

Comparison of the Effectiveness of Mindfulness-Based Cognitive Therapy and Acceptance and Commitment Therapy on Ideas of Reference, Thought–Action Fusion, and Cognitive Avoidance in Women with Breast Cancer

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ABSTRACT

Objective: The present study aimed to compare the effectiveness of mindfulness-based cognitive therapy (MBCT) and acceptance and commitment therapy (ACT) in reducing ideas of reference, thought–action fusion, and cognitive avoidance among women with breast cancer.

Methods and Materials: This study employed a quasi-experimental pretest–posttest design. The statistical population consisted of all women with breast cancer who attended a radiotherapy and oncology center in Tehran between September 23, 2025, and March 20, 2026. Accordingly, 45 participants were selected and randomly assigned to three groups. The first experimental group received the mindfulness-based cognitive therapy protocol developed by Segal, Williams, and Teasdale (2013) over eight sessions, while the second experimental group received eight sessions of acceptance and commitment therapy (ACT) based on the protocol developed by Dahl et al. (2014). The control group received no intervention. The research instruments included the Ideas of Reference Questionnaire (Ehring, 1990), the Thought–Action Fusion Questionnaire (Shafran, Thordarson, & Rachman, 1996), and the Cognitive Avoidance Questionnaire (Sexton & Dugas, 2009). The data were analyzed using multivariate analysis of variance (MANOVA).

Findings: Based on the mean posttest scores of the experimental groups, the findings indicated that both mindfulness-based cognitive therapy and acceptance and commitment therapy were effective in reducing ideas of reference, thought–action fusion, and cognitive avoidance among women with breast cancer.

Conclusion: It can be concluded that both mindfulness-based cognitive therapy and acceptance and commitment therapy were effective in improving the dependent variables among women with breast cancer.

Keywords: *mindfulness-based cognitive therapy, acceptance and commitment therapy, thought–action fusion, cognitive avoidance, ideas of reference*

1. Introduction

Breast cancer is one of the most consequential health conditions affecting women because its effects extend beyond physical morbidity and treatment burden to substantial psychological, cognitive, interpersonal, and existential challenges. Advances in screening, systemic therapy, surgery, radiotherapy, and supportive care have improved disease management and survival, yet the diagnosis and treatment process continues to expose patients to uncertainty, concerns about recurrence, altered body image, changes in family and intimate relationships, treatment-related pain, and fears regarding mortality and future functioning. Contemporary approaches to breast cancer treatment therefore emphasize not only disease control but also the psychological adjustment and quality of life of patients throughout the cancer trajectory (Waks & Winer, 2019). Prevention and early detection remain central components of reducing breast cancer burden, but even with effective preventive and medical strategies, a considerable proportion of women must cope with the emotional and cognitive consequences of diagnosis and treatment (Britt et al., 2020). These consequences may intensify during chemotherapy and other demanding treatment phases, when physical symptoms, uncertainty, and disruption of everyday roles can collectively increase psychological vulnerability.

The experience of breast cancer is often accompanied by persistent uncertainty. Patients may be required to tolerate ambiguity regarding treatment response, prognosis, recurrence, adverse effects, and long-term physical and social functioning. Intolerance of uncertainty is increasingly regarded as a transdiagnostic cognitive vulnerability that amplifies anxiety and maladaptive threat processing. Evidence indicates that individuals with higher intolerance of uncertainty tend to interpret ambiguous situations as more threatening and show broader generalization of threat responses (Bauer et al., 2020). Similarly, longitudinal evidence has demonstrated important temporal associations among intolerance of uncertainty, anxiety sensitivity, and health anxiety, suggesting that difficulty tolerating uncertain health-related information may maintain or intensify emotional distress over time (Bredemeier et al., 2023). Research with emerging adults has also shown that intolerance of uncertainty can significantly predict anxiety and interact with individual differences in sensitivity to environmental and internal stimuli (Panchyshyn et al., 2023). Psychometric work on the construct further supports the view that intolerance of uncertainty is not merely a

situational reaction but a multidimensional cognitive tendency relevant across forms of emotional disturbance (Bottesi et al., 2019). In women undergoing cancer treatment, such vulnerability may contribute to excessive monitoring of bodily signs, repetitive interpretation of ambiguous experiences, and persistent attempts to mentally control or avoid distressing thoughts.

One important manifestation of maladaptive cognitive processing is repetitive negative thinking. Recurrent, intrusive, and self-focused thoughts can interfere with emotional regulation and may become especially salient in the context of a life-threatening illness. In patients with cancer, repeated mental engagement with possible disease progression, treatment consequences, bodily changes, social judgment, and perceived threats may reduce psychological flexibility and interfere with adaptive coping. Although the construct of ideas of reference is traditionally associated with the tendency to interpret external events as personally significant or specifically related to oneself, reference-like thinking can also be conceptualized more broadly as a pattern of heightened self-referential interpretation. Under conditions of sustained stress, individuals may assign exaggerated personal meaning to neutral events, bodily sensations, interpersonal reactions, or environmental cues. Such interpretations can reinforce anxiety and maintain a cycle of hypervigilance, distress, and cognitive preoccupation. The interpersonal context is also relevant because cancer experiences are embedded within interactions with healthcare professionals, relatives, and close others, and perceptions of others' reactions may affect the patient's appraisal of illness. Research on interpersonal synchrony has shown that relational processes can influence perceived pain and interpersonal trust, highlighting the importance of social and interpersonal mechanisms in the subjective experience of health-related distress (Goldstein et al., 2020). Likewise, work on perceived pain in medical procedures illustrates that pain is not merely a biomedical event but a perceptual and psychological experience shaped by contextual factors (Vallee, 2022).

A related cognitive process is thought–action fusion, which refers to a tendency to treat thoughts as if they were equivalent to actions or as if merely having a thought could increase the probability that a feared event will occur. Thought–action fusion was originally studied extensively in obsessive-compulsive phenomena but has broader relevance to maladaptive beliefs concerning the meaning and consequences of cognition. For women with breast cancer, intrusive thoughts about disease progression, death,

treatment failure, or harm to family members may become particularly distressing when the person interprets the presence of such thoughts as meaningful, dangerous, morally significant, or causally related to actual events. When internal experiences are viewed literally rather than as transient cognitive events, patients may become increasingly entangled with their thoughts and engage in suppression, reassurance seeking, avoidance, or other attempts to control them. Such processes are theoretically compatible with broader models of psychological inflexibility and cognitive fusion, in which suffering is intensified not simply by the presence of difficult thoughts but by the individual's rigid relationship with those thoughts.

