

Original Article

Effectiveness of mindfulness-based cognitive therapy on posttraumatic growth, self-management and functional disability among patients with breast cancer

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ABSTRACT

Background & Aim: Breast cancer is accompanied with various psychological problems and need for psychological treatment. Therefore, the aim of this study was to investigate the effectiveness of mindfulness-based cognitive therapy on posttraumatic growth, self-management and functional disability among patients with breast cancer.

Methods & Materials: In a randomized controlled trial with repeated measures design, 20 women with breast cancer were selected among the patients who were referred to the Department of Oncology and Radiotherapy of Tehran Hafta Tir Martyrs hospital using convenience sampling. Participants were randomly assigned into the experimental or control groups. The experimental group received 8 sessions of intervention within two months and the control group did not receive any intervention. Both groups were followed for three months after the intervention. All participants assessed by the Demographic and Disease Characteristics Checklist, Structured Clinical Interview for DSM-5, Posttraumatic Growth Inventory (PTGI), Patient Activation Measure and WHO Disability Assessment Schedule 2.0. Data were analyzed with multivariate repeated measures analysis of variance using IBM SPSS Statistics for Windows, Version 21.0.

Results: The results showed that Time*Group interaction is significant ($F=9.561$, $p<0.001$, Eta square=0.815). In addition, both the Time and Group main effects are significant ($F=4.370$, $p<0.012$; $F=10.500$, $p<0.001$).

Conclusion: Mindfulness-based cognitive therapy and time of assessment have combined effects on the posttraumatic growth, self-management and function disability in patient with breast cancer. The impact of mindfulness-based cognitive therapy in improving posttraumatic growth, self-management and function disability depends on the time of the measurement.

Introduction

Breast cancer is the second most common cancer in women worldwide (1). Most patients with breast cancer survive this common chronic disease and encounter a variety of psychosocial problems that need appropriate interventions (2, 3). Long-term effects and consequences of breast cancer especially their psychological and social consequences have been an important

research topic (4). Breast cancer has several psychosocial consequences including social behavior changes and a new experience after illness and the appropriate interventions to manage them are of great importance (5). Posttraumatic growth is a psychological concept referring to this subject in a way that traumatic events or challenging crisis lead to reform and strengthen the cognitive processes resulted from subsequent events and consequences. According to posttraumatic growth theory, stress management style, social support and cognitive processes related to traumatic

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events can lead to change in thinking pattern, life goal and reduced psychological distress (6, 7). Self-management is another concept that comes as a result of chronic diseases such as breast cancer and refers to the ability to manage everyday problems related to chronic and long-term diseases (8). Self-management of breast cancer involves problem-solving skills, goal setting, decision making and the skills of using resources and acting according to a program (9). The correct understanding of breast cancer and adjustment with it lead to changes in the patient's attitude and ability to self-management of disease (10). Another fundamental concept associated with breast cancer is the patient's functional disability. This refers to the disruption of the functions in one or more aspects of life because of the disease among patients (11). Patients with breast cancer have higher rates of stressful disability situations and also experience a lower quality of life (12). Also, higher functional disabilities were associated with the greater mortality rate in women with breast cancer (13). Although other psychological variables play an important role in the negative consequences of cancer, but in this limited study, there is no way to investigate them. Therefore, the variables are examined that theoretically and conceptually can be influenced by the mindfulness cognitive therapy.

Reducing psychological distress and disabilities caused by the cancer through effective interventions improve the patient's psychosocial functions (14). Mindfulness-based cognitive therapy is one effective psychological treatment for psychosocial aspects of breast cancer in which patients gain awareness and they consider distressing thoughts as transient mental events (15). This treatment was first proposed to prevent depression recurrence but it is now one of the most widely used psychotherapies of

psychosocial aspects of chronic diseases including cancer (9, 16-18).

Although mindfulness based cognitive therapy was originally designed to treat the psychological disturbances, but now it has become an effective intervention for the psychosocial dimension and psychological problems in patients with breast cancer (19, 21). Stafford et al showed mindfulness-based cognitive therapy leads to improvement of posttraumatic growth in patients with breast cancer (22). Mindfulness therapy leads to altering the meaning of life, pacifism, relating with others and personal growth in patients with cancer (23). Furthermore, mindfulness intervention for breast cancer treatment leads to reducing patients' psychological problems and more consistency with this life-threatening disease (24, 25). Results of the study by Johannsen et al showed an 8-session mindfulness program will improve self-management and psychological and social aspects of breast cancer (26).

