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Original Article

The Effectiveness of Mindfulness-Based Stress Reduction on Quality of Life, Emotional Distress, and Pain Intensity among Women with Breast Cancer

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Abstract

Background: The purpose of this study was to investigate the effectiveness of mindfulness-based stress reduction training on improving quality of life, emotional distress, and pain intensity among women with breast cancer.

Methods: In this semi-experimental research, a pretest-post-test design with a control group (unequal) was used. Its statistical population included all women with breast cancer in Sirjan city in 2021. Forty women with breast cancer in Sirjan city in 2021 were selected using the convenience sampling method and randomly assigned to either the experimental or control group. At first, a pre-test was taken from both groups. Then, mindfulness-based stress reduction training was implemented for the experimental group, and no intervention was performed for the control group. To collect data, the quality-of-life questionnaire of the World Health Organization and the emotional distress questionnaire were used. The research data were analyzed using covariance analysis.

Results: The quality-of-life scores in the experimental group increased from 20.54 in the pre-test phase to 85.97 in the post-test phase and decreased from 48.85 to 39.05 in the control group. The emotional distress score in the experimental group decreased from 100.05 in the pre-test to 51.40 in the post-test stage. In the control group, the emotional distress decreased from 107.1 in the pretest to 103.7 in the post-test stage. Also, in the experimental group, the pain intensity scores decreased from 8.60 in the pre-test to 4.35 in the post-test. In the control group, the pain intensity decreased from 7.20 in the pre-test to 7.80 in the post-test.

Conclusion: Stress reduction methods based on mindfulness can be effective in the quality of life, emotional distress, and pain intensity in women with breast cancer. According to the results, it seems necessary for nurses, doctors, and patients to cooperate with psychologists to carry out interventions.

Keywords: Mindfulness-based stress reduction, Quality-of-life, Emotional distress and pain intensity, Breast cancer

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Introduction

Breast cancer is the most common type of cancer among women and has the highest mortality rate worldwide after cardiovascular diseases (1). In 2017, more than 250 000 new cases of breast cancer were diagnosed in the United States, and 12% of American women will be diagnosed with breast cancer in their lifetime (2). In Iran, based on a study in 2016, the age standardized incidence rate of breast cancer was 14.6 cases per 100 000 people. This disease and its complications can have a negative impact on patients' quality of life, emotional well-being, and pain levels (3).

Emotional distress in breast cancer patients can lead to excessive secretion of stress hormones (4). Evidence shows that repeated exposure to stress alone does not lead to negative outcomes, but long-term exposure to stress-induced chemical mediators is the main cause of negative outcomes (5). Distress as a negative emotional state includes negative views towards oneself, others, and the environment and is associated with feelings such as tension and anxiety (6).

Long-term care of chronic diseases such as cancer is one of the main challenges for health systems worldwide and has a profound impact on the quality of life of patients and survivors (7). The American Psychiatric Association has identified cancer diagnosis as a stressful factor that can create a negative mood and cause disruption in various functional areas, including job ability and social relationships (8). Usually, patients react in different ways to the onset and management of the disease and experience depression and anxiety (9). Therefore, the diagnosis of breast cancer can negatively affect the quality of life of patients. Also, 30% to 50% of cancer patients experience moderate to severe pain, which hurts both

their physical health and leads to psychological problems (10). Breast cancer patients often experience significant pain. Based on a survey conducted among individuals suffering from cancer, it was found that 25% of them experienced severe pain (11).

Although drug therapy is effective in pain management, improving the quality of life, and reducing emotional distress, it has adverse and sometimes destructive and addictive side effects. Therefore, psychologists use complementary treatment approaches such as mindfulness-based stress reduction therapy, which is one of the methods of the third wave of behavioral therapy (12) Mindfulness-based stress reduction is one of the most widely used mindfulness approaches. Mindfulness-based stress reduction was originally designed for patients with chronic diseases to help reduce stress and improve their quality of life through focused attention, meditation, cognitive restructuring, and adaptive learning techniques (13).

