

## The effects of acupressure and yoga for coping with premenstrual syndromes on premenstrual symptoms and quality of life

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### ABSTRACT

**Objective:** This study aims to identify the effects of acupressure and yoga for coping with premenstrual syndromes (PMS) on the premenstrual symptoms and quality of life.

**Methods:** This study adopted a randomized intervention design with a pretest-posttest control group. The sample consisted of 155 students with PMS complaints (50 in yoga, 51 in acupressure, and 54 in control group). The students in the intervention groups did yoga and received acupressure throughout 12 weeks.

**Results:** It was found that the Premenstrual Syndrome Scale posttest mean score of the students was lower, and the physical health, psychological health, and environment sub-scale mean scores of the World Health Organization Quality of Life Questionnaire were higher in the yoga group in comparison to the other groups ( $p < 0.05$ ).

**Conclusion:** Yoga was found to be a more effective non-pharmacological method for coping with premenstrual symptoms.

### 1. Introduction

Premenstrual symptoms include complex symptoms and have negative effects on students' attendance to courses, school success, social activities, family relationships, and thus the quality of life [1–7]. Although the severity may vary, 50–90% of women at reproductive age are reported to experience various premenstrual symptoms [5,8–11].

Causing somatic and psychological problems, premenstrual syndrome could affect women's quality of life negatively [6,9]. Every month, many women experience physical and mental problems as well as dysfunctions in professional and social areas due to PMS [12]. Every month, 3%–5% of women cannot go to school or job due to severe PMS [13,14]. Therefore, PMS is a syndrome that should be approached carefully and that affects individuals as well as the health and economy of countries [15]. There is no universally-accepted, single treatment method for the treatment of PMS. The treatment may include many methods including pharmacological and nonpharmacological ones [16, 17]. However, as the pharmacological treatment has many negative effects such as fatigue, headache, anger, depression, and gastrointestinal

bleeding and requires long-term procedures, nonpharmacological methods are preferred more in the treatment of PMS [18,19]. Non-pharmacological methods such as reflexology, acupressure, massage therapy, music therapy, yoga, progressive relaxation exercises, cognitive behavioral therapy, and diet therapy are frequently preferred because they are safer and have fewer side effects than the pharmacological treatment [11,19–29]. An analysis of the nonpharmacological methods used shows that acupressure decreases menstrual distress, premenstrual symptoms, and backache in women who have dysmenorrhea [30–33]. However, Amour et al. stated in their systematic review that although acupressure has a positive effect on reducing PMS symptoms compared to the control group, there is no study that has proven its effect by comparing it with other methods [34]. Beside acupressure, yoga is also used for increasing quality of life by decreasing the PMS-related depression and high blood pressure level [26]. An analysis of the studies conducted shows that yoga done for coping with premenstrual symptoms experienced in the menstrual cycle and dysmenorrhea is a safe and simple treatment method [5,35,36]. Tsai noted that yoga exercises reduced PMS symptoms and improved quality of life [36]. PMS

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involves complex symptoms. Therefore, it should be approached in a multidimensional manner to improve women's quality of life by coping with these symptoms. It is highly important to evaluate the superiority of different methods to each other or use them in a way to complement each other. Although the literature involves studies on the positive effects of acupressure [30–33] and yoga [5,26,35–37] on PMS, no studies were found to have made the comparison of these two methods. Therefore, the present study aims to identify the effects of acupressure and yoga for coping with PMS on premenstrual symptoms and quality of life.

**H1.** Yoga decreases the severity of PMS symptoms and increases the quality of life.

**H2.** Acupressure decreases PMS symptoms and increases the quality of life.

## 2. Methods

### 2.1. Study design

This randomized controlled trial adopted a prospective pretest-posttest intervention design.

