



Effectiveness of Acceptance and Commitment Therapy on Cognitive Flexibility and Body Image Concerns in Women with Breast Cancer

A. Allahverdi ^{1,*} 

¹ Department of Industrial Engineering, University of Rome Tor Vergata, Italy

ARTICLE INFO	ABSTRACT
Article History: Received 3 March 2025 Received in revised form 11 June 2025 Accepted 9 July 2025 Available online 2 December 2025 Keywords: Acceptance and Commitment Therapy; Cognitive Flexibility; Body Image Concerns; Breast Cancer.	Appropriate psychological interventions aimed at promoting psychological well-being in patients with breast cancer are of considerable importance. The present study investigated the effectiveness of Acceptance and Commitment Therapy (ACT) in increasing cognitive flexibility and reducing body image concerns among women with breast cancer. This study employed a pretest–posttest control-group design. Forty women with breast cancer who attended the Oncology and Radiotherapy Department of Imam Khomeini Hospital in Tehran were selected through convenience sampling and then randomly assigned to an experimental group and a control group (20 participants in each group). Both groups completed a demographic questionnaire, the Body Image Concern Inventory, and the Cognitive Flexibility Inventory at pretest. The experimental group then received 10 sessions of group-based ACT, whereas the control group received no psychological intervention. After the intervention, both groups completed the posttest measures. Data were analyzed using analysis of covariance (ANCOVA) in SPSS version 20, with pretest scores as the covariate. The findings indicated that ACT significantly reduced body image concerns and increased cognitive flexibility in women with breast cancer ($p < 0.001$; partial $\eta^2 = 0.456$ and 0.505, respectively). These findings suggest that ACT may be an effective psychological intervention for improving cognitive flexibility and reducing body image concerns in women with breast cancer.

1. INTRODUCTION

With social and industrial changes, patterns of disease have also changed, and chronic diseases have become major health and psychological concerns in contemporary societies. Such diseases constitute important sources of stress and impose substantial economic costs on individuals and communities [1]. Cancer is among the major global health challenges and can threaten health and active life across different age groups, producing numerous physical, psychological, familial, social, and spiritual consequences [2]. Among different cancers, breast cancer is a common, malignant, and progressive disease that affects various dimensions of an individual's life. It is one of the most

* Corresponding Author: aida.allahverdi@students.uniroma2.eu
Department of Industrial Engineering, University of Rome Tor Vergata, Italy



common cancers among women worldwide and accounts for a substantial proportion of cancers diagnosed in women [3]. Breast cancer is also a major health concern among Iranian women [4].

In addition to the burden of the disease itself, the treatments used for breast cancer, including mastectomy or breast-conserving surgery, chemotherapy, radiotherapy and hormonal therapy, frequently produce visible and lasting bodily changes. Women may experience the loss or disfigurement of a breast, surgical scarring, hair loss, weight change, lymphedema, skin changes and premature menopause, often while they are also coping with uncertainty about their prognosis [5,6]. Because these changes affect parts of the body that are closely linked to femininity, attractiveness and sexuality, breast cancer is regarded as one of the cancers with the greatest impact on body image [5]. As survival improves, a growing number of women live for many years with the physical and psychological after-effects of treatment, which makes attention to their psychological adjustment increasingly important.

Physical appearance constitutes an important component of self-perception. Individuals' initial perceptions of themselves are partly shaped by their physical characteristics, and these perceptions may influence their attitudes toward themselves [7]. Physical appearance can be substantially affected by certain illnesses and their treatments. Breast cancer and its treatment may threaten women's sense of identity and expose patients to psychological difficulties such as anxiety, depression, hopelessness, social isolation, fear of a spouse's reaction, concerns about marriage, fear of death, and concerns related to fertility [8,9]. In illnesses that affect physical appearance, body image therefore becomes a particularly important psychological construct [10].

