IJBMC
International Journal of Body, Mind and Culture

Volume 12, Issue 5, pp 273-281
DOI: 10.61838/ijbmc.v12i5.989

Article type:
Original Research

The Effectiveness of Acceptance and Commitment Therapy on Perceived Stress and Health Anxiety in Women with Breast Cancer

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Article history:

Received 21 May 2025
Revised 14 June 2025
Accepted 24 June 2025
Published online 01 Aug 2025

How to cite this article:
Karimpoorian, H., Kordmirza Nikoozadeh, E., & Rafiepoor, A. (2025). The Effectiveness of Acceptance and Commitment Therapy on Perceived Stress and Health Anxiety in Women with Breast Cancer. International Journal of Body, Mind and Culture, 12(5), 273-281.

ABSTRACT

Objective: Cancer, as a chronic physical illness, disrupts both the physical and psychological capacities of individuals, creating a distressing condition for the patient that diminishes quality of life, deteriorates mental health, and reduces overall well-being. This study aimed to evaluate the effectiveness of Acceptance and Commitment Therapy (ACT) on perceived stress and health anxiety in women diagnosed with breast cancer.

Methods and Materials: This quasi-experimental study employed a non-equivalent control group design with pre-test, post-test, and follow-up stages. A purposive sample of 30 women with breast cancer (aged 20–45) referred to medical centers in Tehran in 2023 was selected. Participants were randomly assigned to an ACT intervention group or a control group (n=15). The intervention group received ten 90-minute ACT sessions based on Hayes et al.'s (2004) protocol. Data were collected using the Perceived Stress Scale (PSS-14) and Health Anxiety Inventory (HAI). Repeated measures ANOVA was used for statistical analysis.

Findings: Findings revealed a significant reduction in perceived stress and health anxiety in the ACT group compared to the control group at both post-test and follow-up stages ($p<0.001$). Effect sizes indicated strong practical significance across all variables.

Conclusion: ACT appears to be an effective intervention for improving psychological well-being in women with breast cancer by reducing stress-related symptoms. These findings support the integration of ACT into supportive care for breast cancer patients.

Keywords: Acceptance and Commitment Therapy, Breast Cancer, Perceived Stress, Health Anxiety.

Introduction

According to findings in the field of psychology, the human body and mind are in constant interaction, with each influencing the other; the state of one can determine the condition of the other (Katsura, 2022). Physical illnesses, from both chemical and physiological perspectives, can give rise to psychological disorders.

Often, a physical illness can induce chemical and hormonal changes in the body, which in turn may trigger psychological disturbances in the patient (Wilkinson & Gathani, 2022). Cancer, as a chronic physical illness, disrupts both the physical and psychological capacities of individuals, creating a distressing condition for the patient that diminishes quality of life, deteriorates mental health, and reduces overall well-being (Kashyap et al., 2022).

In this widespread disease, increasing patient survival and managing their psychological health is of paramount importance (Whelan et al., 2023), as it contributes to enhancing their self-worth. The intensity of stress, uncertainty about the future, efforts to survive, constant medication, chemotherapy, and the high cost of treatment all significantly impact the mental well-being of breast cancer patients (Sideris et al., 2022). Studies show that between 50% to 80% of cancer patients simultaneously suffer from at least one psychiatric disorder (Park et al., 2022).

Among the most prominent issues faced by breast cancer patients are the stress and anxiety associated with facing and coping with the disease. Various researchers have found that perceived stress in breast cancer patients acts as an explanatory mechanism that clarifies the significant decline in multiple quality-of-life indicators (Li et al., 2021). According to the cognitive-interactional model of stress, a person's assessment of their relationship with the environment plays a crucial role in stress development (Albahadlv et al., 2023; Davoudi-Monfared et al., 2023). If an individual perceives their environment as excessively stressful and believes they lack the ability to cope, their stress levels increase. Conversely, if they believe they are capable of managing stressful situations, they will experience less stress. Furthermore, individuals who hold negative perceptions of their illness experience higher levels of perceived stress (Zhang et al., 2022).

