

Yoga as a Complimentary and Alternative Therapy for Premenstrual Syndrome

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ABSTRACT

Introduction: Premenstrual syndrome (PMS) refers to the emotional and physical symptoms that occur one to two weeks before the start of each menstrual period. Yoga has been proven as an alternative treatment for symptomatic relief in menstruation conditions. The objective of this study is to assess the effect of yoga on urban women with premenstrual syndrome.

Methods: An online two-group pre-post experimental study design was conducted on (N=60) women suffering PMS symptoms from major Indian cities. Females having a history of normal menstrual cycle were included in this study. Women with menstrual disorders, physical and mental illness and female already practicing yoga have been excluded from the study. Informed consent and pre-post PMS scores were procured from all the participants. Yoga interventions were practiced for one hour daily, five days a week for 30 days and the control group followed their routine activities.

Result: The present study reported (21.04%) reduction in total premenstrual syndrome symptoms in the yoga group which was highly significant with (p-value=0.001), whereas in the control group only (1.63%) reduction in premenstrual syndrome symptoms, which was not statistically significant with (p-value=0.335) using Wilcoxon test.

Conclusion: Yoga is an effective practice in reducing premenstrual syndrome.

Keywords: Premenstrual Syndrome; Women health; Psycho-physiological health; Yoga practice; Therapy

Introduction

Millions of women undergo premenstrual syndrome (PMS) during the reproductive phase of life. Premenstrual syndrome, a common cyclic disorder found in young and middle-aged women, is characterized by emotional and physical symptoms that consistently occur during the luteal phase of the menstrual cycle. Precisely PMS is depiction of hormonal changes in body exhibited via behavioral, psychological, and physical symptoms. The disorders can manifest with a wide variety of symptoms, including depression, mood lability, abdominal pain, breast tenderness, headache, and fatigue [1].

College-going students experiencing premenstrual syndrome account for (67%) of the reproductive age female population and the numbers are large as compared to the working women and housewife. Thereafter, second most affect group would be the working women and a smaller percentage of population is housewives [2]. In India around (27.7%) of the females of age group 15-29 years encounter this

condition. Numerous epidemiological studies concluded that around (80%) of the women experience some symptoms in their premenstrual phase [3]. The prevalence of premenstrual syndrome was (18.4%). Moderate to severe premenstrual syndrome was (14.7%) and PMDD was (3.7%) according to DSM IV-TR and (91%) according to International Classification of Diseases, 10th edition criteria. The symptoms commonly reported were fatigue and lack of energy, decreased interest in work, and anger or irritability. The most common functional impairment item was school productivity and work efficiency. premenstrual symptom screening tool (PSST) has (90.9%) sensitivity, (57.01%) specificity, and (97.01%) predictive value of negative test [3].

Women with premenstrual syndrome show majority of symptoms, particularly during luteal phase, regularly every month. These symptoms are classified into 3 emotional (EM), physical (PHY) and behavioral (BE) categories [4]. The common symptoms of premenstrual syndrome are bloating, breast tenderness,

headache, frequent urination, loss of appetite, insomnia, irritability, depression, lack of energy and increased or decreased of libido [5]. premenstrual syndrome has lower work performance (27.5%), impaired working relationships (23.1%), disputation with their husbands (8.82%), and relationship problems with their children (6%) and social relationship problems (41%) [4]. premenstrual syndrome interferes with the life of patients directly by treatment expenditures and indirectly by inefficient working hours, absenteeism, and productivity [6] and requires cure and management [4].

Earlier few studies reported that Complementary and Alternative Therapy were used to manage the symptoms for premenstrual syndrome. Regular practice of the relaxation response is an effective treatment for physical and emotional premenstrual symptoms and is most effective in women with severe symptoms [7]. Massage therapy is an effective method for relieving symptoms of premenstrual syndrome [8, 9]. The pilates exercises decreases the premenstrual syndrome symptoms considerably and have an important role in healing the PMS symptoms [10]. Aromatherapy can be used for coping with premenstrual syndrome symptoms and sub-dimensions of anxiety, depressive affect, nervousness, pain, bloating, depressive thought scores [1]. MBCT intervention improved depression and anxiety symptoms and total PMS score and potentially beneficial in women with PMS symptoms [12].

