Mental Health and Lifestyle Journal

Year 2026
Volume 4
Issue 5

Comparing the Effectiveness of Acceptance and Commitment Therapy and Positive Psychotherapy on Perceived Stress and Health Anxiety in Women with Breast Cancer

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Article type:
Original Research

Article history:
Received 14 January 2026
Revised 10 April 2026
Accepted 24 May 2026
Initial Publish 23 May 2026
Published online 01 September 2026

ABSTRACT

This study aimed to compare the effectiveness of Acceptance and Commitment Therapy and Positive Psychotherapy on perceived stress and health anxiety in women with breast cancer. This quasi-experimental study employed a pre-test, post-test, and follow-up design with two intervention groups and one control group. The statistical population consisted of women with breast cancer who referred to medical centers in Tehran, Iran, in 2023. A purposive sample of 45 eligible women was selected and randomly assigned to three groups: Acceptance and Commitment Therapy, Positive Psychotherapy, and control. Each intervention was delivered in ten 90-minute sessions. The Acceptance and Commitment Therapy protocol was based on Hayes et al.'s model, and the Positive Psychotherapy protocol was based on Seligman's therapeutic approach. Data were collected using the Perceived Stress Scale and the Health Anxiety Inventory. Repeated measures analysis of variance and Bonferroni post hoc tests were used to analyze the data. Both Acceptance and Commitment Therapy and Positive Psychotherapy significantly reduced perceived stress and health anxiety in women with breast cancer at post-test and follow-up compared with the control group. The reductions were maintained at follow-up, indicating the stability of treatment effects. Comparative findings suggested that Acceptance and Commitment Therapy produced stronger reductions in perceived stress and health anxiety than Positive Psychotherapy. Acceptance and Commitment Therapy and Positive Psychotherapy are both effective psychological interventions for reducing perceived stress and health anxiety in women with breast cancer. However, Acceptance and Commitment Therapy may have a greater effect due to its emphasis on psychological flexibility, acceptance of distressing internal experiences, mindfulness, and value-based committed action. These findings support the integration of structured psychological interventions, particularly Acceptance and Commitment Therapy, into supportive care programs for women with breast cancer.

Keywords: Acceptance and Commitment Therapy; Positive Psychotherapy; Perceived Stress; Health Anxiety; Breast Cancer; Women.

How to cite this article:
Karimpoorian, H., Kordmirza Nikoozadeh, E., & Rafiepoor, A. (2026). Comparing the Effectiveness of Acceptance and Commitment Therapy and Positive Psychotherapy on Perceived Stress and Health Anxiety in Women with Breast Cancer. *Mental Health and Lifestyle Journal, 4*(5), 1-17. https://doi.org/10.61838/mhlj.226

Introduction

Breast cancer is one of the most serious and widespread health challenges affecting women worldwide, not only because of its high prevalence and mortality burden, but also because of its deep psychological, emotional, social, and existential consequences. According to the World Health Organization, breast cancer

remains one of the most commonly diagnosed cancers among women and continues to impose a major global burden on health systems, families, and patients' quality of life (1). Although advances in screening, surgery, chemotherapy, radiotherapy, hormonal therapy, immunotherapy, and targeted treatments have improved survival rates, medical progress has not eliminated the psychological suffering associated with diagnosis, treatment, and survivorship. For many women, breast cancer is experienced not merely as a biological disease but as a life-disrupting condition that threatens bodily integrity, femininity, family roles, social functioning, occupational participation, and the sense of continuity in life. Therefore, contemporary psycho-oncology increasingly emphasizes that effective cancer care should move beyond tumor-centered treatment and include structured psychological interventions aimed at reducing distress, improving coping, and strengthening adaptive functioning.

Women with breast cancer are exposed to multiple stressors from the moment of diagnosis. The initial shock of receiving a cancer diagnosis, uncertainty about disease stage and prognosis, fear of treatment complications, changes in physical appearance, pain, fatigue, sexual concerns, financial pressures, and repeated medical examinations can create a persistent state of emotional vulnerability. A systematic review of psychological distress management in women with breast cancer has shown that distress is a major clinical concern across the illness trajectory and that psychological interventions have become increasingly important in breast cancer care during the past decade (2). These findings indicate that distress among women with breast cancer is not a temporary emotional reaction but a multidimensional psychological response shaped by medical uncertainty, perceived threat, treatment burden, and disruptions in daily life. As survival rates improve, more women live for longer periods with the psychological consequences of breast cancer, which makes the management of stress and anxiety a central component of comprehensive supportive care.

Among the psychological problems experienced by women with breast cancer, perceived stress is particularly important. Perceived stress refers to the extent to which individuals appraise life circumstances as unpredictable, uncontrollable, and overwhelming. In the context of breast cancer, perceived stress is not limited to the objective severity of the disease; rather, it reflects how the patient interprets and evaluates the demands created by illness and treatment. A woman may experience stress when she feels unable to control treatment outcomes, manage family responsibilities, tolerate physical symptoms, or cope with uncertainty about recurrence. The psychometric literature on the Perceived Stress Scale supports its usefulness as a global measure of stress appraisal and shows that perceived stress is a clinically meaningful construct across health-related and nursing populations (3). Because breast cancer creates ongoing demands that can exceed the patient's perceived coping capacity, perceived stress can become a persistent psychological burden requiring direct therapeutic attention.