A wealth of evidence links cancer to psychological stress and emotional factors that are inherently part of modern societies (Plascak et al., 2021). Beyond the psychological role in the formation of cancer, the diagnosis and treatment themselves often lead to stress and anxiety, which negatively affect the patient's overall health (Tan et al., 2023). The most prevalent psychiatric disorders among these patients include adjustment disorder with anxiety, depression, or a combination of both (Jan et al., 2021). Anxiety typically involves feelings of insecurity or threat without a clearly identifiable source and is perceived as a threatening condition resulting from heightened internal or external stimuli that the individual feels unable to control (Fernández-Rodríguez et al., 2021).

Receiving a breast cancer diagnosis often causes significant distress and fear, potentially leading to psychiatric conditions such as anxiety and depressive disorders (Maheu et al., 2021). Health anxiety, or illness anxiety disorder, refers to an excessive and disproportionate fear of having or developing a serious illness. Individuals with health anxiety become overly preoccupied and exhibit heightened worry about their health status, often reacting strongly to minor symptoms (Dennis et al., 2021; Shi et al., 2022). The experience of health anxiety varies among individuals, ranging from mild to severe. Mild forms may facilitate early diagnosis, but severe anxiety can lead to hypochondriasis and significant psychological distress (Nikčević et al., 2021). Understandably, physical health plays a crucial role in people's lives, and many experience occasional health-related concerns (Whelan et al., 2023). For some patients, such concerns are adaptive, promoting vigilance and timely medical attention. Self-care strategies often involve teaching at-risk individuals to monitor their physical symptoms (Bareket-Bojmel et al., 2021). Nevertheless, intense health-related worries can become maladaptive and burdensome (Barbek et al., 2022).

Thus, promoting calmness, acceptance of the illness, a pursuit of well-being, and a sense of responsibility for self-care constitute a sound and exceptional pathway toward physical resilience Carr et al., (2021). Today, the field of psychology and clinical counseling has made significant progress in the development of effective behavioral treatments, including Acceptance and Commitment Therapy (ACT) and positive psychotherapy (Seshadri et al., 2021). Research suggests that positive psychology-based therapies can improve a wide range of psychological variables such as depression, problem-solving, happiness, positive affect, mental health, and resilience (Drigas et al., 2022).

ACT has garnered growing attention in psychological treatment, particularly for patients with chronic or life-threatening illnesses such as cancer (Thompson et al., 2021). As a third-wave behavioral therapy, ACT diverges

from traditional cognitive therapies by focusing not on the content of thoughts and beliefs, but on the psychological processes and the context in which distress occurs (Zhao et al., 2021). ACT consists of six core processes: acceptance, cognitive defusion, self-as-context, values, committed action, and present-moment awareness—summarized into two broader domains of commitment and mindfulness-based processes (Fernández-Rodríguez et al., 2021). This approach trains individuals to engage in flexible and value-driven behaviors in the presence of psychological challenges, such as unpleasant thoughts and emotions (Han et al., 2021). Accordingly, the aim of the present study is to determine the effectiveness of Acceptance and Commitment Therapy on perceived stress and health anxiety in women with breast cancer.

Methods and Materials

Study Design

This study employed a quasi-experimental design with non-equivalent control and intervention groups, using a pre-test, post-test, and follow-up structure. Although participants were randomly assigned to study groups, initial participant recruitment was conducted using purposive sampling, which aligns with quasi-experimental methodologies rather than a full randomized clinical trial. Therefore, the study is best described as a quasi-experimental trial with randomized group allocation and repeated measures.

Participants and Sampling Procedure

The statistical population included all women diagnosed with breast cancer who referred to medical centers in Tehran, Iran, in 2023. From this population, 30 eligible participants were selected using purposive sampling, based on predefined inclusion and exclusion criteria. These individuals were subsequently assigned randomly into two groups: an experimental group receiving Acceptance and Commitment Therapy (ACT) and a control group receiving no psychological intervention, with 15 participants per group. The process of random assignment was conducted using a computerized random number generator by a third party to minimize allocation bias.