Although the effectiveness of mindfulness therapy for some psychosocial aspects of cancer such as emotional distress has been investigated in Iran (27), but the effectiveness of mindfulness-based cognitive therapy on posttraumatic growth, self-management and function disability among patients with breast cancer has not been investigated in Iranian samples. In addition, mindfulness intervention with its effects on patients' thoughts and understanding through techniques such as moment-to-moment awareness, non-judgment and acceptance has a great effect on patient function, self-care and improving life quality in women with breast cancer (28, 29).

Due to the increased incidence of breast cancer and psychological problems related to cancer, an appropriate intervention for psychological aspects of the disease is essential. There are valid psychological

therapies for interventions in the psychological aspects of cancer patients. Among these interventions, the mindfulness cognitive therapy has an effective role in improving the stress-related psychological dimensions such as posttraumatic growth, self-management and functional disability among patients with breast cancer. Therefore, the study of this intervention on these variables would contain a new scientific knowledge in Iran. The theoretical efficiency and effectiveness of mindfulness-based cognitive therapy on some important psychosocial aspects of breast cancer and the cost-effectiveness of this intervention compared the other psychological interventions increase the necessity and importance of this study. Therefore, this study can be fruitful in generating new knowledge as a basis for further investigation and designing appropriate interventions for these patients. It is hypothesized that mindfulness-based cognitive therapy is effective on posttraumatic growth, self-management and functional disability among patients with breast cancer. The aim of this study was to examine effectiveness of mindfulness-based cognitive therapy on posttraumatic growth, self-management and functional disability among patients with breast cancer.

Methods

The current study was a clinical randomized control trial with repeated measures design. The statistical population consisted of all women with breast cancer who received treatment in Tehran Hafe Tirmartyrs hospital in 2016. The study sample included 20 patients with stage 2 breast cancer in this population who were selected by convenient sampling and randomly assigned into intervention group and control group. The sample size was calculated based on G Power soft-ware with the alpha 0.05,

the study power of 0.8 and the effect size of 0.42 that this sample size is adequate for data analysis in this study. The initial sample was 24 participants. Two participants in the treatment group and one participant in the control group were excluded from the groups because of study withdrawal and health problems (fatigue caused by chemotherapy). In addition, one member of the control group was excluded due to missing the final assessment. Therefore, analysis was performed on 20 patients (Figure 1).

Inclusion criteria included age between 20 and 45 years old (to be physically able to perform household works), diagnosis of stage 2 breast cancer by a cancer specialist, being married for controlling marital factors such as marital discord and marital support and having preparatory or higher education (to have literacy to do cognitive tasks). Exclusion criteria included multifocal (MF) breast cancer and multicentric (MC) breast cancer by a cancer specialist, the diagnosis of other serious medical diseases, infections or other types of cancer (by patient medical records and interviewing with the patients), having any psychiatric disorders including personality and psychotic disorders. The reasons for selecting patients with stage 2 were controlling the progression of the disease in the groups and the possibility of intervention for patients. The inclusion and exclusion criteria were investigated through interviews, referring to the physician diagnosis and reviewing patient records. Also, the exclusion criteria due to psychiatric disorders were investigated through two psychiatric diagnostic interview sessions according to the Structured Clinical Interview for DSM-5 (SCID-5) with the patient by an MSc in clinical psychology and a PhD in health psychology. The following instruments used in this study.

