ORIGINAL ARTICLE

The Effect of Cognitive-behavioral Counseling on the Resilience of Female Adolescents with Premenstrual Syndrome: A Randomized Controlled Trial

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ABSTRACT

Background: Premenstrual syndrome (PMS) is one of the causes of poor performance in women, with direct and indirect adverse effects on their marital, family, and social life. This study aimed to examine the effect of cognitive-behavioral counseling on resilience in adolescent girls with PMS.
Methods: This randomized clinical trial was conducted from February to May 2018 on 15-17-year-old girl adolescents in Hamadan high schools. Using the block randomization method and the block size of 10, we randomly assigned 120 participants with moderate to severe PMS into intervention (N=60) and control groups (N=60). Participants in the intervention group received eight 60-minute cognitive-behavioral counseling sessions for 8 weeks, and the control group received no intervention. Data were gathered using demographic questionnaire, Premenstrual Symptoms Screening Tool, and the Connor-Davidson resilience scale. Statistical analysis was performed using SPSS version 16. The Chi-square, independent-samples t-test, and paired t-tests were used to analyze the data. P values <0.05 were considered significant.
Results: The mean total resilience score and all its dimensions increased in the intervention group 3 months after the intervention (P<0.05). Mean scores of total resilience and all subscales except spiritual influences showed statistically significant differences between the intervention and control groups 3 months after the intervention (P<0.05).
Conclusion: Cognitive-behavioral counseling can improve resilience in female adolescents with moderate to severe PMS. It is recommended that school counselors can use cognitive-behavioral counseling to improve the resilience of girls with moderate to severe PMS.
Trial Registration Number: IRCT2015052615341N6.

Keywords: Counseling, Premenstrual Syndrome, Psychological resilience

INTRODUCTION

Adolescents' mental health is one of the criteria for progress in all societies.[1] Premenstrual syndrome (PMS) is common in women and can affect the mental health of women and adolescent girls.[2] PMS is a set of recurrent physical or psychological symptoms, which occur during the luteal phase of the menstrual cycle. It starts about a week prior to bleeding and stops 2–4 days after it. More than 150 symptoms have been described for PMS, including a wide variety of physical and psychological signs such as fatigue, abdominal bloating, breast tenderness, acne, changes in appetite, food cravings, insomnia, anxiety, irritability, anger, depression, and mood swings.[3] This syndrome causes abuse at school, poor performance on homework, and problems in family and personal relationships.[4] A large-scale study on Iranian female high school students found a prevalence of 80.4% for PMS.[5] Treatment of PMS focuses on alleviating symptoms and improving functioning and quality of life for affected individuals.[6]

Stress reduction techniques have been shown to be effective and can even be the first step in managing PMS.[6] People's adaptive responses to stressful and challenging situations such as PMS are influenced by their mental health state and resilience.[7] Resilience is the ability to cope with and recover from difficult situations and adverse life experiences. It is an individual's reaction to psychological challenges, protects them from mental health disorders and life problems, and helps them successfully adapt to these situations, especially through mental, emotional, and behavioral flexibility.[8] An individual's intrinsic characteristics, such as strong emotion regulation and high coping self-efficacy, are among the factors that influence the development of resilience.[9] Strengthening the resilience of adolescents is central to promoting long-term mental health outcomes.[10]

Resilience prevents psychological problems in adolescents and young adults.[11] There is a negative correlation between resilience and high levels of depressive symptoms.[12] However, positive correlations have been found between stress, anxiety, and PMS symptoms, so that 88% of PMS symptoms in adolescents manifest as stress and neurosis.[13]