Empirical evidence shows that women with breast cancer often report elevated perceived stress, anxiety, and depressive symptoms. In a case-control study of treatment-naïve women with breast cancer, perceived stress, anxiety, and depression were found to be clinically relevant psychological concerns, suggesting that distress may be present even before intensive treatment begins (4). This finding is important because it shows that psychological vulnerability is not only a consequence of advanced treatment or long-term survivorship but may emerge early in the cancer experience. High perceived stress can influence sleep, fatigue, pain sensitivity, treatment adherence, immune and endocrine functioning, interpersonal

relationships, and overall quality of life. It may also intensify catastrophic thinking and increase the patient's sensitivity to bodily sensations. Therefore, reducing perceived stress is not only important for emotional well-being but also for broader adaptation to breast cancer and its treatment process.

Health anxiety is another significant psychological concern among women with breast cancer. Health anxiety refers to excessive fear, preoccupation, or worry about having, developing, or experiencing worsening illness. In cancer patients, some level of concern about health is realistic and even adaptive because patients must remain attentive to symptoms, treatment effects, and follow-up recommendations. However, when health-related concerns become excessive, persistent, and disproportionate, they may lead to maladaptive patterns such as repeated reassurance seeking, hypervigilance toward bodily sensations, avoidance of medical information, catastrophic interpretation of benign symptoms, or frequent medical checking. The Health Anxiety Inventory was developed to measure health anxiety and hypochondriacal concerns and has been widely used to assess cognitive, emotional, and behavioral dimensions of excessive illness-related fear (5). In women with breast cancer, health anxiety may be especially complex because bodily sensations are not imaginary; rather, they occur in the context of a real medical condition, which makes it difficult for patients to distinguish adaptive monitoring from excessive fear.

Health anxiety in breast cancer is closely related to fear of recurrence, worry, and intolerance of uncertainty. A scoping review on breast cancer survivorship emphasized that fear of cancer recurrence, health anxiety, worry, and uncertainty are overlapping but conceptually distinct constructs that require careful assessment and targeted intervention (6). Women with breast cancer may interpret fatigue, pain, swelling, skin changes, or treatment-related bodily sensations as signs of disease progression or recurrence. This catastrophic interpretation can increase anxiety and reinforce cycles of checking, reassurance seeking, and avoidance. Over time, health anxiety may reduce quality of life, intensify perceived stress, and interfere with the patient's ability to engage in valued personal, family, and social activities. Therefore, psychological interventions for women with breast cancer should address not only general emotional distress but also specific illness-related anxiety and maladaptive responses to uncertainty.

Acceptance and Commitment Therapy is one of the most relevant contemporary psychological approaches for addressing perceived stress and health anxiety in medical populations. ACT is a third-wave behavioral therapy that aims to increase psychological flexibility, defined as the ability to remain in contact with the present moment and act in accordance with personal values despite unpleasant thoughts, emotions, memories, and bodily sensations. ACT is based on six core processes: acceptance, cognitive defusion, contact with the present moment, self-as-context, values clarification, and committed action (7). Unlike therapeutic approaches that focus primarily on symptom elimination, ACT emphasizes changing the individual's relationship with distressing internal experiences. This orientation is especially suitable for women with breast cancer because many cancer-related experiences, including uncertainty, fear, bodily discomfort, and intrusive thoughts about illness, cannot be completely removed. ACT helps patients reduce experiential avoidance, detach from catastrophic thoughts, accept distressing feelings, and move toward meaningful life activities.

The effectiveness of ACT has been supported in cancer-related psychological outcomes. A meta-analysis examining the effects of ACT among cancer patients found that ACT can improve psychological and physical outcomes, suggesting that psychological flexibility may be an important mechanism of adaptation in

oncology settings (8). Similarly, a systematic review and meta-analysis of randomized controlled trials concluded that ACT reduces psychological distress in patients with cancer (9). These findings provide a strong rationale for applying ACT to women with breast cancer who experience perceived stress and health anxiety. ACT may reduce perceived stress by helping patients appraise difficult thoughts and emotions as experiences that can be accepted rather than controlled. It may reduce health anxiety by weakening cognitive fusion with illness-related thoughts, reducing excessive attempts to eliminate uncertainty, and encouraging values-based behavior even in the presence of fear. In this way, ACT directly targets the psychological processes that sustain stress and illness-related anxiety.

Recent clinical evidence also supports the broader application of ACT for anxiety, depression, distress, and experiential avoidance. A case-series study of ACT delivered through a telehealth platform showed that ACT may be useful for mixed anxiety and depression related to experiential avoidance, demonstrating the adaptability of ACT to contemporary service delivery formats (10). In Iranian clinical contexts, ACT has also shown effectiveness in reducing distress tolerance problems and improving cognitive emotion regulation in women with generalized anxiety disorder (11). Furthermore, comparative research among nurses indicated that acceptance and commitment-based therapy can reduce health anxiety, supporting its relevance for populations exposed to persistent health-related threat and stress (12). An integrated intervention based on acceptance, compassion, and mindfulness was also found to reduce psychological distress and intolerance of uncertainty among anxious emergency department nurses, further emphasizing the therapeutic value of acceptance-based and mindfulness-oriented processes for high-stress populations (13). Although these studies were conducted in different populations, their findings support the clinical assumption that acceptance, mindfulness, cognitive defusion, and values-based action can reduce stress and anxiety processes relevant to women with breast cancer.

