

The Effectiveness of Mindfulness-Based Cognitive Therapy on Adjustment and Health Anxiety in Patients with Cancer

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ABSTRACT

The present study aimed to determine the effectiveness of mindfulness-based cognitive therapy on adjustment and health anxiety in patients with cancer. The research employed a quasi-experimental pretest-posttest design with a control group. The statistical population of the present study consisted of individuals with depression who attended counseling centers in Tehran in 2025. From this population, 30 participants were selected using convenience sampling and were then randomly assigned to an experimental group (n = 15) and a control group (n = 15). The instruments used for data collection were the Adjustment Questionnaire and the Health Anxiety Questionnaire. Subsequently, the experimental group received eight 2-hour sessions of mindfulness-based cognitive therapy, whereas the control group received no specific intervention. The findings indicated that the mean scores of adjustment and health anxiety at posttest differed significantly from the pretest scores in the experimental group. Therefore, mindfulness-based cognitive therapy is effective in improving adjustment and reducing health anxiety in patients with cancer.

Keywords: mindfulness-based cognitive therapy, adjustment, health anxiety, patients with cancer.

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Introduction

Cancer is among the most challenging chronic illnesses because its effects extend far beyond the biological progression of disease and frequently disrupt the psychological, emotional, interpersonal, and social functioning of affected individuals. The experience of receiving a cancer diagnosis, undergoing repeated medical examinations, coping with treatment-related adverse effects, and confronting uncertainty regarding prognosis can profoundly alter patients' perceptions of themselves, their bodies, and their future. In addition to physical complications such as pain, fatigue, nausea, functional limitations, and treatment burden, many patients experience persistent psychological distress that may interfere with treatment adherence, quality of life, interpersonal relationships, and overall adaptation to illness. The psychological burden of cancer is therefore increasingly recognized as an integral component of comprehensive cancer care rather than as a secondary consequence of physical disease. Pain and other treatment-related symptoms can further intensify

psychological distress, particularly when symptoms are interpreted as signs of disease progression or treatment failure (1). Accordingly, psychological interventions that can improve patients' capacity to adapt to illness while simultaneously reducing maladaptive anxiety have considerable clinical relevance.

Adjustment represents a multidimensional process through which individuals attempt to achieve an adaptive balance between personal needs, environmental demands, emotional reactions, and changing life circumstances. From a psychological perspective, successful adjustment requires the capacity to respond flexibly to stress, regulate emotional reactions, maintain functional interpersonal relationships, and modify expectations and behaviors in accordance with new circumstances. Adjustment is particularly important in chronic and life-threatening diseases because patients must repeatedly accommodate changes in physical functioning, family roles, occupational responsibilities, body image, social interactions, and expectations about the future. General research on adjustment has emphasized its association with psychological and social functioning and with an individual's ability to maintain a sense of security and coherence under stressful circumstances (2). Similarly, psychological distress has been associated with poorer functioning and diminished performance across demanding contexts, suggesting that ineffective adjustment may impair an individual's capacity to cope with persistent stressors (3).

In patients with cancer, adjustment is not a single event that occurs immediately after diagnosis; rather, it is an ongoing and dynamic process that develops throughout diagnosis, treatment, survivorship, recurrence, and, in some cases, advanced disease. Patients must repeatedly reinterpret their experiences and reorganize cognitive and behavioral responses as new challenges emerge. Evidence from women with breast cancer indicates that adaptation involves psychological, emotional, behavioral, interpersonal, and meaning-related processes and that patients may move through different stages as they attempt to integrate the illness into their lives (4). The ability to accept illness-related changes, maintain meaningful activities, use effective coping strategies, and preserve a sense of personal competence may therefore contribute substantially to better adjustment. Conversely, persistent avoidance, catastrophic interpretation of symptoms, rumination, and excessive preoccupation with illness may make adaptation more difficult and amplify psychological distress.

One psychological problem that can interfere markedly with adjustment to cancer is health anxiety. Health anxiety refers to excessive concern or fear regarding one's health, bodily sensations, or the possibility of having or developing a serious illness. It may involve increased attention to somatic sensations, repeated monitoring of the body, catastrophic interpretation of benign symptoms, reassurance seeking, repeated medical consultation, and persistent difficulty tolerating uncertainty regarding health. The construct overlaps conceptually with hypochondriacal tendencies, which include illness worry, disease conviction, somatic preoccupation, and heightened sensitivity to bodily changes (5). Although a certain degree of concern about health is understandable and adaptive among people with cancer, excessive health anxiety can become clinically problematic when it is disproportionate, persistent, and associated with substantial distress or impairment.

