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Known Methods to Relieve Symptoms of Premenstrual Syndrome (PMS): A Review

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ABSTRACT

Premenstrual syndrome (PMS) is a set of physical and psychological symptoms that occurs during the premenstrual period. It is a commonly occurring condition. The presence of PMS symptoms is associated with a deterioration in patients' quality of life and affects their daily lives. In recent years, ongoing research has focused on identifying effective methods of alleviating PMS symptoms through both non-pharmacological and pharmacological therapies. Non-pharmacological methods used include dietary changes, physical activity and psychosocial interventions including relaxation techniques. Non-pharmacological methods appear to be a low-cost alternative to pharmacological ones. An appropriate diet rich in fruits, regular physical activity especially in the form of yoga and Pilates, and the use of relaxation and cognitive and behavioral techniques can reduce the severity of PMS symptoms. Pharmacological methods include the use of SSRI group drugs, which are the first choice for pharmacological treatment, SNRI group drugs, and drugs that affect the endocrine system, including hormonal contraception. Currently, the effect of using herbal preparations containing the extract of chaste tree (*Vitex agnus-castus* L.) is also being studied. It is necessary to conduct further research on the possibility of alleviating PMS symptoms both non-pharmacologically and with drugs, and to develop an optimal best practices for patients suffering from PMS symptoms.

Key Words: PMS, PMS management, PMS treatment, Premenstrual syndrome, Premenstrual syndrome management, Premenstrual syndrome treatment

BACKGROUND

Premenstrual syndrome (PMS) is a set of symptoms occurring during the luteal phase in the time before the expected menstruation. The syndrome includes somatic and psychological symptoms.¹ The symptoms reported by patients include abdominal cramps, lowered mood, fatigue, irritability, skin problems, anxiety, anger outbursts, low back pain, increased appetite, abdominal and breast tenderness, headaches, and impaired concentration, among others.^{2,3} Depending on the dominant symptoms, researchers divide the syndrome into affective, somatic and mixed form.³ The most severe form of PMS is premenstrual dysphoric disorder (PMDD), which, according to the diagnosis criteria, occurs in about 2-8 % of women of reproductive age.⁴ The prevalence of PMS worldwide varies by country (from 12 % in France to 98 % in Iran). The worldwide prevalence is 47.8 %.⁵

Proposed mechanisms for the occurrence of PMS include the body's excessive response to changes in steroid hormone levels⁶, the involvement of neurotransmitters - serotonin and γ -aminobutyric acid (GABA)⁷, in addition, the influence of temporal lobe activity (amygdala and hippocampus) on the occurrence of PMS symptoms is now also suspected.⁸ The study identified risk factors that may influence the occurrence of PMS symptoms. These include family burden (positive family history for PMS), long and heavy menstrual bleeding, irregular menstrual cycles, early age of menarche⁹, intensity of menstrual pain^{9,10}, sleep and eating disorders¹⁰, high levels of perceived stress¹¹ smoking, and inappropriate dietary habits (high-calorie and high in fat diet, sugar and salt). Interestingly, research indicates that a diet rich in fruit reduces the risk of PMS symptoms.¹²

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The occurrence of PMS symptoms has a negative impact on the quality of life of women experiencing it.^{13, 14} PMS symptoms lead to restriction of daily activities.¹⁴ In female students, the severity of PMS symptoms has an impact on the amount of academic classes missed due to these symptoms.¹¹ Women experiencing PMS report dissatisfaction with their appearance and the impact on their relationship with family members and others.¹⁴

Due to the reported symptoms and their negative impact on patients' lives, attempts are being made to alleviate the symp-

toms through various strategies, which will be discussed in this article.

In purpose to create this article, literature review was conducted. The scientific papers published to date in the PubMed database were reviewed and analyzed. Keywords used were: "premenstrual syndrome", "premenstrual syndrome's symptoms", "PMS", "PMS treatment", "PMS activity".