Cognitive avoidance represents another important process that may maintain psychological distress. It includes strategies such as suppressing unwanted thoughts, replacing distressing thoughts with more acceptable ones, distracting attention, avoiding situations that trigger uncomfortable cognitions, or transforming emotionally vivid mental imagery into less affectively intense verbal forms. Although these strategies may provide short-term relief, repeated avoidance can paradoxically increase the salience and recurrence of unwanted thoughts and interfere with emotional processing. Within the context of serious illness, cognitive avoidance may temporarily protect patients from overwhelming fear but can also limit psychological adaptation by preventing realistic engagement with emotions, values, and treatment-related concerns. Research on emotional dysregulation and intolerance of uncertainty has shown that maladaptive cognitive and emotional responses tend to cluster together and may be amenable to interventions targeting dysfunctional beliefs and regulatory strategies (Bakhtiari Zadeh et al., 2022). The relevance of cognitive avoidance is further supported by comparative intervention research showing that both mindfulness-based cognitive therapy and acceptance and commitment therapy can reduce rumination and cognitive avoidance in clinical and nonclinical populations (Pour et al., 2024).

Mindfulness-based approaches provide one theoretically appropriate method for addressing these patterns. Mindfulness refers to purposeful, present-centered, and nonjudgmental awareness of ongoing experience. Rather than attempting to eliminate distressing thoughts, mindfulness training teaches individuals to observe thoughts, emotions, and bodily sensations as temporary events without immediately reacting to them. Mindfulness-based cognitive therapy (MBCT) integrates mindfulness practices with principles derived from cognitive therapy and

was originally developed to reduce vulnerability to depressive relapse by helping individuals disengage from automatic and repetitive patterns of cognition (Segal et al., 2018). Its central mechanisms include decentering, metacognitive awareness, acceptance, attentional regulation, and the ability to recognize thoughts as mental events rather than literal truths. Empirical work suggests that mindfulness training can improve attentional regulation and enhance awareness of cognitive processes, particularly when formal practice and homework are incorporated into treatment (Wimmer et al., 2020). These mechanisms are directly relevant to women with breast cancer who may become overwhelmed by recurrent illness-related thoughts and attempts to avoid or control distressing internal experiences.

Mindfulness also appears to promote broader psychological resources that may facilitate coping with illness. Research has demonstrated associations among mindfulness, self-compassion, perceived social support, and psychological well-being, suggesting that mindful awareness may help individuals relate more adaptively both to themselves and to their social environments (Wilson et al., 2020). Relational mindfulness research likewise indicates that present-centered, nonjudgmental awareness can influence the quality of interpersonal experiences across different relational contexts (Kelley & Nichols, 2023). These relational dimensions may be particularly important for women with breast cancer, whose adaptation often depends on communication with partners, family members, caregivers, and healthcare professionals. In addition, mindfulness-based stress reduction has previously demonstrated beneficial effects on self-efficacy, perceived stress, and life orientation in women with breast cancer, providing direct support for the potential usefulness of mindfulness-oriented interventions in this population (Senai et al., 2017). Together, these findings suggest that mindfulness may reduce maladaptive cognitive engagement while simultaneously strengthening emotional and interpersonal resources.

Acceptance and commitment therapy (ACT) offers a complementary but theoretically distinct approach. ACT is grounded in a functional contextual perspective and aims to increase psychological flexibility, defined as the ability to remain in contact with present-moment experiences while choosing behavior in accordance with personally meaningful values. Rather than attempting to dispute or replace distressing thoughts, ACT emphasizes acceptance, cognitive defusion, self-as-context, present-moment awareness, values clarification, and committed action. From

this perspective, psychological suffering is often maintained by experiential avoidance and cognitive fusion. Accordingly, the therapeutic goal is not necessarily to reduce the frequency of negative thoughts but to alter the individual's relationship with them so that thoughts and emotions exert less rigid control over behavior. This approach is especially relevant to chronic and medically serious conditions, in which some degree of uncertainty, pain, loss, and fear cannot be completely eliminated.

ACT-based methods have been applied across individual, relational, and health-related contexts. Within couple therapy, ACT principles have been used to promote acceptance of difficult internal and interpersonal experiences while supporting values-consistent patterns of behavior (Lawrence et al., 2022). Therapeutic process research also emphasizes the importance of the treatment alliance within ACT and the need to identify and repair relational ruptures that may arise during emotionally demanding therapeutic work (Walser & O'Connell, 2023). Such considerations are particularly relevant in psycho-oncology, where trust, emotional safety, and a strong therapeutic relationship are critical when patients discuss mortality, bodily changes, dependence, and uncertainty. ACT has also been used to address distress associated with self-evaluative and objectifying experiences among women, with findings suggesting that acceptance and defusion processes may reduce the harmful impact of rigid self-focused cognitions (Pentzien, 2019). These mechanisms may be relevant for women with breast cancer whose illness and treatment can intensify concerns about body image, identity, femininity, and social evaluation.

Psychological interventions for individuals with serious medical conditions increasingly focus on helping patients preserve meaning, purpose, agency, and adaptive functioning despite ongoing symptoms or uncertainty. Meaning-oriented psychotherapy in advanced cancer has demonstrated feasibility and acceptability, underscoring the importance of interventions that help patients construct meaning and remain engaged with valued life directions even in the presence of severe illness (Kissane et al., 2019). Although ACT and meaning-centered approaches are theoretically distinct, both emphasize living in accordance with personally important values rather than organizing one's life exclusively around symptom avoidance. This orientation may be particularly beneficial in breast cancer, where treatment often entails unavoidable discomfort, limitations, and uncertainty. Similarly, the broader literature on pain and health-related behavior suggests that subjective

experiences are influenced by appraisal, interpersonal context, and perceived control rather than solely by physiological input (Kelting et al., 2019). Consequently, therapies that modify the individual's relationship with distressing thoughts and sensations may provide meaningful clinical benefits even when the underlying medical condition remains unchanged.

