

Review Article

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Impact of relaxation therapy on premenstrual symptoms: A systematic review

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Abstract

Relaxation therapy (RT) is considered to be helpful in the management of symptoms of premenstrual syndrome (PMS). This systematic review (SR) was conducted to find the impact of RT on PMS management, which could be utilized in clinical and community populations. Five major databases like Google Scholar, PubMed, ResearchGate, Scopus, and Web of Science were used as search engines. The Joanna Briggs Institute checklist is used to analyze the quality of articles selected for this review. Only 35 different studies among 71 relevant articles which focused on the topic were selected for this SR. All of the 35 different trials reported that the selected RTs, namely Laura Mitchell, Jacobson, Benson, relaxation unnamed, yoga, aerobic exercise, and massage, significantly decreased PMS. The outcome of this SR suggests that the selected seven RTs effectively relieve PMS and ensure a productive life for all reproductive women.

Keywords:

Premenstrual syndrome, relaxation therapy, systematic review

Introduction

The menstrual cycle is a source of power in women and a gift that invites a shift in attitude and thinking, to improve premenstrual coping and direct life in a meaningful, positive way.

Today premenstrual syndrome (PMS) is common among many young women. It is characterized by the affective and somatic symptoms that appear in the days preceding menses and interfere with women's daily lives.^[1] Robert T. Frank coined the named PMS and was the first to explain this syndrome. Premenstrual disorders, also known as PMS and premenstrual dysphoric disorder (PMDD), is a complication of PMS with varying symptoms. Women experience it cyclically every month before their menstrual phase and will be free from these symptoms within a few days after starting their periods.^[2] Research in

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psycho-neuro-immunology proved that relaxation enhances the immune system. Relaxation therapy (RT) reduces stress, fatigue, and anxiety.^[3] This systematic review (SR) focused on around seven RTs including Jacobson, Laura Mitchells, Benson, yoga, aerobic exercise, and massage. In general, RT helps women refocus their attention on something calming and increases awareness of their bodies.^[4]

Materials and Methods

This SR adhered on to the step-by-step guide for conducting SR by simulating data.^[5]

Literature search

The basic search strategy is built based on the PICO's research question (population, intervention comparison, and outcome). The preliminary search was done electronically for eligible trials in Google Scholar, PubMed, Cochrane, and Scopus to identify relevant articles as shown in Figure 1.

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The main terms of interest considered were PMS and premenstrual tension combined with relaxation interventions. Studies from all countries and written in all languages in the past 10 years were considered. The planned study was conceptualized in September 2020 and anticipated to be completed by mid-2021.

Study selection

This review includes peer-reviewed studies published in English language journals about RTs, progressive muscle relaxation (PMR), and other simple relaxation therapies.

Jacobson’s relaxation technique, otherwise called PMR, involves tightening specific muscles, holding them in the same position, and relaxing. The above method often includes relaxing through one group of body muscles at a time, starting from the feet and giving approximately 1 min to each area. Mitchell’s muscle RT is also based on the physiological principle of reciprocal inhibition. It involves diaphragmatic breathing. In Mitchell’s muscle relaxation techniques, when one group of muscles work, the opposing group relaxes. In the same way, reciprocal relaxation is present in Laura Mitchell RT where one part of the body is moved from an area of tension to the opposite direction and then lettering it go.^[6] The summary of the search strategy carried out in the database and it is available in Table 1.

Initially, 71 articles [Figure 1] were screened, out of which 36 articles were excluded based on inclusion and exclusion criteria.

Inclusion criteria

- For any of the RT mentioned above [refer to Table 1] which evaluates its effect on PMS.
- The study population includes women of reproductive age.
- The population of women with regular 21–35 days of menstrual cycles.
- The women suffering from PMS.

- The study which accepted all articles without any restriction of country, client’s age, race, and the language of publication.

Exclusion criteria

- Studies with data not reliably extracted.
- Duplicated data.
- Abstract only papers.
- Articles without available results.
- Unpublished.
- Selected only recent studies (within 10 years).

Quality assessment methodology of the selected studies

The data were collected from the original authors. The authors did a formal review. After removing the duplicates (unpublished, duplicates, intervention too short, and full texts not available, other diverse therapies), the titles and abstracts were screened by revising, discussing, correcting, re-correcting, and considering important suggestions from five reviewers. The following data were extracted from each selected study: author and year, the prevalence of PMS, country where the study was conducted, study design, sample, sample size, type of intervention, duration of intervention, setting, and the effects of each RT. An assessment of the quality of selected articles was completed with the use of the Joanna Briggs Institute (JBI) checklist as shown in Table 2. Finally, 35 texts showed that the results and trial reports were included as showed in Figure 1 and Table 3.