Research conducted in the field of mindfulness-based stress reduction training has rarely investigated the effectiveness of this method on the quality of life, emotional distress, and pain level of women with breast cancer. The main focus of research conducted in this field has been on variables such as self-efficacy and perceived stress (14).

Background review shows that there has been no comprehensive effort to investigate the simultaneous effectiveness of mindfulness-based stress reduction on emotional distress, pain intensity, and quality of life in women with breast cancer. Neglecting this therapeutic approach to improve the condition of these patients can be considered an important research gap. To address this gap, the present study investigated the effectiveness of mindfulness-based stress reduction treatment on the variables of quality of life, emotional distress, and pain intensity in breast cancer patients.

Methods

This study was semi-experimental with a control group. The statistical population in this research was all women with breast cancer who were selected among women with breast cancer who were referred to Imam Reza Hospital (AS) in Sirjan city. The sampling method used was convenience sampling. The inclusion criteria in this study were: diagnosis of breast cancer, no history of hospitalization and drug use due to chronic psychological problems, no history of participating in other psychological treatment sessions at the same time, minimum age of 30, and a maximum of 70 years, consent to participate in the research until the end and reading and writing literacy. The exclusion criteria were: not participating in training sessions and unwillingness to cooperate, having difficult physical conditions, participating in other psychological interventions simultaneously, not cooperating with the therapist, and not doing the main tasks suggested by the therapist. The sample included 40 people who were randomly divided into two groups of 20 people (experimental group: mindfulness-based stress reduction and control group). Subjects were evaluated before and after (one month) of each intervention with the World Health Organization Quality of Life Scale, the Emotional Distress Scale, and the Pain Intensity Scale based on Johnson's numerical rating (15).

The quality-of-life scale has 26 items. The first two questions examine health status and quality of life in general, and the next 24 questions examine the four areas of physical health (7 questions), mental health (6 questions), social relationships (3 questions), and general health (8 questions).

The questionnaires are graded on a five-point Likert scale. A higher score indicates a better and higher quality of life. The score range of the questionnaire was generally from 26 to 156.

The internal consistency method (Cronbach's alpha) was used to check the reliability of this questionnaire. Cronbach's alpha was 0.82 for physical health, 0.81 for mental health, 0.80 for environmental health, and 0.68 for social relationships. The validity of this tool was investigated using two methods of differential validity and structural validity and it was reported as acceptable (16).

Johnson's numerical rating scale was used to measure pain intensity. This scale relies on the patient's self-report and includes 10-score-graded lines on which the numbers are graded from 0 (no pain at all) to 10 (the most severe pain possible). In terms of psychometric properties, the reliability and validity of this tool have been confirmed as the gold standard in measuring pain intensity. In 2010, in their research on people with chronic cancer pain, Koushki and colleagues found the validity of this tool to be 0.77 in background pain and 0.86 in severe pain (peak pain) and its reliability with the retest method in back pain. They obtained 0.80 in the background and 0.86 in the extreme pain (17).

The intervention was a mindfulness-based stress reduction therapy derived from the intervention therapy sessions. The researcher implemented this protocol for 8 sessions of 120 minutes in 8 consecutive weeks (18).

Session includes

Session 1: Introduction and familiarization of the group members with each other and the therapist; familiarization of the group members with the rules and regulations of the group; answering the possible questions or doubts of the group members; explaining the purpose and necessity of the meetings by the therapist; helping the group members to determine specific goals related to the quality of life, emotional distress, and own pain.

Session 2: Educating patients on the nature of chronic

pain, quality of life, and emotional distress; introducing patients to existing theoretical models in the field of psychological aspects of chronic pain, quality of life, and emotional distress; investigating how theoretical models match with personal experiences regarding the quality of perception of variables; giving weekly assignments.