Since the exact pathophysiology of PMS is unknown, it is usually treated symptomatically. Due to the side effects of medications, treatment of PMS has turned to complementary therapies.[14] These include diet and reflexology, life skills training, and cognitive-behavioral therapy (CBT).[15] CBT is one of the most effective behavioral therapies to defuse critical situations. This nonpharmacological approach has been used in adolescents with depressive disorders, social problems, suicidal thoughts, and poor academic performance.[7] This approach is also recommended for the treatment of fear, stress, and depression. Through CBT, therapists help their clients better understand the issues that caused mental imbalances.[16] Although CBT is effective in reducing inconsistent or inefficient beliefs or feedback and helping people evaluate their thoughts and ideas about unpleasant events, its effectiveness for PMS is controversial. Several studies have shown that CBT has a positive effect on the symptoms and quality of life of adolescent girls and women with PMS.[16] Some studies have also examined the effects of CBT on the psychological health and resilience of high school girls and students during the COVID-19 pandemic.[17, 18] However, none of them have examined the effect of CBT on resilience in adolescent girls with PMS. The bothering symptoms of PMS can increase absenteeism from work and educational institutions, lead to hospital admissions, affect personal and family relationships, and increase the risk of child abuse.[19] Therefore, this study was conducted to examine the effects of cognitive-behavioral counseling on resilience in adolescent girls with PMS.

MATERIALS AND METHODS

This randomized clinical trial was

conducted from February to May 2018 on 120 adolescent girls with PMS in Hamadan, Iran. We calculated the sample size based on the results of a former study,[20] where the effects of an educational program about PMS on the resilience of female students were investigated. The mean posttest resilience scores of the control and intervention groups were 53.78±14.76 and 62.00±11.67, respectively. Accordingly, with a type I error of 0.05, a power of 0.90, a μ1 of 53.87, a μ2 of 62, a *S1* of 14.76, and a *S2* of 11.67, the sample size was set at 57 per group. However, considering the possibility of dropout, we recruited 60 students in each group.

$$N = \frac{(\sigma_1^2 + \sigma_2^2)(z_{1-\frac{\alpha}{2}} + z_{1-\beta})^2}{(\mu_1 - \mu_2)^2} =$$
$$\frac{(14.76^2 + 11.67^2)(1.96 + 1.28)^2}{(53.87 - 62.0)^2} = 57$$

Inclusion criteria were being a female high school student, being 15- 17 years old, living in Hamadan city, obtaining scores of 19 and higher in the Premenstrual Symptoms Screening Tool (PSST), having no history of physical or psychiatric diseases (as self-reported by the participants), and experiencing at least six menstrual cycles. Students who were taking medication for PMS during the study, had experienced events such as the death or illness of a loved one, and had not attended two consecutive counseling sessions were excluded from the study.

First, the 57 high schools and vocational schools in Hamadan were divided into three districts according to their socioeconomic class. Two high schools from each district (i.e. upper, middle, and lower socioeconomic classes) were then selected by lot. These six high schools included 215 girls aged 15-17 years in grades 9 to 11. All students were asked to complete the PSST to identify those with moderate to severe PMS. 95 females were excluded because they did not meet the inclusion criteria. Subsequently, the remaining 120 girls were randomly assigned to a control group (N=60) and an intervention group (N=60). This was done using random allocation software; the students were assigned by permuted block random allocation, and each block included 10 students (i.e. ABBAABABBA), where students were allocated to the experimental (group A) or control (group B) groups, respectively (Figure 1).
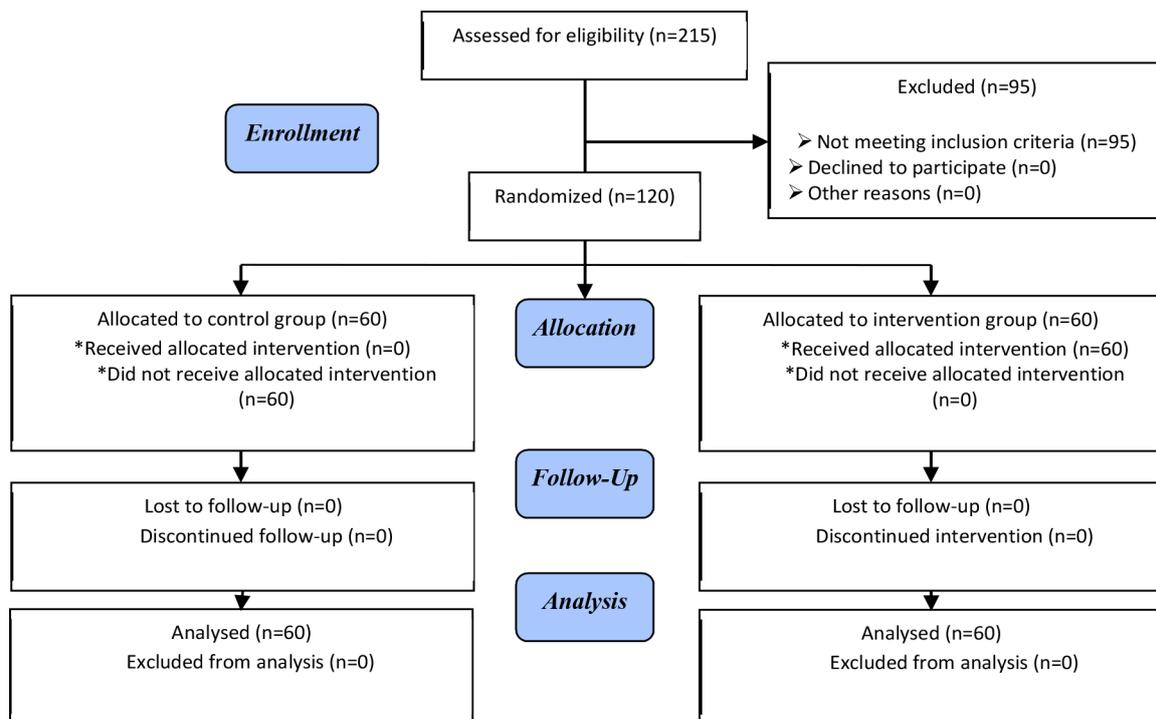