ACT has also been investigated in relation to chronic physical illness and pediatric health conditions. Systematic review evidence on children with diabetes suggests that ACT can reduce depression, anxiety, and stress in chronic illness contexts, indicating that its mechanisms may be useful when individuals must live with long-term medical demands and uncertainty (14, 15). Although diabetes and breast cancer differ substantially in clinical nature, both conditions require adaptation to medical uncertainty, lifestyle disruption, bodily concerns, treatment demands, and emotional distress. The relevance of ACT across chronic illness populations strengthens the rationale for its use in women with breast cancer. In these patients, ACT may help reduce the struggle against fear and stress, increase willingness to experience difficult emotions, and support engagement in meaningful roles despite the presence of illness-related concerns.

Positive Psychotherapy is another promising intervention for women with breast cancer. Positive Psychotherapy is rooted in positive psychology and emphasizes the cultivation of positive emotions, character strengths, meaning, gratitude, optimism, engagement, and supportive relationships. Seligman and colleagues proposed Positive Psychotherapy as an approach that does not merely attempt to reduce symptoms but also seeks to build psychological resources and enhance well-being (16). This approach is highly relevant to breast cancer because patients may become psychologically dominated by threat, loss, uncertainty, and bodily vulnerability. Positive Psychotherapy helps patients identify remaining strengths, notice positive experiences, reconstruct meaning, improve relationships, and develop a more balanced

interpretation of life during illness. It does not deny suffering; rather, it aims to expand the patient's psychological field so that illness-related distress does not become the only organizing center of experience.

The empirical basis for positive psychology interventions has grown substantially. A systematic review and meta-analysis found that positive psychology interventions can improve well-being and reduce distress across diverse populations (17). These findings suggest that interventions focused on gratitude, strengths, optimism, meaning, and positive relationships may help individuals cope more adaptively with adversity. In women with breast cancer, Positive Psychotherapy may reduce perceived stress by increasing emotional resources, enhancing positive reappraisal, and strengthening the sense of agency. It may also reduce health anxiety by redirecting attention away from persistent threat monitoring and toward meaningful activities, positive memories, interpersonal support, and valued life experiences. While ACT primarily targets psychological flexibility and acceptance of distressing experiences, Positive Psychotherapy works through the expansion of positive resources and adaptive meaning-making. Therefore, both approaches may reduce stress and anxiety, but through different therapeutic pathways.

Despite the theoretical and empirical promise of ACT and Positive Psychotherapy, comparative studies examining their relative effectiveness in women with breast cancer remain limited. Much of the existing intervention literature focuses on single-treatment designs, general distress outcomes, or heterogeneous cancer samples. However, perceived stress and health anxiety may respond differently to interventions with distinct mechanisms of change. ACT may be particularly powerful for health anxiety because it directly targets experiential avoidance, cognitive fusion, intolerance of uncertainty, and maladaptive control strategies. Positive Psychotherapy may be particularly useful for perceived stress because it strengthens coping resources, gratitude, meaning, and positive emotional regulation. Comparing these two approaches in the same study can help clarify whether acceptance-based psychological flexibility or positive psychological resource-building has stronger effects on perceived stress and health anxiety in women with breast cancer.

Such a comparison also has practical significance for psycho-oncology services. Many women with breast cancer require brief, structured, group-based interventions that can be integrated into medical care settings. ACT and Positive Psychotherapy are both suitable for structured group delivery and can be adapted to patients' emotional, cognitive, and existential concerns. However, clinicians need evidence about which intervention may be more effective for specific outcomes. If ACT shows stronger effects on perceived stress and health anxiety, it may be prioritized for patients who struggle with uncertainty, catastrophic interpretation of bodily sensations, and experiential avoidance. If Positive Psychotherapy shows meaningful effects, it may be used to strengthen emotional resilience, gratitude, interpersonal connection, and meaning-centered coping. Therefore, comparing these interventions can contribute to more precise, evidence-based psychological care for women with breast cancer.

The present study aimed to compare the effectiveness of Acceptance and Commitment Therapy and Positive Psychotherapy on perceived stress and health anxiety in women with breast cancer.

Methods and Materials

Study Design and Participants

The present study used a quasi-experimental design with a pre-test, post-test, and follow-up structure, including two intervention groups and one control group. The study was conducted to compare the effectiveness of Acceptance and Commitment Therapy and Positive Psychotherapy on perceived stress and health anxiety in women diagnosed with breast cancer. A repeated-measures design was selected because it allowed the researchers to examine changes in the dependent variables across three time points and to determine whether the effects of the interventions remained stable after the completion of treatment.

Although participants were randomly assigned to the three groups, the initial recruitment was carried out through purposive sampling from women with breast cancer who referred to medical centers in Tehran, Iran. Therefore, the study is best classified as a quasi-experimental trial with randomized group allocation. The three study groups consisted of an Acceptance and Commitment Therapy group, a Positive Psychotherapy group, and a control group. The two experimental groups received structured psychological interventions, while the control group received no structured psychological treatment during the study period and continued to receive routine medical care. This methodological structure made it possible to compare each intervention with the control group and also to compare the relative effectiveness of the two psychological treatments.