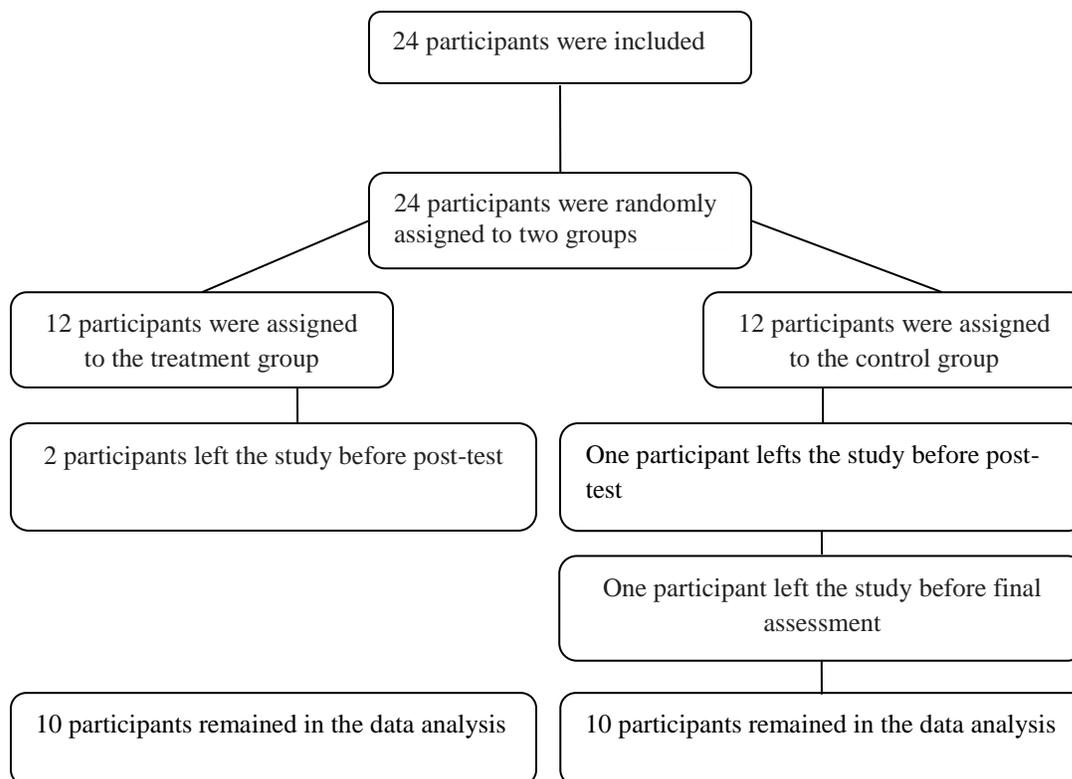


Figure 1. The consort flow diagram in randomly assignment of study participants

The Demographic and Disease Characteristics Checklist was constructed by researchers in this study to collect demographic information and characteristics of medical diseases and psychiatric disorders. This checklist encompass information about age, education, job, income, history of medical diseases or other serious infections, history of psychiatric disorders, family circumstances, lifestyle, disease grade and type of cancer. Structured Clinical Interview for DSM-5 (SCID-5) is a valid clinical instrument for diagnosis on psychiatric disorders that published by American Psychiatric Association. This instrument used by researchers to diagnose patients with comorbid psychiatric disorders for excluding them in this study. The Posttraumatic Growth Inventory (PTGI) was introduced by Tedeschi & Calhoun to investigate the

concept of posttraumatic growth (6). This instrument has 21 items that determine 5 psychological areas after encountering a stressful accident involving new possibilities, personal strength, relating to others, spiritual change, and appreciation of life. Higher scores of participants in this instrument indicate more posttraumatic growth in people. In the study, Cronbach's alpha coefficient obtained for the entire instrument is 0.87 (30). In this current study, content validity was confirmed by five qualified health psychologist and a psychometrician, and the internal consistency of this instrument was determined with Cronbach's alpha of 0.89. Patient Activation Measure (PAM) was introduced by Hibbard et al to investigate the self-management (31). This instrument has 22 items and 4 subscales involving beliefs, knowledge, skills, and access

emotional supports. Higher scores of participants in this scale indicate higher self-management. In this study, Cronbach's alpha was 0.95 for entire instrument. Also, this instrument is well valid and reliable with Cronbach's alpha of 0.95 for self-management diagnosis (31). In this current study, content validity was confirmed by three qualified health psychologist and a two psychometric, and the internal consistency of this instrument was determined with Cronbach's alpha of 0.90. WHO Disability Assessment Schedule 2.0 (WHODAS 2.0) was introduced to investigate the concept of functional disability among the patient with chronic pain (32). This instrument has 36 items that determine 6 domains of cognition, mobility, self-care, getting along, life activities and participation. Scores range from 0 to 100 and higher scores of participants in this instrument indicate more functional disability in people. This instrument is well valid and reliable with Cronbach's alpha of 0.95 for function disability diagnosis; therefore, this instrument has a good validity and reliability for disability diagnosis (32). In this current

study, content validity was confirmed by three qualified health psychologist and a two psychometric, and the internal consistency of this instrument was determined with Cronbach's alpha of 0.92.