LITERATURE REVIEW

Authors	Year	Title of a study	Conclusion
Kwon YJ, Sung DI, Lee JW	2022	Association among Premenstrual Syndrome, Dietary Patterns, and Adherence to Mediterranean Diet	Non-adherence to a Mediterranean diet is associated with a higher incidence of PMS symptoms.
Farpour S, Soleimani D, Moradinazar M, Samadi M	2023	The relationship of dietary inflammatory index and dietary patterns with premenstrual syndrome among women in Kermanshah: An analytical cross-sectional study.	A Western diet and a diet rich in salt and sugar is associated with more severe PMS symptoms.
Hashim MS, Obaideen AA, Jahrami HA, Radwan H, Hamad HJ, Owais AA et al.	2019	Premenstrual Syndrome Is Associated with Dietary and Lifestyle Behaviors among University Students: A Cross-Sectional Study from Sharjah, UAE	A high-calorie diet rich in fat, sugar and salt increases the risk of PMS symptoms, while fruit consumption reduces this risk.
Jafari F, Amani R, Tarrahi MJ	2020	Effect of Zinc Supplementation on Physical and Psychological Symptoms, Biomarkers of Inflammation, Oxidative Stress, and Brain-Derived Neurotrophic Factor in Young Women with Premenstrual Syndrome: a Randomized, Double-Blind, Placebo-Controlled Trial.	Zinc supplementation for 12 weeks among women with premenstrual syndrome had beneficial effects on physical and psychological symptoms of premenstrual syndrome, total antioxidant capacity, and brain-derived neurotrophic factor.
Arab A, Rafie N, Askari G, Taghiabadi M	2020	Beneficial Role of Calcium in Premenstrual Syndrome: A Systematic Review of Current Literature.	The review suggests a beneficial role for calcium in PMS subjects.
Pearce E, Jolly K, Jones LL, Matthewman G, Zanganeh M, Daley A	2020	Exercise for premenstrual syndrome: a systematic review and meta-analysis of randomised controlled trials	Exercise may be an effective treatment for PMS.
Maged AM, Abbassy AH, Sakr HRS, Elsawah H, Wagih H, Ogila AI et al.	2018	Effect of swimming exercise on premenstrual syndrome.	There is beneficial effect of swimming on most of the physical and psychological symptoms of PMS.

Authors	Year	Title of a study	Conclusion
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.	Aerobic exercise as one of the ways to treat premenstrual syndrome can reduce the physical symptoms of the syndrome.
El-Lithy A, El-Mazny A, Sabour A, El-Deeb A	2015	Effect of aerobic exercise on premenstrual symptoms, haematological and hormonal parameters in young women.	Aerobic exercise increases haemoglobin, haematocrit, red cell count and platelet count, and decreases levels of prolactin, oestradiol and progesterone, resulting in improvement of fatigue, impaired concentration, confusion and most premenstrual symptoms.
Pal A, Nath B, Paul S, Meena S	2022	Evaluation of the effectiveness of yoga in management of premenstrual syndrome: a systematic review and meta-analysis.	Yoga can be beneficial in patients with PMS.
Çitil ET, Kaya N	2021	Effect of pilates exercises on premenstrual syndrome symptoms: a quasi-experimental study.	It was seen that the pilates exercises, which were practiced in this study, decreased the PMS symptoms considerably. The pilates exercises have an important role in healing the PMS symptoms.
Han J, Cha Y, Kim S	2019	Effect of psychosocial interventions on the severity of premenstrual syndrome: a meta-analysis.	Psychosocial interventions, especially coping skills training for women with PMS, were effective in reducing the severity of PMS.
Jose A, Nayak S, Rajesh A, Kamath N, Nalini M.	2022	Impact of relaxation therapy on premenstrual symptoms: A systematic review.	Selected methods of relaxation therapy effectively relieve PMS and ensure a productive life for all reproductive women.
Raipure A, Patil S	2023	Comparative Efficacy of Mitchell's and Benson's Relaxation Techniques in Alleviating Pain and Improving Quality of Life Among Patients With Premenstrual Syndrome: A Randomized Controlled Trial	When it comes to lowering the intensity of premenstrual syndrome in young people, Benson's relaxation method is superior to Mitchell's. Both approaches should be entrenched as a regular practice and can be employed on patients to improve their menstrual well-being.
Şener Çetin N, Şolt Kırca A	2023	The Effect of a Mindfulness-Based Stress Reduction Program on Premenstrual Symptoms: A Randomized Controlled Trial	A mindfulness stress reduction program was effective in reducing premenstrual symptoms.