The statistical population included all women diagnosed with breast cancer who referred to medical and oncology centers in Tehran, Iran, in 2023. From this population, 45 eligible women were selected based on the inclusion and exclusion criteria. The participants were then assigned to three equal groups: Acceptance and Commitment Therapy, Positive Psychotherapy, and control, with 15 participants in each group. The sample size was consistent with the structure of the two original intervention studies on which the present merged article was based, in which each intervention group included 15 women with breast cancer and was compared with a control group.

Participants were recruited from medical centers providing services to women with breast cancer. Before entering the study, the aims and procedures of the research were explained to them. They were informed that participation was voluntary, that they could withdraw from the study at any time, and that all personal information and questionnaire responses would remain confidential. After providing written informed consent, eligible participants completed the pre-test questionnaires and were then assigned to one of the three study groups.

Participants were included in the study if they were women diagnosed with breast cancer, were between 20 and 45 years of age, had at least an associate degree, and had received their diagnosis approximately six months or more before entering the study. Participants were also required to have undergone surgery, chemotherapy, and radiotherapy, and their disease should not have progressed to stage IV. In addition, they had to report no use of psychiatric medication during the previous three months and no history of severe psychiatric disorders such as psychosis. Another important condition for entering the study was that participants should not be receiving any other psychological intervention during the research period.

Participants were excluded from the study if they were absent from more than two treatment sessions, began using psychiatric medication or substances during the study, withdrew consent, or were unable to

complete the post-test or follow-up assessments. These criteria were applied to increase internal validity and to ensure that changes in perceived stress and health anxiety could be more confidently attributed to the psychological interventions rather than to other concurrent treatments or uncontrolled psychological conditions.

Data were collected at three stages: pre-test, post-test, and follow-up. At the pre-test stage, all participants completed the Perceived Stress Scale and the Health Anxiety Inventory before the interventions began. The Acceptance and Commitment Therapy and Positive Psychotherapy groups then participated in ten 90-minute sessions according to their assigned treatment protocols. The control group did not receive any structured psychological intervention during this period and continued routine medical care.

Immediately after the completion of the ten treatment sessions, all three groups completed the post-test questionnaires. A follow-up assessment was then conducted to examine the stability of changes in perceived stress and health anxiety after the intervention period. All questionnaires were administered under the supervision of the researcher. Participants were assured that their responses would be used only for research purposes and that no identifying information would be included in the dataset.

The control group did not receive any structured psychological intervention during the active phase of the study. Participants in this group continued to receive routine medical care and completed the same questionnaires at the same three assessment stages as the intervention groups. The inclusion of the control group allowed the researchers to determine whether changes observed in the intervention groups were greater than changes that might occur naturally over time or as a result of routine care. For ethical reasons, participants in the control group were offered access to psychological intervention after completion of the follow-up assessment.

Data Collection

Perceived stress was assessed using the Perceived Stress Scale developed by Cohen, Kamarck, and Mermelstein (1983). The Perceived Stress Scale is one of the most widely used self-report instruments for measuring the degree to which individuals appraise situations in their lives as stressful, unpredictable, uncontrollable, and overwhelming. The original 14-item version of the scale asks respondents to report how often they experienced stress-related thoughts and feelings during the previous month. Items are scored on a five-point Likert scale ranging from 0, meaning “never,” to 4, meaning “very often,” with higher scores indicating greater perceived stress. The scale includes both positively and negatively worded items, and the positive items are reverse-scored before calculating the total score. Cohen et al. (1983) reported acceptable psychometric properties for the scale, and later reviews have confirmed that the PSS is among the most commonly used instruments for assessing psychological stress across clinical and non-clinical populations (Lee, 2012). In the present study, the Perceived Stress Scale was used to evaluate changes in participants’ stress appraisal across pre-test, post-test, and follow-up stages.

Health anxiety was assessed using the Health Anxiety Inventory developed by Salkovskis, Rimes, Warwick, and Clark (2002). The Health Anxiety Inventory is a self-report measure designed to assess cognitive, emotional, and behavioral aspects of health anxiety and hypochondriacal concerns. It measures excessive worry about health, preoccupation with bodily sensations, fear of serious illness, and perceived negative consequences of illness. The items are scored using multiple response options that reflect increasing

severity of health-related worry, with higher scores indicating greater health anxiety. Salkovskis et al. (2002) developed and validated the scale through studies comparing clinical and non-clinical groups and showed that it was sensitive to treatment-related change. Subsequent descriptions of the measure have emphasized that it is suitable for assessing health anxiety across a broad spectrum of severity and can be used in both medical and non-medical samples. In the present study, the Health Anxiety Inventory was used to measure changes in illness-related anxiety among women with breast cancer at pre-test, post-test, and follow-up.