After obtaining written informed consent from all the participants, the inclusion and exclusion criteria were considered by the Demographic and Disease Characteristics Checklist and Structured Clinical Interview for DSM-5. The study instruments were filled out in March 2016 (pre-test), June 2016 (post-test) and October 2016 (follow-up).

The intervention was based on the treatment manual of Williams et al (16) which is appropriate for patients with breast cancer. The researchers who performed the treatment had Master degree in clinical psychology and PhD degree in health psychology and took action toward intervention after mastering the treatment model and participating in mindfulness-based cognitive therapy official workshops of Iranian Organization of Psychology and Counseling.

Table 1. The intervention contents during the 8 sessions

| Sessions | Contents |
|------------------------|--|
| First session | Introducing treatment, an automatic guidance system. knowing how to use present moment awareness of bodily sensation, making a relation and conceptualization, giving an assignment for next week |
| Second session | Facing with obstacles, re-examining last session exercises, giving feedback and discussing about body workout and mindfulness meditation |
| Third session | Breathing mindfulness meditation, re-examining last session exercises, examining body workout, giving feedback and re-examining the exercises and practicing 3-minute breathing |
| Fourth session | Being in the moment, re-examining the exercises, 5-minute practicing of "seeing or hearing", re-practicing conscious session with awareness of breathing and body, distributing leaflets of the fourth session and CDs of meditation |
| Fifth session | Re-examining last session exercises, practicing breathing, sitting meditation including mindfulness of breathing, sounds and thoughts, and explaining the stress, identifying participants' reactions to stress and its relation with pain, examining awareness of pleasant and unpleasant events on feeling, thoughts and bodily sensations and distributing leaflets |
| Sixth session | Teaching differences between thought and reality, re-examining last session exercises, conscious yoga, sitting meditation including mindfulness of breathing, sounds and thoughts |
| Seventh session | Given an explanation about importance of self-care, sleep hygiene, repeating exercises of the previous session, making a list of enjoyable activities, distributing leaflets of the seventh session |
| Eighth session | Examining body workout, over viewing program, examining and discussing programs, practicing stone |

The treatment was held as a two-month intensive phase in Tehran Hafe Tir Martyrs hospital over 8 group sessions of 2.5 hours each. Three months after completing the intervention, both intervention and control groups completed a follow-up assessment in all variables under investigation. The intervention contents during the 8 sessions were tailored and standardized (Table 1).

This study is a Master Thesis in Clinical Psychology that recorded in Iranian Registry of Clinical Trials under registration number of IRCT2016080825732N7. Research was done with consideration of ethical aspects such as obtaining a written informed consent to participate in therapy sessions, privacy and consciousness of information confidentiality, respecting the rights of participants, arbitrariness of participation and probability of study withdrawal at any

stage of the study. The descriptive statistics and multivariate repeated measures analysis of variance used to the data analysis using the IBM SPSS Statistics for Windows, Version 21.0.

Results

In the current study, 20 patients with grade 2 breast cancer were evaluated (10 people in the intervention group and 10 in the control group) in the age range of 20 to 45 years with a mean age of 38.8 years and a standard deviation of 5.6 years. Table 2 shows sample demographic characteristics (education, job, income).

In addition, Table 3 demonstrates descriptive statistics of posttraumatic growth, self-management and functional disability in all groups on three assessments.

