled Clinical Trial. International Journal of Women's Health and Reproduction Sciences, 5(3), 205–211. https://doi.org/10.15296/ijwhr.2017.37
4. Mohebbi Dehnavi, Z., Jafarnejad, F., & Sadeghi Goghary, S. (2018). The effect of 8 weeks aerobic exercise on severity of physical symptoms of premenstrual syndrome: a clinical trial study. BMC Women's Health, 18(1). https://doi.org/10.1186/s12905-018-0565-5
5. Valérie Bougault, Sandrine Schiano-Lomoriello, Castanier, C., Buisson, C., Ericsson, M., Teulier, C., & Collomp, K. (2023). Physical activity and combined hormonal contraception: association with female students' perception of menstrual symptoms. 14. https://doi.org/10.3389/fphys.2023.1185343
6. Chamali, R., Emam, R., Mahfoud, Z. R., & Al-Amin, H. (2022). Dimensional (premenstrual symptoms screening tool) vs categorical (mini diagnostic interview, module U) for assessment of premenstrual disorders. World Journal of Psychiatry, 12(4), 603–614. https://doi.org/10.5498/wjp.v12.i4.603
7. Dimmock, P. W., Wyatt, K. M., Jones, P. W., & O'Brien, P. S. (2000). Efficacy of selective serotonin-reuptake inhibitors in premenstrual syndrome: a systematic review. The Lancet, 356(9236), 1131–1136. https://doi.org/10.1016/s0140-6736(00)02754-9
8. Shi, Y., Shi, M., Liu, C., Sui, L., Zhao, Y., & Fan, X. (2023). Associations with physical activity, sedentary behavior, and premenstrual syndrome among Chinese female college students. BMC Women's Health, 23(1). https://doi.org/10.1186/s12905-023-02262-x
9. Thompson, W. R., Sallis, R., Joy, E., Jaworski, C. A., Stuhr, R. M., & Trilk, J. L. (2020). Exercise Is Medicine. American Journal of Lifestyle Medicine, 14(5), 511–523. https://doi.org/10.1177/1559827620912192
10. American College Of Sports Medicine. (2021). ACSM's guidelines for exercise testing and prescription (11th ed.). Wolters Kluwer/Lippincott Williams & Wilkins Health.
11. Premenstrual Syndrome (PMS). November 2023. Www.acog.org. https://www.acog.org/womens-health/faqs/premenstrual-syndrome
12. PEDro. (1999). PEDro scale. https://pedro.org.au/wp-content/uploads/PEDro_scale.pdf
13. Ebell, M. H., Siwek, J., Weiss, B. D., Woolf, S. H., Susman, J., Ewigman, B., & Bowman, M. (2004). Strength of recommendation taxonomy (SORT): a patient-centered approach to grading evidence in the medical literature. American family physician, 69(3), 548–556
14. Steiner, M., Macdougall, M., & Brown, E. (2003). The premenstrual symptoms screening tool (PSST) for clinicians. Archives of Women's Mental Health, 6(3), 203–209. https://doi.org/10.1007/s00737-003-0018-4