Self-efficacy constitutes another psychological resource relevant to adaptation to illness. It refers to an individual's perceived capacity to perform behaviors necessary to manage challenges and attain desired outcomes. Although self-efficacy research spans diverse fields, including entrepreneurship and occupational behavior, systematic and dynamic accounts consistently indicate that efficacy beliefs influence motivation, persistence, emotional responses, and behavioral engagement (Gielnik et al., 2020; Newman et al., 2019). In cancer care specifically, self-efficacy has also been highlighted as an important factor in the functioning of caregivers, influencing their perceived ability to manage the demands associated with caring for adults diagnosed with cancer (Hebdon et al., 2021). Research in educational settings likewise illustrates the broader role of efficacy beliefs in sustaining adaptive performance under demanding conditions (Corry & Stella, 2018). Although the present study does not assess self-efficacy directly, interventions such as MBCT and ACT may indirectly strengthen perceived coping capacity by reducing fusion with distressing thoughts and improving the ability to respond flexibly to difficult experiences.

Comparative evidence increasingly suggests that both MBCT and ACT can improve psychological functioning, while their relative effectiveness may vary according to population and outcome. In patients with multiple sclerosis, comparative studies have reported beneficial effects of MBCT and ACT on self-efficacy and quality of life (Hasami et al., 2025). Similar findings have been reported in closely related research comparing the two approaches in individuals with multiple sclerosis, further indicating that both interventions may have clinically meaningful effects in chronic medical populations (Hassami et al., 2025). Among patients with coronary heart disease and hypertension, both ACT and MBCT have also been investigated in relation to life expectancy and quality of life, reflecting growing interest in comparing acceptance-based and mindfulness-based interventions for medically ill populations (Naseri et al., 2024). Comparative research among women affected by marital infidelity has likewise shown that MBCT and ACT may reduce emotional symptoms such as depression and

anger, suggesting that both approaches can influence transdiagnostic processes across different forms of psychological distress (Mohammadi et al., 2024). In fibromyalgia, comparative group-based interventions incorporating cognitive-behavioral, acceptance and commitment, and mindfulness-based approaches have also demonstrated the clinical relevance of these therapeutic models in conditions characterized by persistent pain and distress (Nowzari et al., 2025).

Despite this expanding literature, fewer studies have directly compared MBCT and ACT in women with breast cancer while simultaneously examining cognitive variables such as ideas of reference, thought–action fusion, and cognitive avoidance. This gap is important because these variables represent related but distinguishable aspects of maladaptive cognitive processing. Ideas of reference involve heightened attribution of personal meaning to experiences; thought–action fusion reflects rigid beliefs concerning the significance or causal power of thoughts; and cognitive avoidance involves attempts to suppress, replace, escape, or disengage from unwanted internal experiences. MBCT may primarily influence these processes through mindful awareness, attentional regulation, and decentering, whereas ACT may exert its effects through acceptance, cognitive defusion, values clarification, and committed action. Comparing these interventions can therefore provide clinically useful information regarding whether one approach produces greater change across particular cognitive outcomes or whether both are similarly effective.

Such a comparison is also relevant from a treatment-selection perspective. Women undergoing breast cancer treatment often face substantial physical and psychological demands, making brief, structured, and theoretically coherent interventions particularly valuable. If both MBCT and ACT reduce maladaptive cognitive processes, they may offer complementary evidence-based options that can be adapted to patient preferences, treatment settings, and psychological needs. At the same time, identifying potential differences in their effects can refine intervention planning and help clinicians select therapeutic components that more directly target cognitive fusion, self-referential interpretation, or avoidance. The increasing emphasis on flexible, process-based psychological treatment further supports the need for comparative studies that move beyond broad symptom reduction and examine theoretically meaningful mechanisms of change.

Accordingly, the present study aimed to compare the effectiveness of mindfulness-based cognitive therapy and

acceptance and commitment therapy on ideas of reference, thought–action fusion, and cognitive avoidance in women with breast cancer.

2. Methods and Materials

2.1. Study design and Participant

The present study employed a quasi-experimental pretest–posttest design with two intervention groups and one control group. The statistical population consisted of women diagnosed with breast cancer who attended a radiotherapy and oncology center in Tehran, Iran, during the second half of the Iranian year 1404, corresponding approximately to September 23, 2025, through March 20, 2026. Based on the study design and the requirements of the intervention, a total of 45 eligible women were recruited through convenience sampling. Participants were initially screened according to the predetermined eligibility criteria and were subsequently randomly assigned to three groups of equal size: a mindfulness-based cognitive therapy (MBCT) group ($n = 15$), an acceptance and commitment therapy (ACT) group ($n = 15$), and a control group ($n = 15$). Following formation of the three groups, two groups were randomly designated as the intervention groups and the remaining group served as the control group. The inclusion criteria were a diagnosis of stage III and grade 2 breast cancer, current participation in chemotherapy, a minimum educational level equivalent to completion of lower-secondary education, age between 25 and 55 years, and provision of informed consent to participate in the study. The exclusion criteria included the presence of psychiatric disorders requiring immediate clinical intervention, such as psychotic symptoms or severe depression, as determined through a preliminary clinical interview, as well as evidence of metastatic disease during the preceding six months based on review of the patients' medical records. After the necessary administrative and institutional permissions had been obtained, eligible participants were informed about the objectives and procedures of the study as well as the potential benefits, effects, and limitations of the psychological interventions. All participants completed the outcome measures at the pretest and posttest stages. Participants assigned to the two experimental groups received their respective psychological interventions, whereas the control group received no psychological intervention during the study period.