Table 2. Demographic characteristics of the participants in two groups

| Demographic characteristics | Group | Intervention | | Control | |
|-----------------------------|------------------------------|--------------|----|---------|----|
| | | N | % | N | % |
| Education | High school | 2 | 20 | 2 | 20 |
| | Diploma | 6 | 60 | 5 | 50 |
| | Collegiate education | 2 | 20 | 3 | 30 |
| Job | Housewife | 8 | 80 | 9 | 90 |
| | Worker | 0 | 0 | 0 | 0 |
| | Clerk | 2 | 20 | 1 | 10 |
| Income | Less than 1 million Toman | 2 | 20 | 3 | 30 |
| | 1 million to 2 million Toman | 7 | 70 | 6 | 60 |
| | More than 2 million Toman | 1 | 10 | 1 | 10 |

Table 3. Mean and standard deviation of dependent variables in groups on three assessments

| Variable | Group | Test | Mean | Standard division |
|-------------------------------|--------------|-----------|--------|-------------------|
| Post- traumatic growth | Control | Pre-test | 3.1619 | 0.89347 |
| | | Post-test | 2.9905 | 0.77690 |
| | | Follow-up | 2.8810 | 0.93402 |
| | Intervention | Pre-test | 3.0857 | 0.70801 |
| | | Post-test | 3.9619 | 0.68853 |
| | | Follow-up | 3.8810 | 0.68097 |
| Self-management | Control | Pre-test | 2.8182 | 0.59575 |
| | | Post-test | 2.7227 | 0.51890 |
| | | Follow-up | 2.5291 | 0.22983 |
| | Intervention | Pre-test | 2.6955 | 0.82768 |
| | | Post-test | 3.4000 | 0.33181 |
| | | Follow-up | 3.3136 | 0.29259 |
| Function Disability | Control | Pre-test | 1.5972 | 0.48028 |
| | | Post-test | 1.6639 | 0.42420 |
| | | Follow-up | 1.5444 | 0.28695 |
| | Intervention | Pre-test | 1.0583 | 0.75501 |
| | | Post-test | 0.3020 | 0.26237 |
| | | Follow-up | 0.4833 | 0.39135 |

Before performing repeated-measures variance analysis, the assumptions were examined using Box's M Test. The Box's M Test for posttraumatic growth, self-management and function disability are not significant ($F= 0.659, P= 0.683; F= 1.827, P=0.071, F=1.475, P=0.183$, respectively). Box's M Test showed that the observed covariance matrices of all three dependent variables between the two groups are equal. Therefore, variance homogeneity of groups is established for repeated-measures variance analysis. In the next step, in order to use the results of multivariate variance analysis, another presumption, sphericity, was investigated. Mauchly's sphericity test for each of the three components of the study were significant ($p < 0.05$). This means that the sphericity assumption for these components is not true. So to respect this violation, a correction of degrees of freedom was used by Greenhouse-Geisser. Greenhouse-Geisser corrections for within-subjects effect for posttraumatic growth ($p < 0.001, 0.822$), self-management ($p < 0.001, 0.785$), functional disability (0.781 and $p < 0.001$) were obtained. Also, the Levene's Test for Equality of Variances was used at different stages of the experiment, whose results showed that the error variance is the same in the three assessments of study: posttraumatic growth pre-test ($F=0.855, P=0.367$), posttraumatic growth post-test ($F=0.003, P=0.954$), posttraumatic growth follow-up ($F=3.761, P=0.068$), self-management pre-test ($F=1.009, P=0.329$), self-management post-test ($F=0.654, P=0.207$), self-management follow-up ($F=0.365, P=0.554$), function disability pre-test ($F=2.727, P=0.116$), function disability post-test ($F=5.227, P=0.035$), function disability follow-up ($F=0.481, P=0.467$). According to Table 4, the findings of multivariate repeated measures analysis of variance indicate that the effect of measurement time

on the linear combination of variables was significant (within-group value: $0.331, p < 0.001, F=4.370, \text{Eta Square}=0.669$). Table 4 shows multivariate test results to evaluate the between-group and within-group significance effect.

Multivariate test of between-group and within-group significance effects in table 4 showed that the Time*Group interaction is significant ($F=9.561, p < 0.001, \text{Eta square}=0.815$). In addition, both the Time and Group main effects are significant ($F=4.370, p < 0.012; F=10.500, p < 0.001$). Regarding that Time*Group interaction is significant; intervention and time have combined effects on the posttraumatic growth, self-management and function disability in post-test and final assessment. Pairwise comparison of time-group interaction is presented in Table 5.