Over 90% of women attending premenstrual syndrome (PMS) clinic had used at least one complementary therapy for the treatment of their condition [13]. The integrative approach seeks to combine the best of conventional medicine with the range of treatment options available through other, unconventional therapeutic modalities. In the case of premenstrual syndrome, particularly given its multifactorial etiology and its tendency to present in different ways in different women, this approach is well suited and will provide benefit for many patients [14]. A descriptive exploratory design was conducted on a sample of 1120 students with different types of CAM therapy, which shows that (87.0%) used complementary and alternative therapies to minimize PMS. Herbal therapy was the most commonly used as CAT followed by hydrotherapy, changing food types, massage, and exercise [15]. Aromatherapy is an effective tool for the relief of PMS symptoms [16]. herbal medicine can be regarded as an alternative treatment for women suffering from premenstrual syndrome [17]. Exercise reduces premenstrual syndrome symptoms [18]. Acupuncture may be beneficial to patients with premenstrual syndrome [13]. Herbal therapy was effective complementary and alternative therapy for PMS symptoms [19].

A randomized clinical trial of 46 women with premenstrual syndrome found that subjects assigned to the relaxation response group reported significantly greater reduction of mood symptoms compared with controls assigned either charting of symptoms or reading over a 5-month period [20]. Van Zak has reported a protocol using vaginal temperature biofeedback, in which the patient is taught to control vaginal temperature as a means of regulating PMS symptoms. In this study, the investigators did find a significant rise in temperature from vaginal temperature feedback that correlated with a reduction in PMS symptoms [21]. Fifteen subjects completed the entire study and had significant increases in menstrual cycle length during the 3 months of imagery as well as significant declines in total premenstrual syndrome scores [22].

Blake et al [23] compared a group of women randomized to receive immediate weekly cognitive therapy with a group of controls allocated to a waiting group list that kept a symptom diary over a 12-week period. Results indicated that cognitive-behavioral therapy (CBT) was significantly more effective at remitting psychological and somatic symptoms as well as impairment of functioning compared with controls [23]. Morse et al found that women utilizing CBT with relaxation instructions had significantly reduced premenstrual syndrome symptoms compared with women randomized to a non-active control group during two menstrual cycles [24]. In a study by Kirkby, 37 women with severe premenstrual symptoms were nonrandomly assigned to cognitive-behavioral coping skills treatment, a nonspecific treatment, or a waiting-list group. The author found significant reductions in premenstrual symptoms in the coping skills group compared to control subjects both at post treatment and at a 9-month follow-up evaluation [25]. One large survey of over 1,800 women found that Aerobic exercise was used by over half of the women as a self-help measure for alleviating premenstrual syndrome symptoms [26]. Light therapy has been investigated as a possible therapeutic intervention in premenstrual syndrome [27]. Twenty-four women with premenstrual dysphoric disorder were with massage therapy or relaxation therapy reported the decreases in anxiety, depressed mood, and pain in subjects receiving massage (immediately following first and last massage) compared with the control group [9]. Women receiving true reflexology demonstrated a significantly greater decrease in PMS symptoms [28].

Yoga is a practical discipline incorporating a wide variety of practices with desired result of the development of a state of mental and physical health, well-being, inner harmony and ultimately union of the human individual with the universal and transcendent existence. It includes the practice of meditation, regulation of respiration with a variety of breathing exercises, and the practice of a number of physical

exercises and postures, in which the focus is more on isometric exercise and stretching than on aerobic fitness [29, 30]. Yoga reduces negative effects of stress on the immune system by positively regulating the levels of immunoglobulin [31].