According to JBI, the elements have been stated in most of the selected articles which mention the author of the article, the place where the study was conducted, aim of the research, year of publication, population and sample size, methodology, intervention type duration, and findings. Every study had helpful information in its abstract and concludes the effect of the RT.

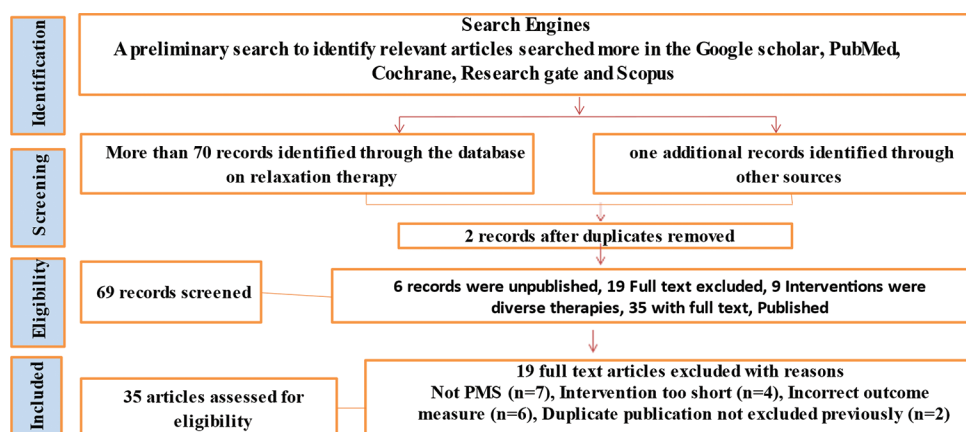


Figure 1: Flowchart of PRISMA with studies incorporated and kept out

Data synthesis

The data analysis is conducted by the descriptive assessment of extracted information. The frequency distribution and percentages were used to identify the number of therapies in each category. The characteristics of the trials were noted. The summary data were used to find the number of cases in each category and parametric tests were not required to analyze the data.

Results

The process of study identification and inclusion process is listed in Figure 1—the PRISMA flow diagram. The combined database searches yielded 70 articles, with one article identified through other sources. Among those two were identified as the same case. Thirty-six studies were excluded because six articles were unpublished, nine interventions were diverse therapies, four were too short, another six

had incorrect outcome measures, and seven were not related to PMS but were on dysmenorrhea. Hence, the present review included 35 articles [Tables 1 and 2]. The number of trials conducted in Iran was 14 (40%). Two trials in each study were conducted in countries like Taiwan^[24,27] and Turkey.^[26,30] Only 1 study was from Egypt^[7] and 15 (43%) studies were conducted in India. Sample sizes across the trials ranged from 15 to 155. Across 35 trials, the age of the participants was between 10 and 45 years (all within reproductive groups). Studies were conducted in various settings such as schools, universities, clinical settings, and community settings. Two trials were recruited from outpatient (gynecology)^[16,28] and another three from schools.^[9,10,13] There were two more studies conducted among nursing students.^[12,26] The studies conducted among other university students (not specified) were 17^[3,7,2,8,11,14,15,19,25,30-33,35,36,38,39] and not uncategorized studies such as late-adolescent girls, women, and students (not specified) were 11 in number.^[17,18,20-24,27,29,34,37]

Table 1: Summary of the search strategy carried out in the database

Sl no	Relaxation	Carried out
1	Laura Mitchell's	2
2	Jacobson	11
3	Benson	3
4	Relaxation	2
5	Yoga	6
6	Aerobic exercise	9
7	Massage	2

Two trials had four groups. The study conducted by Pazoki *et al.*^[37] included four groups. The first group received fennel as an intervention, the second group underwent aerobic exercise, the third group received both fennel and exercise, and the last group was a controlled group with no intervention, neither fennel nor exercise. Another study by Asadi *et al.*^[16] also had four groups; the first group enforced positive self-talking, the second group received relaxation, the third group

Table 2: Summary of the quality assessment of the selected studies with the Joanna