### 2.2. Target population and sample

This study was conducted with female students who were enrolled in the Faculty of Nursing and Health Sciences at two public universities. The target population of the study was the female students who attended the nursing and midwifery departments and received 110 points and over in the Premenstrual Syndrome Scale (PMSS). The calculation of the sample size was done using the PMSS total score, the primary dependent variable, as reference. The calculation is based on 0.86 effect size and PMSS total score reported by Ariöz and Ege [38]. The sample size of the study was calculated as 150, with 0.86 effect size, 0.97 power, and 0.03 margin of error. Considering the potential losses, the study included 60 participants in each group, making 180 students in total. Initially, to prevent any effects between the acupressure and yoga groups, each group was composed of students from a different public university by drawing lots. A person not involved in the research sealed the cards with the names of the universities in opaque envelopes. Without knowing the card in both envelopes, the researchers accepted the first randomly selected envelope as the yoga group and the second as the acupressure group. As for the control group data, the students were selected equally from the identified departments of both universities. All the participating students were administered the PMSS and those who received 110 points and higher were listed. Before the randomization, the students were ranked by the student numbers. The assignment of the students to the experimental and control groups was done using the simple randomization method. Randomization was performed using the online "randomizer.org" web site. Two lists of 30 students from both universities were created. The lists were then put in an opaque envelope and sealed by a person who was not involved in the study. The researchers, without knowing the lists in both envelopes, accepted the first envelope as the experimental group and the second as the control group. After the experimental and control groups were determined, the selection process continued until the number of students in the experimental groups reached 60. As the number of participants in each group was 60, the set range was between 1 and 100 (3 Sets of 3 Unique Numbers Per Set Range: From 1 to 100).

The inclusion criteria were having a regular menstrual cycle (between 21 and 35 days), being single, having no psychiatric diagnosis or gynecological diseases (abnormal uterus bleeding, myoma, ovarian cysts, etc.), not using contraceptives, having no tissue deformities in the extremities, and having no health problems that could prevent doing physical exercises. A total number of 25 students (7 students who did not attend acupressure, 8 students who did not attend yoga sessions, and 10

students who were not reached in the posttest) were not involved in the study (Fig. 1). Hence, the study was completed with 51 students in the acupressure group, 50 students in the yoga group, and 54 students in the control group).

### 2.3. Measurements

Data were collected by using the Socio-demographic Form prepared by the researchers, the Premenstrual Syndrome Scale (PMSS), and the Short Form of the World Health Organization Quality of Life Questionnaire (WHOQOL).

#### 2.3.1. The socio-demographic form

The first part of the Socio-demographic Form prepared in line with the related literature is composed of questions that aimed to collect data about the socio-demographic characteristics of women with PMS (age, education level, income level, working, and height and weight) and menstruation and PMS history (menarche age, frequency and duration of menstruation, the presence PMS in the family). The Socio-demographic Form is composed of 13 questions [39–41].

#### 2.3.2. The Premenstrual Syndrome Scale (PMSS)

The Premenstrual Syndrome Scale developed by Gencdoğan aims to measure the severity of premenstrual symptoms. The five-point likert type scale is composed of 44 questions determining the severity of premenstrual symptoms. The nine subscales of the PMSS are Depressive Affection, Anxiety, Fatigue, Irritability, Depressive Thoughts, Pain, Changes in Appetite, Sleep Changes, and Swelling. The Premenstrual Syndrome Scale enables a retrospective evaluation of the symptoms considering "within one week before the period". The scores obtained from the scale range between 44 and 220 with higher scores indicating increased severity of the premenstrual syndromes. An individual is considered to have premenstrual symptoms when the total PMSS score is higher than 50% (110). The Cronbach's alpha reliability coefficient was reported to be 0.75 for the total scores of the scale and between 0.75 and 0.91 for its subscales [42]. This study found Cronbach's Alpha reliability coefficient 0.88 for the overall scale and between 0.68 and 0.72 for its subscales.