Body image is a multidimensional construct referring to the perceptions, attitudes, thoughts, and feelings that individuals hold about their bodies [11]. Research involving individuals experiencing functional or physical changes has suggested several dimensions of body image, including comfort with bodily sensations, perceived competence of the body, physical appearance, and predictability or stability of bodily functioning over time [12]. Dissatisfaction with body image has been reported increasingly over recent decades [13]. Women may be especially vulnerable to body image disturbances because of social expectations concerning appearance and gender roles [14]. These dimensions reflect the interplay of biological, psychological, perceptual, attitudinal, behavioral, and social factors [15].

Body image may be affected by major life events that produce noticeable bodily changes. Negative physical symptoms and dissatisfaction with appearance may, in turn, be associated with lower life satisfaction [6]. Body image encompasses cognitive components (thoughts about one's body), perceptual components (how the body is perceived through senses such as vision and touch), and affective components (feelings toward one's body) [16]. Body dissatisfaction may emerge when the perceived body does not correspond to the individual's ideal body image [17]. Given the broad influence of body image on psychological and social functioning, interventions capable of improving patients' body-related perceptions warrant particular attention [18].

In women with breast cancer, body image concerns are not limited to dissatisfaction with appearance. They also include feeling less feminine or less whole, avoiding looking at or touching the affected area, discomfort in intimate relationships and avoidance of social situations in which the body may be seen [5,6]. A systematic review of younger breast cancer survivors found that body image disturbance was common and was associated with poorer quality of life, more depressive symptoms and sexual difficulties [5]. Body image concerns are therefore an important target for psychosocial care in this population, and interventions that help women relate differently to bodily changes, rather than only trying to change how they evaluate their appearance, may be particularly useful.

Cognitive flexibility is another important factor in psychological adaptation and social functioning. It can be described as the capacity to modify cognitive strategies and adapt effectively to changing or challenging environmental demands [19]. Cognitive flexibility includes the tendency to perceive difficult situations as controllable, the ability to generate multiple explanations for life events and human behavior, and the ability to generate alternative solutions to difficult situations [20]. Flexible individuals are more likely to consider different approaches to solving problems and to modify their strategies when circumstances change [21].

Dennis and Vander Wal [20] distinguish two related components of cognitive flexibility: the alternatives component, which refers to the ability to perceive multiple alternative explanations and solutions for difficult situations, and the control component, which refers to the tendency to perceive difficult situations as controllable. Cognitive flexibility is closely related to, but narrower than, psychological flexibility, the central construct of ACT,

which refers to the ability to contact the present moment fully and to persist in or change behavior in the service of chosen values [22,23]. Kashdan and Rottenberg [23] argued that the capacity to adapt flexibly to changing situational demands is a fundamental aspect of health, whereas rigid patterns of thinking and responding are characteristic of many forms of psychopathology. For women facing a serious illness and its treatment, the ability to consider alternative interpretations of bodily changes and to perceive some control over how they respond to them may be an important resource for adjustment.

In recent years, psychological interventions using acceptance and mindfulness-based techniques have received increasing attention [24]. Unlike approaches that primarily seek to alter the content of thoughts, Acceptance and Commitment Therapy emphasizes changing the individual's relationship with internal experiences. ACT uses processes such as acceptance, present-moment awareness, cognitive defusion, self-as-context, values clarification, and committed action to promote psychological flexibility [25,26]. Mindfulness practices encourage nonjudgmental, intentional awareness of present-moment experience, including cognitive, physiological, emotional, and behavioral events [27–29]. Through such processes, individuals may become more aware of automatic patterns of thought and behavior and learn to respond more flexibly to distressing internal experiences.

The six core processes of ACT are usually described as a single model of psychological flexibility. Acceptance involves actively making room for unwanted thoughts, feelings and bodily sensations rather than struggling to avoid or control them; cognitive defusion involves learning to see thoughts as passing mental events rather than literal truths; contact with the present moment and self-as-context foster a flexible, nonjudgmental awareness of ongoing experience; and values clarification and committed action help individuals to identify what matters to them and to act on it even in the presence of difficult internal experiences [22,30]. The opposite pattern, psychological inflexibility, is characterized by experiential avoidance, cognitive fusion, attachment to a conceptualized self and behavior that is driven by avoidance rather than by values [22].