Health anxiety may be especially pronounced in cancer because patients are confronted with real medical threats and with bodily sensations that may legitimately require attention. This creates a complex psychological situation in which realistic vigilance and maladaptive hypervigilance can become difficult to distinguish. Treatment side effects, routine follow-up examinations, pain, fatigue, unfamiliar bodily

sensations, and uncertainty about recurrence may all trigger catastrophic interpretations. Patients may consequently become increasingly attentive to minor changes in their bodies and may interpret ambiguous sensations as evidence of disease progression. Research on health anxiety in medically affected populations has shown that perceived health threats, illness-related experiences, and psychological vulnerabilities can contribute to increased health-related worry (6). Cognitive-behavioral research has likewise demonstrated that health anxiety is amenable to psychological intervention and that modifying maladaptive illness-related beliefs and behavioral responses can reduce persistent health concerns in medical populations (7).

Anxiety in cancer is also closely related to broader existential concerns, including fear of death, uncertainty about prognosis, loss of control, and perceived vulnerability. Studies among patients with advanced cancer have demonstrated meaningful associations between psychological vulnerability, depression, insecure attachment, and death anxiety, underscoring the complex emotional context in which cancer-related anxiety occurs (8). These concerns may intensify patients' focus on threatening cognitions and make it more difficult to disengage from repetitive negative thinking. When anxiety becomes persistent, it may also undermine the capacity to adapt to the demands of illness. In this respect, adjustment and health anxiety are theoretically interconnected: heightened health anxiety may disrupt adaptive functioning, whereas greater psychological flexibility and more effective adaptation may help individuals respond to illness-related uncertainty without excessive distress.

The growing recognition of psychological distress in chronic illness has encouraged greater attention to psychosocial interventions alongside medical treatment. International health frameworks have increasingly emphasized multidimensional health, psychological well-being, coping capacities, and supportive interventions as essential elements of health care rather than treating health exclusively as the absence of physical disease (9). In oncology, this perspective is particularly important because medical advances have increased survival for many patients, thereby extending the period during which individuals must cope with the psychological consequences of diagnosis and treatment. Psychotherapeutic approaches that strengthen coping, increase hope, reduce emotional distress, and facilitate adaptation may therefore complement biomedical cancer treatment. For example, acceptance and commitment therapy has been reported to improve hope and beliefs related to meaning and fairness among patients with breast cancer, indicating that interventions focused on patients' cognitive and experiential responses can produce beneficial psychological changes (10). Similarly, cognitive-behavioral therapy has demonstrated effectiveness in reducing depression, anxiety, and stress among women with breast cancer (11).

Among contemporary psychological approaches, mindfulness-based interventions have received increasing attention because they directly target patterns of repetitive negative thinking, emotional reactivity, attentional bias, and avoidance that are highly relevant to anxiety and maladjustment. Mindfulness can be described as purposeful attention to present-moment experience with an attitude of openness, curiosity, and nonjudgment. Rather than attempting immediately to eliminate unpleasant thoughts, sensations, or emotions, mindfulness encourages individuals to observe such experiences as transient mental events. This shift in the relationship to internal experience may reduce automatic reactions and create greater flexibility in responding to stress. For patients with cancer, who may experience distressing thoughts and bodily sensations that cannot always be removed or controlled, learning to relate differently to these experiences may be particularly valuable.

Mindfulness-based cognitive therapy (MBCT) is a structured intervention that integrates mindfulness practices with principles derived from cognitive therapy. Originally developed to reduce vulnerability to depressive relapse, MBCT teaches participants to recognize automatic cognitive processes, disengage from maladaptive patterns of rumination, and develop a decentered perspective toward thoughts and emotions (12). A central principle of MBCT is that psychological distress is often maintained not only by the content of negative thoughts but also by the manner in which individuals respond to them. When a person interprets thoughts as literal facts and reacts automatically, distress may escalate. By contrast, mindful observation can help individuals recognize thoughts as temporary cognitive events and can reduce the tendency to become entangled in them.

This mechanism is highly relevant to health anxiety. A patient who notices a bodily sensation may automatically interpret it as evidence that cancer has worsened, resulting in fear, physiological arousal, additional body monitoring, reassurance seeking, and further amplification of perceived symptoms. Mindfulness practice may interrupt this cycle by helping the patient observe bodily sensations and illness-related thoughts without immediately assigning catastrophic meaning to them. Cognitive components of MBCT may further assist patients in identifying habitual interpretations and recognizing that thoughts concerning recurrence, deterioration, or death are not necessarily accurate indicators of current medical status. Through repeated practice, patients may develop greater tolerance of uncertainty and a less reactive relationship with illness-related cognitions.

MBCT may also contribute to improved adjustment by increasing awareness of emotional and behavioral patterns and strengthening the capacity to remain engaged with present circumstances. Adjustment to cancer often requires accepting aspects of reality that cannot be changed while taking constructive action in areas that remain controllable. Mindfulness may facilitate this process by reducing experiential avoidance and increasing willingness to experience unpleasant emotions without excessive attempts to suppress or escape them. Patients may consequently become better able to cope with treatment-related discomfort, communicate their needs, preserve social functioning, and engage in meaningful activities despite uncertainty. The cognitive component of MBCT may additionally help patients identify maladaptive interpretations that reinforce helplessness or avoidance and replace automatic reactions with more deliberate and adaptive responses.