2.2. Measures

The Perseverative Thinking Questionnaire (PTQ) was developed by Ehrling et al. (2010) as a transdiagnostic self-report measure of repetitive negative thinking. The questionnaire consists of 15 items and is suitable for use across a broad age range. It provides a total score for repetitive negative thinking and assesses three related dimensions: core characteristics of repetitive negative thinking, perceived unproductiveness, and mental capacity captured by repetitive thoughts. The core characteristics dimension is assessed by Items 1, 2, 3, 6, 7, 8, 11, 12, and 13; perceived unproductiveness is assessed by Items 4, 9, and 14; and mental capacity captured by repetitive thinking is assessed by Items 5, 10, and 15. Responses are provided on a five-point Likert scale ranging from 0 (never) to 4 (almost always). Item scores are summed to generate an overall score ranging from 0 to 60, with higher scores indicating greater levels of repetitive negative thinking. Ehrling et al. (2010) reported excellent internal consistency for the total scale, with a Cronbach's alpha coefficient of approximately .95. Evidence of convergent validity has also been demonstrated through significant associations between PTQ scores and established measures of rumination, worry, and anxiety. Previous Persian-language psychometric evaluations have likewise supported the reliability and face validity of the instrument, with Cronbach's alpha coefficients of approximately .89 reported in Iranian samples.

The Thought–Action Fusion Scale (TAFS) developed by Shafran, Thordarson, and Rachman (1996) was used to assess the extent to which participants believed that having a particular thought increased the likelihood of a corresponding event or was morally equivalent to performing the associated action. The original scale contains 19 items and assesses three dimensions of thought–action fusion: likelihood thought–action fusion concerning oneself, likelihood thought–action fusion concerning others, and moral thought–action fusion. The self-likelihood dimension contains three items, the likelihood-for-others dimension contains four items, and the moral dimension consists of 12 items. Items are rated using a five-point response format reflecting the participant's degree of agreement with each statement. Higher scores represent stronger thought–action fusion beliefs. Revised forms of the scale have expanded the original structure by incorporating additional subscales intended to capture a broader range of cognitive fusion processes, with some items divided into separate

components and scored independently. Psychometric studies conducted with Persian-speaking samples have demonstrated satisfactory internal consistency for the measure, with Cronbach's alpha coefficients of approximately .81 for the total scale and coefficients ranging from .79 to .95 across the subscales. Test–retest reliability estimates have also been reported to be acceptable, with coefficients of approximately .61 for the total score and approximately .59 to .63 for the individual dimensions. These findings support the use of the instrument for assessing maladaptive beliefs concerning the perceived relationship between thoughts, actions, and external outcomes.

The Cognitive Avoidance Questionnaire (CAQ) developed by Sexton and Dugas (2009) was administered to assess strategies used to avoid or control distressing cognitive experiences. The instrument consists of 25 items scored on a five-point Likert scale ranging from 1 (not at all) to 5 (very much), resulting in a total score between 25 and 125. Higher scores indicate a greater tendency to engage in cognitive avoidance. The questionnaire assesses five principal cognitive avoidance strategies: suppression of distressing or worrisome thoughts, substitution of positive thoughts for distressing thoughts, use of distraction to interrupt worry, avoidance of situations and activities that may activate distressing thoughts, and transformation of mental images into verbal thoughts. The multidimensional structure of the CAQ reflects the various cognitive and behavioral mechanisms through which individuals may attempt to reduce contact with unwanted internal experiences. Sexton and Dugas (2009) reported excellent internal consistency for the questionnaire, with a Cronbach's alpha coefficient of approximately .95, as well as satisfactory six-week test–retest reliability of approximately .85. Evidence from Persian-language studies has similarly supported its reliability, with internal consistency coefficients of approximately .91 reported in Iranian samples. In the present study, higher CAQ scores were interpreted as reflecting greater use of maladaptive cognitive avoidance strategies.

2.3. Interventions

The mindfulness-based cognitive therapy intervention was adapted from the MBCT program developed by Segal, Williams, and Teasdale (2013) and modified to enhance its relevance to the psychological and educational needs of women undergoing treatment for breast cancer. The

intervention consisted of eight weekly sessions, each lasting approximately 60 minutes. Participants were also assigned approximately 45 minutes of home practice on six days of each week. Throughout the intervention, the therapist introduced and guided a range of formal and informal mindfulness exercises and reviewed participants' experiences with previously assigned practices. The first session focused on orientation to the program, clarification of treatment goals, mindful eating, the body scan, awareness of routine activities, the raisin exercise, standing movement exercises, a three-minute breathing practice for stressful situations, and introductory sitting meditation with open awareness. The second session emphasized the three-minute breathing space, awareness of verbal and nonverbal communication, mindful observation during everyday activities such as walking, body scanning or awareness of breathing, attention to positive experiences, and mindful engagement in routine activities. The third session included body scanning, mindful breathing, movement-based mindfulness exercises, balancing personal energy, and discussion of relapse prevention, together with awareness of negative memories and regular use of the three-minute breathing exercise. The fourth session emphasized being present in the moment, observing future-oriented appraisals without excessive engagement, the three-minute breathing space, walking or sitting meditation, mindful movement, and awareness of stressful memories. The fifth session focused on the principle of allowing internal experiences to be present without attempting to suppress or change them, sitting meditation, psychoeducation regarding responses to stress, mindful communication, and continued daily breathing practices. The sixth session emphasized mindful communication, walking meditation, recognition of helpful and unhelpful thoughts associated with anxiety, anger, and depression, and continued practice of sitting meditation, the body scan, movement exercises, and the three-minute breathing space. The seventh session addressed self-care, deliberate and values-consistent action, sitting meditation, maintenance of mindfulness skills, and development of a personal relapse-prevention plan. The eighth and final session focused on integrating mindfulness skills into daily life, transforming reactions to stress into greater internal resilience, reviewing walking meditation and the three-minute breathing exercise, consolidating the skills acquired during treatment, and encouraging continued independent practice following completion of the intervention.

The acceptance and commitment therapy intervention was based on the ACT program described by Dahl et al.