Inclusion and Exclusion Criteria

To be eligible, participants were required to (a) be female, aged between 20 and 45 years, (b) have received a diagnosis of breast cancer at least six months prior to the study, (c) possess a minimum education level of an associate degree, (d) have undergone surgery, chemotherapy, and radiotherapy, (e) not be in stage IV of the disease, and (f) be free of psychiatric medication use within the past three months. Additionally, participants were required to provide written informed consent and to refrain from engaging in any other psychological treatment during the study. Exclusion criteria included absence from more than two intervention sessions, use of psychiatric medications or substances during the study period, or a documented history of severe psychiatric disorders such as psychosis.

Instruments

Perceived Stress Scale (PSS): Developed by Cohen et al., (2004), this scale includes 14 items rated on a 5-point Likert scale ("never" to "very often") scored from 0 to 4. The scale consists of two subscales: a) Negative perception of stress (7 items) and b) Positive perception of stress (7 items). Internal consistency (Cronbach's alpha) for this scale has ranged from 0.84 to 0.86 across different samples. In a study by Mimura & Griffiths, (2004), Cronbach's alpha values for the Japanese revised version were 0.88 and 0.81 respectively. In this study, Cronbach's alpha was 0.78 for positive perceived stress and 0.72 for negative perceived stress.

Health Anxiety Inventory (HAI): This questionnaire measures health-related anxiety. The long-form was originally developed by Warwick & Salkovskis, (1989), based on the cognitive model of health anxiety and hypochondriasis. The short-form used in this study Salkovskis et al., (2002) includes 58 items and is a paper-based self-report measure. Each item has four response options that reflect different levels of concern, scored from 0 to 3. Higher scores indicate higher health anxiety. The scale includes three factors: main component, general health concern, and perceived negative consequences. Since the original tool was developed in English, it was translated into Persian by Nargesi et al., (2017) and reviewed by domain experts. Content comprehension was also verified with student feedback. For validity assessment, the HAI and the Ahvaz Hypochondriasis Inventory were administered concurrently. Test-retest reliability was 0.90, and Cronbach's alpha ranged from 0.70 to 0.82 (Salkovskis et al., 2002). In 2011, the Persian version was tested on 375 teachers in Andimeshk, yielding a Cronbach's alpha of

0.87. The validity was also supported by correlations with the Illness Attitudes Scale (IAS), reporting coefficients of 0.63 Salkovskis et al., (2002) and 0.94 Abramowitz et al., (2007).

Intervention Procedure

The ACT intervention was conducted over ten 90-minute sessions, administered weekly to the experimental group. The sessions followed the standardized ACT protocol developed by Hayes et al., (2004), which is grounded in six core therapeutic processes: acceptance, cognitive defusion, present-moment awareness, self-as-context, values clarification, and committed action. A licensed clinical psychologist trained in ACT facilitated the sessions. The protocol also integrated metaphors, mindfulness exercises, and behavioral activation tasks to enhance psychological flexibility. Treatment fidelity was monitored via session outlines and periodic supervision. The control group did not receive any structured psychological treatment during the study period but was offered access to the ACT program upon completion of the trial for ethical fairness.

Acceptance and Commitment Therapy (ACT): The intervention was delivered to the experimental group over ten 90-minute sessions based on the protocol by (Hayes et al., 2004).