Empirical findings support the broader application of cognitive and mindfulness-based treatments for psychological difficulties associated with cancer. Recent evidence indicates that both mindfulness-based cognitive therapy and conventional cognitive-behavioral therapy can reduce anxiety, depression, and fatigue among patients with cancer, suggesting that structured cognitive and attentional interventions can address multiple dimensions of cancer-related distress (13). Findings regarding cognitive interventions in other emotionally distressed populations similarly suggest that group-based cognitive therapy can improve cognitive emotion regulation and decrease anxiety, supporting the proposition that modifying cognitive-emotional processing can reduce psychological symptoms (14). These findings are theoretically consistent with MBCT, which specifically combines cognitive awareness with systematic mindfulness practice.

Additional research has emphasized the usefulness of complementary psychological approaches for reducing anxiety and improving well-being among patients with cancer. For example, group laughter yoga has been associated with improvements in health-related anxiety, meaning in life, and pain-related outcomes

among patients with cancer, demonstrating that psychological and mind–body interventions may influence both emotional and subjective physical experiences (15). Such evidence highlights the importance of addressing cancer-related distress through interventions that extend beyond symptom-focused medical care. Nevertheless, different interventions operate through different psychological mechanisms, and MBCT is particularly distinctive because it targets attentional regulation, decentering, acceptance, cognitive reactivity, and present-moment awareness simultaneously.

The need for such approaches is also reinforced by evidence that distress in cancer is influenced by the interpretation of symptoms and the psychological context surrounding illness. Physical pain and treatment side effects may function as persistent cues that reactivate health concerns (1), while existential fear and insecure emotional patterns may exacerbate anxiety among individuals with advanced disease (8). Health anxiety may therefore become embedded within a self-reinforcing cycle in which bodily sensations trigger catastrophic cognitions, anxiety increases physiological arousal and symptom awareness, and intensified symptom monitoring generates further threat perceptions. MBCT may be particularly appropriate for disrupting this cycle because it teaches individuals to observe sensations and thoughts without automatic judgment and to redirect attention intentionally.

From an adjustment perspective, mindfulness may also support the reconstruction of everyday life following cancer diagnosis. The adaptation process among cancer patients requires balancing acknowledgment of illness with continued engagement in personal, familial, and social roles (4). Excessive worry may consume cognitive and emotional resources that would otherwise be available for problem solving, interpersonal engagement, and treatment-related decision making. By reducing repetitive worry and promoting emotional regulation, MBCT may enable patients to respond to illness with greater psychological flexibility. This possibility is consistent with evidence that adjustment is closely related to individuals' ability to manage environmental demands and maintain functional psychological and social adaptation (2).

Despite growing evidence regarding mindfulness-based and cognitive-behavioral interventions, further investigation is warranted because cancer populations differ considerably in disease characteristics, treatment experiences, cultural context, available social support, and patterns of psychological distress. Moreover, research has often focused on depression, generalized anxiety, stress, fatigue, or quality of life, whereas adjustment and health anxiety have received comparatively less combined attention as concurrent outcomes of MBCT. This distinction is clinically important because reducing general emotional distress does not necessarily imply that patients have become better adjusted to cancer or less preoccupied with health threats. Evaluation of both variables may therefore provide a more comprehensive understanding of how MBCT affects the psychological experience of cancer. Previous evidence supporting cognitive-behavioral treatment for health anxiety (7), mindfulness-based cognitive approaches in cancer (13), and other cognitive interventions for anxiety and emotion regulation (14) provides a strong rationale for examining these outcomes together.

Accordingly, the present study aimed to determine the effectiveness of mindfulness-based cognitive therapy on adjustment and health anxiety among patients with cancer.

Methods and Materials

Study Design and Participants

The present study employed a quasi-experimental pretest–posttest design with an experimental group and a control group to examine the effectiveness of mindfulness-based cognitive therapy (MBCT) in improving adjustment and reducing health anxiety among patients with cancer. The statistical population consisted of patients attending counseling centers in Tehran during 2025. In accordance with the study objectives, 30 eligible participants were recruited through convenience sampling and subsequently assigned randomly to either the experimental group ($n = 15$) or the control group ($n = 15$). Participants in both groups completed the study measures at the pretest stage before implementation of the intervention and again at the posttest stage after completion of the treatment period. The experimental group participated in eight MBCT sessions, each lasting approximately two hours, whereas participants in the control group received no specific psychological intervention during the study period and continued to receive their routine services. Random allocation was used to reduce systematic differences between the groups and to increase the internal validity of the comparison. Participation was voluntary, and the participants were informed about the general purpose and procedures of the study before enrollment. Confidentiality of participants' information and anonymity of questionnaire responses were maintained throughout the research process. The principal outcome variables were adjustment and health anxiety, which were assessed using standardized self-report instruments administered under comparable conditions at both measurement occasions.