Interventions

The Acceptance and Commitment Therapy intervention was delivered to the first experimental group in ten 90-minute sessions and was based on the ACT model developed by Hayes and colleagues, with the central aim of increasing psychological flexibility in women with breast cancer. The treatment emphasized acceptance of unpleasant internal experiences, cognitive defusion, mindfulness, self-as-context, values clarification, and committed action, and was designed to help participants respond more adaptively to illness-related stress, uncertainty, distressing thoughts, bodily sensations, and health-related worries. In the first session, therapeutic rapport was established, the group structure and general goals of therapy were introduced, initial therapeutic agreements were completed, and participants became familiar with the ACT approach. In the second session, participants reviewed their previous coping strategies, examined the effectiveness of control-based strategies, were introduced to the limitations of avoidance, and used therapeutic metaphors to understand the ACT perspective. In the third and fourth sessions, ineffective attempts to control painful thoughts and emotions were identified, acceptance was introduced as an alternative to avoidance, the consequences of experiential avoidance were discussed, and willingness toward difficult internal experiences was practiced. In the fifth session, acceptance skills and cognitive defusion were taught, participants learned to observe thoughts as mental events rather than facts, and mindfulness and relaxation exercises were practiced. In the sixth session, the relationship between behavior, emotions, thoughts, and psychological functions was analyzed, avoidance patterns were identified, and the role of these patterns in maintaining perceived stress and health anxiety was examined. In the seventh session, self-as-context and observing-self exercises were taught to help participants distinguish themselves from distressing thoughts and feelings and practice distancing from anxiety-provoking cognitions. In the eighth session, personal values and meaningful life domains were clarified, motivation for change was strengthened, and the ways in which illness-related distress interferes with valued living were discussed. In the ninth and tenth sessions, committed action was taught, realistic value-based behavioral goals were set, therapeutic skills were reviewed, relapse-prevention strategies were strengthened, and post-test assessment was completed. The intervention used group discussion, metaphors, mindfulness exercises, behavioral tasks, and homework assignments, and participants were encouraged to practice the skills between sessions and apply them when facing stress-provoking thoughts, uncertainty about illness, fear of recurrence or progression, and other health-related concerns; the central therapeutic goal was not to eliminate distressing experiences, but to help participants reduce their struggle with these experiences and act in accordance with personally meaningful values.

The Positive Psychotherapy intervention was delivered to the second experimental group in ten 90-minute sessions and was based on Seligman's positive psychotherapy framework, with an emphasis on strengthening

positive psychological resources, identifying personal strengths, increasing awareness of positive experiences, practicing gratitude, using cognitive reframing, and improving interpersonal relationships. In the present study, this intervention was used to reduce perceived stress and health anxiety by helping participants broaden their focus beyond illness-related threat and develop more adaptive emotional and cognitive responses to breast cancer. In the first and second sessions, the therapist and participants were introduced, group rules were established, the treatment rationale was explained, psychological challenges associated with breast cancer were discussed, and participants were oriented to the positive psychotherapy framework. In the third session, personal strengths were identified, the influence of thoughts and emotions on stressful experiences was discussed, psychological distancing exercises were introduced, and strengths-based homework was assigned. In the fourth session, participants practiced daily gratitude, identified three positive events, and increased awareness of positive daily experiences despite illness-related stress. In the fifth and sixth sessions, gratitude journaling continued, positive daily experiences were reviewed, emotional responses were discussed, and attention to constructive aspects of life was reinforced. In the seventh session, gratitude worksheets were used, positive and negative memories were reflected upon, and cognitive reframing of distressing experiences was practiced. In the eighth session, a mid-treatment review was conducted, homework assignments were evaluated, participants' progress was discussed, and positive coping strategies were strengthened. In the ninth session, participants wrote about difficult life experiences, identified alternative interpretations, and explored adaptive coping responses. In the tenth session, techniques for improving interpersonal relationships, increasing positive communication, and strengthening social support were taught, the intervention was reviewed, and post-test assessment was completed. The Positive Psychotherapy sessions included written exercises, group discussion, gratitude practices, strengths identification, reflection on daily positive events, and relationship-enhancement activities, and the intervention was intended to reduce perceived stress by strengthening coping resources and to reduce health anxiety by decreasing excessive threat-focused attention and encouraging more balanced interpretations of illness-related experiences.

Data Analysis

Data were analyzed using SPSS version 22. Descriptive statistics, including mean and standard deviation, were used to describe perceived stress and health anxiety scores across the three groups and three measurement stages. Before conducting inferential analyses, the assumptions of repeated measures analysis were examined. Box's M test was used to assess the homogeneity of covariance matrices, Levene's test was used to examine equality of variances across groups, and Mauchly's test of sphericity was used to evaluate the sphericity assumption. When the sphericity assumption was violated, the Greenhouse-Geisser correction was applied.

Repeated measures analysis of variance was used to examine changes in perceived stress and health anxiety across pre-test, post-test, and follow-up stages. In this analysis, time was considered the within-subject factor and group was considered the between-subject factor. The interaction effect of time and group was used to determine whether the pattern of change differed among the Acceptance and Commitment Therapy, Positive Psychotherapy, and control groups. Bonferroni post hoc tests were used for pairwise

comparisons between measurement stages and study groups. The level of statistical significance was set at $p < .05$, and eta squared was used to report the effect size of the interventions.

Findings and Results

The present study compared the effects of Acceptance and Commitment Therapy (ACT) and Positive Psychotherapy (PPT) on perceived stress and health anxiety in women with breast cancer. Each group included 15 participants. Table 1 presents the mean and standard deviation of the study variables across pre-test, post-test, and follow-up stages.