Author	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Author	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Ferreira <i>et al.</i> (2019) ^[3]	1	1	1	1	1	1	1	1	1	Kamalifard <i>et al.</i> (2015) ^[23]	1	1	1	1	1	1	1	1	1
Mohamed <i>et al.</i> (2015) ^[7]	1	1	1	1	1	1	1	1	1	Wu <i>et al.</i> (2015) ^[24]	1	1	1	1	1	1	1	1	1
Venkatesan <i>et al.</i> (2016) ^[2]	1	1	1	1	1	1	1	1	1	Sharma <i>et al.</i> (2013) ^[25]	1	1	1	1	1	1	1	1	1
Nithyanisha <i>et al.</i> (2019) ^[8]	1	1	1	1	1	1	1	1	1	Kucukkelepce <i>et al.</i> (2021) ^[26]	1	1	1	1	1	1	1	1	1
Gayathri <i>et al.</i> (2018) ^[9]	1	1	1	1	1	1	1	1	1	Tsai (2016) ^[27]	1	1	1	1	1	2	1	1	1
Sonia <i>et al.</i> (2011) ^[10]	1	1	1	1	1	1	1	1	1	Choudhary and Mishra (2013) ^[28]	1	1	1	1	1	1	1	1	1
Jasuja <i>et al.</i> (2018) ^[11]	1	1	1	1	1	1	1	1	1	Vishnupriya and Rajarajeswaram (2011) ^[29]	1	1	1	1	1	1	1	1	1
Thirupathi (2017) ^[12]	1	1	1	1	1	1	1	1	1	Akyuz and Aydin-Kartal (2018) ^[30]	1	1	1	1	1	1	1	1	1
Sudhadevi <i>et al.</i> (2017) ^[13]	1	1	1	1	1	1	1	1	1	Tonekaboni <i>et al.</i> (2012) ^[31]	1	1	1	1	1	1	1	1	1
Jebakani (2019) ^[14]	1	1	1	1	1	1	1	1	1	Vaghela <i>et al.</i> (2017) ^[32]	1	1	1	1	1	1	1	1	1
Chaturvedi and Rangaswamy (2017) ^[15]	1	1	1	1	1	1	1	1	1	Jafarnejad <i>et al.</i> (2016) ^[33]	1	1	1	1	1	1	1	1	1
Asadi <i>et al.</i> (2016) ^[16]	1	1	1	1	1	1	1	1	1	Azimi and Sadeghi (2013) ^[34]	1	1	1	1	1	1	1	1	1
Manjima and Jose (2021) ^[17]	1	1	1	1	1	1	1	1	1	Dehnavi <i>et al.</i> (2015) ^[35]	1	1	1	1	1	1	1	1	1
Mahmoudi (2018) ^[18]	1	1	1	1	1	1	1	1	1	Valiani (2013) ^[36]	1	1	1	1	1	1	1	1	1
Olia <i>et al.</i> (2019) ^[19]	1	1	1	1	1	1	1	1	1	Pazoki <i>et al.</i> (2015) ^[37]	1	1	1	1	1	1	1	1	1
Dewi <i>et al.</i> (2015) ^[20]	1	2	1	1	1	1	1	1	1	Moradi (2011) ^[38]	1	1	1	1	1	1	1	1	1
Khalatbari and Salimynezhad (2013) ^[21]	1	1	1	1	1	1	2	1	1	Lotfipour <i>et al.</i> (2018) ^[39]	1	1	1	1	1	1	1	1	1
Hasani <i>et al.</i> (2014) ^[22]	1	1	1	1	1	1	2	1	1										

Key: Joanna Briggs Institute checklist Q1. If the author(s) name was/were mentioned? Q2. If the year of publication was mentioned? Q3. Is the country, where the study was published or conducted, shown or not? Q4. If the purpose is mentioned? Q5. Is the study population and sample size mentioned? Q6. If the methodology was stated? Q7. If the Intervention type was mentioned? Q8. If the duration of the intervention was stated? Q9. Are the findings of key, which relate to scoping question, identified or not? Answer options: 1—yes; 2—no; 3—unclear

Table 3: Summary of included studies and their characteristics for abstract screening

