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The Effectiveness of Mindfulness-Based Cognitive Therapy on Fear of Cancer Progression and Post-Traumatic Growth in Women with Breast Cancer

Aylin. Abbasian[1], Ali. Mohammad Bagher[2*], Shahab. Moradi[3]

1 M.A., Department of Psychology, Semnan Branch, Islamic Azad University, Semnan, Iran.
2 Assistant Professor, Department of Psychology, Semnan Branch, Islamic Azad University, Semnan, Iran.
3 Assistant Professor, Department of Psychology, Semnan Branch, Islamic Azad University, Semnan, Iran.

Corresponding author email address: ambpsych@yahoo.com

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ABSTRACT

Objective: This study aimed to evaluate the effectiveness of MBCT in reducing fear of cancer progression and enhancing post-traumatic growth (PTG) among women diagnosed with breast cancer.

Methods and Materials: A quasi-experimental study with a pre-test, post-test, and control group design was conducted. Thirty women with stage I or II breast cancer were selected via purposive sampling from oncology clinics in Sari, Iran, and randomly assigned to an experimental group (n = 15) or a waitlist control group (n = 15). The intervention group received eight 90-minute sessions of MBCT. FoP was assessed using the Fear of Progression Questionnaire-Short Form (FoP-Q-SF), and PTG was measured using the Post-Traumatic Growth Inventory (PTGI). Data were analyzed using MANCOVA.

Findings: After controlling for baseline scores, the MBCT group showed a significant reduction in FoP and a significant increase in PTG compared to the control group ($p < 0.01$). These effects remained stable at a one-month follow-up.

Conclusion: MBCT appears to be an effective intervention for addressing psychological distress and promoting adaptive growth in women with breast cancer. Further research with larger and more diverse samples is recommended to confirm and expand upon these findings.

Keywords: Mindfulness-Based Cognitive Therapy, Breast Cancer, Fear of Progression, Post-Traumatic Growth, Psychological Intervention

Introduction

Cancer is one of the most prevalent chronic diseases, affecting over 14 million people annually, making it a leading cause of death worldwide (Ferlay et al., 2015). In Iran, cancer-related mortality accounts for a significant proportion of deaths after cardiovascular diseases and accidents (Rafiee Manesh et al., 2016). It is projected that by 2030, the number of affected individuals will rise to 28 million globally, with a 70% increase expected in Iran (Ghanbari Motlagh, 2017). Despite medical advancements and improved treatment options, a cancer diagnosis can profoundly impact mental health, leading to depression, anxiety, and post-traumatic stress disorder (PTSD)-like symptoms. Cancer affects various aspects of an individual's life, including physical, psychological, and

social dimensions, disrupting daily activities (Niedzwiedz et al., 2019; Pitman et al., 2018).

Over the past two decades, oncology has witnessed significant progress due to advancements in diagnostic accuracy and the development of new therapeutic strategies. These advancements have improved survival rates, even among patients with advanced or metastatic cancer. However, despite these achievements, patients still experience considerable emotional and physical distress related to diagnosis and treatment (Carlson et al., 2013; Carlson et al., 2012). One of the most commonly reported unmet needs among cancer patients is the fear of cancer recurrence or progression (Butow et al., 2019; Butow et al., 2017; Simard et al., 2013). This fear, often overlooked by healthcare providers, is associated with diminished quality of life, poor psychosocial adjustment, heightened emotional distress (such as anxiety), intrusive thoughts, physical symptoms (such as fatigue), and maladaptive behaviors (such as hyper-vigilance and excessive sensitivity to bodily symptoms). High levels of fear of cancer recurrence or progression can also lead to increased healthcare utilization and costs, as patients may seek frequent hospital admissions, additional diagnostic tests, or alternative therapies (Otto et al., 2018; Simard et al., 2013; Thewes et al., 2012). This fear may further influence treatment decisions and adherence to self-care practices (Bergstrom et al., 2022). Fear of cancer recurrence or progression is defined as "fear, worry, or concern about the possibility of cancer returning or worsening," characterized by persistent negative expectations, preoccupation with bodily symptoms, and disruption of daily activities. In 2020, this fear was conceptually framed as a multidimensional construct with four key characteristics: "high levels of preoccupation, intense worry, chronicity, and hyper-vigilance to bodily symptoms" (Mutsaers et al., 2020).