Data Collection Tools

Health anxiety was assessed using the Short Health Anxiety Inventory (SHAI), developed by Salkovskis et al. (2002) to measure cognitive, emotional, and behavioral characteristics associated with excessive concern about health and illness. The questionnaire consists of 18 items and assesses three major dimensions, including general health worry, perceived likelihood of becoming ill, and perceived negative consequences of illness. Each item contains four statements representing increasing levels of health-related concern, and respondents are required to select the statement that most accurately describes their thoughts or experiences. Items are scored from 0 to 3, with higher scores reflecting greater health anxiety. The item scores are summed to calculate both subscale scores and an overall health anxiety score, with total scores ranging from 0 to 54. Scores between 0 and 18 have generally been interpreted as indicating relatively low health anxiety, scores between 18 and 36 as reflecting moderate health anxiety, and scores above 36 as representing comparatively high levels of health anxiety. The instrument has demonstrated acceptable psychometric properties in previous research. The Persian version has also been examined in Iranian samples, with evidence supporting its content, face, and criterion validity, and previous research has reported Cronbach's alpha coefficients above .70 (Nargesi et al., 2017). Consistent with the principle that reliability represents the degree to which a measurement instrument produces stable and consistent results under comparable conditions (Sarmad et al., 2011), internal consistency was also assessed in the present study. Cronbach's alpha for the total Health Anxiety Inventory in the current sample was .81, indicating satisfactory internal consistency.

Adjustment was measured using the Bell Adjustment Inventory, originally developed by Bell and designed to assess different domains of personal and social adjustment. The instrument contains 160 dichotomously scored items answered in a yes/no format and assesses five major dimensions of adjustment: home adjustment, health adjustment, social adjustment, emotional adjustment, and occupational adjustment (Sharma, 2018). The adult form of the questionnaire was used in the present study because it provides separate measures of adjustment across these five domains and permits calculation of an overall adjustment score by summing the relevant component scores. According to the scoring procedure of the instrument, higher scores indicate greater maladjustment or poorer adjustment; therefore, lower scores represent more favorable levels of adjustment. The questionnaire was translated and adapted for use in Iran by Hosseini (2010). Evidence from Iranian research has supported the reliability of the instrument, with a test–retest reliability coefficient of .92 reported for the total score (Hosseini et al., 2017). Previous psychometric evaluations have also documented high reliability coefficients for the home, health, social, emotional, and occupational adjustment subscales as well as for the total scale, with reported coefficients of approximately .91, .81, .88, .91, .85, and .94, respectively (Ghanamparvar Jalali et al., 2010). In the present study, the internal consistency of the overall Bell Adjustment Inventory was evaluated using Cronbach's alpha, and a coefficient of .784 was obtained, indicating an acceptable level of reliability for assessing adjustment among the study participants.

Intervention

Participants assigned to the experimental group received mindfulness-based cognitive therapy in eight group sessions, each lasting approximately two hours. The intervention integrated mindfulness practices with cognitive therapeutic principles to increase participants' awareness of thoughts, emotions, and bodily sensations, reduce automatic and maladaptive reactions to distressing experiences, and promote a more accepting and nonjudgmental orientation toward cancer-related concerns. During the first session, participants were introduced to the objectives and principles of MBCT, the concept of automatic pilot, and the importance of directing attention intentionally to present-moment experiences; initial mindfulness exercises, including mindful awareness of routine activities and focused attention on bodily sensations, were practiced. The second session focused on identifying barriers to mindfulness, distinguishing direct experience from cognitive interpretation, and strengthening attention to bodily sensations and breathing through the body-scan exercise and brief mindfulness practices. In the third session, participants practiced mindful movement and sitting meditation and were encouraged to recognize the relationship between thoughts, emotions, physical sensations, and behavioral responses. The fourth session emphasized identifying automatic negative thoughts and health-related interpretations, particularly catastrophic cognitions concerning illness, physical symptoms, recurrence, or the consequences of cancer, while participants learned to observe such thoughts as mental events rather than objective facts. The fifth session focused on acceptance and willingness to remain in contact with unpleasant emotions and bodily sensations without avoidance, suppression, or excessive cognitive engagement, with particular emphasis on responding more adaptively to illness-related discomfort and anxiety. During the sixth session, cognitive principles were integrated more explicitly with mindfulness practices, and participants learned to recognize habitual maladaptive thinking patterns, disengage from rumination and worry, and adopt a decentered perspective

toward distressing thoughts. The seventh session concentrated on applying mindfulness skills to stressful daily situations, recognizing early signs of emotional distress, developing adaptive responses to health-related concerns, and strengthening self-regulation and adjustment in interpersonal, emotional, and everyday functioning. The eighth and final session reviewed the skills acquired throughout treatment, consolidated the use of formal and informal mindfulness exercises, identified potential obstacles to continued practice, and encouraged participants to develop an individualized plan for maintaining mindfulness practice after termination of the intervention. Participants were encouraged to practice the learned exercises between sessions and to apply mindful awareness to distressing thoughts, emotional reactions, bodily sensations, and health-related concerns encountered in everyday life. The control group did not participate in MBCT or receive any other structured psychological intervention during the corresponding study period.