ROW	Author, year, and prevalence of PMS	Title and country	Study type and setting	Relaxation, duration, and sample size	Findings	Conclusion
Mitchell's relaxation techniques						
1	Ferreira et al. ^[3] (2019), 61.2%	Effect of relaxation techniques on fatigue and headaches in PMS, India	Comparative interventional study university students	A. Meditation B. Mitchell's 4 weeks [15+15=30]	The post-test mean t value 3.40727 and $P < 0.01$ are extremely statistically significant	When comparing Mitchell's RT is more effective than meditation
2	Mohamed and Ewida ^[7] (2015), 75.5%	Efficacy of laser acupuncture with Mitchell's simple relaxation technique in alleviating PMS, Egypt	Evaluative procedure university students	A. Laser acupuncture B. Mitchell's 6 months [15+15=30]	There we see significant reduction in EMG activity in [Rt and Lt trapezius mns], respiratory rate and pulse rate too, [$P < 0.05$]	For reducing PMS laser acupuncture should be included
Jacobson's relaxation therapy						
3	Venkatesan and Annappooran ^[2] (2016), 80%	Effectiveness of PMR technique on PMS among the hostel students, Indi.	Experimental design. College students	Jacobson 5 months 50 samples	Significant difference observed between pre-test and post-test scores of PMS at $P < 0.05$	Effectiveness in reducing PMS by PMR is proved
4	Nithyanisha et al. ^[6] (2019), 80%	Efficacy of aerobic exercise and relaxation training in PMS in collegiates, India	Comparative study College students	A. Exercise B. Jacobson Two weeks [15+15=30]	It was observed that significant decrease in post-test mean values, 23.06 in group A which is lower and shows more effective than 28.06 in group B at $P \leq 0.001$	It was found that more effective is aerobic exercise than Jacobson's RT
5	Gayathri ^[9] (2018), 85%	Effectiveness of Jacob's sons RT on PMS among adolescent girls in CSI, H. S school, India	Experimental design school	Jacobson 28 days [30+30=60]	It was found that post-test mean score of PMS was found higher in experimental group, which is significant	Jacobson's RT can be used in school settings
6	Sonia ^[10] (2011)	Effectiveness of Jacobson's RT on PMS among adolescent girls in selected school, India	Experimental school	Jacobson 30 days [30+30=60]	The t value found in Jacobson's RT showed 17.13 which is significant at $P < 0.001$ level	Jacobson's RT decreases PMS
7	Jasuja et al. ^[11] (2018)	Effect of PMR on somatic and psychological symptoms of PMS, India	Evaluative university students	A. Jacobson B. Control 12 weeks [30+30=60]	There was a tremendous decrease in the PMS symptoms like cold sweats abdominal cramps, abdominal swelling and breast tenderness after PMR	To alleviate PMS, PMR can be used
8	Thirupathi ^[12] (2017), 36.6%	Effectiveness of PMR in reducing the affective symptoms of PMS among the young adult girls, India	Evaluative nursing students	Jacobson 10 days [30+30=60]	The pre-test mean core of PMS was 38.34+22.03, after the RT it was 22.03+7.26 which shows significant	PMR is very effective in relieving the affective symptoms of PMS
9	Sudhadevi et al. ^[13] (2017)	Effectiveness of Jacobson's PMR on PMS among students at selected school, India	Experimental school	Jacobson 1 month 30	It was observed that significant difference in PMS level between pre- and post-test level	PMR is found to be very effective in reducing PMS
10	Jebakanji ^[14] (2019)	Effectiveness of PMR on PMS among the students of selected colleges of Sri Ramachandra university, India	Experimental design university, students	Jacobson 6 months 40	Highly significant difference in all the aspects between experimental and control groups at the level of $P < 0.001$	PMR is a remedy to balance between physical and emotional status
11	Chaturvedi and Rangaswamy ^[15] (2017)	Management of PMS of college students using comprehensive psychotherapy, India	Experimental college students	Jacobson and CBT, diet, exercise 1 month [17+17=34]	There were significant changes in the experiment group regarding concentration, behavioral change, autonomic reaction, negative effect, and arousal of Moos scales	CBT including Jacobson's RT reduced PMS

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Table 3: Contd...