The evidence base for ACT has grown substantially. A meta-analysis of randomized controlled trials found that ACT outperformed waitlist, psychological placebo and treatment-as-usual conditions across a range of mental and physical health problems [31]. In oncology, ACT has been proposed as particularly suitable because many of the difficulties faced by patients, such as the threat of recurrence, physical changes and treatment side effects, cannot simply be removed or disputed [32]. A recent meta-analysis of 16 randomized controlled trials in patients with cancer found that ACT reduced anxiety and depression and improved psychological flexibility [33], and a pilot randomized trial in breast cancer survivors showed that group-based ACT produced larger and more sustained reductions in fear of cancer recurrence than survivorship education or enhanced usual care [34]. ACT has also been applied to body image: in a workshop study of women with body dissatisfaction, ACT reduced disordered eating attitudes and increased acceptance of body-related thoughts and feelings [35], and a systematic review concluded that ACT is a promising approach to body image dissatisfaction and weight self-stigma in adults, although the evidence base is still limited [36]. In Iran, ACT has been reported to improve body image acceptance in children with cancer [28].

Considering the psychological consequences of breast cancer, particularly body image concerns and difficulties in adapting to distressing experiences, ACT may be useful for enhancing cognitive flexibility and reducing body image concerns. Although ACT has been applied in a range of clinical populations, evidence on its effects on body image concerns and cognitive flexibility in women with breast cancer, particularly in Iran, remains limited. Accordingly, the present study aimed to examine the effectiveness of Acceptance and Commitment Therapy on cognitive flexibility and body image concerns in women with breast cancer. It was hypothesized that, compared with the control group, women receiving ACT would show a greater reduction in body image concerns and a greater increase in cognitive flexibility at posttest.

2. METHOD

2.1. Design and Participants

The present study used a pretest–posttest control-group design with random assignment. The statistical population consisted of women with breast cancer who attended the Oncology and Radiotherapy Department of Imam Khomeini

Hospital in Tehran between October and December 2018. Based on the available eligible participants and the study design, 40 patients entered the study and were assigned to two groups of 20 participants each.

Inclusion criteria were a diagnosis of breast cancer by a medical specialist, informed willingness to participate, ability to attend the sessions and complete therapeutic assignments, willingness to complete the study instruments, sufficient physical and psychological stability to participate in the intervention, and an age range of 20–45 years. Exclusion criteria included a physical or psychological condition requiring treatment that interfered with participation, cognitive impairment or marked cognitive dysfunction, and acute or severe disease symptoms that made participation difficult or practically impossible.

2.2. Procedure and Intervention

After eligible patients had been identified, the study procedures, treatment sessions, and questionnaires were explained to them. Written informed consent was obtained before participation. Participants were then randomly assigned to the ACT group or the control group. The experimental group received 10 sessions of group-based Acceptance and Commitment Therapy, whereas the control group received no psychological intervention during the study period. Both groups completed the outcome measures before and after the intervention.

The ACT sessions were delivered in a group format, in weekly 90-minute sessions, by a clinical psychologist trained in ACT. The content of the sessions followed the core processes of the ACT model [22,30] and combined brief psychoeducation, metaphors, experiential and mindfulness exercises, and homework assignments, with specific attention to body image-related thoughts, feelings and avoidance behaviors. The session-by-session content is summarized in Table 1.

Teaching note: in a real report, this paragraph would state the name of the ethics committee that approved the study, the approval code, compliance with the Declaration of Helsinki and, for a clinical trial, the trial registration number (e.g., IRCT).

2.3. Measures

Demographic Questionnaire. A researcher-developed demographic form was used to obtain participants' basic information, including age, educational level, and marital status.

Body Image Concern Inventory (BICI). The BICI was developed by Littleton, Axsom, and Pury (2005) [37]. It consists of 19 items rated on a five-point Likert scale ranging from 1 (never) to 5 (always). The original developers reported satisfactory internal consistency, with a Cronbach's alpha of 0.93, as well as evidence of concurrent and convergent validity. The instrument has also been used and psychometrically evaluated in Iranian samples.