Yogic techniques (Asanas, Pranayama and Dhyana) help in reducing PMS symptoms and preventing suffering from premenstrual tension [32]. Practice of regular Asanas like Makarasana, Shavasana, Pranayama, and meditation along with simple healthy lifestyle changes including regular exercise and healthy diet are beneficial in preventing the premenstrual syndrome [33]. Short-term yoga exercise in the luteal phase in PMS women make feel better and showed a better attention level [34]. Regular practice of yoga for 45 minutes daily, five days a week, for three months in the medical schools can decrease the symptoms of premenstrual syndrome compared to taking daily calcium tablet [35]. Yoga exercise for 12 weeks on Sixty-four premenstrual symptoms may decrease premenstrual distress and improve female employee health [36]. Yoga performed for 10 weeks in three sessions with each session of 60 minutes' duration had showed significantly relieves the PMS symptoms and improved quality of life [4]. PMS subjects attend short-term 12 weeks of yoga classes showed the positive effect in premenstrual syndrome symptoms and edema [37]. Yoga with aerobic exercise were are effective in treating premenstrual syndrome symptoms [7]. Yoga over two months in three sessions with each 60 minutes' session was concluded that yoga has strong effects on depression symptoms and blood pressure [38]. Relaxation therapy is one of the most benefited methods to reduce the difficulties of PMS symptoms [39].

Yoga was found to be a more effective non-pharmacological method for coping with premenstrual symptoms. The relaxation, pranayama & yogic asanas response in the females suffering from PMS showed a reduction in an abnormally high basal sympathetic activity and a heightened Relaxation response [40]. Yoga is beneficial in improving general health and helps relieve nervous tension, anxiety blood circulation, maintaining muscle tone, weight control or reduction and flexibility and increasing the levels of mood-regulating chemicals in the brain, decrease in fluid retention and increase in self-esteem that helps the females in overcoming the distress of premenstrual symptoms. Yoga has potentials to be prescribed for managing anxiety in women with PMS during their menstrual cycle [38]. Yoga has strong effects on depression symptoms and blood pressure; therefore, it can be used as a complementary or alternative remedy for premenstrual syndrome patients [41]. Premenstrual symptoms were found to decrease symptoms and improve quality of life with yoga and acupressure [42]. Yoga significantly relieves the premenstrual syndrome symptoms and can be prescribed for treatment of PMS [4]. Recently a systematic review and meta-analysis

evaluating the effectiveness of yoga on the total scores and sub-domains of PMS. Both quantitative and qualitative analysis of the accumulated data was performed and found that yoga was beneficial in the management of PMS. This benefit was also seen when all the sub-domains of premenstrual syndrome [43].

The above studies on premenstrual syndrome are along with other alternative therapies such as relaxation techniques [39], aerobic exercise [7], calcium intake [35] and has demonstrated the positive effects on women with PMS symptoms.

Few studies demonstrated the positive effects of yoga on premenstrual syndrome related depression [38], reduced premenstrual syndrome symptoms and edema [37], Improved Health related quality of life SF-36 and menstruation pain and distress [36], improved premenstrual tension [32], better attention level [34], improved sleep quality and quality of life [4].

The literature review indicates that no study has been done to assess the effect of yoga as a standalone practice on women with premenstrual syndrome symptoms. This present study aimed to see the effect of yoga intervention on women suffering from premenstrual syndromes.

Methodology

The present study is a two-group pre-post experimental design conducted on (N=60) women suffering PMS symptom, were recruited for the study. All the participants were recruited from major cities like Delhi, Bangalore, Mumbai and Bhopal. The participants attended online yoga intervention. Female below 50 years, having the history of regular menstrual cycle, working and non-working women were included in this study. Women with any menstrual disorders, menopause diagnosed, physically challenged and mental illness and female already practicing yoga have been excluded from the study. Informed consent was procured from all the participants.

Convenient sampling was followed based on the self-report given by prospective participants having PMS and the participants were allocated in the two groups in sequence (Odd numbers in Yoga and Even numbers in Control group respectively).

All subjects gave their informed consent in digital format before they participated in the study. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Centre for Open and Distance Education (CODE), Swami Vivekananda Yoga Anusandhan Samsthana (SVYASA, deemed to be University).

Yoga interventions were practiced for one hour daily for thirty days through online. All the participants were sent the first questionnaire on PMS (Premenstrual Syndrome) via Google form on email id. The questionnaires were filled pre-intervention & post-

intervention for (PMS) via Google form. There were no dropouts from the study.

Assessments tools

Premenstrual syndrome Information on premenstrual symptoms was collected through using the Premenstrual Syndrome Scale (PMSS), with an inter-rater reliability between 0.81 and 0.97. The PMSS consists of 40 items with 5-point Likert-type scale (Never, Rarely, Sometimes, Very often, Always). It consists of three subscales: physical symptoms, psychological symptoms and behavioral symptoms. PMSS has a scoring system from 1-5, as 1 for rarely and 5 for always, accordingly. The lowest scale score is 40 and the highest score is 200. A total score estimated as 80 points or above indicates PMS. The increase in the scores indicates PMS severity increase [44].