ROW	Author, year, and prevalence of PMS	Title and country	Study type and setting	Relaxation, duration, and sample size	Findings	Conclusion
12	Asadi et al. ^[16] (2016)	The effect of relaxation and positive self-talk on symptoms of PMS. Iran	Quasi-experimental OPD clinics	Jacobson, 8 days Group 1: positive self-talk Group 2: RT Group 3: positive self-talk RT Group 4: control [20+20+20+20=80]	Relaxation (23.2) and positive self-talk (21.25), these two methods are effective to reduce PMS as $P<0.001$ when comparing with the control group	Both relaxation and positive talk can significantly reduce PMS
13	Manjima and Jose ^[17] (2011)	Effect of Jacobson's RT on PMS among late adolescent girls in a selected school, India	Experimental late adolescent girls	Jacobson, 5 days, [30+30=60]	The result shows calculated t value (9.98) is higher than that of tabulated t (2.29) at 0.05 level of significance	One of the best methods without side effects is Jacobson's RT which can be used as a measure to reduce PMS
Benson's relaxation						
14	Mahmoudi ^[18] (2018), 41.8%	Comparison effectiveness of CBT and RT in curing PMS, Iran	Comparative students	CBT, Benson 2 months [28+29+25=82]	The ratio of recovery rate between CBT and the BRT, in the RT group is higher and more effective	BRT is more effective to CBT in relieving PMS
15	Olia et al. ^[19] (2019), 83.3%	The influence of Benson RT on Oxidative Stress marker of PMS in students of Khoy university of medical sciences, Iran	experimental design University students	Benson's relaxation 6 months, 60	Significant difference found between in the total MDA index with mean difference of 0.126 and TAC index (-0.122) of the intervention group where $P=0.001$	Benson RT can be used as an alternative medicine
16	Dewi et al. ^[20] Year 2015	The effects of Benson meditation to reduce anxiety level of PMS in female adolescents	Experiment adolescent	Benson's RT 5 days, 20	The result showed that Benson meditation decreased anxiety level of PMS with significance level where $P=0.000$	Nurses can make use of Benson meditation RT
Unnamed relaxation						
17	Khalatbari et al. ^[21] (2013), 90%	Effect of RT on PMS in Dormitory students of Azad Tonekabon University of Iran	Experimental dormitory students	Relaxation 1 month [15+15=30]	After relaxation training the calculated effect size $N^2=0.579$ which is really high compared to 0.14 and shows the high effect size of relaxation training on PMS	Health professional should be aware of nondrug therapy for the control of PMS
18	Hasani et al. ^[22] (2014)	Comparison of the effects of RT and B6 on emotional and physical symptoms in PMS, Iran	Randomized clinical trial students	Relaxation 1 month vitamin B6 1 week [50+50+50=150]	It was found significant difference in the result before and after intervention within vitamin B6 and RT groups where ($P<0.001$)	RT and vitamin B6 can reduce PMS. However, B6 is best in relieving physical symptoms
Yoga						
19	Kamalifard et al. ^[23] (2015), 95%	Effect of Yoga on Women's PMS: A Randomized clinical trial Iran	A Randomized controlled clinical women	Yoga, 10 weeks [31+31=62]	The impact of yoga on emotional, physical, behavioral, and quality of life were 26.28 ± 16.54 , 32.69 ± 20.81 , 10.90 ± 14.10 , 22.8 ± 14.56 . In control group it was 54.91 ± 21.31 , 72.01 ± 22.24 , 44.05 ± 22.32 , 54.00 ± 20.33 , respectively where $P<0.05$	Yoga can be used to practice for the treatment of PMS
20	Wu et al. ^[24] (2015)	The acute effects of yoga on cognitive measures for women with PMS Taiwan	Evaluative study women with PMS	Yoga, 1 month [11+9 = 20]	The alpha brain wave percentage was higher after yoga in the PMS group suggests that participants felt more relaxed or peaceful after yoga	Short-term yoga exercise in the luteal phase will feel better for PMS

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Table 3: Contd...