The results in Table 5 show that on the effectiveness of mindfulness-based cognitive therapy on posttraumatic growth, the difference between the two groups in the pre-test was not significant ($P=0.835$), but in the post-test ($P < 0.008$) and follow-up ($P=0.014$) there was a significant difference between the two groups. Result on the effectiveness of mindfulness-based cognitive therapy on self-management show the difference between the two groups in the pre-test was not significant ($P=0.708$), but in the post-test ($P < 0.003$) and follow-up ($P < 0.001$) there was a significant difference between the two groups. Furthermore, result about the effectiveness of mindfulness-based cognitive therapy on functional disability show the initial difference between the two groups in the pre-test was not significant ($P < 0.073$), but in the post-test ($P < 0.001$) and follow-up ($P < 0.001$) there was a significant

difference between the two groups. The diagrams of mean differences are presented at the time of measurement (Figure 2).

Table 4. Multivariate test of between-group and within-group significance effects

| Variable | Test | Value | F | P value | Eta square |
|-------------------------|--------------------|-------|--------|---------|------------|
| Group | Wilks Lambdai test | 0.337 | 10.500 | 0.001* | 0.663 |
| Time | Wilks Lambdai test | 0.331 | 4.370 | 0.012** | 0.669 |
| Time & Group | Wilks Lambdai test | 0.185 | 9.561 | 0.001* | 0.815 |

*P<0.01; **P<0.05

Table 5. Pairwise comparison of time-group interaction

| Variable | Test | Groups | Mean differences | Standard error | P value | |
|-------------------------------|-----------|---------|------------------|----------------|---------|---------|
| Post- traumatic growth | Pre-test | Control | Intervention | 0.076 | 0.360 | 0.853 |
| | Post-test | Control | Intervention | 0.971 | 0.328 | 0.008** |
| | Follow-up | Control | Intervention | -1.000 | 0.336 | 0.014** |
| Self-management | Pre-test | Control | Intervention | 0.123 | 0.322 | 0.708 |
| | Post-test | Control | Intervention | -0.677 | 0.195 | 0.003** |
| | Follow-up | Control | Intervention | -0.755 | 0.118 | 0.001* |
| Function Disability | Pre-test | Control | Intervention | 0.539 | 0.283 | 0.073 |
| | Post-test | Control | Intervention | 1.361 | 0.158 | 0.001* |
| | Follow-up | Control | Intervention | 1.061 | 0.153 | 0.001* |