PMS (Premenstrual Syndrome) Questionnaire was sent via Google form on email. The PMS questionnaire was filled with the participants in both control and intervention groups. Then the questionnaire was filled after the 1-month yoga sessions. The intervention group was provided the 2nd set of questionnaire post completion of yoga sessions [44].

Intervention

The intervention group practiced specific yoga intervention modules from the list mentioned in the SVYASA book 'Yoga for Common Ailments' (Block 3, Section 1.5, Menstrual Disorders) for 1 hour 5 days a week for 4 weeks via Google meet. The yogic exercises to be administered were mentioned in Table -1. Yoga Module exercise intervention participants attended the session 60 minutes per day for 30 days [45].

The yoga program was implemented following a standardized yoga module developed for women with menstrual disorder (Robin et al. 1991). The intensity was mild to moderate so the practices could be easily followed and performed by novice practitioners. Control group has followed the routine activity.

Table 1 Details of yoga intervention (Robin et al. 1991)

Loosening Exercises (Shitilikarana vyayama)	Frequency
Forward –Backward Bending	5 rounds
Side Bending	5 rounds
Twisting	6 rounds
Rocking and rolling	6 rounds
Surya namaskar (12 counts)	4 rounds
Pavan muktasana	4 rounds
Lumbar stretch	4 rounds
Butterfly flappings	20 rounds
Straight leg raising	4 rounds
Side leg raising	6 rounds
Cycling	10 rounds
QRT (Quick Relaxation Technique)	2 mins

Loosening Exercises (Shitilikarana vyayama)	Frequency
Asanas	
Baddhakonasana	1 min
Padhasthasana	1 min
Ardhacakrasana	1 min
Viparitamarni Kriya	1 min
Naukasana	1 min
Pranayama	
Kapalbhati	20 rounds
Sectional Breathing	4 mins
Nadishuddhi	9 rounds
Bhramari	5 rounds
Meditation	
Nadanusandhana (once in a week)	4 rounds 4 times in 30 days
Dhayan (OM Meditation) (once in a week)	4 times in 30 days
Cyclic Meditation	1 times in 30 days
DRT	Once in every session

Statistical Analysis

Data was extracted from the participant's Google form in an excel file for analysis. Data was analyzed by using SPSS 20 software. For the final analysis, excel file was converted to SPSS format. As the data was not normally distributed and Mann-Whitney U-test was used for statistical analysis to test the significant differences between the two groups.

Results

Demographic details of participants:

The present study demographic distribution was shown in Table 2 with a mean age of 37.80±6.39-year-old in yoga intervention group and 36.90±9.08-year-old in control group which depicts a near similar age group of the study population.

Table 2 Demographic details of women with premenstrual syndrome

Characteristics	Yoga (n=30)	Control (n=30)
Age	Mean/SD: 37.80±6.39	Mean/SD: 36.90±9.08
Education		
School	0	1
Diploma	1	1
Bachelors	11	15
Masters	17	13
Phd	1	0
Occupation		
Student	0	1
Self employed	1	3
Employed	15	15
Homemaker	14	11
Marital status		
Married	28	25
Single	2	5

In the present study premenstrual syndrome (PMS) symptoms were categorized into physiological, psychological, and behavioral and combine symptoms of pre and post yoga intervention group as shown in Table.3

There were significant changes in physical symptoms (p-value<0.001: 18.25%), psychological symptoms (p-value<0.001:24.11%), behavioral symptoms (p-value<0.001: 21.33%), total symptoms of PMS (p-value<0.001:21.04%) in PMS symptoms occur in yoga intervention group compared to control group (Table 3).