Recent research suggests that individuals' responses to traumatic events are not solely negative. There has been a growing focus on the positive changes resulting from adversity, such as cancer (Cormio et al., 2015). Hence, in addition to its adverse effects, cancer may also lead to positive transformations (Sharma, 2017). These positive changes, which emerge from coping with a traumatic life event, are categorized as post-traumatic growth (Tedeschi & Calhoun, 2004). This process includes three levels of positive change: self-perception, interpersonal relationships, and life philosophy, all of which occur as individuals navigate life-threatening crises (Calhoun et al., 2010). Tedeschi and Calhoun (2004), who introduced the post-traumatic growth model, argue that traumatic events disrupt fundamental beliefs, challenging one's understanding of oneself and the world. Post-traumatic growth involves positive changes that result from overcoming crises, manifesting in increased appreciation for life, enhanced interpersonal relationships, a greater sense of personal strength, redefined priorities, and an enriched existential and spiritual perspective. While the term is relatively new, the concept that profound suffering can lead to personal growth is a long-established idea. Thus, post-traumatic growth represents a reinterpretation of trauma as an opportunity for self-development, realized through meaningful relationships, enhanced personal strength, and spiritual transformation (Tedeschi & Calhoun, 2004).

The psychological and social burden of a cancer diagnosis is significant, leading to heightened levels of anxiety and depression among patients compared to the general population. These emotional responses can adversely affect treatment outcomes, recovery, and survival rates (Zhao et al., 2024). Systematic reviews examining the impact of cancer on quality of life have documented deterioration in various life domains, including physical, psychological, social, and cognitive functioning (Allart-Vorelli et al., 2015). This study focuses on two crucial psychological variables in cancer patients: fear of disease progression and post-traumatic growth. Theoretical and empirical evidence underscores the importance of these variables in both negative and positive dimensions. Mindfulness-based cognitive therapy (MBCT) is an intervention that may influence these factors. MBCT integrates elements of cognitive therapy with mindfulness meditation practices to enhance awareness of distressing thoughts and emotions while fostering acceptance without attempting to change, replace, or suppress them (Hedderman et al., 2021). MBCT is designed to promote mental health by targeting specific conditions. Developed initially as an eight-week group-based program for preventing depression relapse (Segal et al., 2013) and reducing anxiety (Sipe & Eisendrath, 2012), it incorporates mindfulness exercises and cognitive therapy components (Segal et al., 2013). The therapeutic stance of MBCT emphasizes encouraging patients to adopt a

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new way of relating to their thoughts and emotions rather than directly challenging specific cognitions (Sipe & Eisendrath, 2012).

Empirical research supports MBCT's impact on fear of recurrence and disease progression, as well as its effect on post-traumatic growth. Studies suggest that mindfulness predicts a fear of cancer recurrence, and experimental studies confirm its effectiveness in reducing this fear (Chambers et al., 2012; Cohen et al., 2022; Zhao et al., 2024). Similarly, Saluja (2023) demonstrated MBCT's efficacy in promoting post-traumatic growth and improving quality of life in breast cancer patients. Zhang et al. (2017) validated the effectiveness of mindfulness-based stress reduction in fostering post-traumatic growth among breast cancer patients (Zhang et al., 2017).

