



The Effect of Mindfulness-Based Cognitive-Behavioral Therapy on Premenstrual Syndrome

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Abstract

Background: Premenstrual syndrome (PMS) is one of the most common psychosomatic disorders in reproductive-aged females and due to its less severe symptoms, administration of non-pharmacological interventions as the first-line is emphasized.

Objectives: The current study aimed at examining the effect of mindfulness-based cognitive-behavioral therapy on PMS symptoms.

Methods: The current randomized, controlled trial was performed on 40 students with PMS from Shahid Chamran University in Ahvaz, Iran in the academic year 2016 - 2017. Students were allocated into 2 groups (20 subjects in each) using simple random sampling method by the random number table. Students in the intervention group received eight 1-hour sessions of mindfulness-based cognitive-behavioral therapy weekly and the students in the control group received no intervention. The PMS symptoms were assessed using the daily symptom records (DSR) questionnaire, before, just after the completion of intervention, and one month later.

Results: In the intervention group, the mean score of PMS symptoms immediately (27.65 ± 7.34) and one month after the completion of the intervention (28.15 ± 7.13) showed a significant reduction, compared with the pre-intervention scores (42 ± 9.09) using the repeated measure test ($P < 0.05$). In the control group, the mean score of PMS symptoms immediately (40.05 ± 7.85) and one month after the intervention (40.15 ± 7.71), compared with that of the pre-intervention (40.25 ± 7.93) showed no significant changes in the control group ($P > 0.05$). Also, the symptoms of PMS significantly reduced in the intervention group in just after the intervention and the follow-up visit, compared with that of the control group ($P < 0.001$).

Conclusions: According to the findings, mindfulness-based cognitive-behavioral therapy could reduce physical and behavioral symptoms of PMS in the studied students.

Keywords: Cognitive-Behavioral Therapy, Mindfulness, Premenstrual Syndrome

1. Background

Premenstrual syndrome (PMS) is one of the most common psychosomatic disorders characterized by manifestation of physical and psychological symptoms, which occur during the luteal phase of the menstrual cycle and resolve by the end of menstruation (1, 2).

Anxiety, depression, fatigue, nervousness, irritability, confusion, and mood swings (3) are the most common psychological symptoms of PMS, while breast tenderness, bloating, swelling, acne, increased appetite, headache, backache, and sleep disturbances are some of its physical symptoms. The premenstrual symptoms affect the quality of life and cause impairment in many aspects of the females' lives (4). Factors such as school dropout, increased rate of commitment to suicide, increased occupational complications, absence from the workplace, and increased

demand for divorce from females during premenstrual period cause serious disturbances and inconveniences in females' lives. Such problems are due to the effect of PMS on the quality of life (5).

The etiology of PMS is not well understood, but the interaction between biological, psychological, environmental, and nutritional factors, ovarian hormones, as well as micronutrients deficiency may play a role in its etiology (6-8). An epidemiological study estimated that about 90% of females experience at least 1 symptom of PMS during their reproductive age (2). Also, the severe form of PMS or premenstrual dysphoric disorder (PMDD) occurs in 2.5% - 3% of females (9).

The treatment of PMS ranges from non-pharmacological management of psychotropic medications to hormones and contraceptive therapy (10-13).

To treatment PMS, a comprehensive program including training, counseling and psychological support, exercise, nutritional assessment, and in some cases if needed, medicine interventions should be administered (14).

The multiple therapies are extensively available due to the multifactorial nature of the PMS syndrome including biological, psychological, and social factors that manifest on the onset of the syndrome. In several studies, psychological interventions were introduced to control the psychological and partly physical symptoms of the syndrome (15).

According to the American college of obstetricians and gynecologists (ACOG), the first-line treatment for premenstrual dysphoric disorder is pharmacotherapy; however, in the treatment of premenstrual symptoms, non-pharmacological approaches should first be administered for the cases with low-degree symptoms (16).

Several psychological programs were used in the treatment of PMS so far, and some of them were reported effective (3). Blake et al., evaluated the effect of cognitive-behavioral therapy as a psychological treatment for females with PMS and almost complete remission of psychological and somatic symptoms was reported (17). In another study, a correlation between mindfulness-based intervention and PMS symptoms was also shown (18).