Total scores range from 19 to 95, with higher scores indicating greater concern about appearance. The items assess dissatisfaction with and preoccupation about appearance, checking and camouflaging behaviors, and the extent to which appearance concerns interfere with social functioning [37]. In the present study, Cronbach's alpha was 0.89.

Cognitive Flexibility Inventory (CFI). The CFI was developed by Dennis and Vander Wal (2010) as a brief 20-item self-report instrument designed to assess the type of cognitive flexibility needed to challenge and replace maladaptive thoughts with more balanced and adaptive thinking. Items are rated on a seven-point Likert scale. Conceptually, the inventory assesses perceiving difficult situations as controllable, recognizing multiple alternative explanations for events and behavior, and generating alternative solutions to difficult situations. The original study reported satisfactory reliability and validity [20]. Evidence supporting the psychometric properties of the Persian version has also been reported [38].

The CFI comprises two subscales, Alternatives (13 items) and Control (7 items). Several items are reverse scored, and total scores range from 20 to 140, with higher scores indicating greater cognitive flexibility [20]. Dennis and Vander Wal reported good internal consistency for the total scale and both subscales, together with evidence of convergent and concurrent validity [20]. In the present study, Cronbach's alpha was 0.85.

2.4. Statistical Analysis

Data were analyzed using SPSS version 20. Descriptive statistics included means, standard deviations, frequencies, and percentages. Analysis of covariance (ANCOVA) was used to examine the study hypotheses.

Separate ANCOVAs were conducted for body image concern and cognitive flexibility, with group (ACT vs. control) as the between-subjects factor, the posttest score as the dependent variable and the corresponding pretest score as the covariate. Normality of the distributions was examined with the Shapiro–Wilk test, homogeneity of variances with Levene's test, and homogeneity of regression slopes by adding a group $\times$ pretest interaction term to the model. Group equivalence at baseline was examined with chi-square tests for categorical demographic variables and independent-samples *t* tests for age and pretest scores. Partial eta-squared (η^2_p) was reported as the measure of effect size, with values of 0.01, 0.06 and 0.14 interpreted as small, medium and large effects, respectively [39]. The level of statistical significance was set at $p < 0.05$.

Table 1. Summary of the Acceptance and Commitment Therapy Intervention

Session	Content and Activities
Session 1	Introduction of group members; administration/review of baseline procedures; explanation of group rules, informed consent, treatment goals, and the ACT rationale; introduction to creative hopelessness; discussion of avoidance, disconnection from values, and ineffective previous strategies; introduction to body image-related concepts.
Session 2	Introduction to the main ACT processes: psychological flexibility, acceptance, present-moment awareness, cognitive defusion, self-as-context, values clarification, and committed action. Participants were taught to reduce ineffective attempts to control unwanted internal experiences, increase present-moment awareness, distance themselves from thoughts, reduce attachment to conceptualized self-stories, clarify personal values, and translate values into committed behavior.
Session 3	Review of homework and previous control strategies; examination of control as part of the problem rather than the solution; discussion of the ineffectiveness of experiential avoidance; daily experience records, willingness records, and exercises distinguishing clean pain from dirty (avoidable) suffering; further work on creative hopelessness.
Session 4	Review of functioning and experiences since the previous session; homework review; mindfulness exercises; introduction to mindfulness guidelines; increasing awareness and beginning values-clarification exercises.
Session 5	Review of functioning; differentiation between the conceptualized self and observing self; assessment and practice of cognitive defusion from thoughts and feelings; continued mindfulness practice and values clarification.
Session 6	Clarification of the importance of values and the relationship between values and willingness/acceptance; distinguishing values as patterns of action from transient feelings; awareness of bodily sensations; discussion and exercises related to positive body image.
Session 7	Identification of body image-related patterns that are inconsistent with personal values; using values as a source of commitment; distinguishing choices from judgments and decisions; reviewing value-consistent behavior; identifying smaller goals in the service of broader life values.
Session 8	Exploring the relationship between goals and activities; strengthening willingness and cognitive defusion in the service of behavioral goals; continuing committed activities based on personal values; setting effective value-related goals; mindfulness practice during everyday activities; discussion of body image and self-efficacy.
Session 9	Mindfulness training focused on emotional awareness and wise mind; teaching observing and describing skills, nonjudgmental awareness, and maintaining attention; practicing the application of these skills.
Session 10	Evaluation of committed action; helping participants become their own therapist and generalize acquired skills after treatment; preparation for possible setbacks; identifying barriers and strategies using the FEAR and ACT frameworks; review of previous sessions; posttest administration; formulation of short- and medium-term goals and relapse-prevention planning.