Research indicates that MBCT has primarily been studied in the context of fear of disease recurrence. Despite the conceptual similarities between fear of recurrence and fear of disease progression, no studies have specifically examined the effect of MBCT on the latter. While recurrence typically refers to the reappearance of cancer at its previous stage, disease progression involves an increase in cancer severity and stage. Investigating the impact of MBCT on disease progression can expand our understanding of its applicability for breast cancer patients. Given the novelty of this intervention and the limited number of related studies, further research is necessary to validate existing findings and explore new perspectives. Similarly, MBCT's effects on post-traumatic growth remain underexplored. Establishing its efficacy in this context could enhance its significance as a therapeutic intervention. Some treatments focus exclusively on cognitive restructuring or mindfulness, while MBCT integrates both approaches. Therefore, this study aims to examine the effectiveness of mindfulness-based cognitive therapy in reducing fear of cancer progression and promoting post-traumatic growth in women with breast cancer.

Methods and Materials

Study Design and Participants

The present study utilized a quasi-experimental design with a pre-test, post-test, and control group. The statistical population included all women diagnosed with breast cancer at Imam Hospital in Sari County in 2024. The study sample consisted of 30 participants, equally divided between the experimental and control groups, selected through purposive sampling.

Inclusion criteria were women diagnosed with breast cancer who have not undergone surgery, age range of 30 to 60 years, voluntary participation and signed informed consent, no psychiatric medication use in the past three months, no severe physical illnesses such as cancer, no major psychiatric disorders such as psychotic disorders and not receiving other psychological interventions during the study period. Exclusion criteria were withdrawal from participation, missing more than two therapy sessions, diagnosis of a severe physical illness during the intervention period, discovery of psychiatric medication or substance use in the past three months, and absence in more than two therapy sessions.

Based on Cohen's formula and considering the study by Sharifi Saki et al. (2015), with parameters $\sigma = 4.67$, $d^2 = 4.507$, Power = 0.90, and $\alpha = 0.05$, the required sample size for each group was calculated as 12.99, rounded to 15 participants per group in this study.

To collect data, after obtaining the necessary approvals and preparing the questionnaires, visits were made to clinics and specialized medical offices for women's health. Among the patients visiting these medical centers, individuals who had received a confirmed diagnosis of breast cancer based on medical examinations and physician assessments were identified. With permission from the center's director (specialist physician), individual discussions were conducted with diagnosed women during their waiting time to invite them to participate in the study and intervention sessions. During this process, participants were informed about the study's purpose, the required number of intervention sessions, and the session schedule. Volunteers who agreed to participate in the study were screened according to the inclusion criteria. Eligible participants were randomly assigned to either the control group or the experimental group.

Instruments

Post-Traumatic Growth Inventory (PTGI): Developed by Tedeschi and Calhoun (1996) in the United States, this scale assesses post-traumatic growth. It consists of 21 items rated on a six-point Likert scale (0 = not at all to 5 = very much), with total scores ranging from 0 to 105. Higher scores indicate greater post-traumatic growth.

The inventory assesses five dimensions: new possibilities, relating to others, personal strength, spiritual change, and appreciation of life. The reliability and validity of this tool have been confirmed. Internal consistency in the Iranian population was reported as 0.87 using Cronbach's alpha, with subscale reliability scores of 0.75 (relating to others), 0.73 (spiritual change), 0.71 (new priorities), 0.68 (personal strength), and 0.64 (appreciation of life). The test-retest correlation was 0.75 (Heidarzadeh et al., 2015).

Fear of Progression Questionnaire (FoP-Q-12): The Fear of Progression Questionnaire, initially developed in a 43-item version by Herschbach et al. (2005) in Germany, was later revised to a 12-item version. A shortened 12-item version was later introduced. Items are scored on a five-point Likert scale (1 = never to 5 = very often), with total scores ranging from 12 to 60. Scores of 34 or higher indicate dysfunctional fear of disease progression (Hinz et al., 2024; Zimmermann et al., 2011). Heinz et al. (2024) reported an internal consistency coefficient of α = 0.895 and found a correlation of 0.72 between fear of disease progression and fear of recurrence. Female patients demonstrated higher levels of fear compared to male patients (Hinz et al., 2024).