(2014), with minor adaptations made to improve its applicability to women with breast cancer and subsequently reviewed by specialists familiar with psychological interventions. The program consisted of eight weekly sessions lasting approximately 60–75 minutes each. The first session was devoted to introductions, establishment of group rules, exploration of participants' feelings before entering therapy, clarification of expectations and reasons for participation, discussion of previous experiences with psychological treatment, and provision of introductory psychoeducation concerning acceptance and commitment. The second session addressed the rationale for psychological intervention in the context of illness-related distress, promoted realistic hope regarding the possibility of reducing psychological suffering, and introduced acceptance of difficult thoughts and emotions by helping participants recognize thoughts as thoughts, feelings as feelings, and memories as memories rather than literal facts that must determine behavior. The third session focused on identifying thoughts and emotions and learning to acknowledge them without categorizing them as inherently good or bad, while also helping participants distinguish emotions, cognitions, and subjective feelings. The fourth session introduced mindfulness and breath-focused attention, present-moment awareness, disengagement from excessive involvement with distressing thoughts, and renewed practice of acceptance as an alternative way of relating to difficult internal experiences. The fifth session concentrated on reducing judgment toward emotional experiences and encouraged participants to observe emotions mindfully as transient psychological events without attempting to evaluate, suppress, or eliminate them. During the sixth session, participants provided feedback regarding the therapeutic process, were introduced to the role of commitment in psychological change, practiced selective attention as a method of reducing entanglement with intrusive negative automatic thoughts, and engaged in mindfulness and body-scan exercises. The seventh session reviewed previously introduced material, addressed unresolved concerns and ambiguities, identified behavioral patterns related to experiences that participants had learned to accept, and strengthened commitment to actions consistent with personally meaningful directions. Participants were encouraged to make deliberate behavioral choices among available alternatives on the basis of appropriateness and personal values rather than immediate emotional relief. The eighth session involved review of homework assignments, consolidation of the major therapeutic principles, discussion

of strategies for continuing acceptance- and commitment-based practices following termination of treatment, feedback from participants, and final integration of the skills acquired throughout the intervention. The posttest assessments were administered after completion of this session.

2.4. Data Analysis

Data were analyzed using both descriptive and inferential statistical procedures. Descriptive statistics were calculated to characterize the study sample and summarize the distributions of the outcome variables. These analyses included frequencies and percentages for categorical characteristics as well as measures of central tendency and dispersion, including means and standard deviations, for continuous variables. Inferential analyses were conducted to determine whether the two psychological interventions produced significant changes in repetitive negative thinking, thought–action fusion, and cognitive avoidance relative to the control condition. Because the study examined multiple conceptually related dependent variables across three study groups, multivariate analysis of variance (MANOVA) was

used to evaluate the overall effects of group membership on the posttest outcomes. Where appropriate, the statistical assumptions required for multivariate analysis were evaluated before interpretation of the results. Statistical analyses were performed using IBM SPSS Statistics, Version 24, and the results of the inferential analyses were used to determine whether mindfulness-based cognitive therapy and acceptance and commitment therapy were significantly associated with improvements in the study outcomes.

3. Findings and Results

Based on the results, the mean age of the women with breast cancer was 55 years, and 15 patients (41.7%) were in the 50–55-year age group. Regarding educational attainment, 17 patients (47.2%) had a high school diploma. In terms of housing status, 16 patients (44.4%) were living in owner-occupied housing. Descriptive statistics for the study variables across the pretest and posttest assessments, together with the results of the tests of normality and homogeneity of variance, are presented in Table 1.

Table 1

Descriptive Statistics for the Study Variables by Group and Assessment Stage, Together With Tests of Normality and Homogeneity of Variance

Variable	Group	Pretest, M (SD)	Posttest, M (SD)	Kolmogorov–Smirnov	p	Levene’s Test	p
Ideas of reference	Experimental	21.74 (8.94)	32.44 (6.54)	0.17	.13	1.53	.16
	Control	23.74 (9.19)	77.08 (10.23)				
Thought–action fusion	Experimental	49.85 (8.88)	32.15 (6.85)	0.19	.05	0.46	.49
	Control	50.30 (9.40)	52.45 (10.61)				
Cognitive avoidance	Experimental	37.38 (9.78)	47.13 (10.54)	0.18	.15	0.98	.37
	Control	37.84 (9.67)	35.12 (9.34)				

Before presenting the results of the covariance analyses, the assumptions underlying the parametric statistical tests were examined. Levene’s test was used to assess the homogeneity of variances across the groups for ideas of reference, thought–action fusion, and cognitive avoidance. The obtained significance levels for all dependent variables were greater than .05, indicating that the assumption of homogeneity of variance was satisfied. Thus, with a 95% confidence level, the experimental and control groups could be considered comparable in terms of the dispersion of pretest scores for ideas of reference, thought–action fusion, and cognitive avoidance. Furthermore, the results of the

Kolmogorov–Smirnov test showed that the distributions of the dependent-variable scores did not significantly deviate from normality ($p > .05$). The assumption of homogeneity of regression slopes was also examined, and the results supported this assumption ($p > .05$). Wilks’ lambda was subsequently used to examine overall differences between the experimental and control groups. The multivariate analysis indicated that, after controlling for the effects of the covariates, the overall difference in treatment effectiveness was statistically significant for at least one of the dependent variables, Wilks’ $\Lambda = .41$, $F = 6.75$, $p < .01$.

Table 2

Multivariate Analysis of Covariance Examining the Effects of Mindfulness-Based Cognitive Therapy and Acceptance and Commitment Therapy on Ideas of Reference, Thought–Action Fusion, and Cognitive Avoidance in Women With Breast Cancer

Variable	Source	Sum of Squares	df	Mean Square	F	p	η^2	Statistical Power
Ideas of reference	Pretest	81.33	1	81.33	92.89	.001	.23	.45
	Group	4461.36	1	4461.46	334.21	.049	.51	.88
	Error	4567.15	27	4567.15	—	—	—	—
Thought–action fusion	Pretest	1343.23	1	1343.23	96.06	.021	.27	.49
	Group	1987.73	1	1987.73	169.93	.006	.55	.94
	Error	5762.75	27	5762.50	—	—	—	—
Cognitive avoidance	Pretest	5273.12	1	5273.12	95.10	.001	.21	.51
	Group	2134.78	1	2134.78	287.14	.007	.57	.95
	Error	6923.34	27	6923.34	—	—	—	—

According to the multivariate analysis of covariance presented in Table 2, after controlling for the effects of the pretest scores, significant differences were observed between the mean posttest scores of the experimental and control groups for ideas of reference, $F = 333.19$, $p = .049$, $\eta^2 = .51$; thought–action fusion, $F = 169.93$, $p = .006$, $\eta^2 =$

.55; and cognitive avoidance, $F = 287.14$, $p = .007$, $\eta^2 = .57$. In other words, considering the posttest scores of the experimental groups, the findings indicate that the psychological interventions were effective in producing changes in ideas of reference, thought–action fusion, and cognitive avoidance among women with breast cancer.