Table 1

Session Content Based on Hayes et al. (2004) Protocol

Session	Content and Assignments
Session 1	Establishing therapeutic rapport, introducing the topic, completing questionnaires, signing treatment agreement
Session 2	Reviewing previous coping methods and their effectiveness using metaphors, providing feedback and homework
Sessions 3 & 4	Identifying ineffective control strategies, promoting acceptance of painful experiences using metaphors (e.g., computer and cheese), feedback and homework
Session 5	Teaching acceptance steps, awareness of avoidance consequences, cognitive defusion through metaphors, relaxation training, mindfulness exercises
Session 6	Introducing the three-part behavioral model (behavior, feelings, psychological functions), behavior analysis, feedback and homework
Session 7	Teaching self-as-context and observing self using metaphors, sensory awareness, and distancing from depressive thoughts, feedback and homework
Session 8	Clarifying values, enhancing motivation for change, identifying meaningful experiences, focused exercises, feedback and homework
Sessions 9 & 10	Teaching committed action, identifying value-driven behaviors, session review, feedback, and post-test administration

Analysis

Descriptive statistics (means, standard deviations, and frequency distributions) were computed for all variables. Prior to inferential testing, assumptions of normality and homogeneity were evaluated using Box's M, Levene's test, and Mauchly's sphericity test. Where sphericity was violated, the Greenhouse-Geisser correction was applied. To assess within-group and between-group differences over time, repeated measures ANOVA was conducted for each dependent variable. In cases where ANOVA assumptions were not met, the Kruskal-Wallis test was employed. Additionally, multivariate analysis of variance (MANOVA) was performed to examine overall treatment effects across time points. Pairwise comparisons were conducted using Bonferroni-adjusted post hoc tests. All analyses were conducted using SPSS version 22, and statistical significance was set at $p < 0.05$. Missing data were minimal and handled using listwise deletion.

Ethical Considerations

The study received ethical approval from the institutional ethics committee. All participants provided written informed consent and were assured of their anonymity, confidentiality, and the voluntary nature of participation. No personal identifiers were recorded. Participants in the control group were offered the full ACT intervention after the study's completion to ensure ethical parity.

Findings and Results

The descriptive findings of this study include statistical indicators such as mean, standard deviation, sample size, frequency tables, and percentage distributions, which are presented for all study variables in the tables below.

Table 2

Mean and standard deviation of research variables in experimental and control groups

Variable	Group	Pre-Test (Mean ± SD)	Post-Test (Mean ± SD)	Follow-Up (Mean ± SD)
Health Anxiety	ACT	95.00 ± 28.36	86.40 ± 25.66	84.40 ± 24.94
	Control	97.06 ± 30.59	98.53 ± 30.70	97.46 ± 30.77
Perceived Stress	ACT	27.33 ± 6.23	20.73 ± 4.27	20.33 ± 4.54
	Control	29.73 ± 7.27	28.20 ± 7.26	27.80 ± 7.20

As shown in Table 2, repeated measures ANOVA was used to examine the significance of differences in perceived stress scores between the ACT and control groups. Before performing repeated measures ANOVA, the assumptions were tested using Box's M test, Mauchly's sphericity test, and Levene's test. Since Box's M was not significant for any variable, the assumption of homogeneity of variance-covariance matrices was satisfied. Likewise, Levene's test results indicated that the assumption of homogeneity of variance across groups was also met. However, Mauchly's test for sphericity was significant for the sleep quality variable, indicating a violation of the sphericity assumption (Mauchly's W = 0.63; df = 2; p < 0.0001). Therefore, the Greenhouse-Geisser correction was used to interpret within-subject and interaction effects.

Table 3

Multivariate Analysis of Variance (MANOVA)

Effect	Test Type	Value	F	Hypothesis df	Error df	P-Value	Eta^2
Time	Pillai's Trace	0.63	275.47	2	27	0.001	0.64
	Wilks' Lambda	0.04	275.47	2	27	0.001	0.64
	Hotelling's Trace	20.40	275.47	2	27	0.001	0.64
	Roy's Largest Root	20.40	275.47	2	27	0.001	0.64
Time*Group	Pillai's Trace	0.48	132.67	2	27	0.001	0.48
	Wilks' Lambda	0.09	132.67	2	27	0.001	0.48
	Hotelling's Trace	9.82	132.67	2	27	0.001	0.48
	Roy's Largest Root	9.82	132.67	2	27	0.001	0.48

As seen in Table 3, all significance levels are below 0.0001, indicating a statistically significant difference in the mean scores across time and groups. Specifically, Wilks' Lambda (value = 0.09, F = 132.67, p < 0.0001) confirms a significant interaction effect of ACT on reducing perceived stress compared to the control group.