Session 3: Examining the weekly assignment, providing feedback, answering possible questions and ambiguities, getting to know each other members with the conceptual model of classical cognitive-behavioral therapy in the field of chronic pain, quality of life, and emotional distress, and giving weekly assignments.

Session 4: Examining the weekly assignment; providing feedback; answering possible questions and ambiguities; investigating the role of emotions in chronic pain, quality of life, and emotional distress; presenting the weekly assignment.

Session 5: Examining weekly assignments, providing feedback, answering possible questions and ambiguities, teaching how to solve problems

Session 6: Examining the weekly assignment, providing feedback, answering possible questions and doubts, teaching communication skills and self-expression.

Session 7: Examining the weekly assignment, providing feedback, answering possible questions and doubts, and training on time management.

Session 8: Overview and practice of skills learned in previous sessions

In this research, to analyze the data based on the measurement level of the variables and hypotheses, in the descriptive part, descriptive statistics of mean ± standard deviation (SD) and number (frequency %) were used. In the inferential part, considering that the research design is semi-experimental in the form of pre-test-post-test, it is unequal with the control group to compare the average scores of qualities of life, emotional distress, and pain intensity in the research groups from covariance analysis and Bonferroni test. For the assumptions of this method, the Kolmogorov-Smirnov test, Levin test, and regression slope were used with a significance level of 0.05. Data analysis was done using the SPSS-v23 software.

Results

In the present study, 40 women with breast cancer were placed in two experimental and control groups (20 people in each group). Most were between 44 and 50 years old (10 people), had bachelor's degrees (10), and were housewives. Demographic variables are shown in Table 1.

The descriptive components of the scores of the groups in the pre-test and post-test are presented separately by groups and variables shown in Table 2.

According to Table 2, the quality-of-life scores in the experimental group increased from 54.20 in the pre-test phase to 97.85 in the post-test phase ($P=0.02$) and decreased from 48.85 to 39.05 in the control group

Table 1. Demographic variables

Variables	Experimental group		Control group	
	No.	%	No.	%
Age group (y)				
30-36	2	10	2	10
37-43	3	15	3	15
44-50	10	50	10	50
51-57	2	10	2	10
58-62	3	15	3	15
Education level				
Diploma	5	25	5	25
Bachelor's degree	10	50	10	50
Master's degree	3	15	3	15
Doctorate	2	10	2	10
Marital status				
Single	8	40	9	45
Married	12	60	11	55
Occupation status				
Housewife	10	50	11	55
Employee	10	50	9	45

($P<0.064$). The scores related to emotional distress in the experimental group were (100.05) in the pre-test stage and (51.40) in the post-test stage, and as can be seen, the average scores decreased ($P<0.04$). In the control group, the emotional distress in the pre-test stage was 107.1, and in the post-test, stage was 103.7 ($P<0.16$). Moreover, in the experimental group, the pain intensity scores decreased significantly from 8.60 in the pre-test to 4.35 in the post-test ($P<0.03$). In the control group, the pain intensity in the pre-test phase was 7.20, and in the post-test, phase was 7.80 ($P<0.17$).

Moreover, Table 3 compares the average scores of other variables before and after the intervention, including general, physical, mental, environmental, and social health. The study's results showed that all variable changes in the experimental group were significant.

It can be inferred that mindfulness-based stress reduction training is effective in improving emotional distress and its variables in women with breast cancer as the main effect of the group or the intergroup effect was significant ($P<0.05$).

The Eta coefficient effect on the depression variable was 0.16, anxiety 0.14, and anger 0.21. In addition, the pain intensity in women with breast cancer significantly improved under the influence of mindfulness-based stress reduction training ($P<0.05$), and the effect size (Eta coefficient) in the pain intensity variable was 0.11.