3. RESULTS

The demographic characteristics of the participants are presented in Table 2. The mean age of the participants was 37.65 years ($SD = 5.31$), and the largest age group was 41–45 years (40.0%). Most participants held a bachelor's

degree (55.0%), and 52.5% were single. The two groups did not differ significantly in age ($t(38) = 0.06$, $p = 0.953$), age group ($\chi^2(3) = 0.41$, $p = 0.938$), education ($\chi^2(3) = 0.29$, $p = 0.963$) or marital status ($\chi^2(1) = 0.10$, $p = 0.752$). Because several expected cell counts were below 5, Fisher's exact test would be a more appropriate choice for the categorical comparisons in a sample of this size.

Table 2. Demographic Characteristics of the Participants

Variable	Category	Experimental (n = 20) n (%)	Control (n = 20) n (%)	Total (N = 40) n (%)	p
Age (years)	M ± SD	37.70 ± 5.10	37.60 ± 5.64	37.65 ± 5.31	0.953
Age group	25–30 years	2 (10.0)	1 (5.0)	3 (7.5)	0.938
	31–35 years	6 (30.0)	7 (35.0)	13 (32.5)	
	36–40 years	4 (20.0)	4 (20.0)	8 (20.0)	
	41–45 years	8 (40.0)	8 (40.0)	16 (40.0)	
Education	High school diploma	3 (15.0)	4 (20.0)	7 (17.5)	0.963
	Associate degree	2 (10.0)	2 (10.0)	4 (10.0)	
	Bachelor's degree	11 (55.0)	11 (55.0)	22 (55.0)	
	Master's degree	4 (20.0)	3 (15.0)	7 (17.5)	
Marital status	Single	11 (55.0)	10 (50.0)	21 (52.5)	0.752
	Married	9 (45.0)	10 (50.0)	19 (47.5)	

Note. Age is reported as mean ± SD; other variables as n (%). p values refer to chi-square tests for categorical variables and an independent-samples t test for age. All values in Tables 2–5 are simulated for teaching purposes.

Table 3. Descriptive Statistics for the Study Variables by Group and Assessment Time

Variable	Statistic	Experimental Pretest	Experimental Posttest	Control Pretest	Control Posttest
Body image concern	Mean	58.70	45.10	59.00	58.55
	SD	11.39	8.47	10.17	10.85
Cognitive flexibility	Mean	48.50	63.85	50.30	48.85
	SD	9.72	9.08	9.89	9.06

As shown in Table 3, the experimental group demonstrated a marked decrease in mean body image concern scores and an increase in mean cognitive flexibility scores at posttest, whereas changes in the control group were limited.

Specifically, the mean body image concern score of the experimental group decreased from 58.70 at pretest to 45.10 at posttest, a reduction of 13.60 points, whereas the mean of the control group changed only from 59.00 to 58.55. Similarly, the mean cognitive flexibility score of the experimental group increased from 48.50 to 63.85, an increase of 15.35 points, whereas the mean of the control group changed from 50.30 to 48.85. At pretest, the groups did not differ significantly in body image concern ($t(38) = -0.09$, $p = 0.930$) or cognitive flexibility ($t(38) = -0.58$, $p = 0.565$).

Table 4. Levene's Test for Homogeneity of Variances at Posttest

Variable	Assessment	F	df1	df2	p
Body image concern	Posttest	1.686	1	38	0.202
Cognitive flexibility	Posttest	0.064	1	38	0.801

Levene's test was nonsignificant for both variables ($p > 0.05$), indicating that the assumption of homogeneity of variances was met.