Table 3 Changes in physical symptoms, psychological symptoms, behavioral symptoms, total premenstrual symptoms of (PMS) after one-month intervention in both groups

Measurement	Groups	Pre (n=30)	Post (n=30)	% change	Within Groups
		Mean ±SD	Mean ±SD		Wilcoxon signed rank test Pre/Post
PMS (Physical Symptoms)	Yoga	39.67 ± 10.42	32.43 ± 9.01	18.25	0.001*
	Control	36.47 ± 10.09	35.63 ± 9.60	2.30	0.235
PMS (Psychological Symptoms)	Yoga	33.43 ± 8.93	25.37 ± 8.51	24.11	0.001*
	Control	29.80 ± 7.78	29.43 ± 8.43	1.24	0.645
PMS (Behavioural Symptoms)	Yoga	29.20 ± 9.27	22.97 ± 8.39	21.33	0.001*
	Control	25.33 ± 8.42	25.03 ± 8.83	1.18	0.640
PMS (Total PMS Symptoms)	Yoga	102.30 ± 25.87	80.77 ±24.01	21.04	0.001*
	Control	91.60 ± 22.58	90.10 ±23.97	1.63	0.335

*Significant level at $\alpha=0.05$

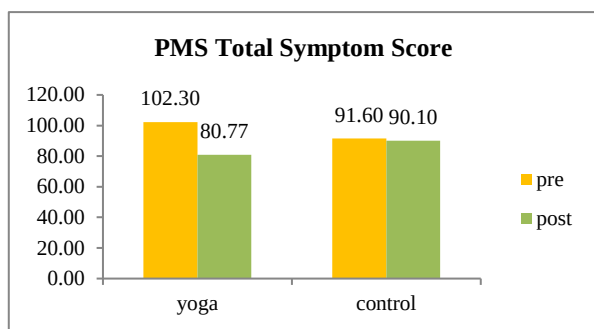


Figure 1 The PMS Total Symptom Score

Discussion

The present study showed that one-month yoga intervention showed significant changes in Premenstrual Symptoms of in yoga group compared to control group. There were significant changes in physical symptoms (18.25%), psychological symptoms (24.11%), and behavioral symptoms (21.33%), Total Symptoms of premenstrual syndrome (21.04%) in PMS symptoms occur in yoga intervention group compared to control group.

The previous studies were Yoga intervention on PMS, and the findings of present study were compared with previous studies. Most of research concluded 10-12 weeks' yoga intervention significantly relieved 57% PMS symptoms related behavior which were unlike present study which suggested 4 weeks' yoga intervention showed 24% psychological changes in premenstrual syndrome symptoms [46]. The present study showed beneficial effects of yoga even at a shorter duration of time which is not available in the literature.

The yoga intervention in the present study includes breathing exercise, Asanas, and meditation for 60 minutes per session, five days a week for one month. This was also advocated by Oates et al [47] in a systematic review that frequency ranges from 10 to 90 minutes for duration of 14 days to 16 weeks. This signifies that irrespective of the frequency and duration of yoga intervention a significant reduction in premenstrual syndrome was found in all the research [47].

Tsai concluded that the physical premenstrual syndrome symptoms relieved most followed by psychological which was shown as improvement in six scales of SF-36 [36]. It was unlike in our study where maximum reduction was seen in psychological (24%) followed by behavioral (21%) and then physical symptoms (18%). This can be attributed to study population where Tsai had evaluated on working females while present included all type of occupation of females thus removing the lifestyle bias.

A randomized controlled clinical trial with 62 subjects performed yoga for 10 weeks in 3 sessions with each session of 60 minutes' duration evaluated the effect

of yoga exercise on emotional, behavioral, physical symptoms and quality of life of subjects with premenstrual syndrome demonstrated that, yoga significantly relieves the premenstrual syndrome symptoms [4]. Premenstrual syndrome symptoms with Sixty-two subjects practiced yoga over two months in three sessions with the duration of 60 minutes has strong effects on reduction of (51%) depression symptoms and blood pressure [38].

The possible mechanism explaining about the improvement due to yoga practice is hormonal fluctuations resulting in physical, psychological and behavioral symptoms of premenstrual syndrome as explained previously [48]. yoga can significantly reduce the effects of elevated stress responses and reduces both anxiety and depression through downregulating the hypothalamic-pituitary-adrenal axis which is activated in response to a physical or psychological stressor and is responsible for a chain of behavioral, physiological, and psychological responses in a human body. These changes are said to be due to the release of cortisol, epinephrine, and norepinephrine which can be regulated with a regular practice of yoga, ultimately leading to a healthy mind, body, and soul [48]. As stress and anxiety are proportionately related to the symptoms of premenstrual syndrome and menstrual pain, reduction in stress and anxiety with yoga can significantly reduce menstrual pain and symptoms of premenstrual syndrome symptoms [48].