Table 1. Mean and Standard Deviation of Perceived Stress and Health Anxiety Across Groups

Variable	Group	Pre-test M ± SD	Post-test M ± SD	Follow-up M ± SD
Perceived Stress	ACT	27.33 ± 6.23	20.73 ± 4.27	20.33 ± 4.54
	PPT	28.66 ± 7.29	24.60 ± 5.18	24.06 ± 5.38
	Control	29.73 ± 7.27	28.20 ± 7.26	27.80 ± 7.20
Health Anxiety	ACT	95.00 ± 28.36	86.40 ± 25.66	84.40 ± 24.94
	PPT	98.86 ± 31.74	91.53 ± 27.12	90.80 ± 27.02
	Control	97.06 ± 30.59	98.53 ± 30.70	97.46 ± 30.77

As shown in Table 1, perceived stress and health anxiety decreased in both intervention groups from pre-test to post-test and follow-up. The control group showed no meaningful reduction in either variable. Before conducting repeated measures analysis of variance, statistical assumptions were examined. The results of Box's M and Levene's tests indicated that the assumptions of homogeneity of covariance matrices and equality of variances were met. When Mauchly's test indicated violation of sphericity, the Greenhouse-Geisser correction was applied. Repeated measures ANOVA showed significant effects of time, group, and the time × group interaction for both perceived stress and health anxiety.

Table 2. Repeated Measures ANOVA for Perceived Stress and Health Anxiety

Variable	Source	F	p	η^2
Perceived Stress	Time	160.63	.001	.85
	Time × Group	111.36	.001	.79
	Group	9.99	.004	.26
Health Anxiety	Time	155.08	.001	.84
	Time × Group	123.79	.001	.81
	Group	46.38	.001	.48

The significant time × group interaction indicates that changes in perceived stress and health anxiety differed significantly across the three groups. Both ACT and PPT led to significant reductions in the outcome variables compared with the control group. The large effect sizes suggest that the interventions had substantial practical significance. Bonferroni post hoc comparisons were conducted to examine within-group changes across time. The results showed that both ACT and PPT significantly reduced perceived stress and health anxiety from pre-test to post-test and from pre-test to follow-up. Changes from post-test to follow-up were not significant, indicating that treatment effects were maintained over time.

Table 3. Bonferroni Post Hoc Comparisons in Intervention Groups

Variable	Group	Pre-test to Post-test	Pre-test to Follow-up
Perceived Stress	ACT	7.40*	7.00*
	PPT	3.78*	3.76*
Health Anxiety	ACT	8.96*	11.43*
	PPT	7.10*	8.70*

* $p < .01$.

The results indicate that both interventions were effective in reducing perceived stress and health anxiety. However, the reduction scores were larger in the ACT group than in the PPT group for both variables. To compare the relative effectiveness of the two interventions, mean reductions from pre-test to post-test and follow-up were examined. ACT produced greater reductions in perceived stress and health anxiety than PPT at both post-test and follow-up stages.

Table 4. Mean Reduction Scores in the Intervention Groups

Variable	Group	Pre-test to Post-test Reduction	Pre-test to Follow-up Reduction
Perceived Stress	ACT	6.60	7.00
	PPT	4.06	4.60
Health Anxiety	ACT	8.60	10.60
	PPT	7.33	8.06

Overall, the findings showed that both Acceptance and Commitment Therapy and Positive Psychotherapy significantly reduced perceived stress and health anxiety in women with breast cancer. Nevertheless, ACT showed greater effectiveness than PPT in reducing both outcomes, particularly at follow-up.

Discussion and Conclusion

The present study aimed to compare the effectiveness of Acceptance and Commitment Therapy and Positive Psychotherapy on perceived stress and health anxiety in women with breast cancer. The findings showed that both interventions significantly reduced perceived stress and health anxiety from pre-test to post-test and follow-up compared with the control group. The results also indicated that the therapeutic effects were maintained at follow-up, showing that the observed improvements were not limited to the immediate post-intervention stage. However, the comparison of reduction scores demonstrated that Acceptance and Commitment Therapy produced greater reductions than Positive Psychotherapy in both perceived stress and health anxiety. This pattern suggests that both interventions are clinically useful in psycho-oncology, but ACT may be more powerful for outcomes that are closely related to experiential avoidance, cognitive fusion, intolerance of uncertainty, and excessive illness-related monitoring.

The first major finding was that Acceptance and Commitment Therapy significantly reduced perceived stress in women with breast cancer. This result is consistent with previous evidence showing that ACT is effective in reducing psychological distress among patients with cancer (8, 9). Breast cancer is accompanied by multiple uncontrollable stressors, including fear of recurrence, uncertainty about prognosis, treatment complications, bodily changes, disruption of social and family roles, and repeated exposure to medical procedures. In such conditions, stress is not only a reaction to external demands but also a product of the patient's appraisal of these demands as unpredictable, uncontrollable, and overwhelming. The Perceived Stress Scale literature emphasizes that perceived stress reflects the subjective evaluation of life circumstances rather than the mere presence of stressors (3). Therefore, the reduction of perceived stress in

the ACT group may be explained by changes in participants' relationship with stressful thoughts, emotions, and bodily sensations.