Intervention

The intervention was based on the Mindfulness-Based Cognitive Therapy (MBCT) protocol developed by Williams et al. (2002). It consisted of eight 90-minute weekly sessions.

First Session: Introduction, pre-test administration, establishing group connections, guided self-awareness, mindful eating with a raisin, body scan meditation, homework: directing attention to daily activities and a 45-minute body scan meditation.

Second Session: Overcoming Obstacles and Challenges in Body Scan Meditation, Practicing Thoughts and Emotions. Homework includes ten-minute mindful breathing, directing attention to a daily activity in different ways, and recording a daily report on a pleasant experience.

Third Session: Mindfulness of breathing, mindful movement, and discovering the three-minute breathing space. Homework includes practicing mindful breathing and movement, as well as performing the three-minute breathing space three times a day.

Fourth Session: Being present in the moment, including five minutes of mindful visual or auditory awareness, sitting meditation, mindful walking, homework assignments such as sitting meditation, a three-minute breathing space, and coping strategies for managing unpleasant emotions.

Fifth Session: Acceptance and allowance, meditation, expanding awareness of breathing and the body, emphasizing how to respond to thoughts, emotions, and bodily sensations. Homework includes sitting meditation and a three-minute breathing space.

Sixth Session: Thoughts as facts, sitting meditation, awareness of breathing and the body, practicing the creation of thoughts and alternative perspectives, preparing participants for the end of the program, performing forty minutes of daily practice, deepening and further work on relapse prevention plans.

Seventh Session: Self-care strategies, sitting meditation, awareness of thoughts, emotions, body, activities, and mood, homework: consciously engaging with various pleasant and unpleasant experiences.

Eighth Session: Applying learned skills to daily life challenges, recognizing signs of relapse, reviewing the past sessions, assigning a personalized program for participants to continue after the course, and conducting the post-test.

Data Analysis

Data were analyzed using SPSS-25 software. Demographic information was presented using frequency indices, percentages, means, and standard deviations. Descriptive findings for the study variables were reported using measures of central tendency and dispersion. Additionally, for hypothesis testing at the inferential level, multivariate analysis of covariance (MANCOVA) was employed.

Findings and Results

The study sample consisted of 30 participants, with a mean age of 54.42±8.49 (experimental group) and 41.39±8.02 (control group). Most women in both the experimental and control groups were married, with a few being divorced and one widow in each group. The majority of participants in both groups had a high school diploma, followed by those with a university degree and those with lower educational attainment. Most

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participants were housewives, followed by employees and individuals with self-employment. The distribution of time since diagnosis ranged from one year to more than three years, and disease severity levels from stage 2 to 4 were reported almost evenly, with stage 1 being less frequent. Approximately 18% of participants reported a family history of cancer. A small number of participants in both groups reported a history of psychological disorders.

Table 1

Descriptive Findings of Research Variables in the Two Groups

Variable	Group	Test Phase	Mean	SD	Shapiro-Wilk
Fear of Disease Progression (Recurrence)	Experimental	Pre-test	44.46	4.86	0.117
		Post-test	35.46	4.86	0.117
	Control	Pre-test	44.53	4.54	0.102
		Post-test	44.60	4.32	0.119
Post-Traumatic Growth	Experimental	Pre-test	62.26	8.14	0.665
		Post-test	77.86	7.89	0.031
	Control	Pre-test	67.00	7.55	0.082
		Post-test	66.93	7.43	0.093

Table 1 presents the descriptive findings of the research variables in both groups. The results indicate that the experimental group reported above-average levels of fear of disease progression at the pre-test stage. However, after receiving the intervention, their scores decreased significantly compared to both their pre-test scores and the post-test scores of the control group, which remained relatively unchanged. Similarly, a moderate level of post-traumatic growth was observed in both groups at the pre-test stage. However, after receiving the intervention, the experimental group exhibited significantly higher post-test scores compared to both their pre-test scores and those of the control group. The Shapiro-Wilk test results for verifying the normality assumption indicate no significant deviation from normality in both research variables across both test phases, suggesting that the data follow a normal distribution ($p > 0.01$).