Strength of the study is a comparable control group, awareness about the premenstrual syndrome through questionnaire. With technological aid, tele-yoga and online mode yoga intervention showed the changes on the symptoms. Limitations of the study are short term intervention period, and small sample size. It was self-reported assessment based on PMS scale and the data was done based on the self-report provided by the prospective participants, so it is difficult to understand the actual magnitude reduction of the Symptoms. This study will be helpful to provide specific effect sizes or any other relevant statistics to further support the findings.

The Scope for the future studies are large sample size study, longer duration of intervention period, follow-up study and offline intervention can be studied. Yoga is a non-invasive treatment modality, which is being scientifically validated through numerous experiments across the globe. It is cost-effective and can be practiced under professional trainers and on own after following the practices thoroughly. The add-on benefits of yoga are positive physical and psychological health in the clinical population.

Conclusion

The present study concluded that a short duration yogic intervention significantly reduces premenstrual syndrome symptoms in females compared to control group.

References

- [1] Dickerson LM, Mazyck PJ, Hunter MH. Premenstrual syndrome. *Am Fam Physician*. 2003 Apr 15;67(8):1743-52.
- [2] Ashritha M, Rani SL, Brundha MP. Effects of premenstrual syndrome in day-to-day life of women. *Drug Invention Today*. 2020 Jul 15;14(7).
- [3] Raval CM, Panchal BN, Tiwari DS, Vala AU, Bhatt RB. Prevalence of premenstrual syndrome and premenstrual dysphoric disorder among college students of Bhavnagar, Gujarat. *Indian Journal of psychiatry*. 2016 Apr;58(2):164. [http://doi: 10.4103/0019-5545.183796](http://doi.org/10.4103/0019-5545.183796).
- [4] Kamalifard M, Yavari A, Asghari-Jafarabadi M, Ghaffarilaleh G, Kasb-Khah A. The effect of yoga on women's premenstrual syndrome: a randomized controlled clinical trial. *International Journal of Women's Health and Reproduction Sciences*. 2017 Jul 1;5(3):205-11.
- [5] Zaafrane F, Faleh R, Melki W, Sakouhi M, Gaha L. An overview of premenstrual syndrome. *Journal de Gynecologie, Obstetrique et Biologie de la Reproduction*. 2007 Feb 26;36(7):642-52.
- [6] Ledger WL. The menstrual cycle. *Dewhurst's textbook of obstetrics & gynaecology*. 2012 Jan 10:485-94. DOI:10.1002/9781119979449.
- [7] Vaghela N, Mishra D, Sheth M, Dani VB. To compare the effects of aerobic exercise and yoga on premenstrual syndrome. *Journal of Education and Health Promotion*. 2019;8. doi: 10.4103/jehp.jehp_50_19.