Data Analysis

Data were analyzed using descriptive and inferential statistical procedures. Descriptive statistics, including frequency, percentage, mean, and standard deviation, were used to summarize demographic characteristics and participants' scores on adjustment and health anxiety at the pretest and posttest stages. Before conducting the main inferential analyses, the statistical assumptions required for parametric analysis were examined, including the normality of score distributions and the homogeneity of variances. To determine whether mindfulness-based cognitive therapy produced significant post-intervention differences in adjustment and health anxiety between the experimental and control groups while statistically controlling for baseline differences, analysis of covariance was used with pretest scores entered as covariates and posttest scores treated as dependent variables. Because the study included two related psychological outcomes, multivariate analysis of covariance could first be used to evaluate the overall intervention effect, followed by univariate analyses of covariance for adjustment and health anxiety. Statistical significance was evaluated at an alpha level of .05. In addition to significance testing, appropriate effect-size indices were considered to estimate the magnitude of the intervention effect and thereby provide information about the practical importance of the observed differences between the experimental and control groups.

Findings and Results

Descriptive statistics were first calculated to provide an overview of the participants' scores on adjustment and health anxiety at the pretest and posttest stages in the experimental and control groups. The means and standard deviations for both study variables are presented in Table 1.

Table 1. Means and Standard Deviations of Adjustment and Health Anxiety Scores at Pretest and Posttest

Variable	Group	Pretest M	Pretest SD	Posttest M	Posttest SD
Adjustment	Control	30.53	5.32	32.56	5.45
	Experimental	31.78	5.47	41.63	6.12
Health Anxiety	Control	44.86	6.23	41.35	6.65
	Experimental	42.14	6.23	32.69	4.89

As shown in Table 1, the mean adjustment score in the experimental group increased from 31.78 (SD = 5.47) at pretest to 41.63 (SD = 6.12) at posttest, whereas the corresponding mean in the control group

changed only from 30.53 (SD = 5.32) to 32.56 (SD = 5.45). Regarding health anxiety, the experimental group demonstrated a substantial decrease from a pretest mean of 42.14 (SD = 6.23) to a posttest mean of 32.69 (SD = 4.89). In comparison, the control group showed a smaller reduction from 44.86 (SD = 6.23) at pretest to 41.35 (SD = 6.65) at posttest. These descriptive findings indicate greater pretest-to-posttest changes in both outcome variables among participants who received mindfulness-based cognitive therapy than among those in the control group.

Prior to conducting the inferential analyses, the normality of the distributions was examined using the Kolmogorov–Smirnov test. The results indicated nonsignificant deviations from normality for adjustment at pretest ($Z = 0.166$, $p = .137$) and posttest ($Z = 0.148$, $p = .420$), as well as for health anxiety at pretest ($Z = 0.174$, $p = .138$) and posttest ($Z = 0.165$, $p = .410$). Because all significance values were greater than .05, the distributions of the study variables were considered approximately normal. Given the normality of the variables and the interval-level measurement of the outcome scores, analysis of covariance (ANCOVA) was used to compare posttest scores between the experimental and control groups while statistically controlling for the corresponding pretest scores.

Table 2. Analysis of Covariance for the Effects of Mindfulness-Based Cognitive Therapy on Adjustment and Health Anxiety

Outcome Variable	Source	Sum of Squares	df	Mean Square	F	p	Power
Adjustment	Pretest	223.963	1	223.963	0.658	.486	.186
	Group	898.783	1	898.783	11.355	.006	.568
	Error	189.238	27	7.008	—	—	—
Health Anxiety	Pretest	196.286	1	196.286	3.568	.536	.138
	Group	686.453	1	686.453	10.562	.005	.456
	Error	102.238	27	3.786	—	—	—

As presented in Table 2, after controlling for pretest scores, a statistically significant between-group effect was found for adjustment, $F(1, 27) = 11.355$, $p = .006$, indicating that the posttest adjustment scores differed significantly between the experimental and control groups. The reported statistical power for the group effect was .568. A statistically significant group effect was also observed for health anxiety after adjustment for baseline scores, $F(1, 27) = 10.562$, $p = .005$, with a reported statistical power of .456. The pattern of the descriptive and inferential findings therefore indicates that mindfulness-based cognitive therapy produced significant changes in adjustment and health anxiety among patients with cancer compared with the control condition.

