

The Effect of Mindfulness-Based Stress Reduction Program on Metacognitive Awareness, Rumination, and Self-Compassion in Menopausal Women

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Abstract

Women spend more than a third of their lives during menopause and estrogen deficiency. In addition, these neuroendocrine changes affect a woman's physical and mental health by reducing her fertility and menstrual function. Therefore, this study aims to investigate the effect of mindfulness-based stress reduction on metacognitive awareness, rumination, and self-compassion in postmenopausal women. This research was applied in terms of purpose and semi-experimental in terms of implementation method. The statistical population of this study included all postmenopausal women referred to the Valiasr Hospital Health Center in Iran in the fall of 2021; 70 women were selected by convenience sampling and randomly assigned to experimental (35) and also control (35) groups to investigation. According to the findings of paper, data analysis results using Multivariate Analysis of Covariance (MANOVA) showed that this research effectively helps to increase metacognitive awareness and also increase self-compassion, and also it can decrease rumination in postmenopausal women.

Keywords: Mindfulness-based stress reduction program • Rumination • Metacognitive awareness • Self-compassion • Menopausal women

Introduction

Menopause is caused by a cessation of follicle-stimulating hormone secretion and is defined as a 12-month interruption of menstruation for no other specific reason [1]. One of the challenges for menopausal women is identifying their symptoms. In epidemiological studies, menopause means the cessation of menstruation (loss of ovarian follicles) for 12 months without a specific cause and finally the end of the reproductive period, and usually occurs between the ages of 45 and 52 years. During it, women undergo endocrine, somatic, and psychological changes that are associated with the aging of follicles and estrogen deficiency.

Changes in body shape and size, skin and hair status, and sexual function are culturally indicative of menopause, and women's attitudes toward experiencing these symptoms affect how they transition and their effects. Leaves several psychological [2]. One of the studied variables in postmenopausal women is metacognitive awareness. Metacognitive awareness shows how individuals use metacognitive knowledge and supervisory expertise to control their cognition [3].

Metacognition is the knowledge of thought processes and the ability to manage cognitive processes and self-knowledge, such as knowledge of the framework of their knowledge, organization, and planning, use of problem-solving strategies, and the ability of self-assessment and self-improvement [4]. In the late 1970s, Flavell coined the term metacognition to mean "cognition of cognitive phenomena" or simply "thinking about one's thinking" [3]. Metacognitive awareness is part of our knowledge of the world that deals with cognitive issues. The knowledge and beliefs that we gain through experience and store in long-term memory. This knowledge does not depend on specific content. Instead, it is related to the mental activity [5].

Based on previous research findings, there is a relationship between metacognitive awareness and rumination [6]. Rumination is a cognitive process that significantly increases the risk of developing pathological symptoms and is associated with maintaining emotional disorders such as anxiety and depression. Rumination is a repetitive thought process that is often uncontrollable and has a specific (but not necessarily) specific intellectual content, and often takes the form of a depressing ruminant. Negative and repetitive thoughts are usually about past events or current stressors [7]. In other words, rumination as a maladaptive cognitive strategy is effective in various disorders such as depression [8-10]. Ruminants can also be the basis of patients' cognition and include endlessly reviewed thoughts, fueling frustration about the future and negative self-assessments and affecting mood and patients' motivation [11]. Rumination is associated with psychological dysfunction and increased negative emotions such as anger and stress [12]. In some studies, findings have shown that self-compassion-based therapies can effectively reduce the symptoms of rumination [13,14], defines self-love as a three-component structure: kindness to self-judgment, human sharing *versus* isolation, and mindfulness *versus* duplication.

Neff [13], considers kindness about being and accepting one's sufferings in life, not denying or belittling them, and considers kindness to oneself and others due to this awareness and acceptance. Neff, et al. [14], believe that affection protects a person against anxiety and depression by controlling self-criticism and negative emotions. Gilbert [15], also believes that much evidence that being kind to oneself affects mental health, well-being, and social relationships. Empathy and compassion with oneself lead to better results and efficiency than self-centeredness.

Therapists with different theoretical approaches use different methods to control and treat feelings of loneliness and rumination in different populations. One of the psychological therapies that have been considered in the treatment of mood disorders in recent years is mindfulness-based stress reduction therapy, which has shown great efficiency in terms of adaptability [16], for primary prevention in health. And has achieved the best results in patients with symptoms of stress, anxiety, depression and negative emotions [17,18]. In mindfulness-based cognitive education, clients learn how to relate to their irrational thoughts and feelings and focus on changing and changing the content of their thoughts [19].