Authors	Year	Title of a study	Conclusion
Khodakarami B, Babakhani N, Masoumi SZ, Mohagheghi H, Farhadian M	2023	The Effect of Cognitive-behavioral Counseling on the Resilience of Female Adolescents with Premenstrual Syndrome: A Randomized Controlled Trial.	Cognitive-behavioral counseling can improve resilience in female adolescents with moderate to severe PMS.
Borji-Navan S, Mohammad-Alizadeh-Charandabi S, Esmaeilpour K, Mirghafourvand M, Ahmadian-Khooiarood A	2022	Internet-based cognitive-behavioral therapy for premenstrual syndrome: a randomized controlled trial.	The internet-based cognitive-behavioral therapy could reduce the symptom severity of women suffering from PMS while improving their perimenstrual quality of life.
Schellenberg R, Zimmermann C, Drewe J, Hoexter G, Zahner C	2012	Dose-dependent efficacy of the Vitex agnus castus extract Ze 440 in patients suffering from premenstrual syndrome.	This study demonstrated that the Vitex Agnus Cactus extract Ze 440 was effective in relieving symptoms of PMS, when applied in a dose of 20mg. Therefore, for patients suffering from PMS, 20mg Ze 440 should be the preferred daily dose.
Momoeda M, Sasaki H, Tagashira E, Ogishima M, Takano Y, Ochiai K.	2014	Efficacy and safety of Vitex agnus-castus extract for treatment of premenstrual syndrome in Japanese patients: a prospective, open-label study.	Vitex Agnus Cactus extract improved PMS symptoms in Japanese patients, with no substantial adverse events.
He Z, Chen R, Zhou Y, Geng L, Zhang Z, Chen S, et al.	2009	Treatment for premenstrual syndrome with Vitex agnus castus: A prospective, randomized, multi-center placebo controlled study in China	Vitex agnus castus (VAC BNO 1095 corresponding to 40mg herbal drug) is a safe, well tolerated and effective drug of the treatment for Chinese women with the moderate to severe PMS.
Dimmock PW, Wyatt KM, Jones PW, O'Brien PM.	2000	Efficacy of selective serotonin-reuptake inhibitors in premenstrual syndrome: a systematic review.	SSRIs are an effective first-line therapy for severe PMS. The safety of these drugs has been demonstrated in trials of affective disorder, and the side-effects at low doses are generally acceptable.
Marjoribanks J, Brown J, O'Brien PM, Wyatt K	2013	Selective serotonin reuptake inhibitors for premenstrual syndrome. Cochrane Database Syst Rev.	SSRIs are effective in reducing the symptoms of PMS, whether taken in the luteal phase only or continuously. Adverse effects are relatively frequent, the most common being nausea and asthenia. Adverse effects are dose-dependent.
Freeman EW, Rickels K, Yonkers KA, Kunz NR, McPherson M, Upton GV	2001	Venlafaxine in the treatment of premenstrual dysphoric disorder.	Venlafaxine is significantly more efficacious than placebo for PMDD treatment. Response to treatment can occur in the first treatment cycle, and venlafaxine is well tolerated.

Authors	Year	Title of a study	Conclusion
Cohen LS, Soares CN, Lyster A, Cassano P, Brandes M, Leblanc GA	2004	Efficacy and tolerability of premenstrual use of venlafaxine (flexible dose) in the treatment of premenstrual dysphoric disorder	Premenstrual use of venlafaxine is an efficacious and well-tolerated treatment for premenstrual dysphoric disorder.
Mazza M, Harnic D, Catalano V, Janiri L, Bria P	2008	Duloxetine for premenstrual dysphoric disorder: a pilot study.	Duloxetine 60 mg/day was effective in reducing PMDD symptoms and generally well tolerated. Adverse events (nausea, insomnia, poor appetite) were low.
Ramos MG, Hara C, Rocha FL	2009	Duloxetine treatment for women with premenstrual dysphoric disorder: a single-blind trial.	The main side-effects associated with duloxetine were dry mouth, nausea, drowsiness, insomnia, decreased appetite, decreased libido, and sweating. Duloxetine was effective and generally well tolerated in the treatment of PMDD.
Pearlstein TB, Bachmann GA, Zacur HA, Yonkers KA.	2005	Treatment of premenstrual dysphoric disorder with a new drospirenone-containing oral contraceptive formulation.	Drospirenone/EE, given in a 24/4 regimen, was superior to placebo for improving symptoms associated with PMDD.
Marr J, Heinemann K, Kunz M, Rapkin A	2011	Ethinyl estradiol 20µg/drospirenone 3mg 24/4 oral contraceptive for the treatment of functional impairment in women with premenstrual dysphoric disorder.	Ethinyl estradiol 20µg/drospirenone 3mg in a 24/4 regimen significantly improved functional impairment in women with PMDD. Symptoms improved in parallel.
Marr J, Niknian M, Shulman LP, Lynen R.	2011	Premenstrual dysphoric disorder symptom cluster improvement by cycle with the combined oral contraceptive ethinylestradiol 20 mcg plus drospirenone 3 mg administered in a 24/4 regimen.	Ethinylestradiol 20 mcg/drospirenone 3 mg 24/4 improved commonly recognizable PMDD symptom clusters relating to negative emotions, food cravings and water retention-related symptoms to a significantly greater extent than placebo during all three cycles of treatment.
Wyatt KM, Dimmock PW, Ismail KM, Jones PW, O'Brien PM	2004	The effectiveness of GnRHa with and without 'add-back' therapy in treating premenstrual syndrome: a meta analysis.	GnRHa appear to be an effective treatment in the management of premenstrual syndrome. The addition of hormonal add-back therapy to reduce side effects does not reduce efficacy.
Cronje WH, Vashisht A, Studd JW	2004	Hysterectomy and bilateral oophorectomy for severe premenstrual syndrome.	Despite few reports of TAH/BSO as a treatment for severe PMS, we have found surgery, coupled with appropriate HRT, to be an extremely effective and well-accepted permanent cure for PMS.