Discussion and Conclusion

The present study investigated the effectiveness of mindfulness-based cognitive therapy (MBCT) on adjustment and health anxiety among patients with cancer. The findings indicated that, after controlling for pretest scores, there were statistically significant differences between the experimental and control groups in both adjustment and health anxiety. Specifically, the ANCOVA results showed a significant group effect for adjustment, $F(1, 27) = 11.355$, $p = .006$, and for health anxiety, $F(1, 27) = 10.562$, $p = .005$. Descriptive findings also demonstrated a substantial post-intervention change in the experimental group relative to the control group. Health anxiety decreased markedly among participants who received MBCT, whereas comparatively smaller changes were observed in the control group. Likewise, adjustment scores changed

more substantially in the experimental group than in the control group. Taken together, these findings support the effectiveness of MBCT in modifying important psychological outcomes among patients coping with cancer. However, because the Bell Adjustment Inventory was described in the Methods section as being scored such that higher scores represent poorer adjustment, the direction of scoring for this measure should be verified before the final manuscript is submitted; the inferential finding of a significant group difference remains unchanged, but interpretation of whether the numerical increase represents better or poorer adjustment depends on the scoring procedure actually used.

The finding regarding adjustment is broadly consistent with the theoretical foundations of mindfulness-based interventions and previous evidence concerning psychological adaptation to serious illness. Adjustment to cancer is a dynamic process that requires individuals to respond to changes in physical functioning, emotional experience, family roles, occupational responsibilities, and uncertainty about the future. Taleghani Faryad and Nikbakht Nasrabadi emphasized that adaptation among women with breast cancer involves an ongoing process through which individuals reinterpret their illness, reconstruct everyday life, and develop strategies for managing emotional and practical challenges (4). From this perspective, MBCT may promote adjustment because it helps patients approach difficult experiences with greater awareness and less automatic reactivity. Instead of becoming absorbed in catastrophic thoughts, avoidance, or repetitive worry, patients are trained to observe thoughts and emotions as transient events and to respond to them more flexibly. Such a shift may facilitate acceptance of cancer-related changes and enable patients to remain engaged in valued personal and social activities despite continuing medical stressors.

The present result can also be understood in light of the broader concept of psychological adjustment as the capacity to maintain functional equilibrium between individual needs and environmental demands. Research on adjustment has emphasized its relationship with psychological and social functioning and with the ability to maintain a sense of security in stressful circumstances (2). Cancer substantially challenges this equilibrium because patients are often required to tolerate uncertainty, reorganize daily routines, depend on others, and accommodate treatment-related limitations. MBCT may strengthen adjustment by increasing awareness of internal states while simultaneously reducing impulsive reactions to those states. Through repeated mindfulness practice, patients may become better able to distinguish between the immediate reality of an experience and the evaluative thoughts that accompany it. This distinction can reduce the tendency to respond to every distressing thought or bodily sensation as if it represents an urgent threat, thereby contributing to more adaptive functioning.

The finding regarding adjustment is also compatible with evidence from psychological interventions used with cancer populations. Mahmoudi and Karbalaee Bagheri reported that acceptance and commitment therapy improved hope and belief in a just world among patients with breast cancer, suggesting that interventions emphasizing acceptance, psychological flexibility, and a changed relationship with distressing internal experiences can produce beneficial psychological outcomes (10). Although acceptance and commitment therapy and MBCT are distinct approaches, both reduce excessive struggle with unpleasant internal experiences and encourage a more flexible response to thoughts and emotions. This common mechanism may partly explain why mindfulness-based cognitive therapy can contribute to improved adjustment in patients who must cope with difficult aspects of illness that cannot always be controlled or eliminated.

The current findings are additionally aligned with studies demonstrating the usefulness of cognitive and mindfulness-based interventions for psychological symptoms in cancer. Rafiei et al. found that mindfulness-based cognitive therapy and cognitive-behavioral therapy were effective in reducing anxiety, depression, and fatigue among patients with cancer (13). Similarly, Rezaeian Langroudi and Khazaei demonstrated that cognitive-behavioral therapy reduced depression, anxiety, and stress in women with breast cancer (11). These findings support the general proposition that structured interventions targeting maladaptive cognition, emotional responses, and behavioral patterns can improve psychological functioning in oncology populations. The present study extends this evidence by suggesting that MBCT may influence not only general emotional symptoms but also patients' broader adjustment to their condition.

The significant reduction in health anxiety observed in the experimental group represents another important finding. Health anxiety is particularly relevant in cancer because patients are exposed to genuine threats to their physical health while simultaneously experiencing treatment-related sensations that may be ambiguous and difficult to interpret. According to the conceptualization of hypochondriacal and health-anxious tendencies, individuals with elevated health anxiety are more likely to attend selectively to bodily sensations, interpret benign or uncertain physical experiences as evidence of serious disease, and remain preoccupied with illness-related possibilities (5). For a patient with cancer, normal fluctuations in fatigue, pain, gastrointestinal sensations, sleep, or physical strength may therefore become triggers for catastrophic interpretations regarding recurrence, progression, or treatment failure.

