⇒ Research Article

The Efficacy of Mindfulness-based Stress Reduction on Health Control and Self-care in Women With Hypertension: A Randomized-controlled Trial

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Abstract

Background: It is necessary to help people with hypertension solve the related problems by identifying factors affecting their health control and self-care, which can be improved using different approaches. This study aimed to determine the effectiveness of mindfulness-based stress reduction (MBSR) therapy in improving health control and self-care in women with hypertension.

Methods: The statistical population of this randomized controlled trial study included all women with hypertension referred to the Farshchian Specialized Cardiovascular Clinic (Hamadan, Iran) in 2019. The sample size consisted of 30 subjects who were selected by the convenience sampling method and randomly assigned to two experimental and control groups each containing 15 subjects. The MBSR group was trained in eight 90-minute sessions, while the control group received no intervention. Data were analyzed using repeated-measure analysis of variance by SPSS 22.

Results: The results revealed that MBSR significantly affected health control ($P<0.001$) and self-care ($P<0.001$) in women with hypertension.

Conclusion: Overall, MBSR could effectively improve health control and self-care in women with hypertension, thus it may be used for decreasing psychological problems in this group of women.

Keywords: Mindfulness, Health control, Self-care, Hypertension

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Background

Due to the increasing prevalence and the harmful and bed-based consequences of hypertension, controlling this disease has gained particular importance to minimize the chances of complications, although hypertension treatment requires taking specific preventive measures (1). However, the reported rates for controlling hypertension are still frustrating (2) so that the success rate for controlling blood pressure in the United States is only 27%, and even lower in the United Kingdom, France, and Germany. Statistics show that many hypertension patients in Iran are unaware of the disease, and people diagnosed with the disease do not have adequate control over their conditions, management, and prevention of hypertension (3). This disease requires self-care behaviors, especially throughout life (4). Self-care includes maintaining health, and preventing and treating the disease by self-care behaviors, including regular blood pressure control, reducing salt consumption, exercising, not smoking, avoiding mental-psychological pressures, and having plans for healthy nutrition, weight loss, and frequent medication use (5). Traditional education is ineffective in changing behavior due to a lack of attention to factors affecting behavior and a lack of logical order (6).

Hypertension requires patients' participation in the treatment process, and treatment outcome depends on patients' health beliefs and their understanding of the disease. One of the factors affecting self-care behaviors is the health locus of control, which is the degree of belief that their health is under the control of internal or external factors (7). People who have an external health locus of control believe that specific consequences and events in their lives are determined by forces such as doctors, luck, destiny, and fortune instead of individuals. Those who have an inner health control channel believe that inevitable consequences and accidents result from their behaviors and actions and determine their health directly (7). A health locus of control is an influential variable in developing health behaviors and treatment capacity and explaining health problems. The internal health

control source is positively associated with knowledge and attitude, psychological status, health behaviors, and better health. In contrast, most external sources of health control (i.e., mighty, influential, and fortunate people) are associated with adverse health behaviors and poor psychological status (8).

Schwartz (9) demonstrated that the inner health locus of control was effective in preventing disease and hope for life. Furthermore, a large volume of research indicates that people with an internal locus of control generally seem to give more adaptive responses than the exterior when faced with health problems. These adaptive responses range from preventive and discreet health care to treatment strategies during illness or disorder. According to Orem's theory of self-care, it is a learned behavior that can meet the general needs, growth, development, and deviation from the health of clients (10). Self-care is taken when the self-care agent (client) has adequately addressed self-care needs (11).

Hypertension has the highest prevalence in the third to fifth decades of life, namely, when a person is at the most productive stage of life from many people's views, and people of this age (except for the critical stage of the disease when they are often hospitalized) can take care of themselves and take responsibility for their care. Accordingly, it is possible to implement a care plan that is designed according to the patients' accomplished and latent abilities to strengthen their self-care force and prevent the loss of their power (12).

Today, it is stated that the best health care outcomes are achieved when patients are actively involved in their care. Self-care includes some aspects of physical care and active participation in the process of self-care, including following up on treatment progress, monitoring symptoms, examining side effects, pursuing positive health-related behaviors (e.g., having a healthy diet and regular exercise), and improving the general health of the patient, ultimately reducing the cost of treatment (13).

Self-care behavior is affected by various factors. It has been empirically proved that there is a significant difference between two individuals in terms of reactions and disabilities, as well as social and physical performance in the same medical and damage conditions. One factor that explains this vital difference is psychological components such as people's thoughts and fundamental beliefs. Research shows that people who have negative attitudes toward their disease and consider it severe, uncontrollable, and chronic act very passively, have poor social performance, and represent many disabilities (14). Recently, much attention has been paid to the role of patients in the process of self-care to the extent that new care models for chronic patients, including empowerment programs, are based on the role and responsibility of patients in their daily care (15).