Discussion

This study showed a significant difference between the average scores of the quality of life among the subjects

Table 2. Descriptive indices of scores in the two research groups in the pre-test and post-test by variables

Variables		Groups					
		Experimental groups			Control group		
		Mean	SD	*P* value	Mean	SD	*P* value
Quality of life	Pre-test	54.20	7.21	0.02	48.85	5.29	<0.064
	Post-test	97.85	5.68		39.05	5.99	
Emotional distress	Pre-test	100.05	50.4	<0.04	107.1	3.44	<0.16
	Post-test	51.40	8.05		103.7	3.94	
Severity of pain	Pre-test	8.6	0.75	<0.03	7.2	1.19	<0.17
	Post-test	4.35	0.8		7.8	1.05	

SD, Standard deviation.

Table 3. Comparison of the average scores of general health, physical health, mental health, environmental health, and social health in the experimental and control groups after the intervention

Variables		Groups					
		Experimental groups			Control group		
		Mean	SD	*P* value	Mean	SD	*P* value
General health	Pre-test	4.3	1.21	0.04	3.85	1.03	0.58
	Post-test	7	1.04		3	0.9	
Physical health	Pre-test	14.45	3.1	0.03	13.65	2.47	0.28
	Post-test	24.10	1.51		10.8	2.52	
Mental health	Pre-test	12.05	2.32	0.2	10.7	1.89	0.46
	Post-test	23.55	1.73		8.55	1.73	
Environmental health	Pre-test	17.20	30.03	0.02	15.15	2.58	0.67
	Post-test	31.5	2.27		12	2.4	
Social health	Pre-test	6	1.25	0.03	5.8	1.28	0.34
	Post-test	11.1	1.48		4.7	1.45	

SD, Standard deviation.

of the experimental and control groups in the post-test phase with the pre-test, which indicates the effectiveness of this treatment method in improving the quality of life of women with breast cancer. In this regard, Harbi et al concluded that female patients with type 2 diabetes who participated in the treatment sessions of the mindfulness-based stress reduction program gained more self-care and quality of life (19). Sohrabi et al stated that cognitive behavioral therapy integrated with mindfulness can improve the quality of life, reduce psychological distress, and increase adherence to the treatment of patients with type 2 diabetes (20). Shahreki Kemak et al stated that stress reduction training based on mindfulness effectively reduces pain intensity and increases the quality of life of patients with thalassemia major (21). Cascales-Pérez et al concluded that mindfulness training improves quality of life, mood, and concentration (22). Zhang et al. stated that mindfulness-based stress reduction is significantly effective in the quality of life of women with breast cancer (23).

Modern psychological treatment advocates, which are known as third-wave psychotherapy treatments, emphasize the role of psychological resources for people facing stressful events and believe that these resources can provide the necessary treatment measures for the recovery of people under pressure. Mindfulness-based stress reduction therapy is an effective way to deal with stress. By changing the way of reacting to stress, this method improves psychological functions and increases mental health. By reducing focus on the past and future and paying attention to the present, mindfulness reduces worries, rumination, and negative physical reactions to mental stress. As a result, it improves the quality of life of patients. It can also be claimed that over time, breast cancer affects various functions of a person, including occupational, family, and social, by creating mental, physical, and social limitations. It also improves patients' mood and attitude. Decreasing self-esteem, self-confidence, and fear of death, along with the limitations caused by the disease, cause depression and decrease the quality of life. Teaching mindfulness to breast cancer patients, focusing on present experiences and reducing negative thoughts and ruminations, increases their quality of life. Also, the results of this research confirmed

the effectiveness of mindfulness-based stress reduction treatment in reducing the emotional distress of women with breast cancer (23). In this regard, Yazdanimehr et al concluded that training in a stress reduction program based on mindfulness effectively improves pregnant women's mental well-being and quality of life (24). Park et al stated that mindfulness-based cognitive therapy has a positive and significant effect on psychological distress (25). Zhang et al concluded that mindfulness-based stress reduction has a positive effect on quality of life, distress, and sleep quality in people with breast cancer (23). Brotto et al concluded that mindfulness and cognitive behavioral therapy have a moderate effect on reducing psychological distress in patients with MS. The diagnosis of breast cancer, as well as its treatment, has negative emotional effects on women in various fields. These areas include themes related to coping with the disease, adapting to the disease, disturbed self-image, and worrying about the consequences of the disease, which causes the person to become angry, and endure a lot of anxiety and depression.