Figure 1: Consort flow diagram of the study participants.

Initially, all 120 students were requested to complete the Connor-Davidson Resilience Scale (CD-RISC-25). Then, the 60 participants in the intervention group were divided into subgroups of 8-12 people, and each subgroup received the group cognitive-behavioral counseling intervention. The intervention was implemented in eight sessions, each lasting one hour, and held over four consecutive weeks (two sessions per week). Each session included PowerPoint-assisted lectures, questions and answers, and group counseling and discussion. Participants in the control group received no intervention. All counseling sessions were conducted by a senior midwifery counselor certified in cognitive-behavioral counseling, based on well-known resilience training guidelines (Table 1).[21, 22]

Table 1: Contents of the counseling sessions

Session 1	- Cognitive structure: Identifying dysfunctional beliefs and clarifying negative thoughts related to PMS[a] and puberty, increasing knowledge - Behavioral structure: Assessment of the cognitive-behavioral model, and introduction to cognitive distortions in the field of PMS - Homework: Reviewing the personal cognitive distortions about PMS
Session 2	- Homework review. - Cognitive structure: Evaluating strategies to combat cognitive distortions, introduction to behavioral problems associated with PMS - Behavioral structure: Raising self-awareness of PMS-related behavioral changes - Homework: Practicing the identification of cognitive distortions using mind record sheets
Session 3	- Homework review. - Cognitive structure: Introducing behaviors and thoughts that lead to loss of resilience, preventing such behaviors and thoughts - Behavioral structure: Promoting self-esteem and self-efficacy - Homework: Conducting a cognitive reconstruction, completing thought record sheets, exercises to deal with and prevent inappropriate behaviors and thoughts
Session 4	- Homework review. - Cognitive structure: Introducing behaviors and thoughts that lead to loss of resilience, preventing such behaviors and thoughts - Behavioral structure: Promoting optimism, positive attitude, happiness, and hope - Homework: Performing cognitive reconstruction, completing thought record sheets, exercises to deal with and preventing inappropriate behaviors and thoughts
Session 5	- Homework review. - Cognitive structure: Introducing behaviors and thoughts that lead to loss of resilience, preventing such behaviors and thoughts - Behavioral structure: Practicing emotion management (stress, anger, and anxiety management) - Homework: Conducting a cognitive reconstruction, completing thought record forms, exercises to deal with, and preventing inappropriate behaviors and thoughts
Session 6	- Homework review. - Cognitive structure: Introducing behaviors and thoughts that lead to loss of resilience, preventing such behaviors and thoughts - Behavioral structure: Improving decision-making power and responsibility - Homework: Performing cognitive reconstruction, completing thought record forms, exercises to deal with, and preventing inappropriate behaviors and thoughts
Session 7	- Homework review. - Cognitive structure: Introducing behaviors and thoughts that lead to loss of resilience, preventing such behaviors and thoughts - Behavioral structure: Increasing and improving adaptation, interpersonal and social skills, effective communication, and empathy - Homework: Practicing strategies to prevent the return of inappropriate behaviors and thoughts
Session 8	- Homework review. - Cognitive structure: Practicing strategies to prevent resilience reduction - Behavioral structure: Reviewing the contents of previous sessions - Homework: Presenting solutions to prevent the return of inappropriate behaviors and thoughts