MBCT may reduce health anxiety by changing the way patients attend to and interpret these internal experiences. A central principle of MBCT is that thoughts are not necessarily facts and that individuals can learn to observe cognitions without automatically believing or acting upon them (12). This process, often described as decentering or cognitive distancing, may be particularly useful for cancer-related health anxiety. When a patient notices a bodily sensation and experiences the thought that the disease may have worsened, mindfulness practice can help create psychological distance between the sensation, the thought, and the behavioral response. Instead of immediately engaging in catastrophic interpretation, reassurance seeking, repeated checking, or rumination, the patient can acknowledge the experience and redirect attention to the present moment. Repeated practice of this process may gradually weaken the cycle through which bodily vigilance and catastrophic cognition maintain health anxiety.

The present finding is consistent with evidence indicating that cognitive-behavioral interventions can reduce health anxiety in medical populations. Tyrer et al. reported beneficial outcomes of cognitive-behavioral therapy for health anxiety among medical patients, supporting the idea that illness-related fears are responsive to structured psychological treatment (7). MBCT incorporates several processes that are complementary to traditional cognitive-behavioral techniques, particularly mindful attention, nonjudgmental observation, and reduced engagement with repetitive thought. Rather than challenging every threatening cognition directly, MBCT teaches patients to alter their relationship to cognition itself. This may be advantageous in cancer because some health-related concerns are realistic and cannot simply be disputed as irrational. Mindfulness allows patients to acknowledge legitimate uncertainty while reducing the escalation of that uncertainty into excessive anxiety.

The reduction in health anxiety is also compatible with findings reported by Safari et al., who identified health anxiety as an important psychological issue among individuals who had experienced serious medical

illness and demonstrated that health-related worry is associated with multiple psychological and illness-related factors (6). Although their study focused on recovered hospitalized older adults with COVID-19 rather than cancer patients, the underlying process is relevant: exposure to serious illness can increase vigilance toward bodily sensations and concern about future health. Cancer patients may experience this process repeatedly during treatment, follow-up examinations, or episodes of physical discomfort. MBCT may reduce this heightened vigilance by training patients to observe physical sensations in a more balanced manner without immediately attaching catastrophic meaning to them.

The findings can further be explained in relation to existential anxiety. Cancer frequently evokes concerns about mortality, disease progression, loss of control, and separation from loved ones. Scheffold et al. demonstrated that psychological vulnerability, including insecure attachment, is associated with depression and death anxiety among patients with advanced cancer (8). Such existential concerns can intensify health anxiety because every symptom may acquire symbolic significance as possible evidence of deterioration. Through mindfulness, patients are encouraged to remain in contact with present experience rather than becoming persistently absorbed in anticipated future threats. This present-centered orientation does not eliminate realistic concerns about prognosis but may decrease the tendency to repeatedly rehearse catastrophic future scenarios, thereby reducing anxiety.

The effect of MBCT on health anxiety may also be related to improvements in emotional regulation. Mirzahassemi and Kabiri Qomi found that group cognitive therapy improved cognitive emotion regulation and reduced anxiety among depressed individuals (14). Although that study involved a different clinical population, it supports the mechanism whereby changes in cognitive-emotional processing contribute to reductions in anxiety. Mindfulness strengthens awareness of emotional states before automatic reactions become dominant and can help individuals identify worry, fear, and catastrophic thinking as they arise. This increased metacognitive awareness may enable cancer patients to interrupt maladaptive emotional cycles and select more adaptive responses to health-related concerns.

The present findings are also supported indirectly by evidence from complementary psychological interventions for cancer. Moradi and Esfahani Asl reported that group laughter yoga was beneficial for anxiety, health-related outcomes, meaning in life, and pain severity among patients with cancer (15). Although laughter yoga and MBCT differ substantially in their procedures, both approaches may reduce excessive physiological and cognitive arousal and facilitate a less threat-focused orientation toward illness. Such findings reinforce the broader conclusion that psychological interventions can influence the subjective experience of cancer and can contribute meaningfully to emotional adaptation alongside medical treatment.

Physical symptoms and pain may be particularly important in understanding why MBCT influences both adjustment and health anxiety. Cancer patients frequently experience pain resulting from the disease itself or from diagnostic and treatment procedures. Pain management therefore constitutes a central component of cancer care (1). Nevertheless, pain is not only a physical sensation; it can also become a powerful psychological cue that activates fears concerning disease progression and mortality. Mindfulness practices teach patients to differentiate the sensory component of bodily discomfort from evaluative judgments such as "this means my condition is getting worse." By reducing this secondary layer of catastrophic interpretation, MBCT may help patients respond more adaptively to unavoidable physical symptoms and thereby reduce both health anxiety and maladaptive responses to illness.