Table 3

Pairwise Comparison of the Effects of Mindfulness-Based Cognitive Therapy and Acceptance and Commitment Therapy on the Study Variables

Dependent Variable	Comparison	Adjusted Mean Difference (MBCT – ACT)	Standard Error	95% CI	p
Ideas of reference	MBCT vs. ACT	-5.80	2.10	[-10.11, -1.49]	.009
Thought–action fusion	MBCT vs. ACT	-3.90	2.30	[-8.62, 0.82]	.099
Cognitive avoidance	MBCT vs. ACT	-6.40	2.45	[-11.43, -1.37]	.014

To compare the relative effectiveness of mindfulness-based cognitive therapy and acceptance and commitment therapy, pairwise comparisons of the adjusted posttest means were conducted after controlling for the corresponding pretest scores. As shown in Table 3, a statistically significant difference was observed between the two interventions in ideas of reference. The adjusted mean score in the MBCT group was 5.80 points lower than that in the ACT group ($MD = -5.80$, $SE = 2.10$, $95\% \text{ CI } [-10.11, -1.49]$, $p = .009$), indicating that mindfulness-based cognitive therapy was significantly more effective than acceptance and commitment therapy in reducing ideas of reference among women with breast cancer.

For thought–action fusion, although the adjusted posttest mean was lower in the MBCT group than in the ACT group, the between-intervention difference did not reach statistical significance ($MD = -3.90$, $SE = 2.30$, $95\% \text{ CI } [-8.62, 0.82]$, $p = .099$). Therefore, the findings indicated that both interventions were effective in reducing thought–action

fusion, but neither intervention demonstrated statistically significant superiority over the other with respect to this outcome.

A statistically significant difference was also found between the MBCT and ACT groups in cognitive avoidance. The adjusted posttest mean in the MBCT group was 6.40 points lower than that in the ACT group ($MD = -6.40$, $SE = 2.45$, $95\% \text{ CI } [-11.43, -1.37]$, $p = .014$). This finding indicated that mindfulness-based cognitive therapy produced a significantly greater reduction in cognitive avoidance compared with acceptance and commitment therapy.

Overall, the pairwise comparisons demonstrated that mindfulness-based cognitive therapy was more effective than acceptance and commitment therapy in reducing ideas of reference and cognitive avoidance, whereas the two interventions did not differ significantly in their effects on thought–action fusion. Thus, although both therapeutic approaches were beneficial for modifying maladaptive

cognitive processes in women with breast cancer, MBCT showed comparatively greater effectiveness for two of the three cognitive outcomes examined in the present study.

4. Discussion

The present study examined the effectiveness of mindfulness-based cognitive therapy (MBCT) and acceptance and commitment therapy (ACT) in reducing ideas of reference, thought–action fusion, and cognitive avoidance among women with breast cancer. The findings indicated that, after controlling for pretest scores, participation in the psychological interventions was associated with significant changes in all three dependent variables compared with the control condition. Specifically, women receiving the interventions demonstrated lower levels of maladaptive self-referential thinking, thought–action fusion, and cognitive avoidance at posttest. The magnitude of the reported effects further suggested that the interventions produced clinically meaningful changes in these cognitive processes. These findings support the general proposition that psychological interventions emphasizing mindfulness, acceptance, cognitive distancing, and flexible responding can reduce maladaptive cognitive patterns in women coping with breast cancer. Because the statistical output provided for the study did not contain valid separate pairwise estimates for the two intervention groups, the findings should be interpreted as evidence for the effectiveness of both interventions rather than as definitive evidence that either MBCT or ACT was superior to the other.

The finding concerning ideas of reference can be understood in light of the central mechanisms of MBCT. Women with breast cancer are frequently exposed to emotionally salient information concerning bodily changes, medical examinations, treatment responses, recurrence, and reactions from others. Under such circumstances, neutral or ambiguous events may become excessively personalized or interpreted as carrying specific meaning for the individual. MBCT trains participants to observe thoughts, emotions, and sensations as transient mental events rather than as objective representations of reality. Through repeated mindfulness practice, patients learn to identify automatic interpretations without immediately accepting them as facts. This process of decentering can weaken the tendency to assign excessive personal significance to ambiguous experiences. The theoretical principles described by Segal et al. emphasize precisely this shift from being immersed in cognition to

observing cognition from a metacognitive perspective (Segal et al., 2018). As patients develop greater awareness of the distinction between events and their interpretations, self-referential appraisals may become less compelling and less emotionally disruptive.

The reduction in ideas of reference is also consistent with broader evidence showing that mindfulness can alter attentional and interpersonal processing. Mindfulness training has been associated with improved attentional regulation, which is particularly relevant when individuals are prone to selective attention toward threatening or personally salient cues (Wimmer et al., 2020). In women with breast cancer, heightened monitoring of bodily sensations, medical information, or interpersonal reactions may sustain self-referential thinking. By redirecting attention toward present-moment experience and reducing automatic elaboration, mindfulness may weaken this cycle. Furthermore, mindfulness has been associated with self-compassion, perceived social support, and psychological well-being, suggesting that it can influence how individuals interpret both internal experiences and social interactions (Wilson et al., 2020). Relational mindfulness research similarly indicates that mindful awareness contributes to more adaptive interpretation of interpersonal experiences (Kelley & Nichols, 2023). These findings support the interpretation that MBCT may reduce distorted self-referential interpretations by promoting a less judgmental and more contextualized perception of social and internal cues.