ROW	Author, year, and prevalence of PMS	Title and country	Study type and setting	Relaxation, duration, and sample size	Findings	Conclusion
21	Sharma et al. ^[25] (2013)	Comparative study of effect of anulomaviloma and yogic asanas in PMS, India	Comparative university students	Yoga anulomaviloma (pranayama), 3 months 60	Between baseline and post-values in groups A, B, and C; amongst the three groups, we found a significant difference ($P<0.05$)	Relaxation response in the females suffering from PMS reduction
22	Kucukkelepce et al. ^[26] (2021), 50-90%	The effects of acupressure and yoga for coping with PMS and quality of life, Turkey	RCT Nursing students	Three groups Yoga, 1 year [50+51+54=155]	The results showed that there was a significant difference between the pre-test and post-test mean scores of the yoga and acupressure groups ($P<0.005$)	Yoga found to be more effective
23	Tsai ^[27] (2016), 90.6%	Effect of yoga exercise on PMS among female employees in Taiwan	Female electronic employees	Yoga, 12 weeks 64	Yoga helped to less use of analgesics ($P=0.0290$) and decreased moderate or severe effects of menstrual pain on work ($P=0.0011$)	Benefits of regular exercise such as yoga may decrease PMS and improve female employee health
24	Choudhary and Mishra ^[28] (2013)	Effects of 16 weeks yogic intervention in PMS, India	RCT OBG OPD	Yoga 16 weeks 52	The result reveals a significant decrease in the negative affect category ($P\leq 0.00001$)	Asanas, pranayama, and dhyana can reduce PMS
Aerobic exercise						
25	Vishnupriya and Rajarajeswaram ^[29] (2011), 90%	Effects of aerobic exercise at different intensities in PMS, India	Experimental general community	Three groups Aerobic exercise 6 weeks [20+21+20=61]	There is significantly high correlation between the VO_{2max} and Borg scale scores in Group A (mild intensity), B (moderate), and C (severe intensity) with $r=0.981$, $r=0.812$, and $r=0.844$, respectively	Promote exercise as a potential intervention for PMS
26	Akyuz and Aydin-Kartal ^[30] (2018)	Effects of diet and aerobic exercise on PMS, Turkey	RCT Public university	Aerobic exercise 426, 2 months	It was determined that the mean PMS score of the diet and aerobic exercise groups decreased significantly	Aerobic exercise reduced the symptoms and intensity of PMS
27	Tonekaboni et al. ^[31] (2012), 85%	Effects of two intensity of aerobic exercise on clinical symptoms of PMS in fertile women Iran	Experimental University students	Three groups 3 aerobic exercise 3 sections in a week [30+30+30=90]	The first finding showed that aerobic exercise with high intensity has effect on negative mood, discomfort, and edema resulting from PMS	The study reveals that regular aerobic exercise is effective in reducing PMS symptoms
28	Vaghela et al. ^[32] (2017), 90%	To compare the effects of aerobic exercise and yoga on PMS, India	Randomized trial Physiotherapy students	Aerobic exercise Yoga 1 month 72	The results showed significant reduction both in pain intensity (VAS) and PMSS in both groups at the end of the treatment program ($P<0.05$)	Both aerobic exercises and yoga movements help in reducing PMS
29	Jafamejad et al. ^[33] (2016)	Effect of aerobic exercise program on PMS in women of hot and cold temperaments, Iran	RCT University students	Aerobic exercise Eight weeks, 65	After aerobic exercise, physical symptoms of PMS of hot temperament decreased from 21.8 ± 2.5 to 10.4 ± 3.1 ($P=0.001$) and decreased from 20.8 ± 3.8 to 9.5 ± 1.7 ($P=0.001$) among participants of cold temperament	Aerobic exercise reduces the physiological and psychological symptoms of PMS in both groups
30	Azimi and Sadeghi ^[34] (2013), 40%	Effects of aerobic and walking exercise on physical and psychological symptoms and pain of PMS, Iran	Experimental students	Aerobic exercise 3 months	Significant pain reduction at the end of first and third month of intervention ($P=0.008$, $P=0.047$)	Exercise is recommended for the reduction of PMS

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Table 3: Contd....

ROW	Author, year, and prevalence of PMS	Title and country	Study type and setting	Relaxation, duration, and sample size	Findings	Conclusion
31	Dehnavi et al. ^[36] (2015)	Effects of 8 weeks of regular aerobic exercise on intensity of PMS, Iran	A clinical trial University of Medical Sciences	Exercise 8 weeks, 65	After intervention the physical and psychological symptoms of PMS in the intervention group had a significant reduction ($P=0.001$)	Regular aerobic exercise will definitely reduce the intensity of PMS
32	Valiani ^[36] (2013)	Comparison in the effects of aerobic exercise and vitamin B6 in severity of PMS in non-athletic girls, Iran	University students	Three groups Aerobic exercise, vitamin B6, 8 weeks [20+20+20=60]	The results showed that the severity of symptoms reduced after 1 and 2 ($P\leq 0.001$) months of exercise	The above results proved that aerobic exercise and vitamins B6 intake could reduce the severity PMS
33	Pazoki et al. ^[37] (2015), 70%	Comparing the effects of aerobic exercise and <i>Foeniculum vulgare</i> on PMS, Iran	Comparative school girls	1. Aerobic exercise vs. control 2. Fennel vs. exercise 3. Fennel extracts 4. Control 8 weeks [12+12+12+12=48]	PMS reduced significantly after the intervention in experimental groups (fennel, exercise, and fennel+exercise) compared to control group ($P<0.05$)	Fennels and exercise good to reduce the severity of PMS
Massage						
34	Moradi ^[38] (2011), Iran	Assessment of the effects of massage therapy on PMS, Iran	RCT University students	Massage, 8 weeks [15+15=30] days	Significant decrease in mean of somatic (56.7%) and physiological (64.8%) at $P<0.001$ level	Massage therapy is an effective method for relieving PMS
35	Loffipur et al. ^[39] (2018)	Effects of Geranium aromatherapy massage on PMS, Iran	Clinical trial University students	Massage, 8 weeks [40+40+40=120] days	Aroma massage RT decreased the PMS including physical and mental symptoms too ($P<0.001$)	Aroma massage decreased the physical and mental symptoms of PMS

received both positive self-talk and relaxation, and the fourth group was the control group.