Mindfulness is defined as a bringing one's non-judgmental attention to thoughts, emotions, body sensations, and the interactions. This skill is considered as the main core in mindfulness-based cognitive therapy (MBCT). MBCT as an evidence-based psychological group program helps people to manage and reduce their stresses and depressive symptoms (19-21). The mindfulness skill is trained through discussion sessions, cognitive behavioral exercises, and meditation (22).

MBCT is a structured program of 1-2-hour sessions within 8 consequences weeks. Practice a daily exercise at home and within the group is the main part of MBCT. It was specifically developed to prevent the relapse of symptoms in people with a history of depression (23), although it is currently applied to the treatment of current depressive signs. A meta-analysis showed that mindfulness-based interventions are effective to prevent depression relapse (24). The clinical effectiveness of mindfulness-based treatment is also obvious in the relief of chronic pains (25), and some other medical conditions (26) such as fibromyalgia, heart issue, and cancerous cases as well as chronic fatigue syndrome (27, 28). Also, in patients with prostate or breast cancer, an anti-inflammatory effect of the treatment on pro-inflammatory cytokine profiles was reported using mindfulness-based intervention (29). In a recent study, it was shown that cognitive-behavioral therapy can be effective to improve the depression and excitability in females

with menstrual syndrome. According to a systematic review of cognitive-behavioral therapy to treat PMS and premenstrual dysfunction, integration of mindfulness and cognitive-behavioral methods were recommended for better achievement (30).

According to the results of these studies, and because of the literature gap and the effects of PMS on the quality of females' lives, and the need for using nonpharmacological interventions in reducing PMS symptoms, the current study aimed at examining the effect of mindfulness-based cognitive therapy on premenstrual symptoms in females.

2. Methods

2.1. Participants

In the current randomized, controlled trial with pretest-posttest design, 40 students with PMS from Shahid Chamran University of Ahvaz, Iran, from October 2016 to March 2017 were enrolled. The Shahid Chamran University is a non-medical state university in Ahvaz located in the Southwest of Iran. At the first stage, all female students with PMS were invited to participate in the study by an announcement. In this stage, 310 students referred to participate in the screening phase of the trial of which 205 students met the inclusion criteria as the age range of 18 - 35 years, accessibility within the next six months, PMS questionnaire score 33 - 64, being single, and regular menstrual periods (21 - 35-day cycles and 3 - 10 days of bleeding), no known mental and physical disorders, no adverse events during the last three months, no surgery in the past three months, and no use of antidepressants or hormonal drugs in the past three months. The exclusion criteria were: alcohol addiction, absence more than three sessions, being a student or graduated from counseling/psychology program. Written informed consent was obtained from all the students.

2.2. Sampling

To calculate the sample size, the power of the study was considered 90% with $\alpha = 0.01$ and the confidence interval of 95%. According to the formula, and based on a previous study (30), the sample size was set to 20 using the sample volume formula. Students were allocated into two groups (20 subjects in each) using the simple random sampling method by random number table.

$$n = \frac{\left(z_{1-\frac{\alpha}{2}} + z_{1-\beta}\right)^2 [s_1^2 + s_2^2]}{(\bar{x}_1 - \bar{x}_2)^2} \quad (1)$$

$$N = \frac{(1/96 + 1/28)^2 (1/56^2 + 1/34^2)}{(3/83 - 2/32)^2} \quad (2)$$

2.3. Intervention Program

Mindfulness-based cognitive therapy includes training of meditation and psychoeducation on cognitive processing according to the following standard protocol:

1- Attentional control that is maintaining a moment-by-moment awareness.

2- How to disengage from judgmental and evaluative language by processing and moving to an experiential attention of the present moment.

3- How to disengage from negative thoughts and emotions and physical sensations.

Mindfulness-based intervention allows the practitioners to act more reflectively rather than impulsively. In the present study, MBCT was implemented within eight sessions.

The first session included rapport with the client, gathering the information, providing psychoeducation on mindfulness, cognitive-behavioral therapy (CBT), identifying depression, stress, anxiety, and automatic thoughts, and guiding the client through mindfulness meditation. In the next session, awareness of bodily sensations and in the third session, dealing with barriers as well as short breathing meditation, while being compassionate with her, was trained.

In the fourth session, the client was helped to understand most of her thoughts are not necessarily a fact, and she learned how to use the thought records; also, training on cognitive distortion was provided. In the fifth session the ability to live at the time while being aware of attachments and aversions was trained; then, deep breathing and sleep health benefits were explained and the client learned how to have a brief body exercise.