#### 2.3.3. Short form of the World Health Organization Quality of Life Questionnaire (WHOQOL)

The World Health Organization (WHO) defined quality of life in 1980 and developed the WHOQOL-100 scale. The scale enabled cross-cultural comparisons with the contribution of 15 centers from various countries [43]. Turkish validity and reliability of the scale were performed by Eser et al. (1999). The Turkish version of the short form scale (WHOQOL-BREF - TR) was formed according to the WHOQOL-100 [43]. The scale has 27 questions in four domains including physical health, psychological health, social relationships, and environment. Responses to the questions are given considering the last 15 days. Each question is scored from 1 to 5, and the minimum and maximum scores are 0 and 100 respectively. Physical health, psychological health, social relationships, and environmental domain scores are calculated using the questions apart from the first two general questions [43]. When the scores are calculated, the 1st and 2nd items are evaluated independently, and the 3rd, 4th, 26th, and 27th questions are scored reversely as they include negative statements [43,44]. There is no total score on the scale. Higher subscale scores indicate a higher quality of life. Cronbach's Alpha values of WHOQOL-BREF were reported to be as follows: physical health: 0.82, psychological health: 0.66, social relationship: 0.53, and environment: 0.73 [43]. As for the present study, the Cronbach's Alpha coefficients were 0.41 for the physical health, 0.78 for the psychological health, 0.49 for the social relationships, and 0.75 for the environment subscales.