- [8] Moradi M. Assessment of the effects of massage therapy on premenstrual syndrome. *Zahedan Journal of Research in Medical Sciences*. 2011 May 31;13(2). <https://brieflands.com/articles/zjrms-94066.html>.
- [9] Hernandez-Reif M, Martinez A, Field T, Quintero O, Hart S, Burman I. Premenstrual symptoms are relieved by massage therapy. *Journal of Psychosomatic Obstetrics & Gynecology*. 2000 Jan 1;21(1):9-15.
- [10] Çitil ET, Kaya N. Effect of pilates exercises on premenstrual syndrome symptoms: a quasi-experimental study. *Complementary Therapies in Medicine*. 2021 Mar 1;57:102623. doi.org/10.1016/j.ctim.2020.102623.
- [11] Uzunçakmak T, Alkaya SA. Effect of aromatherapy on coping with premenstrual syndrome: A randomized controlled trial. *Complementary Therapies in Medicine*. 2018 Feb 1; 36:63-7. doi.org/10.1016/j.ctim.2017.11.022
- [12] Panahi F, Faramarzi M. The effects of mindfulness-based cognitive therapy on depression and anxiety in women with premenstrual syndrome. *Depression Research and Treatment*. 2016 Oct;2016. doi.org/10.1155/2016/9816481.
- [13] Domoney CL, Vashisht A, Studd JW. Use of complementary therapies by women attending a specialist premenstrual syndrome clinic. *Gynecological Endocrinology*. 2003; 17(1), pp.13-18. doi.org/10.1080/gye.17.1.13.18
- [14] Girman A, Lee R, Kligler B. An integrative medicine approach to premenstrual syndrome. *American Journal of Obstetrics and Gynecology*. 2003 May 1;188(5):S56-65.
- [15] Amasha HA, Mohamed RA, Nageeb H. Complementary and alternative therapies for premenstrual syndrome: an exploratory study. *Khartoum Medical Journal*. 2017;10(3).
- [16] Es-Haghe S, Shabani F, Hawkins J, Zareian MA, Nejatbakhsh F, Qaraaty M, et al. The effects of aromatherapy on premenstrual syndrome symptoms: a systematic review and meta-analysis of randomized clinical trials. *Evidence-Based Complementary and Alternative Medicine*. 2020 Dec 21;2020. doi.org/10.1155/2020/6667078
- [17] Maleki-Saghooni N, Karimi FZ, Moghadam ZB, Najmabadi KM. The effectiveness and safety of Iranian herbal medicines for treatment of premenstrual syndrome: a systematic review. *Avicenna Journal of Phytomedicine*. 2018 Mar;8(2):96. PMC5885324.
- [18] Babazadeh R, Keramat A. Premenstrual syndrome and complementary medicine in Iran: a systematic review. *KAUMS Journal (FEYZ)*. 2011 Jun 10;15(2):174-87.
- [19] Nageeb H, Mohamed RA, Amasha H. Prevalence of premenstrual syndrome: complementary and alternative therapy among nursing students. *IOSR Journal of Nursing and Health Science*. 2015;4(2):7-15.
- [20] Goodale I, Domar A, Benson H. Alleviation of premenstrual syndrome symptoms with the relaxation response. *Obstetrics & Gynecology*. 1990 Apr 1;75(4):649-55.
- [21] Van Zak DB. Biofeedback treatments for premenstrual and premenstrual affective syndromes. *International Journal of Psychosomatics*. 1994 Jan 1;41(1-4):53-60.