DISCUSSION

Based on the research, ways to alleviate the symptoms of premenstrual syndrome have been identified. Known methods of alleviating symptoms are discussed below.

Effect of diet on the severity of PMS symptoms

The results of studies on the effect of diet on the occurrence of PMS symptoms are inconclusive.¹⁵ In a study conducted in Korea, it was observed that non-adherence to a Mediterranean diet was associated with a higher incidence of PMS symptoms.¹⁶ The study conducted in Iran shows that a Western diet and a diet rich in salt and sugar is associated with more severe PMS symptoms.¹⁷ Similar findings came from a study conducted in the United Arab Emirates, where it was observed that a high-calorie diet rich in fat, sugar and salt increased the risk of PMS symptoms, while fruit consumption reduced this risk.¹² In a study conducted in Iran, it was observed that supplementation with zinc gluconate (containing 30 mg of elemental zinc) daily for 12 weeks led to a reduction in the severity of psychological and physical symptoms of PMS.¹⁸ There are also reports indicating a positive effect of calcium supplementation on the alleviation and incidence of PMS symptoms, but these require further research.¹⁹

Effect of physical activity on the severity of PMS symptoms

Physical activity has a positive effect on alleviating PMS symptoms and can be recommended as one course of action to reduce the discomfort.²⁰ A reduction in the severity of PMS symptoms was observed as a result of swimming trainings.²¹ The study conducted in Iran found that performing aerobic exercise for 20 minutes a day 3 times a week for a period of 8 weeks led to a reduction in the physical discomfort experienced during PMS.²² Similar findings came from a study conducted in Egypt.²³ A study conducted in India compared the effects of aerobic exercise and yoga practice on reducing the severity of PMS symptoms. Both aerobic exercise and yoga practice have been shown to reduce the severity of pain and the severity of perceived symptoms in women with PMS, while yoga practitioners have been shown to have a greater effect of activity on symptoms than aerobic exercisers.²⁴ A study conducted in Turkey investigated the effect of Pilates on the severity of PMS symptoms, and the results showed significant improvement in those who practiced that kind of physical activity.²⁵

Effect of psychosocial interventions on the severity of PMS symptoms

Psychosocial interventions can reduce the severity of PMS symptoms.²⁶ Relaxation techniques can be used effectively to relieve PMS symptoms.^{27, 28} A study conducted in India compared the effectiveness of the Benson relaxation technique

and the Mitchell technique in relieving PMS symptoms - more improvement was obtained after using the Benson technique.²⁹ Mindfulness meditation³⁰, as well as cognitive and behavioral techniques, can also be used to relieve PMS symptoms.^{31, 32}