Furthermore, there were **six trials** which conducted by various authors to show the characteristics of interventions. These six studies also include three groups. The first trial conducted by Mahmoudi,^[18] on three groups which are namely relaxation group which received Benson relaxation training, cognitive-behavioral group which received Micheal Ferry Hawton cognitive-behavioral training and the control group. Another trial was conducted by Hasani *et al.*,^[22] on three groups. The first group received the relaxation, second group received 80 mg vitamin B6 tablets, and the third group considered as control group without any intervention. There was also a study which conducted by Kucukkelepce *et al.*,^[26] and it chosen acupressure and yoga as interventions. Acupressure was performed by the investigator who had acupressure certification on the first group. Yoga was performed by the researcher who had yoga certification. No interventions were given to the control group. The fourth study conducted by Vishnupriya and Rajarajeswaram,^[29] analyzed the potential benefits of aerobic exercises at different intensities in the treatment of PMS. Subjects were randomly allocated into three groups: Group A (mild intensity), Group B (moderate intensity), and Group C (severe intensity). The fifth study was conducted by Tonekaboni *et al.*^[31] The aim of the study was to determine two different intensities of regular aerobic training on clinical symptoms of PMS. The subjects of the study were divided into three groups: high-intensity exercise group, moderate-intensity exercise group, and a control group which did not participate in any of the sporting activities. The selected sixth study was conducted by Valiani,^[36] to know the effects of two different methods of aerobic exercise and vitamin B6 intake on the severity of symptoms of PMS. The samples were randomly divided into three groups as aerobic exercise group, vitamin B6 group, and control group.

The characteristics of the interventions used in this review that include Jacobson's relaxation were 11 [31%],^[2,8-17] Mitchell's relaxation were 2 (6%),^[3,7] Benson relaxation were 3 (9%),^[18-20] relaxation unnamed were 2 (6%),^[21,22] yoga were 6 (17%),^[23-28] aerobic exercise were 9 (26%),^[29-37] and massage were 2 (6%)^[38,39] as shown in Table 1.

We also came across some comparators like positive self-talk,^[16] vitamin B6,^[22,36] fennel extracts,^[37] *Foeniculum vulgare*,^[37] meditation with visualization,^[3] acupressure,^[26] and acupuncture^[7] in certain trials. The selected study population comprised nursing students, university students, working women, and clients attending OPDs and other clinics.

It is well known that PMS has a consistent pattern of both emotional and physical symptoms occurring during the luteal phase of the menstrual cycle in almost every woman with sufficient severity that interferes with some aspects of their life. PMS is also a superior alert to college students, and many non-pharmacological interventions help in reducing PMS. Furthermore, relaxation techniques help in relieving symptoms in all dimensions.^[2]

The primary outcome of this systematic study suggests that the selected seven relaxation therapies were efficacious in decreasing symptoms of PMS and increasing the productivity of reproductive-age women. Many studies mentioned the prevalence of PMS, which is within the range of 50–90% as shown in Table 3.

Different trials reported that RTs of both PMR and other simple RTs could reduce PMS by solving problems such as lack of concentration, behavior change, depression, anxiety, hostility, phobic anxiety, and somatic anxiety.^[15] Yoga is a method used for coping with PMS and it is found that the severity of PMS is decreased significantly with the help of yoga and it also improves the quality of life.^[26] Exercising and yoga reduce the physical difficulties of PMS along with lowering the risk of dysmenorrhea. Hence, employers can teach female employees the benefits of regular exercise like yoga which decreases premenstrual symptoms and improves female employees' productivity.^[27]

There were also some **secondary outcomes** noticed in this review. Nithyanisha reveals that aerobic exercise is more effective than relaxation training in subjects with PMS.^[8] The study conducted by Jasuja shows that PMR is one of the best tools to cope with stress and deal with stressors. It helps in alleviating symptoms of PMS and improves the overall well-being of women.^[11] Apart from that, Mahmoudi proved that the PMS and PMDD can be improved by the practice of cognitive and behavioral therapy and relaxation technique. However, relaxation technique performs a superior role among those therapies.^[18] Findings of the study by Asadi *et al.*^[16] showed that training cognitive-behavioral techniques emphasize positive self-talking, relaxation, and combined methods in the reduction of PMS. A study conducted by Olia explained that Benson's relaxation techniques can be used as an alternative method on the variability levels of oxidative stress markers and consequently for reducing physical and mental symptoms of PMS.^[19] The study by Hasani^[22] shows that both relaxation techniques and vitamin B6 effectively reduce the psychological symptoms of PMS but vitamin B6 is more effective in reducing physical symptoms compared to relaxation.^[36]