- [22] Groer M, Ohnesorge C. Menstrual-cycle lengthening and reduction in premenstrual distress through guided imagery. *Journal of Holistic Nursing*. 1993 Sep;11(3):286-94.
- [23] Blake F, Salkovskis P, Gath D, Day A, Garrod A. Cognitive therapy for premenstrual syndrome: a controlled trial. *Journal of Psychosomatic Research*. 1998 Oct 1;45(4):307-18.
- [24] Morse CA, Dennerstein L, Farrell E, Varnavides K. A comparison of hormone therapy, coping skills training, and relaxation for the relief of premenstrual syndrome. *Journal of Behavioral Medicine*. 1991 Oct;14:469-89.
- [25] Kirkby RJ. Changes in premenstrual symptoms and irrational thinking following cognitive-behavioral coping skills training. *Journal of Consulting and Clinical Psychology*. 1994 Oct;62(5):1026. doi.org/10.1037/0022-006X.62.5.1026.
- [26] Pullon SR, Reinken JA, Sparrow MJ. Treatment of premenstrual symptoms in Wellington women. *The New Zealand Medical Journal*. 1989 Feb 1;102(862):72-4.
- [27] Parry BL, Haynes P. Mood disorders and the reproductive cycle. *The Journal of Gender-specific Medicine*. 2000 Jul 1;3(5):53-8. PMID: 11253256.
- [28] Oleson T, Flocco W. Randomized controlled study of premenstrual symptoms treated with ear, hand, and foot reflexology. *Obstetrics & Gynecology*. 1993 Dec 1;82(6):906-11.
- [29] B.K.S. Iyengar, *Light on Yoga: The Classic Guide to Yoga*, 2006.
- [30] Khalsa SB. *Yoga as a therapeutic intervention. Principles and practice of stress management*. 2007 Aug 16;3:449-62.
- [31] Brotto LA, Krychman M, Jacobson P. Eastern approaches for enhancing women's sexuality: mindfulness, acupuncture, and yoga (CME). *The Journal of Sexual Medicine*. 2008 Dec;5(12):2741-8.
- [32] Choudhary A, Mishra J. Effect of 16 weeks yogic intervention in premenstrual syndrome. *International J Pharma and Bio Sci*. 2013 Jan;4(1): B207-b212. ISSN 0975-6299.
- [33] Thejaswini HJ, Narayana BP, Suhas SK, Savitha HP. Yoga and healthy life style modification in prevention of premenstrual syndrome. <http://indianyoga.org>.
- [34] Wu WL, Lin TY, Chu IH, Liang JM. The acute effects of yoga on cognitive measures for women with premenstrual syndrome. *The Journal of Alternative and Complementary Medicine*. 2015 Jun 1;21(6):364-9.
- [35] Bharati M. Comparing the effects of yoga & oral calcium administration in alleviating symptoms of premenstrual syndrome in medical undergraduates. *Journal of Caring Sciences*. 2016 Sep;5(3):179. doi: 10.15171/jcs.2016.019
- [36] Tsai SY. Effect of yoga exercise on premenstrual symptoms among female employees in Taiwan. *International Journal of Environmental Research and Public Health*. 2016; 13(7), p.721. doi.org/10.3390/ijerph13070721.
- [37] Tsai FH, Chu IH, Lin TY, Liang JM, Hsu HT, Wu WL. Preliminary evidence on the effect of yoga on the reduction of edema in women with premenstrual syndrome. *European Journal of Integrative Medicine*. 2017 Jan 1;9:63-8.
- [38] Ghaffarilaleh G, Ghaffarilaleh V, Sanamno Z, Kamalifard M. Yoga positively affected depression and blood pressure in women with premenstrual syndrome in a randomized controlled clinical trial. *Complementary Therapies in Clinical Practice*. 2019 Feb 1;34:87-92. doi.org/10.1016/j.ctcp.2018.11.007.
- [39] Jose A, Nayak S, Kamath N, Nalini M. The mystery behind relaxation therapy: adieu to premenstrual syndrome. *Journal of Health and Allied Sciences NU*. 2021 Sep;11(03):119-25.
- [40] Sharma B, Misra R, Singh K, Archana RS. Comparative study of effect of anuloma-viloma (pranayam) and yogic asanas in premenstrual syndrome. *Indian J Physiol Pharmacol*. 2013 Oct 1;57(4):384-9.
- [41] Ghaffarilaleh G, Ghaffarilaleh V, Sanamno Z, Kamalifard M. Yoga positively affects depression and blood pressure of women with premenstrual syndrome. *Complement Ther Clin Pract*. 2018 Feb;34:87-92.
- [42] Kucukkelepce DS, Unver H, Nacar G, Tashan ST. The effects of acupressure and yoga for coping with premenstrual syndromes on premenstrual symptoms and quality of life. *Complementary Therapies in Clinical Practice*. 2021 Feb 1;42:101282. doi.org/10.1016/j.ctcp.2020.101282.
- [43] Arghya P, Banashree N, Sayanti P, Snehlata M. Evaluation of the effectiveness of yoga in management of premenstrual syndrome: a systematic review and meta-analysis. *Journal of Psychosomatic Obstetrics & Gynecology*. 2022; 43(4): 517-25.
- [44] Padmavathi MP, Sankar R, Kokilavani N, Dhanapal K, Ashok B. Validity and reliability study of premenstrual syndrome scale (PMSS). *International Journal of Advances in Nursing Management*. 2014 Jan;2(1):04-5. ISSN-2347-8632.
- [45] Robin Monro, Nagendra HR, Nagarantha R. (1991). *Yoga for common ailments*.

- [46] Lata P, Lohan U. Effect of yoga on pre menstrual syndrome amongst college girl students. *Int J Phy Edu. Spo.*;3(01):23-6.
- [47] Oates J. The effect of yoga on menstrual disorders: a systematic review. *The Journal of Alternative and Complementary Medicine*. 2017 Jun 1;23(6):407-17.
- [48] Sengupta P. Health impacts of yoga and pranayama: a state-of-the-art review. *International Journal of Preventive Medicine*. 2012 Jul;3(7):444. PMC3415184.