*P<0.01; **P<0.05

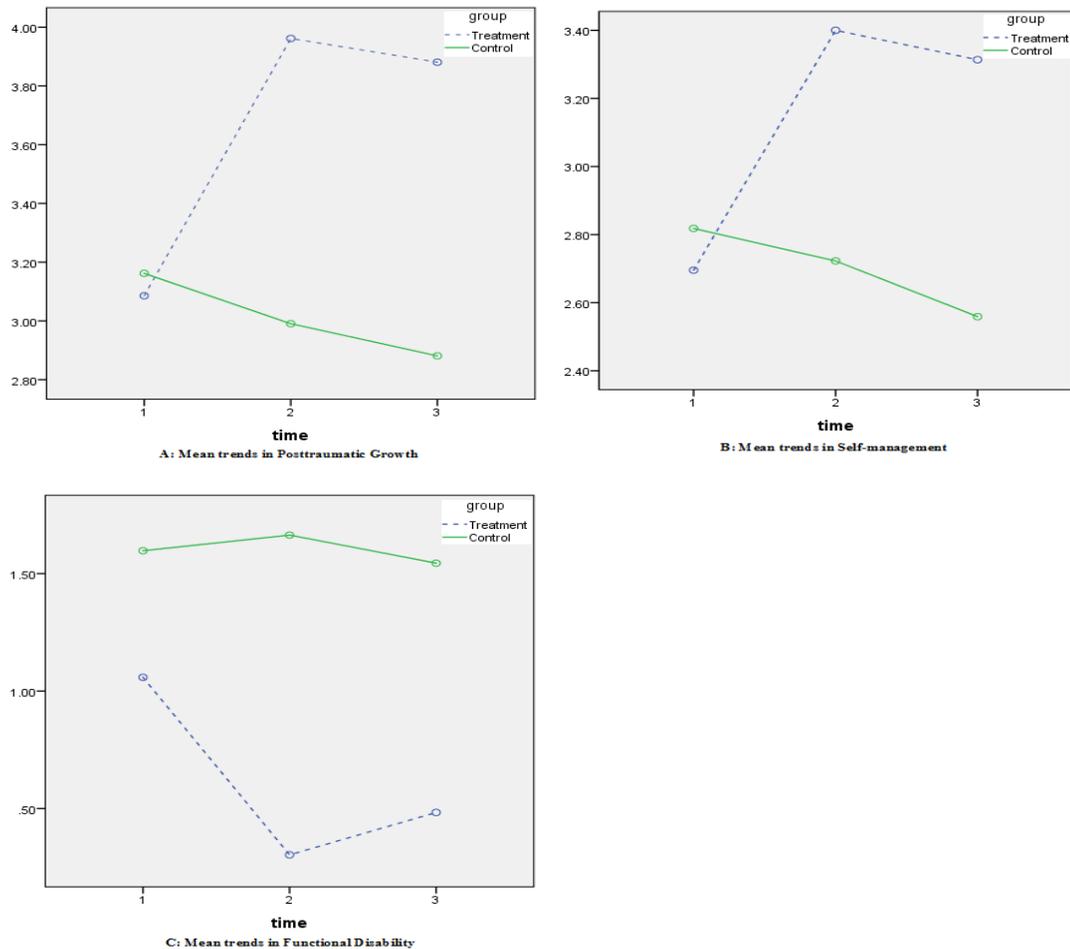


Figure 2. Mean trends in (A) Posttraumatic growth, (B) Self-management and (C) Functional disability

Discussion

Following the aim of this study about the effectiveness of mindfulness-based cognitive therapy on posttraumatic growth, self-management and functional disability of patients with breast cancer, findings showed that mindfulness-based cognitive therapy in interaction with time of assessment have combined effects on the posttraumatic growth, self-management and function disability in patient with breast cancer. The impact of intervention in improving posttraumatic growth, self-management and function disability depends on the time of the measurement. When an interaction is significant, attention focused on the interaction instead of the main effects. These results are in line with the study of Stafford et al (22), Cormio et al (5) and Pat-Horenczyk et al (23) that showed mindfulness-based cognitive therapy has positive effect on cognitive aspects of breast cancer patients such as posttraumatic growth.

In this study, the intervention and time of measurement interaction is significant and the interpretation the main effects of group or time of measurement has not an accurate conclusion of the results. In explaining effectiveness of mindfulness-based cognitive therapy on posttraumatic growth among patient with breast cancer, as Zhang et al (33) have pointed out, mindfulness-based cognitive therapy increases attention and focus on processing major life events in patients with cancer. After the intervention, patients feel better about the value of life, have more awareness about how to manage the everyday life problems and gain enthusiasm to overcome the disease. In another argument, mindfulness-based cognitive therapy strengthens moment-to-moment awareness of physical and psychological experiences without judgment and analysis to help increasing positive feeling towards the disease and develop

effective coping techniques. According to Stafford et al (22), by seeing everything as it is in mindfulness-based cognitive intervention, it is focused on learning to accept changes and being aware of new possibilities in every moment of life. This could lead to posttraumatic growth. In explaining these findings based on a review study together with meta-analysis, Zhang et al (33) concluded that mindfulness about what happens and even about times of painful experiences enhances the right processing of experiences related to cancer, unifies the current situation with past experience of ourselves and the world, and helps setting new life goals based on disease characteristics (33).