In the sixth session, the thoughts and emotions were accepted as fleeting events; then, daily mindfulness, mindful eating, and mindful labeling of thoughts, feelings, and behaviors were also trained.

In the next session, the client was familiarized with the symptoms of depression, stress, and rumination thinking. Also, the client was trained how to accept rumination thinking without judgment and use the diffusion technique to reduce it. In the last session, the insights and techniques found most useful by the client as well as identifying the obstacles to practice mindfulness was reviewed, and a checklist of techniques presented in the program was provided (31-33).

Then, the students filled out a demographic questionnaire, and the daily symptom records scale was also completed by them to confirm PMS diagnosis. The students were trained how to complete the questionnaires. Out of 205 students who were assessed for two menstrual cycles, 100 subjects completed and returned the questionnaires,

and based on the PMS criteria (21), the disorder was confirmed in 55 ones. Out of which 10 students refused to participate, 5 were graduated, and only 40 students entered the study; then, they were divided randomly into two intervention and control groups (20 subjects in each) using the table of random numbers (Figure 1). The participants in the intervention group received eight 1-hour sessions of mindfulness-based cognitive-behavioral counseling presented by the corresponding author and the control group received no intervention. Both groups completed PMS questionnaire after the completion of consultation sessions as well as one month later.

2.4. Data Collection Instruments

2.4.1. A Demographic Questionnaire

2.4.2. Daily Symptom Records Questionnaires

It is a 32-item self-report, standard inventory developed to determine PMS. The severity of symptoms is scored based on a 4-option Likert scale as 0 (no), 1 (mild), 2 (moderate), and 3 (severe) and total score comprises a mean score of symptoms from a week prior to the menstrual bleeding to five days afterward. The severity of physical symptoms is calculated by adding the score of the symptoms such as headache, breast tenderness, acne, swelling, bloating, palpitations, and the severity of psychological symptoms was determined by a total score of the symptoms including irritability, tension, sleep problems, mood swings, food cravings, willingness to be alone, depression, forgetfulness, anxiety, poor concentration, crying, commitment to suicide, decreased libido, and fatigue. The validity and reliability of DSR questionnaire were confirmed by Delaram et al., in Iran; the content validity analysis was used to evaluate its validity (90%) and the test-retest method was also employed to assess the reliability ($r = 0.79$) (34).

2.5. Statistical Analysis

Data were analyzed with SPSS Ver. 23 (Chicago, IL, USA). Independent t test was used to analyze the quantitative data. The Chi-square and the Mann-Whitney U test were used to analyze the qualitative data. Multivariate test was also used to compare PMS core between the three investigated intervals. In the intragroup analysis, since the study was designed based on three intervals (before the intervention as well as immediately and one month after the intervention), the repeated measures analysis of variance (ANOVA) was used for the normal quantitative variables. P value < 0.05 was considered the level of significance.

2.6. Ethical Consideration

The ethics committee of Ahvaz Jundishapur University of Medical Sciences approved the study protocol (code