Table 4

Repeated Measures ANOVA for Pre-Test, Post-Test, and Follow-Up Across Groups

Variable	Source	SS	df	MS	F	P-value	Eta^2
Perceived Stress	Time	67.28	1.46	46.46	160.63	0.001	0.85
	Time*Group	47.02	1.46	32.21	111.36	0.001	0.79
	Error	11.82	40.87	0.28			
	Group	46.94	1	46.94	9.99	0.004	0.26
	Error	131.51	28	4.69			
Health Anxiety	Time	446.06	1.35	329.75	155.08	0.001	0.84
	Time*Group	356.06	1.35	263.22	123.79	0.001	0.81
	Error	80.53	37.87	2.12			
	Group	291.60	1	291.60	46.38	0.001	0.48
	Error	2414.13	28	86.21			

The results in Table 4 show that the main effects of time and group, as well as the interaction effect of group*time, are statistically significant across all three variables. For instance, the interaction between group and time for perceived stress is significant (F= 111.36, df = 1.46, p<0.001) with a large effect size (Eta^2 = 0.79). Bonferroni post hoc tests were used for pairwise comparisons.

Table 5

Bonferroni Post Hoc Test Results for Study Variables

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Variable	Group	Comparison	Post-Test	Follow-Up
	ACT	Pre-Test	7.40*	7.00*
		Post-Test	–	0.40
Perceived Stress	Control	Pre-Test	0.89	0.78
		Post-Test	–	0.61
	ACT	Pre-Test	8.96*	11.43*
Health Anxiety		Post-Test	–	2.00
	Control	Pre-Test	1.47	0.40
		Post-Test	–	0.75

**P<0.01*

The results in Table 5 indicate that perceived stress scores in the ACT group were significantly lower than those in the control group at post-test and follow-up stages (lower scores indicate greater improvement). Similarly, health anxiety scores significantly decreased in the ACT group compared to the control group at both post-test and follow-up.

Discussion and Conclusion

The results indicated that Acceptance and Commitment Therapy (ACT) had a significant impact on perceived stress in women with breast cancer. These findings are consistent with the studies by (Sadeghpour et al., 2025; Albahadlv et al., 2023; Mahdavi et al., 2017; Jawad et al., 2022; Zhao et al., 2021; Li et al., 2021; Andreevich et al., 2023), and (Song et al., 2024).

This finding can be explained by noting that ACT, as a third-wave psychological therapy, has recently garnered substantial attention due to its effectiveness in improving psychological problems and reducing stress. This approach has been particularly useful for breast cancer patients, who not only face physical challenges but also suffer from various psychological consequences such as perceived stress. Breast cancer, the most common cancer among women, often brings about anxiety, depression, and stress in addition to its physical impact (Albahadlv et al., 2023). Perceived stress—referring to an individual's subjective evaluation of psychological pressure—can significantly increase in cancer patients and negatively influence their health anxiety and recovery process.

ACT is a therapeutic model that emphasizes acceptance of negative thoughts and emotions and encourages committed action aligned with personal values rather than attempting to eliminate these experiences. The therapy comprises six core processes: acceptance, cognitive defusion, present-moment awareness, self-as-context, values clarification, and committed action. Its primary aim is to enhance psychological flexibility, which improves an individual's ability to adaptively cope with life's challenges. In cancer patients, especially those with breast cancer, psychological flexibility is crucial for managing the stress induced by illness and treatment. Perceived stress in these patients may stem from fear of disease progression, uncertainty about the future, bodily changes, and social pressures (Zhang et al., 2022). Research has shown that this type of stress can suppress the immune system and intensify pain and fatigue.