About intervention on self-management among patient with breast cancer, findings showed that the mindfulness-based cognitive therapy in interaction with time of assessment is effective for self-management in patients with breast cancer and has caused self-management improvement in the intervention group compared with the control group in post-test and follow-up. These results are consistent with the study of Bower et al (18), Eyles et al (5) and Cramer et al (23) that found mindfulness-based cognitive therapy has positive effect on physical, psychological and social self-management of breast cancer patients. It is argued that mindfulness interventions improve psychological and physical symptoms and patients' self-management by reducing catastrophizing of symptoms and teaching cognitive coping styles with disease conditions. Also, According to Eyles et al (9), by improving self-management of life associated with cancer, mindfulness-based cognitive therapy leads to reduce fears of symptoms return, increase mindfulness of physical and psychological states in stressful situations and increase awareness of how to deal with stimulants and stressors. In addition, it can be argued that during the

mindfulness intervention process, patients learn how to be and live in the present moment and do self-management actively through improving awareness of the disease and the correcting attitude towards the disease and its consequences.

About effectiveness of intervention on functional disability among patient with breast cancer, findings showed that the mindfulness-based cognitive therapy in interaction with time of assessment is effective for functional disability in patients with breast cancer and has caused functional disability improvement in the intervention group compared with the control group in post-test and follow-up. These results are in line with the study of Witek-Janusek et al (28), Schellekens et al (20) and Pat-Rahmani et al (27) that mindfulness-based cognitive therapy has positive effects on reducing functional disability in patients with breast cancer and it is, on the other hand, inconsistent with some studies investigated by Cramer (21). To explain this result, it can be noted that mindfulness improves psychosocial functions in patients with cancer by strengthening self-assessment and self-monitoring. According to Huang and Shi (34), mindfulness intervention helps to recognize and control the triggering and continuation factors of functional disability in patients with cancer. So, most research has demonstrated the effectiveness of mindfulness-based cognitive intervention in cases of chronic pain and functional disability in patients with cancer (35). In other explanations for similar findings, it can be argued that, by strengthening the adoption with chronic pain and reducing acute reaction to pain, mindfulness intervention reduces reaction responses to disease experiences which lead to improving patient's functional aspects and reducing their functional disabilities. In addition, mindfulness is a strong predictor of patient's functions such that disease

adjustment without challenging the disease or preventing it. In fact, focusing on the moment and non-reactive awareness have a significant role in improving functional disabilities of cancer patients. To explain inconsistent results about effectiveness of mindfulness-based cognitive therapy on functional disability among patient with breast cancer with some studies, this can be caused by different conceptual and operational definitions, different methods and various study instruments and statistical communities.

Finally, results revealed mindfulness-based cognitive therapy by time interaction is effective on posttraumatic growth, self-management and functional disability among patients with breast cancer. There is a global difference from pre-test to post-test and final assessment in a group by time interaction. It is possible that the participants in treatment group undergone natural development over time and it is misleading to focus a global difference over time when this difference may be due to the intervention. However, it is concluded that both treatment and control group may undergone natural development over time that this issue may be accompanied by benefits of the intervention.

The new integrated knowledge in this study is the mindfulness-based cognitive therapy reinforces posttraumatic growth, improves self-management and diminishes functional disability among patients with breast cancer and the effect of the intervention is standing three months after the treatment termination. It can be inferred that Iranian practitioners can use this treatment to improve disorders including posttraumatic growth, self-management and functional disability of breast cancer patients. This study showed that the application of mindfulness-based cognitive therapy would result in 3-month continuation of intervention results.

Therefore, it can be inferred that mindfulness-based therapy has sustainable results in psychosocial aspects in patients with breast cancer.

This current study has also significant disadvantages that should be considered in generalizing its results and implications. This study was conducted only on women with breast cancer, which limits generalizing findings to populations with other cancers and health conditions. The low sample size is another limitation in this study which reduces the range of generalization of the results. The other limitation of this study is that it was only performed on married women and cannot be generalized to single women. The dependent variables were specific in this study. Therefore, it is difficult to generalize the results to other psychosocial variables. It is recommended to conduct future research on other samples with higher sampling size. Replication of this intervention for other psychosocial variables in other cancer cases can bring new and comprehensive results about the effectiveness of this intervention in cancer patients. It is also recommended that this therapy be a part of comprehensive treatment programs of breast cancer for preventing the recurrence of the disease and better treatment it. Furthermore, given that this treatment is nonmedical, non-invasive, and effective in controlling psychological problems of patients with cancer, it is recommended to be used in hospitals and cancer treatment centers.

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Conflict of Interest

The authors declared no conflicts of interest in this study.

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