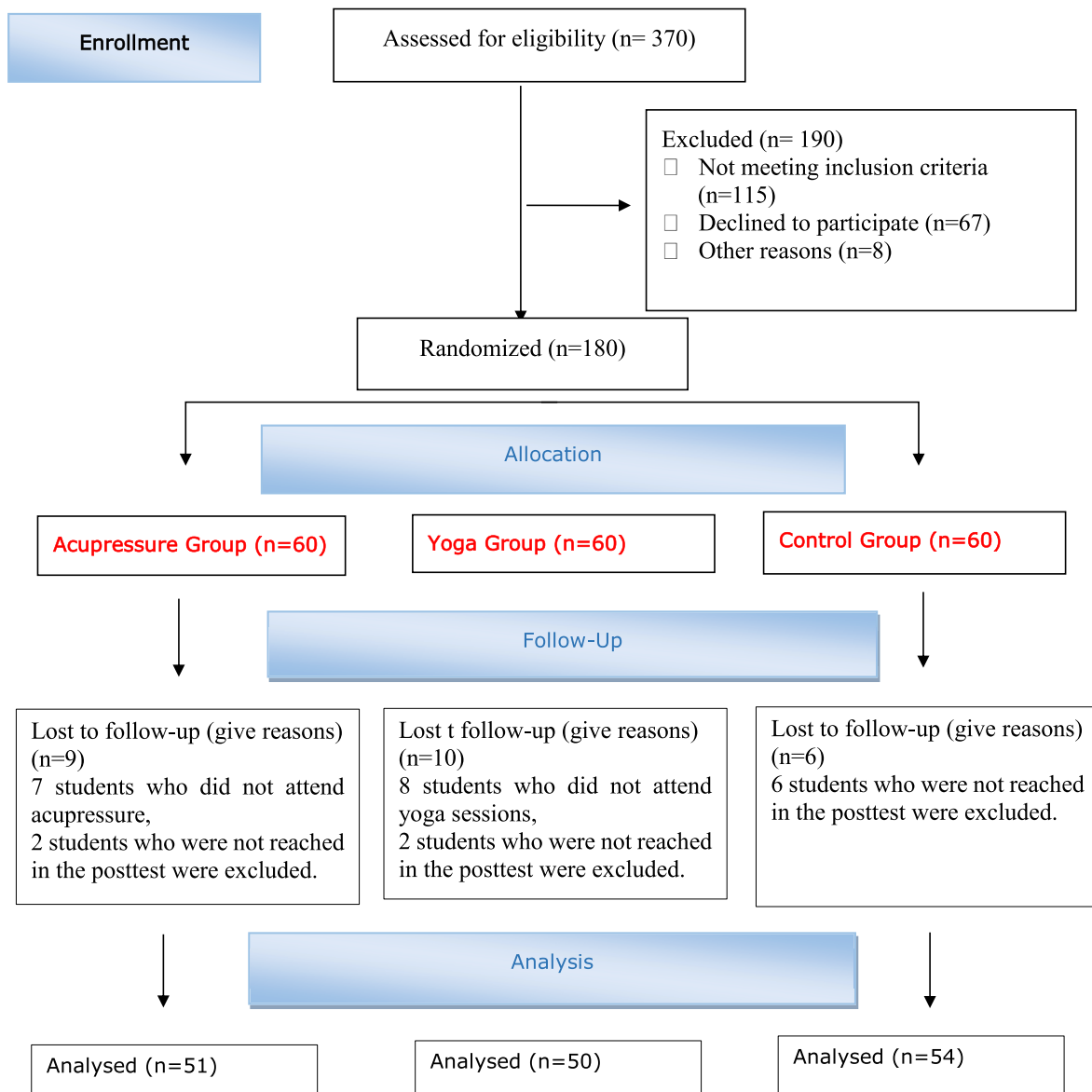


Fig. 1. Consort follow diagram

#### 2.4. Data collection

Data were collected between February and June 2019. The pretest data were collected through face to face interviews conducted by the researchers on weekdays during the times the students had no classes. The posttest data were collected 12 weeks later. Data collection included the administration of the Socio-demographic Form, PMSS, and WHOQOL-BREF. Both intervention groups and the control group were administered the Socio-demographic Form, PMSS and WHOQOL-BREF as pretest and PMSS and WHOQOL-BREF as the posttest.

#### 2.5. Intervention

1. *Acupressure Group*: Acupressure was performed by the researcher who had acupressure certification twice a week and 24 times in total. Acupressure was done in the antenatal class laboratory on the days and hours determined by the researcher and the student, with the participation of one student at each time. Acupressure was performed by the researcher at the same frequency until the study was completed.

*Acupressure Administration Protocol*: the participating students were asked to be in a semi-sitting or supine position so that they could feel comfortable and the researcher could access acupressure points comfortably. The determined acupressure points were performed acupressure in direction of the meridian in a certain order. The order was according to Spleen 6th point (SP 6) and Large Intestine 4th point (Li 4). Acupressure was performed on 4 acupressure points including 2 points in the upper/lower extremity along with the parallel points in each intervention. Individuals receiving acupressure may respond to the application differently, so the rigidity and pressure were adjusted according to the participating individual's sensitivity. The thumb or index finger was used for applying acupressure manually depending on the acupressure point. To provide circulation before the pressure, a 30-min massage was given to each acupressure point, which was followed by consecutive pressures applied for 90 s. Each intervention included 8-min sessions in total: 4 points and 2 min for each point. Consecutive pressures were done to have soothing effects and cause no disturbance or pain.

2. *Yoga Group*: Yoga was performed by the researcher who had yoga certification once a week and 12 times in total. It was done in the

Skills Development laboratory of the related faculty on the dates determined by the researcher and students, and with groups of 6 students. Hence, the yoga group performed yoga under the guidance of the researcher with 1-h sessions weekly for 12 weeks. Yoga was performed by the researcher in the same frequency until the study was completed

2.5.1. Yoga administration protocol

**Breathing exercises:** This phase aims to raise awareness about breathing. The breathing exercises take 5 min. At this phase, Kapalbhatai Pranayama yoga breathing exercises were applied. The laboratory where yoga was done was aired to prepare a suitable environment for the breathing exercises.

**Asanas:** Yoga asanas are physical movements based on stretching and balance. In these postures, students are helped to focus all their attention on their bodies. Asanas enhance physical and psychological relaxation. The purpose of the asanas is to teach students to move all their bodies, stay in balance, and relax.

This phase took 40 min and was composed of five basic asanas which included cat-cow pose, child’s pose, plank pose, cobra pose, and downward dog [26,37]. To compare the effects of aerobic exercise and yoga on Premenstrual syndrome [37]. The cat-cow pose increases the lung capacity by strengthening the thorax. It increases the flexibility and mobility of the pelvic joints. The child’s pose stretches the back and hips and helps to relieve stress, sickness, fatigue, and flatulence. The downward dog pose strengthens arms, shoulders, stomach and quadriceps and ankles and stretches shoulders, hamstrings, and chest. The plank pose strengthens arms, wrists, and spine. The cobra pose stretches out the chest and abdominal muscles and protects the flexibility of the spine. It also helps to reduce back pain.