Therefore, this study aimed to evaluate the effect of mindfulness-based stress reduction programs on metacognitive awareness, rumination, and self-compassion in postmenopausal women. The following hypothesis has been tested.

Does a mindfulness-based stress reduction program increase

metacognitive awareness and self-esteem in postmenopausal women as well as reduce their rumination?

Research method

This study was applied for purpose and was semi-experimental in terms of implementation method with pre-test and post-test design with a control group. Its statistical population included all Menopausal women referred to the Valiasr Hospital Health Center (we received research ethics committee) in Tehran in 2021, who met the criteria for inclusion in the study, including natural menopause, no severe physical or mental illness. The number of 30 people who had a lower score in the initial test of metacognitive awareness, rumination, and affection were selected in an accessible way and based on the possibility and consent to attend meetings as a research sample and were replaced randomly in two groups of 15 Experimental and control groups [20]. The tools used in this study were as follows;

- Schraw and Dennison Metacognitive Awareness Questionnaire (1994): This study measured the subjects' metacognitive awareness by Schraw and Dennison's Metacognitive Awareness Questionnaire. This questionnaire contains 52 questions, of which 17 are components of metacognitive knowledge and 35 of metacognitive regulations. The answers are rated on a 5-point scale, from strongly agree (5) to strongly disagree (1). The total score of this questionnaire range is between 52 and 175. The cognitive component's score range is between 17 and 85, and that of the metacognitive setting is between 35 and 175. The questionnaire's validity and reliability in domestic and foreign studies, including the study of Schraw [21], was calculated and confirmed Mousavi [22].

- Nolen-Hoeksema [23], Ruminant Questionnaire: This questionnaire was developed by [23,24], in Iran. It evaluates adverse posterior reactions and consists of two subscales of ruminant responses and distracting responses, each containing 11 expressions. The questionnaire consists of 22 statements graded from 1 (never) to 4 (often) according to the Likert scale. In the study by Bagherinezhad et al. [24], the reliability coefficient of the questionnaire by Cronbach's alpha method was 0.90, and for its dimensions was 0.92 and 0.89. The questionnaire's validity by correlating it with the Metacognitive Beliefs Questionnaire was 0.65 at the level of 0.001.

- Neff [13], Self-compassion questionnaire: This questionnaire contains 26 items and 6 components of self-kindness, self-judgment, human commonalities, isolation, vigilance or extreme awareness, and imitation in a 5-point Likert scale from strongly disagree=1 to strongly agree=5. Differential validity, internal consistency, and retest reliability of this scale are appropriate, and Cronbach's alpha coefficient of the original version has been obtained 0.92 [13].

Materials and Methods

First, research questionnaires were administered as a pre-test to both experimental and control groups. The experimental group then underwent a mindfulness-based stress reduction program for eight sessions of eight hours, and the control group did not receive any psychotherapy services. At the end of the intervention, all participants in both groups completed the questionnaire. The mindfulness therapy model was based on Kabat-Zinn's model [19]. Thus, the training sessions used for this study included mindfulness-based exercises, expression of individual experiences after training, and learning cognitive-behavioral skills of postmenopausal women for eight sessions, as reflected in Table 1. It should be noted that the experimental group performed the techniques they learned in the sessions as homework three times a day for 15 minutes at home and wrote them down.

Table 1. Contents of therapeutic sessions Kabat-Zinn.

Session	Content
First	Introduce the subjects to each other and determine the purpose of these therapy sessions, define and practice mindfulness.
Second	Doing meditation exercises.

Third	Training to guide the awareness of the inner world (body) and the outer world (outside the body) of oneself using the practice of going back and forth between the inside and the outside world.
Fourth	Practicing memory <i>versus</i> observation exercises that facilitate movement from the past to the present and explain a variety of thoughts (observative, judgmental, futuristic, predictive, storytelling).
Fifth	Perform sitting meditation practice with awareness of breathing and practice observing and hearing <i>versus</i> judging.
Sixth	Sit down meditation practice with breathing awareness and practice 'Think about your awareness'.
Seventh	Sit down meditation practice with breathing awareness and practice 'White Room Meditation'. Explain that instead of fighting irrelevant and dysfunctional thoughts, one should bring them into our consciousness and just observe them.
Eighth	Practice sitting meditation as well as observing and listening without judging Practice Let your thoughts pass through.