ACT may have reduced perceived stress by increasing psychological flexibility. According to the ACT model, psychological suffering is maintained when individuals become fused with distressing thoughts, avoid unpleasant emotions, and organize behavior around the control or elimination of internal experiences (7). Women with breast cancer may repeatedly attempt to suppress fear, control intrusive thoughts, avoid conversations about illness, or over-monitor bodily sensations in an effort to reduce distress. However, these strategies often intensify stress because they increase struggle with experiences that cannot be fully controlled. Through acceptance, mindfulness, cognitive defusion, values clarification, and committed action, ACT helps patients recognize thoughts and emotions as transient internal events rather than absolute realities. This process can reduce the perceived burden of cancer-related stressors and allow patients to engage in meaningful actions despite fear and uncertainty. The present finding is also aligned with evidence that ACT can reduce depression, anxiety, and stress in chronic illness contexts such as diabetes, where individuals must adapt to persistent medical demands and uncertainty (14, 15).

The second major finding was that Acceptance and Commitment Therapy significantly reduced health anxiety. This finding is theoretically meaningful because health anxiety in women with breast cancer often involves catastrophic interpretations of bodily symptoms, excessive reassurance seeking, fear of recurrence, and persistent worry about disease progression. The Health Anxiety Inventory was specifically developed to assess excessive health-related fear and hypochondriacal concerns, making it relevant to clinical contexts where individuals become preoccupied with the possibility of serious illness (5). In women with breast cancer, health anxiety may be intensified by real physical sensations caused by surgery, chemotherapy, radiotherapy, hormonal changes, pain, fatigue, or medical follow-up procedures. The challenge is that these sensations are not necessarily imagined, but their interpretation may become excessively threatening. ACT directly addresses this mechanism by helping patients defuse from catastrophic thoughts, accept uncertainty, and reduce maladaptive control strategies.

This result is consistent with studies showing that ACT can improve anxiety-related outcomes in cancer patients and other high-distress groups (8, 9). It is also compatible with findings from ACT-based interventions for experiential avoidance-related anxiety and depression, including evidence from telehealth delivery formats (10). Health anxiety is closely linked to experiential avoidance because patients may attempt to reduce anxiety by checking symptoms, seeking repeated reassurance, avoiding medical information, or suppressing fear. These responses may provide short-term relief but maintain long-term anxiety. ACT disrupts this cycle by teaching patients to observe illness-related thoughts without automatically obeying them, tolerate uncertainty without excessive checking, and choose behaviors based on values rather than fear. The effectiveness of acceptance-based interventions in reducing health anxiety among nurses also supports this interpretation, because nurses, like cancer patients, may be highly exposed to health-related threat cues and bodily vigilance (12). Similarly, evidence that an integrated intervention based on acceptance, compassion, and mindfulness reduces psychological distress and intolerance of uncertainty in anxious emergency nurses further supports the role of acceptance-based processes in anxiety reduction (13).

The findings also showed that Positive Psychotherapy significantly reduced perceived stress in women with breast cancer. This result is consistent with the broader evidence base for positive psychology

interventions, which suggests that such interventions can improve well-being and reduce psychological distress across different populations (17). Positive Psychotherapy is based on the assumption that psychological treatment should not only reduce negative symptoms but also strengthen positive emotions, personal strengths, gratitude, meaning, hope, and interpersonal connection (16). In the context of breast cancer, patients may become cognitively and emotionally dominated by threat, loss, uncertainty, and bodily vulnerability. Positive Psychotherapy can reduce perceived stress by helping patients identify personal resources, notice positive daily experiences, reinterpret difficult events, and maintain a sense of meaning despite illness-related challenges. Therefore, the decrease in perceived stress in the PPT group may reflect an improvement in coping resources and a broadening of emotional perspective.

The effect of Positive Psychotherapy on perceived stress can also be explained through its emphasis on gratitude, strengths recognition, positive event recording, and relationship enhancement. These components may help patients move beyond a narrowed focus on disease-related threat and become more attentive to areas of life that remain meaningful and manageable. Breast cancer often disrupts identity and daily functioning, but positive psychological exercises can help patients reconnect with values, relationships, abilities, and sources of emotional support. This does not mean ignoring the seriousness of cancer; rather, it means helping patients develop a more balanced psychological orientation in which distress and positive meaning can coexist. In this regard, the finding is consistent with the general movement in psycho-oncology toward interventions that not only manage symptoms but also support quality of life, resilience, and adaptive adjustment among women with breast cancer (2).

The fourth major finding was that Positive Psychotherapy significantly reduced health anxiety. This result can be explained by the intervention's capacity to shift attention away from continuous threat monitoring and toward more adaptive cognitive-emotional content. Health anxiety is often maintained by excessive attention to bodily sensations, catastrophic interpretation of symptoms, and persistent uncertainty about illness. A scoping review of breast cancer survivorship research emphasized that fear of cancer recurrence, health anxiety, worry, and uncertainty are related but distinct constructs that require careful conceptualization and measurement (6). Positive Psychotherapy may reduce these concerns by helping patients cultivate gratitude, identify meaningful life experiences, strengthen social support, and develop alternative interpretations of distressing events. When patients become more aware of positive experiences and personal strengths, illness-related fear may become less dominant in their cognitive and emotional life.