ACT helps patients break the cycle of experiential avoidance, a pattern of attempting to escape unpleasant thoughts, feelings, or memories—which often increases their intensity. By promoting acceptance of these experiences, ACT effectively reduces perceived stress. Another key mechanism through which ACT exerts its influence is enhancing present-moment awareness. Cancer patients often dwell on past regrets or worry about the future, reducing their ability to live in the present. This state contributes to heightened stress and deteriorated health anxiety. ACT teaches mindfulness skills to help patients redirect attention from future fears or past regrets to the present moment (Ramirez et al., 2020). This shift not only reduces stress but also strengthens patients' connection to their core life values.

Commitment to values, another fundamental component of ACT, plays a significant role in lowering perceived stress. This involves identifying personal core values and committing to behaviors that align with them. For instance, a breast cancer patient who prioritizes family values might choose to spend more time with loved ones despite stress or worry. Such value-based actions can enhance life's meaning and reduce psychological distress (Fernández-Rodríguez et al., 2021). Clinical studies also support the efficacy of ACT in reducing perceived stress among patients with chronic conditions, including cancer. Overall, ACT—through acceptance, mindfulness, and value-based action—effectively reduces perceived stress in women with

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breast cancer by enhancing psychological flexibility and adaptive coping.

ACT was also found to significantly reduce health anxiety in women with breast cancer. This aligns with the findings of (Sadeghpour et al., 2025; Albahadlv et al., 2023; Mahdavi et al., 2017; Jawad et al., 2022; Zhao et al., 2021; DaneshNia, 2023; Li et al., 2021) and (Callaghan et al., 2012).

Health anxiety is a common psychological concern among patients with chronic illnesses, particularly breast cancer. In addition to its physical toll, breast cancer imposes considerable psychological stress. Affected women often experience heightened concerns about disease progression, recurrence, and treatment outcomes, all of which contribute to health anxiety—defined as excessive, irrational worry about one's health. This form of anxiety is associated with fear, worry, and distress, and can severely disrupt daily functioning. ACT plays a vital role in reducing health anxiety by fostering acceptance of physical and emotional experiences and diminishing maladaptive responses to health-related worries (Trindade et al., 2021). Patients with breast cancer face a high risk of health anxiety due to the serious nature of the illness and its treatment challenges. Factors such as fear of recurrence, concerns about treatment efficacy, and side effects contribute to elevated anxiety. Health anxiety not only worsens psychological distress but can also impair patients' ability to manage their condition effectively.

Like any research, this study had limitations that should be considered when interpreting the findings and making recommendations. Participant bias in responding to questionnaires, which could affect result accuracy. The presence of uncontrolled but influential variables. The exclusive use of questionnaires without employing other data collection tools such as interviews or observations. Limited generalizability due to the sample being restricted to breast cancer patients in Tehran. The uncontrollable honesty level of respondents in answering questionnaire items. The potential influence of test conditions due to repeated questionnaire exposure (pre-test and post-test). Future research is encouraged to replicate this study in other cities and among patients with other types of cancer or chronic illnesses to compare and validate findings. Researchers are also advised to explore the comparative efficacy of ACT and positive psychotherapy in various patient populations. Considering gender differences in psychological responses, future studies could examine the treatment's effectiveness in both men and women separately and tailor interventions accordingly. Long-term follow-ups (6 months or more) are recommended to evaluate the sustained impact of therapeutic interventions.

ACT appears to be an effective intervention for improving psychological well-being in women with breast cancer by reducing stress-related symptoms. These findings support the integration of ACT into supportive care for breast cancer patients.

Acknowledgments

The authors express their gratitude and appreciation to all participants.

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. Ethical considerations in this study were that participation was entirely optional.

Transparency of Data

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

Funding

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

Authors' Contributions

All authors equally contribute to this study.

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