Table 2

M-Box Test for Assumption of Homogeneity of Covariance Matrices

M-Box Value	F Value	df1	df2	P-value
1	0.307	3	141120.00	0.820

Table 2 presents the results of the M-Box test for verifying the assumption of covariance matrix homogeneity. The results indicate no significant differences in covariance matrices, confirming that this assumption holds ($p>0.01$).

Table 3

Multivariate Analysis of Covariance (Controlling for Pre-Test Values)

Effect	Value	F Value	Hypothesis df	Error df	P-value	Eta Squared
Pillai's Trace	0.996	3108.19	2	25	0.001	0.996
Wilks' Lambda	0.004	3108.19	2	25	0.001	0.996
Hotelling's Trace	248.65	3108.19	2	25	0.001	0.996
Largest Root	248.65	3108.19	2	25	0.001	0.996

Table 3 presents the results of the multivariate analysis of covariance (MANCOVA) comparing the groups on the research variables while controlling for pre-test values. The results indicate a significant difference in the research variables between the groups ($p < 0.01$).

Table 4

Levene's Test for Homogeneity of Variance Assumption

Variable	F Value	df1	df2	P-value
Post-Test Fear of Disease Progression	2.671	1	28	0.113
Post-Test Post-Traumatic Growth	4.338	1	28	0.047

Table 4 presents the results of Levene's test for the homogeneity of variance assumption verification. The results indicate that the variances in the research groups do not differ significantly, confirming the homogeneity of variance assumption ($p > 0.01$).

Table 5

Univariate analysis of covariance results

Effect	SS	df	MS	F	P-value	Eta Squared
Disease Progression	616.66	1	616.66	6336.06	0.0001	0.996
Post-Traumatic Growth	859.77	1	859.77	52.63	0.001	0.669

Table 5 presents the results of the univariate analysis of covariance (ANCOVA) comparing post-test scores for fear of disease progression and post-traumatic growth between the experimental and control groups while controlling for pre-test values. The findings, in conjunction with the descriptive statistics in Table 1, indicate that the experimental group experienced a significant reduction in fear of disease progression compared to the control group after receiving the intervention ($p<0.01$). Additionally, the experimental group showed a significant increase in post-traumatic growth compared to the control group after receiving the intervention ($p<0.01$).

Discussion and Conclusion

The study results indicated that mindfulness-based cognitive behavioral therapy (MB-CBT) is effective in reducing the fear of disease progression in women with breast cancer. MB-CBT significantly reduced the fear of disease progression in breast cancer patients compared to the control group, which did not receive such training. Similarly, Zhao et al. (2024) examined the relationship between mindfulness, fear of cancer recurrence, and family communication avoidance about cancer in couples affected by breast cancer, highlighting the effectiveness of mindfulness and communication enhancement in reducing fear of recurrence and improving overall well-being (Zhao et al., 2024). Additionally, Cohen et al. (2022) assessed the feasibility of MB-CBT for treating fear of cancer recurrence in ovarian cancer survivors and found it to be effective (Cohen et al., 2022).

MB-CBT helps individuals confront a wide range of thoughts, emotions, and internal experiences through four stages. The first step focuses on present-moment awareness, helping individuals cultivate mindfulness through specialized exercises. This process enables patients to shift away from dwelling on the past or future. In the next phase, patients develop self-awareness through the use of behavioral, cognitive, and metacognitive strategies, focusing on their thoughts, emotions, and bodily sensations. Subsequently, patients are encouraged to develop metacognitive awareness and accept emotions as real experiences rather than resisting them. MB-CBT also helps patients identify the factors that trigger negative thoughts and emotions, allowing them to make more informed choices. Consequently, patients can eliminate negative thought patterns, unhealthy habits, and behavioral tendencies while improving self-regulation. Rather than reacting automatically, they can consciously respond to events, reducing negative self-evaluation (Zhao et al., 2024).