**Meditation Phase:** This phase lasts 15 min. During the meditation, the students were asked to close their eyes, be silent, and lie back by relaxing all their bodies. Using the savasana pose, the students were instructed to consciously relax their whole body by releasing their arms and legs with palms face up and eyes closed position. This position helps to relax all the psychophysiological systems. The yoga coach assisted all the participants to attain the right yoga postures to avoid exercise injury and guided the breathing frequency. The same yoga routine was done for 12 weeks.

3. The control group was not given any interventions after the administration of the pretest. Both intervention groups and the control group were administered the PMSS and WHOQOL-BREF forms three months after the first data collection.

2.6. Data analysis

Data were analyzed via the Statistical Package for Social Sciences (SPSS) 22.0. Data analysis included the use of frequencies, percentages, and means, chi-square and independent t-tests, ANOVA test, and Bonferroni test; 95% confidence intervals and p-values of <0.05 were utilized for testing the results.

2.7. Ethical considerations

Before the study was conducted, the Ethics Committee Approval was obtained from the non-interventional clinical research Ethics Committee of the Health Sciences (2019/4-32). Besides, written permission was obtained from the deans of the faculties where the study was conducted. The participating students were given information about the informed consent form, and their written consent was obtained.

3. Findings

This study aims to identify the effects of acupressure and yoga for

coping with premenstrual syndromes (PMS) on the premenstrual symptoms and quality of life. The findings of the study are presented in the tables. Table 1 presents the comparison of the experimental and control groups according to the control variables.

It was found that all the students in the three groups were aged between 19 and 22, the majority of them did not work, and more than half of them had income equal to/more than expenses. In addition, the majority of the students had a menstruation duration of 6–8 years and a menstrual cycle between 21 and 28 days. An analysis of the BMI indicated normal values in three groups. No significant differences were found between the groups in terms of the control variables (p > 0.05), which indicates the homogeneity of the intervention and control groups.

Table 2 presents the comparison of pretest-posttest PMSS mean scores of the students in the experimental and control groups. The results showed that there was a significant difference between the pretest and posttest mean scores of the yoga and acupressure groups (p < 0.005), but the pretest and posttest mean scores of the control group did not indicate significant differences (p > 0.05). It was determined that the difference between the pre-test PMSS mean scores of the students in the experimental and control groups was not significant (p > 0.05), however, the difference between the post-test was statistically significant (p < 0.05). As a result of the Bonferroni analysis applied to determine the origin of the difference between the experimental groups, it was determined that the difference was caused by the yoga group (p < 0.05).

Table 3 presents the comparison of the pretest-posttest WHOQOL-BREF sub-scale mean scores of the students in the intervention and control group. While the students in the acupressure group demonstrated differences between the pretest-posttest scores only in the physical sub-scale, the yoga group was found to have significant differences between the pretest and posttest mean scores in the physical health, psychological health, and environment sub-scales of the WHOQOL-BREF. There was a significant decrease in the premenstrual symptoms of the students in the yoga group compared to the acupressure group, and both yoga and acupressure group had significant differences in the physical sub-scale (p > 0.05).

Table 4 presents the comparison of difference/reduction in PMS and WHOQOL-BREF scale between two groups. Significant reduction in PMS symptoms was found in students with yoga compared to acupressure and significant difference was found in physical health domain these

**Table 1**  
Distribution of socio-demographic and menstruation characteristics of experimental and control groups (N = 155).