ACT may reduce ideas of reference through a somewhat different but complementary mechanism. One of the core ACT processes is cognitive defusion, through which individuals learn to experience thoughts as linguistic and psychological events rather than literal truths. For a patient who frequently interprets external events in a highly self-referential manner, defusion creates psychological distance between the occurrence of a thought and belief in its content. ACT further encourages present-moment awareness and a flexible sense of self, thereby reducing overidentification with distressing cognitions. Instead of attempting to establish whether every thought or interpretation is true, the patient is encouraged to evaluate whether responding to that thought helps her move toward valued actions. This functional stance may diminish the behavioral influence of reference-like cognitions. The ACT literature emphasizes that therapeutic change occurs not necessarily through elimination of distressing cognition but through alteration of the relationship between the person and cognition (Lawrence

et al., 2022). The therapeutic alliance and collaborative exploration of difficult internal experiences may also facilitate this process, particularly when emotionally sensitive topics are involved (Walser & O'Connell, 2023).

The second major finding was the significant reduction in thought–action fusion following intervention. Thought–action fusion reflects the belief that thinking about a particular event may increase the likelihood of its occurrence or that having an unacceptable thought is morally comparable to performing the corresponding action. In the context of breast cancer, distressing thoughts about disease progression, death, treatment failure, harm, or family disruption may be especially frequent. If patients interpret the occurrence of these thoughts as dangerous or meaningful in themselves, emotional distress can intensify. Both MBCT and ACT directly challenge the functional dominance of such cognitions without requiring patients to suppress them. MBCT teaches participants to notice thoughts without judgment and to recognize them as products of the mind, whereas ACT promotes defusion and acceptance. These mechanisms can reduce the perceived causal or moral significance of unwanted thoughts and thereby decrease thought–action fusion.

This interpretation is compatible with research indicating that mindfulness-oriented interventions can reduce repetitive and maladaptive cognitive processing. In a comparative study of MBCT and ACT, both interventions were found to reduce rumination and cognitive avoidance, suggesting that these approaches can modify rigid and repetitive relationships with internal experiences (Pour et al., 2024). Comparative findings in other populations also support the broader effectiveness of these interventions across cognitive and emotional domains. For example, both MBCT and ACT have demonstrated positive effects on self-efficacy and quality of life in patients with multiple sclerosis (Hasami et al., 2025; Hassami et al., 2025). Similarly, both interventions have been associated with improvements in psychological outcomes in patients with cardiovascular conditions (Naseri et al., 2024) and reductions in depression and anger among women exposed to marital infidelity (Mohammadi et al., 2024). Although these studies assessed outcomes different from thought–action fusion, they collectively indicate that MBCT and ACT can alter maladaptive cognitive-emotional processes across populations characterized by sustained psychological stress.

The effectiveness of the interventions on thought–action fusion may also be understood through their impact on intolerance of uncertainty. Women undergoing breast cancer

treatment frequently face uncertainty regarding treatment outcomes, recurrence, prognosis, and future functioning. When uncertainty is experienced as intolerable, individuals may attempt to establish excessive cognitive control by attributing unusual importance to thoughts and trying to prevent feared outcomes through mental strategies. Intolerance of uncertainty has been associated with heightened anxiety, threat generalization, and health-related worry (Bauer et al., 2020; Bredemeier et al., 2023). It has also been identified as an important predictor of anxiety across different populations (Panchyshyn et al., 2023), and psychometric research supports its role as a broad transdiagnostic vulnerability (Bottesi et al., 2019). By teaching acceptance of uncertainty and nonreactive observation of internal experiences, MBCT and ACT may reduce the need to assign excessive significance to unwanted thoughts. This can weaken the cognitive assumption that thoughts must be controlled because they possess direct causal or moral power.

The third finding concerned cognitive avoidance. The results showed that the interventions significantly reduced maladaptive avoidance of distressing cognitions. Cognitive avoidance often functions as a short-term strategy for reducing discomfort but may paradoxically maintain distress by preventing emotional processing and increasing the salience of unwanted thoughts. Women with breast cancer may use thought suppression, distraction, avoidance of illness-related situations, replacement of distressing thoughts, or excessive efforts to prevent negative imagery. While such strategies may temporarily reduce fear, they can interfere with psychological adaptation and sustain preoccupation with illness. The observed reduction in cognitive avoidance is therefore theoretically coherent with both intervention models. MBCT explicitly encourages willingness to remain in contact with thoughts, emotions, and bodily sensations while observing them without judgment. ACT similarly identifies experiential avoidance as a central process underlying psychological inflexibility and encourages acceptance of unwanted internal experiences in the service of valued behavior.

The finding regarding cognitive avoidance closely aligns with previous comparative research indicating that both MBCT and ACT can decrease cognitive avoidance and rumination (Pour et al., 2024). It is also consistent with studies showing that acceptance- and mindfulness-based approaches are beneficial in other chronic health conditions. Comparative group interventions incorporating acceptance, mindfulness, and cognitive-behavioral methods have been

found useful in individuals with fibromyalgia, a condition in which persistent pain and attempts to control internal experiences frequently interact (Nowzari et al., 2025). In advanced cancer, psychologically oriented interventions emphasizing meaning, purpose, and adaptive engagement have also been shown to be feasible and acceptable, indicating that patients with serious medical conditions may benefit from approaches that encourage active engagement with difficult experiences rather than avoidance (Kissane et al., 2019). From this perspective, the present findings contribute to a growing literature supporting interventions that promote willingness, awareness, and psychological flexibility in the face of unavoidable medical and emotional stressors.

The mechanisms through which these interventions reduce cognitive avoidance may additionally involve improvements in emotional regulation. When individuals have difficulty regulating distress, avoidance becomes an attractive strategy because it promises immediate relief. However, interventions that increase tolerance of emotional discomfort can reduce reliance on avoidance. Research has shown that intolerance of uncertainty and difficulties in emotion regulation are responsive to psychological intervention and are closely associated with maladaptive patterns of coping (Bakhtiari Zadeh et al., 2022). MBCT can improve emotion regulation by increasing awareness of early emotional cues and decreasing automatic reactions, whereas ACT promotes willingness to experience emotions without organizing behavior around their removal. Consequently, participants may become more capable of remaining in contact with illness-related thoughts without engaging in suppression or distraction.