However, although Positive Psychotherapy was effective, Acceptance and Commitment Therapy produced stronger reductions in both perceived stress and health anxiety. This comparative finding is clinically important. The superiority of ACT may be due to its more direct focus on the psychological mechanisms that maintain stress and health anxiety in cancer patients. Breast cancer involves real uncertainty, unavoidable physical sensations, and legitimate fears about recurrence or disease progression. Positive Psychotherapy strengthens positive resources, but ACT specifically teaches patients how to respond to unpleasant internal experiences without avoidance, fusion, or excessive control. Since perceived stress and health anxiety are strongly connected to appraisals of uncontrollability, intolerance of uncertainty, and catastrophic interpretations of bodily experiences, ACT may be more directly matched to these outcomes. This explanation is consistent with previous findings showing that perceived stress, anxiety, and depression are

highly relevant in women with breast cancer and may be central pathways through which the disease affects psychological adjustment (4).

The maintenance of treatment effects at follow-up is another important finding. Both interventions produced improvements that remained stable after the intervention period, suggesting that participants may have internalized therapeutic skills and continued to apply them after sessions ended. For ACT, this stability may be related to repeated practice of mindfulness, defusion, acceptance, values clarification, and committed action. These skills can be applied independently when patients encounter new stressors, medical appointments, bodily sensations, or illness-related thoughts. For Positive Psychotherapy, the stability of effects may be related to continued use of gratitude exercises, strengths-based reflection, positive event awareness, and interpersonal engagement. The maintenance of change is especially important in breast cancer care because psychological challenges often continue beyond active treatment. The ongoing global burden of breast cancer and the growing number of survivors highlight the need for interventions that produce durable psychological benefits rather than only short-term relief (1).

Overall, the findings support the integration of structured psychological interventions into supportive care programs for women with breast cancer. Both ACT and Positive Psychotherapy can reduce perceived stress and health anxiety, but ACT appears to have a stronger effect because it directly targets psychological flexibility, acceptance of distressing experiences, cognitive defusion, and values-based action. These findings are consistent with the broader evidence that ACT reduces psychological distress in cancer populations (8, 9), while Positive Psychotherapy and positive psychology interventions improve well-being and reduce distress by strengthening adaptive psychological resources (16, 17). The results therefore suggest that psycho-oncology interventions should be selected not only according to general effectiveness but also according to the psychological mechanisms most relevant to the patient's symptoms. For women whose distress is driven by illness-related fear, catastrophic thoughts, avoidance, and uncertainty, ACT may be especially appropriate. For women who need to strengthen positive affect, gratitude, meaning, and interpersonal resources, Positive Psychotherapy may also provide substantial benefit.

This study had several limitations. First, the sample size was relatively small, with 15 participants in each group, which may limit statistical power and reduce the generalizability of the findings. Second, the participants were selected from women with breast cancer who referred to medical centers in Tehran, and therefore the results may not be fully generalizable to women in other regions, cultures, socioeconomic conditions, or cancer care systems. Third, the study relied on self-report measures, which may be influenced by response bias, social desirability, emotional state at the time of assessment, or participants' expectations regarding treatment. Fourth, the follow-up period was limited, and longer follow-up assessments are necessary to determine whether the therapeutic effects remain stable over several months or years. Fifth, the study did not examine possible mediating mechanisms such as psychological flexibility, experiential avoidance, gratitude, meaning in life, or social support, and therefore the exact processes through which each intervention produced change could not be empirically tested.

Future research should replicate this study with larger and more diverse samples of women with breast cancer across different cities, treatment stages, and medical settings. It is also recommended that future studies include longer follow-up periods, such as three-month, six-month, and one-year assessments, to evaluate the durability of treatment effects. Researchers should examine mediating and moderating

variables to clarify whether ACT reduces stress and health anxiety primarily through psychological flexibility and acceptance, and whether Positive Psychotherapy works mainly through gratitude, positive affect, meaning, and interpersonal support. Future studies may also compare individual, group-based, online, and blended formats of these interventions to determine which delivery model is most feasible and effective in oncology settings. In addition, mixed-methods designs could provide a deeper understanding of patients' lived experiences, perceived therapeutic benefits, and barriers to participation in psychological interventions during cancer treatment and survivorship.

In practice, psycho-oncology teams are encouraged to integrate structured psychological interventions into routine supportive care for women with breast cancer. ACT may be prioritized for patients who show high levels of illness-related worry, intolerance of uncertainty, catastrophic interpretation of bodily sensations, avoidance, and difficulty accepting distressing internal experiences. Positive Psychotherapy may be particularly useful for patients who need support in rebuilding hope, gratitude, personal strengths, positive relationships, and meaning after diagnosis and treatment. Clinicians can also consider combining elements of both approaches, using ACT to reduce struggle with fear and uncertainty and Positive Psychotherapy to strengthen positive coping resources and life engagement. Oncology centers should provide accessible group-based psychological programs, train mental health professionals in evidence-based interventions, and coordinate psychological care with medical treatment so that women with breast cancer receive comprehensive support for both physical and psychological adjustment.

Acknowledgments

The authors express their deep gratitude to all participants who contributed to this study.

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.

Funding

This research was carried out independently with personal funding and without the financial support of any governmental or private institution or organization.

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