Socio-Demographic characteristics	Acupressure group (n = 51)		Yoga group (n = 50)		Control group (n = 54)		a Test and significance
	n	%	n	%	n	%	
<b>Age</b>							
19-22 age	43	84.3	45	90.0	51	94.4	F = 2.916
23-25 age	8	15.7	5	10.0	3	5.6	p = 0.233
<b>Working Status</b>							
Employed	11	16.4	7	14.0	11	19.3	F = 1.101
Unemployed	40	83.6	43	86.0	43	80.7	p = 0.577
<b>Income Status</b>							
Income less than expense	24	47.1	18	36.0	16	29.6	F = 3.466
Income equal to expense/more than expense	27	52.9	32	64.0	38	70.4	p = 0.177
<b>Menstruation Duration/day</b>							
2–5	22	43.1	18	36.0	18	33.3	F = 1.140
6–8	29	56.9	32	64.0	36	66.7	p = 0.566
<b>Menstruation<sup>a</sup> Frequency/day</b>							
20–28	27	52.9	26	52.0	27	50.0	F = 0.095
29–40	24	47.1	24	48.0	27	50.0	p = 0.953
<b>BMI (Mean ± Sd)</b>	22.32 ± 2.89		21.37 ± 3.56		21.81 ± 5.33		F = 271.936 p = 0.106

<sup>a</sup> ANOVA test.

**Table 2**  
Comparison of pretest-posttest PMSS mean scores of experimental and control groups.

Groups	PMSS			*Test and Significance
	Yoga group Mean (SD)	Acupressure group Mean (SD)	Control group Mean (SD)	
Pretest	150.72 (14.42)	150.86 (28.70)	144.74 (26.67)	F = 9.450 p = 0.283
Posttest	81.02 (17.81)	140.56 (23.21)	140.70 (30.64)	F = 99.138 p = <b>0.001</b>
<sup>b</sup> Test and Significance	t = 21.530 p = <b>0.001</b>	t = 3.133 p = <b>0.003</b>	t = 0.815 p = 0.419	

<sup>a</sup> ANOVA test was used.

<sup>b</sup> Paired Simple t-test was used.

**Table 3**  
Comparison of pretest and posttest WHOQOL-BREF mean scores of experimental and control groups.

Groups	WHOQOL-BREF subscales	Pretest	Posttest	*Test ve Önemlilik
<b>Acupressure Group</b>	Physical domain	21.68 ± 2.23	23.19 ± 4.36	t = -2.661 p = <b>0.010</b>
	Psychological domain	19.43 ± 3.99	19.47 ± 3.66	t = -0.090 p = 0.929
	Social domain	10.03 ± 1.99	10.01 ± 1.79	t = 0.077 p = 0.939
	Environmental domain	29.56 ± 4.87	29.96 ± 4.23	t = -0.747 p = 0.458
<b>Yoga Group</b>	Physical domain	20.88 ± 1.79	27.84 ± 2.63	t = -15.792 p = <b>0.001</b>
	Psychological domain	19.66 ± 5.77	22.50 ± 3.48	t = -2.631 p = <b>0.011</b>
	Social domain	9.90 ± 2.00	10.44 ± 1.55	t = -1.937 p = 0.059
	Environmental domain	28.10 ± 4.86	31.00 ± 4.99	t = -4.379 p = <b>0.001</b>
<b>Control Group</b>	Physical domain	21.77 ± 2.31	21.98 ± 4.72	t = -0.269 p = 0.789
	Psychological domain	20.18 ± 4.01	20.01 ± 3.95	t = 0.295 p = 0.769
	Social domain	10.33 ± 2.78	10.12 ± 2.42	t = 0.551 p = 0.584
	Environmental domain	28.92 ± 6.22	27.90 ± 5.75	t = 1.115 p = 0.270

<sup>a</sup> Paired Simple t-test was used.

**Table 4**  
Comparison of difference/reduction in Premenstrual Syndrome and WHOQOL-BREF Scale between two groups – independent t-test.

Comparison of difference	Akupresur (n = 51)	Yoga (n = 50)	P
Reduction in PMSS, Mean ± SD	10.29 ± 23.46	85.92 ± 28.90	t = 14.450 p: <b>0.000*</b>
Reduction in WHOQOL-BREF Physical health domain, Mean ± SD	1.50 ± 4.05	6.96 ± 3.11	t = 7.567 p: <b>0.000*</b>

\*P < 0.001. SD=Standard deviation, PMSS=Premenstrual Syndrome Scale, WHOQOL-BREF= Short Form of the World Health Organization Quality of Life Questionnaire.

two groups (p > 0.05).