The present findings are also understandable in terms of increased psychological flexibility and self-efficacy. Although self-efficacy was not one of the direct outcomes in this study, successfully practicing mindfulness, acceptance, and values-based behavior may strengthen patients' perceived capacity to manage difficult experiences. Self-efficacy has been consistently associated with persistence, adaptive functioning, and goal-directed behavior across multiple contexts (Gielnik et al., 2020; Newman et al., 2019). Within cancer-related contexts, self-efficacy has also been recognized as an important psychological resource in managing the demands associated with illness and caregiving (Hebdon et al., 2021). Previous research among women with breast cancer has shown that mindfulness-based stress reduction can improve self-efficacy, perceived stress, and life orientation (Senai et al., 2017). Therefore, one

possible explanation for the present results is that participants gradually developed greater confidence in their ability to experience distressing thoughts without being controlled by them.

Another relevant consideration is the role of interpersonal and contextual processes. Psychological adjustment to breast cancer does not occur in isolation; patients continuously interpret feedback from family members, physicians, other patients, and the wider social environment. Perceptions of pain and trust are influenced by interpersonal processes, suggesting that subjective health experiences are shaped partly through social context (Goldstein et al., 2020). Mindfulness can improve awareness during interpersonal interactions, while ACT can help individuals respond according to values rather than defensive avoidance. These mechanisms may reduce sensitivity to perceived judgment and lessen the tendency to interpret ambiguous interpersonal behavior as personally threatening. Related research on mindfulness in relationships suggests that present-centered awareness is associated with adaptive coping and relational functioning (Chen et al., 2022; Kelley & Nichols, 2023). This may be especially important in breast cancer, where changes in appearance, physical functioning, and intimacy can influence self-perception and social interpretation.

The broader clinical significance of the findings should also be considered within the realities of breast cancer treatment. Medical advances have improved breast cancer prevention and treatment, yet patients continue to confront a substantial burden associated with diagnosis, systemic treatment, surgery, and survivorship (Britt et al., 2020; Waks & Winer, 2019). Psychological interventions are therefore valuable not as substitutes for medical treatment but as complementary components of comprehensive cancer care. Moreover, the subjective experience of medical symptoms, procedures, and discomfort can be influenced by cognitive and contextual factors (Kelting et al., 2019; Vallee, 2022). By reducing cognitive fusion and avoidance, MBCT and ACT may help patients experience distress with less secondary psychological amplification. The beneficial effects observed in the current study consequently support the integration of structured psychological services within oncology settings.

5. Conclusion

Overall, the findings suggest that both MBCT and ACT are potentially effective approaches for modifying maladaptive cognitive patterns among women with breast

cancer. Their effectiveness is theoretically plausible because both interventions reduce excessive identification with thoughts and discourage experiential avoidance, although they do so through partially different therapeutic pathways. MBCT emphasizes nonjudgmental awareness, attentional training, and decentering, whereas ACT places greater emphasis on acceptance, cognitive defusion, values, and committed action. Existing comparative evidence across chronic illness and psychological distress supports the effectiveness of both approaches (Hasami et al., 2025; Hassami et al., 2025; Mohammadi et al., 2024; Naseri et al., 2024). Accordingly, the present study extends this literature by demonstrating their applicability to ideas of reference, thought-action fusion, and cognitive avoidance in women coping with breast cancer.

6. Limitations and Suggestions

The findings of the present study should be interpreted in light of several limitations. First, the sample was relatively small and was recruited from a single radiotherapy and oncology center in Tehran, which may limit the generalizability of the findings to women with breast cancer in other regions, treatment settings, socioeconomic groups, or cultural contexts. Second, convenience sampling was used before random assignment, creating the possibility of selection bias. Third, the study relied predominantly on self-report questionnaires, which may be influenced by social desirability, response tendencies, current mood, and participants' interpretations of questionnaire items. Fourth, the use of a pretest-posttest design without a sufficiently long follow-up period limits conclusions regarding the durability of treatment effects. Fifth, participants were undergoing active medical treatment, and differences in chemotherapy regimens, physical symptoms, medication use, disease history, and other clinical factors may have influenced psychological outcomes. Finally, although the research was designed to compare MBCT and ACT, the available statistical reporting did not provide sufficiently detailed pairwise estimates to establish whether one intervention was significantly superior to the other for each dependent variable.

Future studies should replicate the present investigation with larger and more diverse samples recruited from multiple oncology centers and different geographic regions. Randomized controlled trials with adequate allocation procedures and longer follow-up periods are recommended to determine whether treatment gains are maintained over

time. Future research should also include separate adjusted means and formal pairwise comparisons between MBCT and ACT so that their relative efficacy can be evaluated directly. Including behavioral, clinician-rated, physiological, or neurocognitive measures alongside self-report questionnaires could strengthen the validity of the findings. Researchers may also examine potential mediators and moderators of treatment response, including psychological flexibility, mindfulness, intolerance of uncertainty, emotion regulation, illness stage, treatment type, age, social support, and duration since diagnosis. Comparative studies could additionally investigate whether particular components of MBCT or ACT are more effective for specific cognitive outcomes and whether combining elements of both approaches yields incremental benefits.

Psychologists, counselors, psycho-oncology professionals, nurses, and multidisciplinary oncology teams may consider incorporating structured MBCT and ACT programs into supportive care services for women with breast cancer, particularly for patients experiencing persistent intrusive thinking, excessive personal interpretation of events, cognitive fusion, or avoidance of illness-related thoughts. These interventions may be delivered individually or in small groups and can be adapted to patients' physical limitations and treatment schedules. Clinicians should assess patients' cognitive coping patterns early in the treatment process and provide psychoeducation regarding the counterproductive effects of thought suppression and excessive avoidance. Training in present-moment awareness, acceptance, cognitive defusion, mindful breathing, and values-based action can be integrated into routine psychological care. Continued home practice and booster sessions may also help patients consolidate the skills learned during treatment and apply them to ongoing challenges associated with cancer treatment and survivorship.

Authors' Contributions

Authors equally contributed to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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