Another result obtained in this study was the effectiveness of the stress reduction training method based on mindfulness in improving pain intensity in women with breast cancer (26). Accordingly, Shahreki Kemak et al stated that stress reduction training based on mindfulness effectively reduces pain intensity and increases patients' quality of life with thalassemia major (21). Bagheri et al stated that the treatment of ester reduction mindfulness-based Q is suggested as an effective treatment for improving the severity of symptoms and reducing pain catastrophizing (27).

According to various psychological models of chronic pain, such as Dismore, the interpretation of pain and the response to pain-causing stimuli play a significant role in determining the future pain experience. According to these theories, cognitions produce psychological responses such as emotional performance towards pain and affect the activities of the underlying nervous system of pain perception (28). Therefore, the experience of pain affects both emotional and cognitive reactions. Mindfulness involves accepting current experiences like thoughts, without trying to change them. Practicing mindfulness skills increases the ability to tolerate negative situations and forces them to cope effectively. Another possible explanation of this effect could be that mindfulness, through reducing the coping strategy of pain catastrophizing, may be effective in reducing the severity of pain interference in daily life. Judgment and prejudice in many situations cause tension, stress, and unrest in people, and this is the beginning of disaster. Catastrophizing also increases negative emotions and stress, and this cycle increases the intensity of pain. In order to prevent catastrophizing, individuals should refrain from making judgments. Mindfulness helps to reduce this maladaptive strategy by offering non-judgmental and calming acceptance practices. Some of the contents of the mindfulness training program, such as tension generation techniques, help to increase the patient's self-control and self-restraint, thereby improving the severity of the problem. In general, the results of this research can confirm the results of previous studies and theories related to the role of third-wave treatments, including stress reduction based on mindfulness in improving the quality of life, emotional distress, and pain intensity in women with breast cancer. Based on this method, patients are taught to accept what is beyond their control and, while accepting emotions, not suppressing them, and not making unrealistic interpretations, try to create a purposeful and meaningful life.

Focusing on the present and moment-to-moment experience of life, accepting emotions, and understanding them in general by increasing psychological flexibility can improve quality of life and reduce emotional distress and pain intensity in women with breast cancer. Finally, this psychological intervention can be considered effective in improving the quality of life, emotional distress, and pain intensity in women with breast cancer. The current research had limitations such as a limited time frame, non-cooperation of some participants in completing the questionnaires accurately, incomplete information of some participants, and lack of access to some participants to complete the information.

Conclusion

This research suggested that the studied psychological intervention can effectively promote quality of life and reduce emotional distress and pain intensity. It can be practiced by therapists and experts in the field of counseling and mental health in educational centers, organizations, welfare institutions, health, and other environments related to patients with breast cancer. Moreover, considering the prevalence of breast cancer and the negative effects it has on women's lives, it is suggested that this therapeutic intervention be considered as a group training intervention for women with breast cancer.

Authors' Contribution

Conceptualization: Hamid Shahdadi.
Data curation: Nasrollah Erfani.
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Supervision: Amin Rafiepoor.
Validation: Amin Rafiepoor.
Visualization: Amin Rafiepoor.
Writing–original draft: Amin Rafiepoor.
Writing–review & editing: Hamid Shahdadi.

Competing Interests
There are no potential conflicts of interest related to the research, authorship, or publication.

Data Availability Statement
The corresponding author can provide the datasets upon request.

Ethical Approval
No animals were used in this research and human participants were used. This study was conducted in accordance with the ethical principles of the Declaration of Helsinki (1975) and its revised version (2013).

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