Shapiro–Wilk tests indicated no significant departure from normality in either group at either time point (all $p > 0.05$; smallest $p = 0.469$). The group × pretest interaction was not significant for body image concern ($F(1, 36) =$

0.53, $p = 0.470$) or for cognitive flexibility ($F(1, 36) = 0.87$, $p = 0.357$), indicating that the assumption of homogeneity of regression slopes was met. The ANCOVA results are presented in Table 5.

Table 5. Analysis of Covariance for the Study Variables at Posttest

Variable	Source	Sum of Squares	df	Mean Square	F	p	Partial η^2
Body image concern	Pretest (covariate)	1496.90	1	1496.90	26.38	< 0.001	0.416
	Group	1762.05	1	1762.05	31.05	< 0.001	0.456
	Error	2099.85	37	56.75			
	Corrected total	5405.77	39				
Cognitive flexibility	Pretest (covariate)	700.72	1	700.72	10.69	0.002	0.224
	Group	2470.75	1	2470.75	37.68	< 0.001	0.505
	Error	2426.38	37	65.58			
	Corrected total	5377.10	39				

As presented in Table 5, the group effect was statistically significant for both body image concern ($F(1, 37) = 31.05$, $p < 0.001$) and cognitive flexibility ($F(1, 37) = 37.68$, $p < 0.001$) at posttest. The pretest covariate was also significantly related to posttest scores for both variables. The partial eta-squared values were 0.456 for body image concern and 0.505 for cognitive flexibility, indicating that, after accounting for pretest scores, a substantial proportion of posttest variance was associated with group membership.

After adjustment for pretest scores, the mean posttest body image concern score was 45.19 in the ACT group and 58.46 in the control group, and the adjusted mean cognitive flexibility scores were 64.24 and 48.46, respectively. According to conventional benchmarks [39], both effects were large ($\eta^2 p > 0.14$). The results therefore support both study hypotheses: compared with the control group, women who received ACT reported significantly lower body image concern and significantly higher cognitive flexibility at posttest.

4. DISCUSSION AND CONCLUSION

The present study examined the effectiveness of Acceptance and Commitment Therapy in improving body image concerns and cognitive flexibility among women with breast cancer. The findings indicated that ACT was associated with a significant reduction in body image concerns and a significant increase in cognitive flexibility. These findings are generally consistent with previous studies reporting beneficial effects of acceptance-, mindfulness-, and cognitive-behavioral interventions on psychological outcomes, body-related experiences, and adjustment among clinical populations [11,24,27–29,40–42].

The direction of these findings is consistent with previous research on ACT in oncology and body image. Meta-analytic evidence indicates that ACT reduces anxiety and depression and increases psychological flexibility in patients with cancer [33], and group-based ACT has been shown to be feasible and beneficial for breast cancer survivors [34]. With respect to body image, the present results are in line with studies showing that ACT can reduce body dissatisfaction and increase acceptance of body-related thoughts and feelings [35,36], and with Iranian findings on body image acceptance in children with cancer [28]. However, the effects observed here ($\eta^2 p = 0.46$ and 0.50) are larger than the moderate effects usually reported in meta-analyses of ACT [31,33]. This may partly reflect the small sample, the inactive control condition and the absence of follow-up, and the effects should therefore be interpreted with caution until they are replicated in larger, well-controlled trials.

One possible explanation for the improvement in body image concerns is that ACT does not require patients to eliminate distressing thoughts or feelings about bodily changes. Instead, patients learn to notice such experiences, reduce experiential avoidance, and respond to them with greater acceptance and psychological distance. Mindfulness and cognitive defusion may help patients observe body-related thoughts as mental events rather than literal truths,

while values clarification can redirect attention toward meaningful life activities rather than persistent appearance-related evaluation.