Effect of drug treatment on the severity of PMS symptoms

The possibility of using herbal preparations to relieve PMS symptoms is currently the subject of scientific research. In a study conducted in Germany, it was proven that the use of a preparation containing an extract of the chaste tree (*Vitex agnus-castus* L.) alleviated the severity of PMS symptoms.³³ Similar results have been obtained in Japan³⁴ and China³⁵. Medications are also used to relieve PMS symptoms. Selective serotonin reuptake inhibitors (SSRI) are medications that are effective in treating the symptoms of PMS and PMDD. These drugs are effective whether used continuously or used only during the luteal phase of the cycle. Efficacy regardless of how the drug is used is comparable. SSRI group drugs are the first line of treatment.^{7, 36, 37} SSRI group drugs with proven efficacy in the treatment of PMS include citalopram, escitalopram, fluoxetine, paroxetine and sertraline.³⁶ All doses of drugs appear to be effective in alleviating PMS symptoms. It was observed that there was a dose-dependent effect on both the effectiveness of therapy and the risk of side effects. Administering high doses of SSRIs can lead to side effects. The drugs used and drug dosages can be selected individually. The most commonly reported side effects are nausea and weakness.³⁷ The SNRI drug venlafaxine can also be used to alleviate PMDD symptoms.^{38, 39} The effectiveness of another drug from the SNRI group - duloxetine - was also studied. Duloxetine at a dose of 60 mg/d was effective in reducing PMDD symptoms and was well tolerated by patients.^{40, 41} The possible effect of oral hormonal contraception on the relief of PMS and PMDD symptoms remains under study. Administration of contraceptive pills containing drospirenone and ethinylestradiol in a schedule of 24 days of drug use/ 4 days off (in a 28-day cycle) reduced PMDD symptoms and improved the mood of women using the contraception.^{42, 43} In studies, the effectiveness of oral hormonal contraception containing 20 mcg of ethinylestradiol and 3 mg of drospirenone in a 24/4 schedule has been proven as early as the first cycle of the drug use. The drug alleviated PMDD symptoms associated with negative emotions, increased appetite, and symptoms related to excessive water accumulation in the body.⁴⁴ The use of estradiol at a dose of 100 mcg twice a week in the form of a patch applied to the skin in combination with micronized progesterone at a dose of 100 mcg or 200 mcg over a 10- or 12-day cycle (it can be administered orally or vaginally, which may have fewer side effects) or in combination with the long-acting progesterone LNG-IUS 52 mg is also effective. This combi-

nation prevents endometrial proliferation. Danazol at a dose of 200 mg administered twice a day is effective in relieving PMS symptoms, but has limited use due to virilization side effects.⁴⁵ GnRH agonists are effective drugs in alleviating PMS symptoms^{45,46}; these drugs cause inhibition of steroid production by the ovaries, which removes PMS symptoms, but due to possible side effects in the form of decreased bone mineral density (BMD), they should only be used in a small number of cases.⁴⁵

Effect of surgical treatment on the severity of PMS symptoms

The last line of treatment is surgery. This kind of treatment is reserved for patients in whom other forms of treatment have failed.⁴⁵ A hysterectomy is performed along with bilateral salpingoovariectomy.⁴⁷ Use of GnRH analogs is recommended before surgery is performed, which can help predict its expected effects. Hormone replacement therapy (HRT) can be used after surgery.^{45,47}

CONCLUSIONS

Premenstrual syndrome is a common condition affecting many patients, and its symptoms have a significant impact on women's quality of life. PMS symptoms include not only physical complaints, but also mental ones. Given the prevalence of PMS, it is necessary to develop an optimal, effective symptom treatment regimen and identify behaviors and factors that can prevent PMS symptoms. It is important to remember that the treatment of PMS should be individualized to each patient's expectations, needs and preferences. Pharmacological methods seem to be an effective solution, but due to possible side effects, they require the development of individualized therapy. In the case of drug treatment, the patient should be warned about the possibility of side effects. The non-pharmacological symptom relief methods studied may be an effective method of reducing the severity of ailments, but require further research. Non-pharmacological methods appear to be a cheap, effective and safe means of relieving symptoms. The patient should be informed about the options for non-pharmacological relief of PMS symptoms. Introducing lifestyle changes, suggesting an increase in appropriately selected physical activity or dietary counseling and relaxation techniques can be attractive alternatives to drug treatment for some patients. Given the prevalence of PMS symptoms in the population of menstruating women, it becomes necessary to create a consistent and effective practice available to physicians in contact with these patients. The effect of individual factors on alleviating symptoms remains a subject of research. The research conducted so far suggests that it is possible to make general dietary recommendations for women suffering from PMS, but this requires

further research to identify dietary factors, and the effect of dietary intake of micro- and macro-elements on the occurrence of PMS symptoms. The possibility of using herbal preparations also requires further research. Known pharmacological methods are an alternative to non-pharmacological practice, but due to possible side effects, their use may not be acceptable to some patients. Further research is needed on the possibility of alleviating PMS symptoms both non-pharmacologically and with drugs.

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