Mindfulness-based stress reduction (MBSR) therapy is one of the effective treatment methods for reducing stress and improving mental disorders. This method has simple procedures derived from meditation and yoga, aiming at creating the awareness of the present and immediate contact with body and mind changes in patients, thereby increasing the ability of people to control and cope with unpleasant life events (16). The MBSR approach increases the flexibility of cognitive activities, reduces rumination and self-criticism assessment, and increases proper cognitive processes such as nonjudgmental observation of subjective contents. In this method, patients are encouraged to process the experience as it forms without judgment and to change and accept their relationship with challenging thoughts and feelings (17). This treatment method has some effects on improving mental illness in the structure of behavioral medicine designed for a wide range of people with chronic stress and pain-related disorders (18).

Objectives

This study sought to determine the effectiveness of MBSR on health control and self-care in women with hypertension.

Methods

In this randomized controlled trial study, the statistical population included all women with hypertension referring to the Farshchian Specialized Cardiovascular Clinic (Hamadan, Iran) in 2019. The sample size consisted of 30 subjects, including 15 individuals in each of the experimental and control groups who were voluntarily selected by convenience sampling and randomly assigned to the two groups. The number of samples was calculated based on similar studies considering an effect size of 0.40, a confidence level of 0.95, a test power of 0.80, and a loss rate of 10% for each group of 30 people (15). The cognitive reconstruction group was trained in an MBSR treatment once a week for 90 minutes during 12 weeks, while the control group underwent no intervention. At the end of the intervention, the health locus of control and self-care tests was performed again on both groups. After 3 months of follow-up, the test was performed again through questionnaires, and the effectiveness and continuation of the intervention were evaluated in the end.

The Multidimensional Health Locus of Control

The Multidimensional Health Locus of Control (MHLC) scale was identified by Walston et al to determine the source of health control (19). It has three components, including internal health control, effective people's health control, and chance health control sources. The subjects should indicate their agreement or disagreement with each of the phrases on a six-point Likert-type scale ranging from completely disagree (1) to fully agree (6). Higher scores of internal health and influential people represent higher health control, and higher health-related

chances reveal less health control in the person. The Coder-Richardson's coefficients of reliability were 0.50, 0.61, and 0.77 for the internal control scale, the control source for influential individuals, and the chance-control source, respectively. Based on the results, the coefficients of Cronbach's alpha for the components of the internal control source, the control source for the influential individuals, and the chance-control source were 0.70, 0.75, and 0.69, respectively. In the method of Spearman-Brown split-half reliability coefficient between Persian and English versions, the correlations between internal items, chance, and influential individuals were 0.71, 0.70, and 0.72, respectively, all of which are significant ($P<0.001$) according to previous research (16). In the study by Moshki et al, Cronbach's alpha coefficients for the sources of internal health control, influential people's health, and chance-related health were 0.81, 0.77, and 0.75, respectively (20).

The Summary of Diabetes Self-care Activity Measure

The European Questionnaire on Self-care Behavior of Heart Failure Patients was developed by Toobert et al. This questionnaire consists of 12 questions, and each question is answered based on a five-point Likert-type scale ranging from completely agree (1) to absolutely disagree (5). The individual's total score is obtained from the sum of responses, and lower scores indicate more appropriate self-care. The minimum and maximum scores of the participants in this questionnaire are 12 and 60, respectively. The Cronbach's alpha coefficient of this questionnaire was 0.88 (21). In the study by Heidari et al, the questionnaire was redistributed among the same 22 patients after one month, and a retest reliability coefficient of 0.77 was reported for this questionnaire. Moreover, the reliability of this questionnaire was 0.86 by Cronbach's alpha method (22).

The MBSR protocol was performed in eight sessions once a week each for 90 minutes. Table 1 summarizes the MBSR sessions. This protocol is derived from Kabat-Zinn (23).

Data were analyzed using descriptive (mean and standard deviation indices) and inferential (repeated-measure ANOVA) statistics. The assumptions of the inferential test were investigated by Levene's test (to examine the homogeneity of variances), Shapiro-Wilk test (for normality of data distribution), M-Box test, and Mauchly sphericality test. The age of the two groups was compared using the independent t test. The statistical analysis was performed using SPSS software (version 22) at a significance level of 0.50.

Results

The means ± standard deviations (SD) of age were 39.20±7.39 and 39±81.8 years in the test and control groups, respectively, which was not significantly different between the two groups ($P=0.549$). The minimum and maximum ages were 21 and 49, as well as 24 and 47 years in the test and control groups, respectively. The mean and SD of research variables are presented in Table 2.