Results

The results of Table 2 show that in both groups it is the most abundant for employed people. And for age in the experimental group, the age group 55 to 57 has the lowest frequency but in the control group, the lowest frequency is in the age group of 52 to 54 years. For education, in both groups, people with university education have the highest frequency.

Table 2. Describes the frequency of demographic data.

		Job Group		
Test	Employed	24	68.6	68.6
	housewife	11	31.4	100
Control	Employed	22	62.9	62.9
	housewife	13	37.1	100
age				
Test	49-51	13	37.1	37.1
	52- 54	13	37.1	74.3
	55-57	9	25.7	100
Control	49-51	12	34.3	34.3
	52-54	11	31.4	65.7
	55-57	12	34.3	100
Education				
Test	Primary	7	20	20
	Diploma	9	25.7	45.5
	University	19	54.3	100
Control	Primary	8	22.9	22.9
	Diploma	9	25.7	48.6
	University	18	51.4	100

Table 3 shows the mean and standard deviation of mental rumination, awareness, and affection variables in the control and experimental groups. Also, the mean of awareness and affection variables increased in the experimental group after the test, which is not observed in the control group.

In the present study, a single sample Kolmogorov-Smirnov test was used to evaluate the normality of the variables. The results show that for the four modes of pre-test-post-test by groups (experimental and control) the variables of mental rumination, awareness and affection, with respect to significance levels higher than 0.05; Hypothesis zero that the data is normal is accepted and it is concluded that the data follow a normal distribution.

Table 4 illustrates the mean and standard deviation of the variables of rumination, awareness and affection by pre-test-post-test in two groups of control and experiment. The results show that the mean post-test of the experimental group decreased in the rumination variable but did not change significantly in the control group. Also, the mean of awareness and affection variables increased in the post-test of the experimental group, which is not observed in the control group.

Table 3. Mean and standard deviation of research variables by group and pre-test-post-test.

Group		Experiment			Control	
		N	Minimum	Maximum	Mean	Std. Deviation
Experiment	Rumination pre-test	35	28	81	57.714	15.693
	Rumination post-test	35	28	73		
	Pre-test metacognitive awareness	35	14	50		
	Post- test metacognitive awareness	35	29	55		
	Self-compassion pre-test	35	30	85		
	post-test self-compassion	35	33	87		
Control	Rumination pre-test	35	29	80		
	rumination post-test	35	32	75		
	Pre-test metacognitive awareness	35	30	49		
	Post- test metacognitive awareness	35	30	49		
	Self-compassion pre-test	35	35	85		
	Post-test self-compassion	35	35	81		

Table 4. The mean and standard deviation of the variables of mental rumination, awareness and affection by pre-test-post-test in two groups of control and experimental.

Group		Post- test		Pre- test	
		Mean	Std. Deviation	Mean	Std. Deviation
Experiment	Rumination	57.714	15.693	49.9714	13.5982
	Metacognitive awareness	35.1143	7.24273	37.6571	5.26332
	Self-love	50.9714	15.53456	57.1143	14.55168
control	Rumination	58.543	15.3916	57.5429	14.81125
	Metacognitive awareness	35.9714	5.38782	35.6857	3.87125
	Self-love	52.7143	13.53117	47.1143	11.42951

The results of Table 5 of the multivariate effects test with respect to the level of significance show that there is a significant difference between the groups with the effect size of 0.296.

In Table 6, the results of Levin test to examine the similarity of variances of mental rumination, awareness and affection variables show that significance levels higher than 0.05 for all three variables indicate the acceptance of the null hypothesis that the variance is similar in groups.

As shown in Table 7, the results show that with pre-test control, there is a significant difference between menopausal women in the experimental group and the control group in rumination, metacognitive awareness and self-compassion. ($P=0.01$ and $F=17.663$; $p=0.024$ and $F=5.350$; $p=0.01$ and $F=15.695$ respectively); Therefore, the main hypothesis is confirmed. In other words, mindfulness-based stress

reduction programs are effective on mental rumination, metacognitive awareness, and self-love for menopause women. Since the mean post-test of the experimental group decreased in the mental rumination variable but did not change significantly in the control group, it can be concluded that the mindfulness-based stress reduction program reduced the mental rumination of postmenopausal women. Also, since the mean post-test of the experimental group increased in metacognitive consciousness but did not change significantly in the control group, it can be concluded that the mindfulness-based stress reduction program increased metacognitive awareness of postmenopausal women. It has increased but has not changed significantly in the control group. It can be concluded that mindfulness-based stress reduction program has increased affection for postmenopausal women.