Discussion

The outcome of this SR suggests that selected seven RTs,

namely, PMR like Jacobson, Laura Mitchells, Benson, and other simple relaxations like relaxation, yoga, aerobic exercise, and massage, are effective, and their impact on PMS is tremendous. This SR provides further clinical and community support that the selected RTs are effective treatments for PMS. RT, including PMR and autogenic training, teaches clients to become physically and mentally relaxed through its physiological effects. It may slow heart rate, respiratory rate, and increase extremity temperature. It also enhances coping ability by decreasing anxiety and increasing self-control.^[17] A study proved significant changes in pain, concentration, behavior change, autonomic reaction, negative affect, and arousal. After undergoing comprehensive psychotherapy, there is a significant reduction in depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism, somatic anxiety, and hysteria.^[15] Moreover, another study expressed that the female employees who practice yoga have very few physical symptoms of PMS with a lower risk of dysmenorrhea. Therefore, employers can help female employees to understand the benefits of practicing yoga which will decrease premenstrual symptoms and improve their health.^[27] Apart from these, another study proved that relaxation technique helps to relieve the symptoms in all dimensions. The samples were moderately affected with physical 50 (100%) symptoms, psychological 17 (34%) symptoms, behavioral 25 (50%) symptoms, and pain 22 (44%) before the intervention. The samples which were severely affected by the symptoms are psychological 33 (66%), behavioral 23 (36%), and pain 28 (56%). However, the result of the post-test assessment showed that the severity of the symptoms was reduced. Most of the samples belong to the moderate and mild symptoms categories after PMR intervention for 2 months for 5 days a week. In the same way, the number of samples with physical 36 (72%) symptoms, psychological 34 (68%) symptoms, behavioral 29 (52%) symptoms, and pain 41 (82%) also reduced from severe to a moderate category of symptoms. Also, samples with physical symptoms, 14 (28%), psychological 16 (32%) symptoms, behavioral 17 (34%) symptoms, and pain, 4 (8%) samples were reduced to mild symptoms.^[2] Almost all studies show that RTs are instrumental in alleviating physical, psychological, and behavioral symptoms and making women more productive in different settings. The findings of this study may provide a guideline for practicing relaxation therapies in relieving PMS while pharmacologists strive to reduce physical and psychological symptoms of PMS. "Lifestyle is one of the series of factors that affect the health of people."^[40] "Important behavioral problems (such as depression, aggression, and irritability) occur during PMS which weaken occupational and social function of the girls."^[41]

Therefore, the result of this SR can be used by the health care professionals as an implication of research

and practice to teach women who come to clinical and community health settings that they can use RTs without fear of side effects since a majority of students studying in schools, colleges, and other women experience the symptoms of PMS. This review centered mainly on students and working women to improve their performance, which benefits their education, personal life, family life, and social life. This SR finds that RT can be used as an effective method to relieve PMS and it can be practiced anywhere without any cost and adverse effects. Since different relaxation therapies are introduced, a personal choice can also be considered.

The strength of this study is that it used PRISMA guidelines, current best practices, and guidance for SRs. This SR shows that the selected seven RTs reduced PMS in women who are engaged in the studies, are from different age groups, and are recruited from varying clinical and nonclinical settings. This study included different types of electronic databases and published literature.

Limitations and recommendation

As in this study, RTs differed in their effects and the length of intervention. All trials were conducted in different countries and cultures and varying outcome measures were used to assess the effects. The results of the present study may be applied from high schools, colleges of different categories, and even the workplaces of woman wherever they are employed. Thereby quality of life is improved in all settings as holistic well-being, lessening absenteeism, positive attitude, increased educational score, and productivity.

Conclusion

This SR proves that selected seven RTs, namely, PMR like Jacobson, Laura Mitchells, Benson, and other simple relaxations like relaxation, yoga, aerobic exercise, and massage, are effective in combating PMS. The SR also supports clinical and community areas that recommend that the selected RTs effectively treat PMS. RT includes PMR and autogenic training, providing physical and mental relaxation to the person who practices it. Moreover, the SR is the best evidence that those women can be more active and energetic during their period of PMS. This SR result helps create awareness among the women who are struggling with PMS who can use RTs as relaxation methods to reduce the various discomforts that limit their personal and professional achievements.

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Conflicts of Interest

There are no conflicts of interest.

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