[a]Premenstrual syndrome

After three months, all participants were followed up and re-completed the CD-RISC-25. It should be noted that counseling sessions were held for the control group after completion of the second round of questionnaires. This study was a single-blind one, and the person performing the statistical analyses had no information about the intervention and control groups.

Demographic characteristics of the participants were collected using a demographic questionnaire. PSST is a tool for PMS assessment which was developed in 2003 by Steiner et al.[23] PSST contains 19 items in two main parts. The first part has 14 items for assessing physical and psychological symptoms, and the second part consists of five items assessing the impact of symptoms on the individual's daily life. All items are rated on a 4-point Likert scale, ranging from "never=0" to "severe=3." The total score of this tool varies between zero and 57. Scores of 19 and higher are moderate and severe PMS. Steiner and Bentz reported that the retest reliability was $r=0.69$, and Cronbach's alpha was 0.924, respectively.[24] In a study carried out by Hashemi et al. (2013), the sensitivity and specificity coefficients of the Persian version of PSST were 0.9 and 0.77, respectively. They also reported Cronbach's alpha and test-retest reliability coefficient of the tool as 0.91 and 0.56, respectively.[19] Hariri et al. (2013) also examined the content validity and reliability of the Persian version of PSST and reported the content validity ratio and content validity index of the tool to be 0.7 and 0.8, respectively. They also reported the Cronbach's alpha of the PSST was 0.93.[25]

The 25-item CD-RISC-25 was also used to measure the students' resilience before and after the intervention. This scale was developed by Conor and Davidson in 2003. The CD-RISC-25 has 5 subscales with 5 items each. The subscales are "Perceived personal competence," "Trust in one's instincts and tolerance of negative affects," "Positive acceptance of change and secure relationships," "Sense of control," and "Spiritual influences." All items are scored on a 5-point Likert scale, ranging from "Not true at all=0" to "True nearly all the time=4." The total score ranges from 0 to 100, with higher scores showing higher resilience. The Cronbach's alpha and test-retest reliability coefficients of CD-RISC-25 were 0.89 and 0.87, respectively, and it correlates strongly with the Kobasa Hardiness measure (r=0.83).[26] Ahangarzadeh and Rasouli (2015) translated the CD-RISC-25 into Persian and evaluated its psychometric properties. The Persian version includes 25 items in five subscales, and its Cronbach's alpha is reported to be 0.82.[27]

Statistical analyses were performed using SPSS software version 16. Data were analyzed using the chi-square test, independent-samples t test, and paired t test. P-values of less than 0.05 were considered significant.

The study protocol was reviewed by the Institutional Review Board and received ethical approval from the Ethics Committee of Hamadan University of Medical Sciences, Hamadan, Iran (IR.UMSHA.REC.1395.220). All participants signed a written informed consent at baseline and were assured of data confidentiality, voluntary participation, and the right to withdraw from the study.