The relationship between psychological distress and functional impairment provides another explanation for the observed results. Dendle et al. showed that psychological distress can be associated with impaired performance and functioning in demanding contexts (3). Although their study concerned medical students rather than cancer patients, the general principle is relevant: persistent psychological distress consumes attentional and emotional resources and may interfere with adaptive functioning. In cancer patients, excessive anxiety can limit concentration, sleep, social engagement, treatment decision-making, and everyday activities. By decreasing cognitive preoccupation with illness and strengthening present-moment attention, MBCT may release psychological resources that can be redirected toward coping, relationships, self-care, and meaningful activities.

Taken together, the findings suggest that MBCT may operate simultaneously through several mechanisms, including reduced rumination, decreased catastrophic interpretation of bodily sensations, improved emotional regulation, increased acceptance of uncontrollable experiences, enhanced present-moment awareness, and greater cognitive decentering. These mechanisms are consistent with the theoretical framework of MBCT (12) and with evidence supporting mindfulness-based, cognitive-behavioral, acceptance-based, and other psychosocial interventions among people with cancer (10, 11, 13, 15). The findings therefore contribute to the growing body of evidence suggesting that psychological care should be regarded as an important component of comprehensive cancer treatment. Attention to emotional and adaptive functioning is consistent with broader health-care perspectives emphasizing that effective care involves psychological well-being and coping capacities in addition to management of physical symptoms (9).

The findings of the present study should be interpreted in light of several limitations. First, the sample consisted of only 30 participants, with 15 individuals in each group, which limits statistical power and reduces the extent to which the findings can be generalized to the broader population of patients with cancer. Second, participants were recruited through convenience sampling from counseling centers in Tehran, and therefore individuals who seek psychological services may differ systematically from cancer patients who do not attend such centers. Third, the study used a quasi-experimental pretest–posttest design without a follow-up assessment, making it impossible to determine whether the observed improvements were maintained after completion of the intervention. Fourth, the study relied primarily on self-report questionnaires, which may be influenced by social desirability, response tendencies, current mood, or participants' interpretations of questionnaire items. Fifth, potentially important clinical variables such as cancer type, stage of disease, duration since diagnosis, treatment modality, medication use, pain severity, and comorbid psychological disorders were not examined as possible moderators of treatment response. Finally, the scoring direction of the adjustment instrument requires careful verification because the descriptive pattern reported in the study should be interpreted consistently with the scoring protocol of the Bell Adjustment Inventory.

Future studies are recommended to replicate the present investigation with larger and more heterogeneous samples recruited from multiple oncology centers and geographical regions in order to increase generalizability. Randomized controlled trials with larger sample sizes would provide stronger evidence regarding the causal effects of MBCT on adjustment and health anxiety. Researchers should also include follow-up assessments at three, six, or twelve months after treatment to determine the durability of therapeutic gains. Future investigations could compare MBCT directly with cognitive-behavioral therapy,

acceptance and commitment therapy, supportive counseling, or other evidence-based psychological interventions to determine their relative effectiveness. It would also be useful to investigate potential mediating mechanisms such as mindfulness, cognitive decentering, rumination, psychological flexibility, emotion regulation, intolerance of uncertainty, and fear of cancer recurrence. Further research should examine whether treatment effectiveness differs according to cancer type, stage of disease, gender, age, treatment status, pain severity, or time since diagnosis. Incorporating clinician-rated outcomes, behavioral indicators, qualitative interviews, and physiological measures alongside self-report questionnaires could also provide a more comprehensive understanding of treatment effects.

The findings have practical implications for psychologists, counselors, psycho-oncology specialists, nurses, and other professionals working with patients with cancer. MBCT can be considered as a complementary psychological intervention within oncology and supportive-care services, particularly for patients experiencing persistent health-related worry or difficulties adapting to the emotional and practical consequences of cancer. Screening for health anxiety and adjustment difficulties could be incorporated into routine psychosocial assessment so that patients requiring additional psychological support can be identified early. Where appropriately trained clinicians are available, structured MBCT groups may be integrated with routine medical treatment, rehabilitation, and survivorship programs. Clinicians should adapt mindfulness exercises to patients' physical capacities, fatigue levels, treatment schedules, and disease-related limitations and should emphasize that mindfulness is intended to improve the patient's relationship with distressing thoughts and sensations rather than replace necessary medical evaluation. Providing patients with structured home practice, brief mindfulness exercises that can be used during treatment sessions or medical follow-up, and strategies for managing recurrence-related fears may further increase the clinical usefulness and accessibility of the intervention.

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Authors' Contributions

All authors equally contributed to this study.

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 Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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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