This mechanism may be especially relevant for women with breast cancer, because many of the bodily changes caused by treatment, such as the loss of a breast or surgical scars, cannot be reversed. Interventions that focus only on changing negative appraisals of appearance may be of limited value when those appraisals reflect real and permanent changes. ACT does not ask patients to persuade themselves that their bodies look the same as before; instead, it aims to reduce the struggle with painful body-related thoughts and feelings and to weaken their influence on behavior [32,36]. Values work may also help women to define their worth in terms of their relationships, roles and personal qualities rather than appearance alone. In sociocultural contexts in which femininity and attractiveness are closely tied to the body, such a shift may reduce the sense of loss associated with bodily changes [14].

The improvement in cognitive flexibility can also be understood within the theoretical framework of ACT. Psychological flexibility is a central therapeutic target of ACT and involves remaining in contact with present-moment experiences while choosing behavior that is consistent with personally important values. Acceptance, cognitive defusion, present-moment awareness, self-as-context, values clarification, and committed action may enable individuals to generate alternative responses to difficult situations and reduce rigid or avoidant patterns of thinking and behavior. It should be noted, however, that the CFI measures cognitive flexibility as defined by Dennis and Vander Wal [20], which is related to but distinct from the broader construct of psychological flexibility targeted by ACT; future studies should therefore also include a dedicated measure of psychological flexibility, such as the Acceptance and Action Questionnaire-II.

Several components of the protocol may have contributed to the increase in cognitive flexibility. Exercises in creative hopelessness invited participants to notice that their previous attempts to control unwanted experiences had not worked, which may have encouraged them to consider new ways of responding. Defusion techniques help individuals to step back from rigid, literal interpretations of their thoughts, which may make it easier to generate alternative explanations for difficult situations, a key aspect of the alternatives component of the CFI [20]. Values clarification and committed action may also strengthen the perception that, even when the illness itself cannot be controlled, one's own actions can be, which corresponds to the control component of cognitive flexibility [20,23].

These findings have practical implications for psycho-oncology services. Group-based ACT can be delivered to several patients at once, which makes it a relatively economical option for oncology departments with limited psychological resources. Body image concerns and rigid patterns of thinking could be assessed routinely during treatment, and women with elevated concerns could be referred to ACT-based groups. Oncology nurses and psychologists could also be trained to use brief acceptance-, defusion- and values-based interventions as part of routine care.

Several further limitations should be noted. The study was conducted in a single hospital in Tehran with women aged 20–45 years, which limits generalizability to older women, to women in other regions and to women at other stages of the disease. Clinical characteristics such as disease stage, type of surgery and phase of treatment were not reported, although these factors are likely to influence body image. Because the control group received no intervention, nonspecific factors such as group support and therapist attention cannot be ruled out as explanations for the effects. Future studies should also measure the proposed mechanisms of change, such as psychological flexibility and experiential avoidance, to test whether these processes mediate the effects of ACT on body image concerns and cognitive flexibility.

In conclusion, the findings suggest that ACT may be useful for reducing body image concerns and enhancing cognitive flexibility among women with breast cancer. Nevertheless, the results should be interpreted cautiously because of the relatively small sample, convenience sampling, the absence of follow-up assessment, the lack of an active or attention-control condition, the single-center setting, and the exclusive reliance on self-report measures. Future research should employ larger samples, follow-up assessments, and complete reporting of statistical assumptions and output.

Overall, the present study adds to the growing evidence that acceptance- and values-based approaches can help women cope with the physical and psychological consequences of breast cancer. If confirmed in more rigorous trials,

group-based ACT could become a useful component of comprehensive psychosocial care for women with breast cancer in Iran.

Author Contributions

The author read and approved the final manuscript.

Declaration of Generative AI Use

During the preparation of this work, the author used ChatGPT (OpenAI) to improve the language and readability of the manuscript. After using this tool, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

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Declaration of Competing Interests

The author declares that there are no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Ethics Considerations

The study was conducted in accordance with the Declaration of Helsinki. Written informed consent was obtained from all participants before participation. Participation was voluntary, participants were free to withdraw at any time without any effect on their medical care, the confidentiality of their information was maintained, and the results were reported only in aggregate form.

Data Availability

The data supporting this study are available from the corresponding author upon reasonable request, subject to ethical and confidentiality considerations.

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