**4. Discussion**

The premenstrual syndrome involves complex symptoms and could have effects on students' attendance to the courses, school success,

social activities, family relationships, and thus the quality of life [1–7]. The right management of premenstrual symptoms is of great importance in terms of improving reproduction/sexual health and the quality of life of young females [12].

Acupressure, a complementary therapy used for coping with PMS, has been reported to be effective in decreasing premenstrual symptoms [34,45–47].

Studies conducted by Padmavathi et al. [47] and Choung and Song [48] investigated the effects of acupressure on premenstrual symptoms and found that acupressure decreased premenstrual symptoms. In addition, Bazarganipour et al. [45] found that acupressure applied on two different acupressure points decreased the severity of premenstrual symptoms and improved quality of life. This study also found that the acupressure intervention decreased the severity of the premenstrual symptoms and improved quality of life (p < 0.05). The findings of the present study are in line with the findings in the studies conducted by Padmavathi et al. [47], Padmavathi [46], Bazarganipour et al. [45], and Choung and Song [48].

Yoga is another non-pharmacological method used for coping with premenstrual symptoms. This study found that the 12-week yoga used for coping with premenstrual symptoms decreased the severity of PMS symptoms significantly and improved quality of life (p < 0.05).

Kamalifard et al. [5], Choudhary et al. [48], and Tsai [36] investigated the effects of yoga on premenstrual symptoms and found that yoga decreased the severity of the premenstrual symptoms and improved quality of life. On the other hand, Bharati [35] investigated the effects of the use of oral calcium and yoga on premenstrual symptoms and found that yoga was more effective in decreasing the symptoms in comparison to calcium. In addition, a study that evaluated the effects of yoga and respiration techniques on premenstrual symptoms and basal parameters found that although yoga and respiration techniques had similar effects on basal parameters, yoga was more effective in reducing the severity of premenstrual symptoms [49]. The results of this study are in line with the literature. An analysis of these studies shows that compared to oral calcium intake and respiration techniques, yoga was more effective in decreasing the severity of premenstrual symptoms. Hence, the present study found that yoga was more effective in decreasing the severity of premenstrual symptoms in comparison to acupressure.

**4.1. Study limitations and strengths**

The limitation of this study is that the sample was composed of single women only. In the study, students were followed during an education period, as it would be difficult to follow during the summer break. Therefore, the short duration of the study, such as 3 months, is another limitation of the study. The strengths of the study are that it adopted a randomized controlled design and evaluated the effects of two different non-pharmacological treatment methods for coping with premenstrual symptoms and proved the superiority of these two methods to each other. However, the generalizability of the results is limited to this sample group.

**5. Conclusion**

In conclusion, yoga and acupressure for coping with premenstrual symptoms were found to decrease symptoms and improve quality of life. Moreover, in comparison to acupressure, yoga was found to be more effective in decreasing the severity of the premenstrual symptoms and improving the quality of life. Yoga is a cost-effective, simple, safe, and effective approach that can be done alone anytime and anywhere for decreasing the severity of premenstrual symptoms; therefore, it is recommended that women should be instructed to do yoga for coping with PMS. In addition, future studies that compare the alternative treatment methods for coping with premenstrual symptoms with yoga and acupressure could be beneficial.

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## CRedit authorship contribution statement

**Didem Simsek Kucukkelepce:** Conceptualization, Methodology, Formal analysis, Investigation, Writing - original draft, Supervision. **Hacer Unver:** Formal analysis, Writing - review & editing. **Gulcin Nacar:** Writing - review & editing. **Sermin Timur Tashan:** Conceptualization, Methodology, Writing - original draft, Supervision.

## Declaration of competing interest

We declare “No conflict of interest for this study”

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