Table 5. Multivariate effects test.

Multivariate Tests							
Effect	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	
Group	Pillai's Trace	0.296	8.827	3	63	0	0.296
	Wilks' Lambda	0.704	8.827	3	63	0	0.296
	Hotelling's Trace	0.42	8.827	3	63	0	0.296
	Roy's Largest Root	0.42	8.827	3	63	0	0.296

Table 6. Levin test (test of homogeneity of variances).

Levene's Test of Equality of Error Variances ^a				
	F	df1	df2	Sig.
Rumination Post- test	0.556	1	68	0.459
metacognitive awareness Post- test	2.963	1	68	0.09
self-compassion Post- test	0.424	1	68	0.517

Table 7. Results of multivariate analysis of covariance to compare post-test of stress reduction program based on mindfulness on mental rumination, metacognitive awareness and self-compassion of women in all three experimental and control groups awaiting treatment with pre-test control.

Tests of Between-Subjects Effects							
Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	Rumination pre test	11721.775	4	2930.444	62.925	0	0.795
	Metacognitive awareness pre test	474.047	4	118.512	7.369	0	0.312
	Self-compassion pre test	5274.615	4	1318.654	10.56	0	0.394
Intercept	Rumination pre test	26.448	1	26.448	0.568	0.454	0.009
	Metacognitive awareness pre test	503.965	1	503.965	31.335	0	0.325
	Self-compassion pre test	1029.174	1	1029.174	8.242	0.006	0.113
Group	Rumination pre test	822.573	1	822.573	17.663	0	0.214
	Metacognitive awareness pre test	86.051	1	86.051	5.35	0.024	0.076
	Self-compassion pre test	1959.761	1	1959.761	15.695	0	0.194
Error	Rumination pre test	3027.096	65	46.571			
	Metacognitive awareness pre test	1045.396	65	16.083			
	Self-compassion pre test	8116.471	65	124.869			
Total	Rumination pre test	217037	70				
	Metacognitive awareness pre test	95655	70				
	Self-compassion pre test	203504	70				
Corrected Total	Rumination pre test	14748.871	69				
	Metacognitive awareness pre test	1519.443	69				
	Self-compassion pre test	13391.086	69				

Note: a. R Squared=0.795 (Adjusted R Squared=0.782)

b. R Squared=0.312 (Adjusted R Squared=0.270)

c. R Squared=0.394 (Adjusted R Squared=0.357).

Discussion

The findings of this study are consistent with the results of Shi, et al. [25-28]. As Shi, et al. [25], in a study have found that mindfulness training positively effects on pregnant women's mental health and rumination. The study of Hassannejad [8], indicated that mindfulness-based stress reduction treatment programmers have been influential in tolerance of ambiguity, rumination, and metacognitive awareness of infertile women under treatment.

Shulman et al. [26], also found in a study that mindfulness-based cognitive intervention has a positive effect as adjunctive therapy for postpartum depression and rumination. Also, Mortezaee, et al. [27], in a study entitled Comparison of metacognitive therapy and treatment of stress reduction program based on mindfulness on depression, self-assessment and emotion regulation have achieved the results that both types of treatment on depressive symptoms, self-assessment and regulation Emotions have a positive effect.

It is also consistent with the findings of Kabat-Zinn, et al. [29], who stated that in mindfulness-based cognitive education, clients learn how to relate to their irrational thoughts and feelings and to change the content of thoughts. Focus and change them. Also, the findings of Ahmadi et al. [30], Soleimanifar, et al. [31], showed that the mindfulness program affects metacognitive beliefs.

In explaining the effectiveness of mindfulness training on metacognitive awareness, rumination and affection, it can be said that mindfulness creates its effects through four mechanisms of attention regulation, body awareness, emotion regulation, and changes in the individual's view of himself. It is thought that engaging in conscious attention and developing a more receptive relationship with the experience of the moment is helpful because postmenopausal women can enable people to let go of habits and useless reactions to the recent experience and instead choose the path. More beneficial to answer, and this process puts these women on the path to promoting metacognitive awareness and self-love and reducing and controlling rumination.