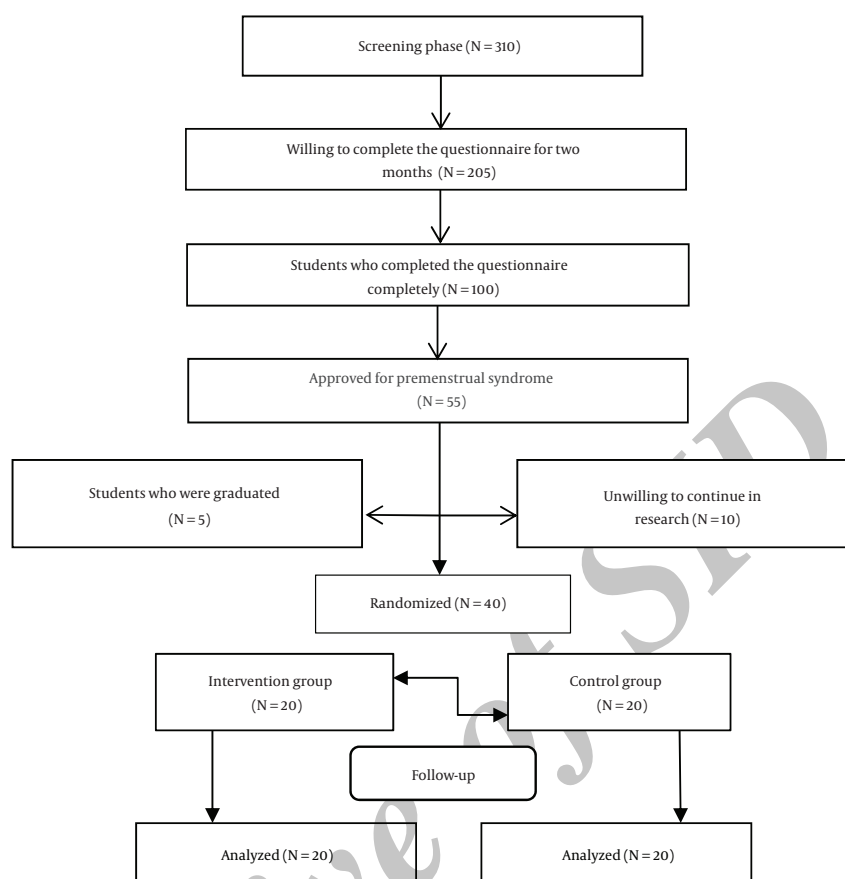


Figure 1. Flow Diagram of the Recruitment and Retention of the Study Participants

number: IR. AJUMS.REC.1395.437). The study was also registered in the Iranian registry of clinical trials (the reference code: IRCT2016110630750N1).

3. Results

The results of the current study showed that the two groups were similar in terms of the socio-demographic and reproductive characteristics. The mean \pm standard deviation (SD) age of the intervention and control groups was 21.55 ± 1.73 and 21.50 ± 1.35 years, respectively. The mean \pm SD BMI in the intervention and control groups was 22.19 ± 2.56 and 22.47 ± 3.58 kg/m², respectively. Most of the students in both groups (85%) had a regular menstruation with a moderate volume of bleeding (80%). Socio-demographic characteristics of the participants are listed in Table 1.

The Kolmogorov-Smirnov test was used to evaluate the normality of quantitative data; however, the data were a little normal ($P > 0.05$). The physical and behavioral, as well

Table 1. Sociodemographic and Reproductive Characteristics of the Study Participants (N=20)^a

Characteristic	MBCT Group	Control Group	P Value
Age, y	21.55 \pm 1.73	21.50 \pm 1.35	0.920 ^b
Reproductive age, y	12.5 \pm 0.82	12.5 \pm 0.88	1.00 ^b
BMI, kg/m ²	22.19 \pm 2.56	22.47 \pm 3.58	0.778 ^b
Menstruation pattern			0.669 ^c
Regular	17 (85)	17 (85)	
Irregular	3 (15)	3 (15)	
Menstrual bleeding			0.766 ^c
Low	2 (10)	1 (5)	
Moderate	16 (80)	16 (80)	
High	2 (10)	3 (15)	

Abbreviation: MBCT, Mindfulness-Based Cognitive Therapy.

^aValues are expressed as mean \pm SD or No. (%).

^bIndependent t-test.

^cChi-square-test.

as overall symptoms of PMS decreased in the intervention group ($P < 0.001$), whereas in the control group at baseline,

just by completion of the intervention, and one month afterward, no significant difference was observed among the mean scores of PMS. The mean score of physical symptoms significantly reduced in the intervention group compared with the control group just after the completion (9.55 ± 3.10 vs. 15.00 ± 4.29) ($P < 0.001$), and one month after the intervention ($P < 0.001$). Similarly, the mean score of psychological symptoms decreased in the intervention group compared with the control group (18.10 ± 6.33 vs. 25.55 ± 6.12) and the difference was significant ($P < 0.001$) in favor of one month follow-up. The mean total score of symptoms decreased in the intervention group compared with the control group (27.65 ± 7.43 vs. 40.05 ± 7.85) ($P < 0.001$), in favor of the follow-up. The mean score of physical, psychological, and general symptoms in the intervention group significantly reduced compared with those of the control group just after the completion of the MCBT sessions and a 1-month follow-up (Table 2).