Before the repeated-measure ANOVA test, the results of M-Box, Mauchly, and Levene's tests were evaluated for observing the assumptions. The homogeneity condition of variance-covariance matrices was not ruled out since the M-Box test was not significant for all research variables. Moreover, the non-significance of all Levene's test variables showed the satisfied condition of equality of intergroup variances, and the variance of the dependent variable error was equal in all groups. Finally, the results demonstrated that Mauchly's sphericity test was significant for the research variables, indicating not meeting the (sphericity) assumption of the equality of variances among the subjects. Thus, the Greenhouse-Geisser test was used to evaluate the univariate test results for intragroup effects and interactions. Furthermore, the Lambda Wilkes test with a value of 0.14 represented a significant difference ($P<0.001$) in MBSR effects on improving weight, body image, and self-esteem in both test and control groups at a significant level of 0.05.

The results in Table 3 indicate the significance of ANOVA for both the within-group factor (time) of the self-care variable and the between-group factor ($P<0.001$). Therefore, there was a significant difference between the mean scores of self-care in post-test and follow-up between the two groups. ANOVA was also significant in the internal health variable for within-group (time) and between-group factors ($P<0.001$). Thus, the two groups were significantly different in the mean scores of internal health in the post-test and follow-up stages. Furthermore, the results of the health variable of chance-related influential individuals indicated that ANOVA was significant for the within-group (time) and between-group factors ($P<0.001$). Accordingly, the mean scores of health-related influential people were significantly different in post-test and follow-up. The results of chance-related health scores revealed a significant ANOVA for the within-group (time) and between-group factors ($P<0.001$). Therefore, a significant difference was found between the mean of chance-related health scores in the post-test and follow-up.

Discussion

The current study attempted to evaluate the effectiveness of MBSR on health control and self-care in women with hypertension. The results revealed that the efficacy of MBSR affected health control and self-care in women with hypertension. These findings are in line with those of Keyvan et al (24), confirming the effectiveness of MBSR on self-care and life expectancy in patients with diabetes. Our findings also correspond to those of Heshmati and Zemestani (25), reporting the effectiveness of MBSR in the health locus of control and symptoms of coronary

Table 1. Mindfulness-based Stress Reduction Therapy

Sessions	Content
First	Presenting welcome speech and brief introduction, expressing group therapy rules, explaining the relationship between mind and body and how psychological factors affect medical problems, thinking, feeling, and physiological behavior, providing luggage example, practicing, practicing guided imaginative relaxation, and providing assignments for the next session.
Second	Reviewing previous session assignments, negative thoughts, and other possible facts. Practice: Identifying negative thoughts, cognitive distortions. Practice: Identifying distortions of logical errors. Method: Identifying logical fallacies and determining assignments for the upcoming session.
Third	Reviewing the assignments of the previous session, the advantage of stopping negative thoughts: (1) Focusing on an object and giving details; (2): Mental exercises (countdown); (3) Reviewing happy memories and pleasant daydreams. Practice IV: Interesting and favorite activities, determining assignments for the upcoming session.
Fourth	Practicing emotion-achieving techniques, practicing sedative writing techniques, practicing blind group identification, emotional processing improvement techniques, and receiving assignments for the upcoming session.
Fifth	Reviewing the assignments of the previous session, regular desensitization. Practice: Visual desensitization, indulging, visual indulging practice, and assignments for the upcoming session.
Sixth	Reviewing previous session assignments, assumptions, and inefficient rules. Practice: Identifying beliefs, weak traditions, and logical analysis.
Seventh	Reviewing the assignments of the previous session, incompatible schema and their relationship with inefficient assumptions and negative self-determination thoughts, practicing identifying inefficient schemas using the downward arrow, injecting opinion, practicing, and determining assignments for the upcoming session.
Eighth	Reviewing the assignments of the previous session, summing up the previous content, and running the post-test.

Table 2. Mean and SD of Research Variables in the Test and Control Groups

Variables	Group	Pretest		Post-test		Follow-up	
		Mean	SD	Mean	SD	Mean	SD
Self-care	Test	39.90	4.54	50.57	4.90	50.44	4.82
	Control	40.61	4.21	40.95	4.27	40.38	4.12
Internal health control	Test	28.73	3.79	33.25	2.69	33.11	2.45
	Control	27.05	4.01	27.25	3.69	27.20	3.61
People's health control	Test	22.00	6.88	29.21	4.86	29.13	4.80
	Control	22.25	6.20	23.00	6.08	22.76	5.94
Chance health control	Test	15.80	4.21	12.11	3.81	12.05	3.75
	Control	19.25	5.57	18.90	5.37	18.83	5.19

Note. SD: Standard deviation.