This judgment-free observation can reduce emotional responses that reduce metacognitive awareness and self-esteem and increase rumination in the long run. Based on this, it can be argued that mindfulness exercises increase the ability of postmenopausal women to tolerate emotional states and equip them to deal effectively. Therefore, it can be said that the primary mechanism in the effectiveness of mindfulness treatment is to promote metacognitive awareness and self-compassion and control and reduce rumination in learning their effective coping strategies during therapy sessions to deal with negative emotions and feelings. Regular mindfulness exercises increase people's attention to their body, emotions, and thoughts. Attention to the body and breathing is practiced in mind, and the people being treated become aware of the different sensations they experience in the body and even while breathing. They also learn that when the body heats in a state of anger or fear, the heart rate increases and the rhythm of breathing changes slows down and slows down, resulting in increased attention to the body by practicing mindfulness. Moreover, this awareness paves the way for the following control.

In this regard, the results of this study indicate the effectiveness of these exercises on metacognitive awareness, rumination, and self-compassion in postmenopausal women. In general, according to the study results, it can be said that the reason for the effectiveness of mindfulness-based cognitive therapy in this study is that mindfulness therapy leads to cognitive change in the way of thinking and behavior of postmenopausal women.

Also, it can be said that mindfulness modulates emotions without judgment and increases awareness of psychological emotions. Furthermore, it helps to see and accept emotions and physical phenomena clearly and recognize thoughts as they occur to play a role in metacognitive awareness, rumination, and self-love in postmenopausal women. Mindfulness treatment by modifying negative behaviors and negative thoughts leads to positive health-related behaviors. One of the essential aspects of mindfulness therapy is that people learn to deal with

negative emotions and thoughts and deal with mental events. Experience a cheerful face. In this sense, this process promotes metacognition, reduces rumination, and promotes self-compassion.

Mindfulness-based stress reduction program is a new intervention-treatment-psychology field that requires extensive research in all areas. Therefore, it is suggested that this intervention be performed on different age groups and other disorders with different stages of the disorder and compare the results. It is suggested that in addition to the self-assessment questionnaire, other methods such as clinical interview, observation, projection tests, Etc., be used to measure cognitive emotion regulation strategies. A follow-up study should accompany future research to evaluate the durability of the effect of this treatment method. A follow-up study has not been performed in this study to evaluate the durability and effectiveness of this method over time [32].

It is worth mentioning that to promote metacognitive awareness, reduce rumination, and increase self-esteem in counseling and psychological centers; it is recommended to use this treatment method for postmenopausal women and benefit from this educational method in meetings and workshops. Hold training for them. According to the findings of this study, it can be said that since the educational protocol used in this study is implemented in a group and with a specific period, counselors and psychologists can treat with sessions with a specific time limit.

Conclusion

The primary purpose of this study was the effect of mindfulness-based stress reduction program on metacognitive awareness, rumination, and self-compassion in postmenopausal women. Based on the findings of this study, mindfulness-based stress reduction programs are effective on mental rumination, metacognitive awareness, and self-compassion for postmenopausal women.

Mindfulness-based stress reduction programs have also reduced the mental rumination of postmenopausal women. However, on the other hand, mindfulness-based stress reduction program has increased the metacognitive awareness of postmenopausal women, and finally, mindfulness-based stress reduction program has increased affection for postmenopausal women.

Limitations and Recommendations for Future Research

One of the main limitations of this study is the statistical sample and sampling method. Considering that the participants of this study participated voluntarily, caution should be exercised in generalizing the findings to other statistical populations. In addition, the lack of a follow-up phase to assess the sustainability of the impact of the intervention has limited the generalization of these findings. Therefore, it is suggested that in future research, random sampling methods should be used to select the samples, and the follow-up phase should be included in the research project.

Declarations

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Author contributions

M.H. developed the study concept and all authors contributed to the study design. Testing and data collection were performed by A.K. and M.H. and then performed the data analysis and interpretation under the supervision of Dr. M.A.Y. M.H. and S.N.S. aided in interpreting the results and worked on the manuscript. All authors discussed the results and commented on the manuscript. Dr M.A.Y. and M. H. provided critical revisions. All authors approved the final version of the manuscript for submission.

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Availability of data and materials

The datasets used for this manuscript are available from the corresponding author on reasonable request. Investigators interested in obtaining the SPSS can contact the corresponding author.

Declarations

Ethics approval and consent to participate The Valiasr Hospital Health Center was approved. All study participants provided written informed assent before participation.

Competing interests

The authors declare that they have no competing interests.

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