Table 2. PMS Symptoms in the Study Groups (N = 20)^{a, b}

PMS Symptoms	MBCT Group	Control Group	P Value
Physical			
Pre-test	15.80 \pm 4.58	15.15 \pm 4.38	0.649
Post-test	9.55 \pm 3.10	15.00 \pm 4.29	0.001
Follow-up	9.95 \pm 2.99	15.10 \pm 4.20	0.001
P value ^c	0.001	0.168	
Behavioral			
Pre-test	26.20 \pm 7.55	25.60 \pm 6.25	0.786
Post-test	18.10 \pm 6.33	25.55 \pm 6.17	0.001
Follow-up	18.20 \pm 6.22	25.55 \pm 6.12	0.001
P value ^c	0.001	0.860	
Total PMS score			
Pre- test	42.00 \pm 9.09	40.256 \pm 7.93	0.520
Post-test	27.65 \pm 7.43	40.05 \pm 7.85	0.001
Follow-up	28.15 \pm 7.13	40.15 \pm 7.71	0.001
P value ^c	0.001	0.216	

Abbreviation: MBCT, Mindfulness-Based Cognitive Therapy.

^aValues are expressed as mean \pm SD.

^bIndependent t-test.

^cRepeated measures analysis of variance (ANOVA).

4. Discussion

Premenstrual syndrome is one of the health problems, which results in physical and psychological symptoms and may also have some adverse effects on lifestyle (35).

The MBCT program provides a regular training in mindfulness as a self-regulation strategy to reduce stress

and manage emotion in the subjects. MBCT program helps people to prevent habitual negative thoughts, emotions, and behavioral patterns and by increasing awareness helps them to respond and deal with different situations. By MBCT education, the participants probably learn how to release themselves from negative thoughts and images accompanied by subsequent stress, anxiety, and depression (32, 36). The results of the current study indicated that mindfulness-based cognitive behavioral therapy was effective in reducing the score of overall symptoms of PMS in the intervention group, compared with the control group immediately and one month after the completion of the intervention.

To the best of researchers' knowledge, there was a lack of data about the impact of MBCT on the symptoms of PMS, but the outcomes of the present study were comparable with some of the previous ones regarding the impact of MCBT on other related disorders (25-28).

In a study by Kues on the internet-based cognitive behavioral self-help for PMS, a positive effect of the intervention on the symptoms of PMS was reported (37). Also Lustyk et al., supported the effect of a mindfulness-based intervention on reducing the severity of symptoms in the ones with premenstrual symptoms (18).

The results also showed that physical symptoms of PMS decreased following the participation in CBT counseling sessions. In a study on the effect of a cognitive-behavioral group training program tailored to primary care patients, it was shown that cognitive-behavioral group therapy was effective on unexplained physical symptoms (38). Another study conducted by Ahmadvand showed that the mindfulness is a strong predictor of well-being and is connected positively and significantly with it. Hence, mindfulness could be a method to decrease stress and improve well-being and mental health (39). Hossein Nazari et al., showed in a study that cognitive-behavioral therapy strategies can affect health and immune system. They showed that increasing females' awareness about the symptoms of PMS and the physiologic process of menstruation caused them to better adapt to it and the associated physiological changes and the attitude of females toward her gender and related issues were totally changes. The results of their study showed that cognitive-behavioral methods reduce the symptoms of PMS, which is consistent with the present study results (40).

The results of the present study indicated that the behavioral symptoms reduced in students who received mindfulness-based cognitive behavioral therapy program. De Jong demonstrated that mindfulness-based cognitive behavioral therapy was effective on depression and body awareness in patients with chronic pain and depression (41). Also, MCBT as a potential treatment for emotional dis-

turbances in adolescents with HIV/AIDS and adequate feasibility and acceptability was offered by Sinha et al (42).

Moreover, van Ravesteijn in a study measured the effect and cost-effectiveness of MCBT on patients with somatoform disorders and found that the intervention can be a meaningful treatment for somatoform disorders and patients after participation in MBCT showed interest to receive mental health care (43).

5.1. Conclusion

The study showed that MCBT can reduce physical and behavioral symptoms of PMS; it also helped counselors and therapists to reduce the symptoms and decrease the cost of treatments in females with PMS.

5.2. Limitations and Suggestions

The limitation of the study was a relatively short-term follow-up period. Due to the advantages of MCBT, compared with other psychotherapies, to prevent symptoms relapse, a longer-term follow-up period (at least 1 year) is recommended. The strong point and novelty of the study was that it was the first study on the effects of MBCT program on PMS symptoms.

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