RESULTS

The overall prevalence of PMS (mild, moderate, and severe) was 93.80% among the initial 215 girl students. Demographic and menstrual cycle characteristics did not have statistical differences between the intervention and control groups (P>0.05) (Table 2). There was not a statistically significant difference between the intervention and control groups regarding demographic characteristics (parents' job, education level, illnesses, life companions), and menstrual cycle characteristics (age of first menstruation, duration of monthly bleeding, and length of menstrual cycle) were not (P>0.05)

Scores of "perceived personal competence", "sense of control", and "spiritual influences" subscales did not have statistically significant differences before the intervention between the control and intervention groups.

Table 2: Comparison of demographic variables between the intervention and control groups

Variable		Intervention group N (%)	Control group N (%)	P value
Mother's education level	Illiterate	2 (3.30)	2 (3.30)	0.98*
	Primary or Secondary education	16 (26.70)	16 (26.70)	
	High school	8 (13.30)	10 (16.70)	
	Diploma	19 (31.70)	17 (28.30)	
	Academic	15 (25)	15 (25)	
Father's education level	Illiterate	1 (1.70)	2 (3.30)	0.39*
	Primary or Secondary education	24 (40)	16 (26.70)	
	High school	10 (16.70)	8 (13.30)	
	Diploma	13 (21.70)	21 (35)	
	Academic	12 (20)	13 (21.70)	
Mother's job	Homemaker	49 (81.70)	54 (90)	0.19*
	Employed	11 (18.30)	6 (10)	
Father's job	Unemployed	3 (5)	2 (3.30)	0.64*
	Employed	57 (95)	58 (96.60)	
Living companion	Parents	60 (100)	59 (98.30)	0.32*
	Relatives	0 (0)	1 (1.70)	
Mother's health	Diseased	7 (11.60)	3 (5)	0.18*
	Healthy	53 (88.30)	57 (95)	
Father's health	Diseased	1 (1.70)	4 (6.70)	0.17*
	Healthy	59 (98.40)	56 (93.30)	
		Mean±SD	**Mean±SD**	
Body mass index		21.30±3.10	20.80±3	0.45**
Age of first menstruation		12.90±1.01	12.70±1.60	0.38**
Length of menstrual bleeding		6.20±1.70	6.20±1.50	0.98**
Length of menstrual cycle		29.60±5.20	27.90±5.10	0.80**

*Chi-square test; ** Independent *t*-test

However, the mean scores for the subscales "trust in one's instincts and tolerance of negative affect" (P=0.002), "positive acceptance of change and secure relationships" (P=0.01), and the "total resilience" mean scores (P=0.009) showed statistically significant differences between the groups before the intervention. The mean total resilience score and all its subscales significantly increased 3 months after the intervention in the intervention group (P<0.001), whereas most of the resilience mean scores (except for the "positive acceptance of change and secure relationships", and "total resilience score") did not change significantly in the control group (P>0.05). Mean scores of total resilience and all subscales, except spiritual influences, had statistically significant differences between the intervention and control groups 3 months after the intervention, (P<0.05). As the two groups were not homogeneous in the total baseline scores in "trust in one's instincts and tolerance of negative affect", "positive acceptance of change and secure relationships", and the "total resilience" mean scores, analysis of covariance was used on these dimensions to interpret the results of the post-test scores, all of which showed a significant difference between the intervention and control groups (P<0.05) (Table 3).

DISCUSSION

The results revealed that after the intervention, the mean scores of total resilience and all its subscales (except spiritual influences) increased significantly in the intervention group and were higher than those in the control group. The insignificant effect of the intervention on the spiritual influences subscale indicates that

Table 3: Comparison of the scores of resilience and its subscales in the intervention and control groups before and after the intervention