Table 3. Repeated Measures ANOVA for the Effects of Time and Group on Health Control and Self-care

Variables	Source	Effects	F	P Value	Eta squared
Self-care	Within-group	Time	558.28	0.001	0.93
		Time*Group	415.37	0.001	0.91
	Between-group	Group	119.59	0.001	0.75
Internal health control	Within-group	Time	162.42	0.001	0.81
		Time*Group	153.09	0.001	0.80
	Between-group	Group	64.56	0.001	0.63
People's health Control	Within-group	Time	88.84	0.001	0.70
		Time*Group	101.56	0.001	0.72
	Between-group	Group	105.42	0.001	0.73
Chance health control	Within-group	Time	145.00	0.001	0.79
		Time*Group	88.78	0.001	0.70
	Between-group	Group	41.59	0.001	0.52

Note. ANOVA: Analysis of variance.

heart disease. Moreover, the results of this study conform to those of Farahmand et al (14), Ghanei Gheshlagh et al (15), Reich et al (26), and Bennett and Dorjee (27).

To explain the effectiveness of MBSR in the health locus of control of women with hypertension, it can be argued that the locus of control for health is the belief that one's health is under the control of internal or external factors. The source of control varies in different people. The locus of control expresses people's perception of their abilities to control the surrounding environment (26). People with an internal health locus of control believe that they are surrounded and influenced by their environment, are generally active, and show constructive behaviors. In contrast, people with an external locus of control think that their life is entirely under the control of the environment and factors beyond the control of the individual; they attribute their successes and failures to factors such as luck, power of others, destiny, and the like, and do not take responsibility for their behavior in most cases. People with an external control locus are reactive individuals who are waiting for others to move them and avoid stressful situations (27). All mindfulness exercises are designed in a way to increase attention to the body. The critical role of the body has also been proved in new interdisciplinary domains such as mind-body medicine. In studies that use mindfulness, the emphasis is on the interaction between physical, cognitive, and emotional processes (28). Mindfulness-based training is planned by integrating meditation and physical examination techniques to increase the understanding and awareness of thoughts, emotions, programmed involuntary body senses of emotions, and automatic and involuntary body senses. It is planned so that the response to thoughts, feelings, and body sensations can be removed from the mechanical state and changed in their occurrence by applying its methods (29). The stress management plan is a kind of control program in which one learns how to deal with stress using the biological roots of stress to reduce unpleasant aspects of stress and threats that make them good and valuable to control stress growth. Life skills

protect this person against stress, and stress management skills reduce it through learning, anxiety, and unpleasant threatening aspects (30).

Regarding the effectiveness of MBSR in self-care in women with hypertension, it can be discussed that self-care is one of the essential aspects of a health-oriented lifestyle and one of the health-promoting behaviors (31). Self-care is a self-development activity to typically protect psychophysical health. It is an action in which a person uses one's knowledge, skills, and abilities as a source to independently take care of their health. Some characteristics of self-care include being voluntary, learned, and compelled to protect one's health, family, and relatives. Self-care is the maintenance of health, prevention, and treatment of the disease by the person; in addition, self-care behaviors regarding blood pressure include regular blood pressure control, reduced salt consumption, no smoking, exercise, avoidance of mental-psychological stresses, healthy nutrition, weight loss, and frequent use of medication (32). In MBSR, patients pay more attention to their role than any other factor in providing their health by reducing stress and improving mental disorders by themselves and constantly paying attention to their illness and life conditions. Using simple practices such as meditation and yoga in the MBSR method, the person attempts to gain immediate contact with the body, and mindfulness changes, increasing people's ability to control and cope with unpleasant life events. The MBSR approach increases the flexibility of cognitive activities, reduces rumination and self-criticism assessment, and increases proper cognitive processes such as the nonjudgmental observation of subjective contents. In this procedure, patients are encouraged to process the experience without judgment as it is formed and change their relationships with challenging thoughts and feelings and accept them (33). This method considers the role of the individual in self-care more than external individual-related factors.

The limitations of this research include the impossibility of controlling the within-family variable and the family's socioeconomic status on the dependent variables of the study, as well as the existence of cultural and educational differences between the subjects.

Conclusion
Based on the findings of this study, the MBSR approach is effective in health control and self-care in women with hypertension.

Conflict of Interests
The authors declare that there is no conflict of interests.

Ethical Approval
All subjects received written information about the research and willingly participated in the research. The participants were assured that all information was confidential and would be used for research. The participants' names and surnames were not registered to observe privacy. They also completed the Health and Self-Care Control Center questionnaire. This research received the code of ethics committee (IR.HUMS.REC.1398.322) from Hormozgan University of Medical Sciences and the clinical trial code IRCT20200302046671N1 from the Iranian Registry of Clinical Trials.

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