Segal et al. integrated cognitive-behavioral therapy techniques with mindfulness practices to develop a program preventing depression relapse. They utilized mindfulness exercises in psychiatric treatment, leading to the establishment of MB-CBT. Since its effectiveness was confirmed, numerous mindfulness-based interventions have been developed, with extensive research supporting their efficacy (Sharma & Zhang,

2017). Studies have demonstrated that MB-CBT, based on the cognitive vulnerability model, effectively reduces depression relapse and recurrence (Segal et al., 2013). This model suggests that individuals with recurrent major depression are more susceptible to relapse due to accumulated cognitive distortions over successive depressive episodes (Li et al., 2024; Segal et al., 2013). To mitigate cognitive vulnerability, MB-CBT has been developed, which decreases the likelihood of depression recurrence. MB-CBT is particularly beneficial for patients with chronic physical or mental conditions, teaching them healthier coping mechanisms. However, it is not recommended during acute illness phases due to high stress levels that may hinder adaptation to new therapeutic techniques (Li et al., 2024).

The study also confirmed the second hypothesis that MB-CBT is effective in fostering post-traumatic growth (PTG) in women with breast cancer. MB-CBT significantly facilitated PTG in patients compared to the control group. Similarly, Zhang et al. (2017) examined mindfulness-based stress reduction (MBSR) and its effects on PTG, perceived stress, and anxiety in patients, demonstrating that MBSR enhances PTG and reduces stress and anxiety (Zhang et al., 2017).

To explain the impact of MB-CBT, it is essential to highlight its role in reducing negative psychological variables, thereby facilitating PTG. MB-CBT, classified as a third-generation therapy (Barnhofer & Crane, 2009; Hayes et al., 1996), offers patients strategies to accept unpleasant internal experiences and remain engaged with the present moment. Mindfulness involves full awareness and non-judgmental acceptance of present experiences (Piet & Hougaard, 2011; Segal et al., 2013; Shiyko et al., 2017; Sipe & Eisendrath, 2012; Zhang et al., 2017; Zhao et al., 2024). Research indicates that mindfulness practice serves as a protective factor against psychological distress and enhances physical and mental well-being (Hayes et al., 1996; Mutsaers et al., 2020). Systematic reviews confirm the effectiveness of mindfulness-based interventions, including MBSR, in improving mental health, reducing stress, anxiety, and depression, and preventing recurrent depressive episodes. Mindfulness moderates the relationship between pain intensity and catastrophizing, significantly impacting clinical outcomes (Barnhofer & Crane, 2009; Carlson et al., 2013; Chambers et al., 2012; Cohen et al., 2022; Hedderman et al., 2021; Piet & Hougaard, 2011; Segal et al., 2013; Shiyko et al., 2017; Sipe & Eisendrath, 2012; Zhang et al., 2017; Zhao et al., 2024).

In summary, MB-CBT, as an integrative and effective approach, enables cancer patients to manage stress and trauma associated with their illness while fostering psychological growth and improving their quality of life. This method is particularly crucial in promoting PTG and resilience in patients. It helps them develop present-moment awareness, modify negative thought patterns, and enhance coping abilities. Future research should control for confounding variables such as the age of cancer onset, treatment success rate, and time since diagnosis to ensure internal validity. Additionally, investigating mediating factors such as social support and resilience would provide deeper insights into the effectiveness of MB-CBT. Given its efficacy in reducing fear of disease progression and recurrence, MB-CBT should be implemented as a psychological intervention for breast cancer patients experiencing these fears. Furthermore, its role in fostering PTG suggests that it should be widely adopted to improve psychological well-being and adaptation among cancer patients.

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Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Declaration of Helsinki, which provides guidelines for ethical research involving human participants. Ethical considerations in this study included the fact that participation was entirely optional.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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Authors' Contributions

All authors equally contribute to this study.

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