Various Resilience subscales	Group	Before The Intervention Mean±SD	3 months after The Intervention Mean±SD	P value**
Perceived personal competence	Control	18.90±6.60	19.20±5.40	0.16
	Intervention	16.50±5.60	21.50±5.40	<0.001
	P value	0.51*	0.03*	
Trust in one's instincts and tolerance of negative affects	Control	15.30±0.51	5.60±5	0.13
	Intervention	12.70±3.70	18.60±4.30	<0.001
	P value	0.002*	<0.001***	
Positive acceptance of change and secure relationships	Control	11.60±3.30	12±3.60	0.007
	Intervention	9.90±3.70	13.20±3.40	<0.001
	P value	0.01*	<0.001***	
Sense of control	Control	6.50±3.30	6.60±3.30	0.71
	Intervention	6.10±2.70	8.10±2.40	<0.001
	P value	0.40*	0.006*	
Spiritual influences	Control	5.70±2.10	5.70±2	0.70
	Intervention	5±2.30	5.80±1.70	<0.001
	P value	0.08*	0.92*	
Total	Control	58.20±16.90	59.20±16.70	0.006
	Intervention	50.50±14.90	67.30±15.20	<0.001
	P value	0.009*	<0.001***	

*Independent *t*-test; **Paired t-test; ***Analysis of covariance

longer interventions may be needed to affect this dimension of resilience. In general, our findings are indicative of the positive effect of counseling sessions on promoting resilience in girls with moderate to severe PMS.

Some studies have reported that CBT could improve mental health and resilience in high school students during the COVID-19 pandemic.[17, 18] In a study on adults who attended CBT sessions, the participants reported improvement in their ability to perceive and describe difficult life situations positively, accept what cannot be changed, effectively manage worry and anxiety, develop psychological flexibility in the face of change, and continually seek opportunities for growth and development.[28] All of these changes are also necessary to improve the adolescents' resilience in dealing with the mood and psychological symptoms of PMS. In another study on nurses who participated in eight 60-minute CBT sessions, the intervention significantly reduced their burnout and improved their resilience and healthy lifestyle behaviors.[29] A study also reported that an educational program based on the cognitive-behavioral approach was able to improve the levels of psychological resilience in students; however, it did not significantly affect the students' perceived psychological well-being.[30] These results suggest the need to develop resilience skills at a younger age and in adolescence, so that they can not only manage PMS symptoms, but also handle other life situations and crises. A study also reported the positive effects of CBT on the resilience of patients with panic disorder.[31] Some studies also reported that CBT could relieve depression and improve reflective skills, empathy, well-being, and resilience.[32] These positive effects of CBT in reducing negative moods (fear, anxiety, depression), and asking for social help and social well-being (positive acceptance of change, and self-control) are among the most important factors in reducing PMS symptoms, and in the current study were assessed using a standard resilience measurement scale. CBT has also been reported to improve the adolescents' ability to manage anxiety, depression, anger, and aggression, and to promote coping skills and self-awareness in girls with PMS.[33] All of these effects, along with improved resilience, improve not only a student's ability

to cope with problematic situations, but also her overall perceived health and PMS symptoms. Although no study has investigated the effect of CBT on resilience in adolescents with PMS, a recent multicenter study conducted during the COVID-19 pandemic confirmed the role of resilience and coping strategies in the mental health of the general population.[34] A systematic review also confirmed the effect of resilience-oriented CBT on depressive symptoms in adolescents.[35] A study on the effects of emotional intelligence training on resilience and aggression in adolescents also found that managing emotions could help improve resilience and manage aggression. Given that emotional intelligence is one of the subsets of resilience-based cognitive behavioral counseling,[36] such findings are in line with the results of the current study. Consistently, a recent systematic review has suggested CBT as the primary method for managing PMS symptoms.[37] Some studies on patients with insomnia have also reported that CBT could relieve insomnia, improve resilience, and decrease the risk of depression.[38, 39] These studies not only support the beneficial effect of CBT on resilience, but also can provide evidence for the efficacy of CBT in PMS because both insomnia and depression are symptoms of PMS.

As a strength point, we benefited from the enthusiasm of teenagers for participating in the counseling sessions. However, the short length of the intervention can be considered a limitation in this study. In addition, due to the nature of the intervention, it was impossible to blind the intervention group.

Conclusion

Cognitive-behavioral counseling can improve resilience in female adolescents with moderate to severe PMS. We suggest that school counselors can use cognitive-behavioral counseling to improve the resilience of girls with moderate to severe PMS. It is suggested that further studies should be conducted with a larger sample size and a longer intervention and follow-up.

Conflict of Interest: None declared.

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