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Effectiveness of Eye Movement Desensitization and Reprocessing (EMDR) Therapy on Fear of Cancer Recurrence and Body Image in Patients with Breast Cancer

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A B S T R A C T

Objective: The present study aimed to compare the effectiveness of Eye Movement Desensitization and Reprocessing (EMDR) therapy on fear of cancer recurrence and body image in patients with breast cancer.

Methods and Materials: This research employed a quasi-experimental design, using a pretest-posttest-follow-up model with a control group for data collection. The statistical population consisted of women undergoing chemotherapy for breast cancer who visited the Jihad Daneshgahi Breast Disease Specialized and Subspecialized Clinic in Tehran during the second half of 2023. From this population, 40 individuals were selected using cluster random sampling and were randomly assigned to an experimental group (n = 20) and a control group (n = 20). The experimental group received EMDR therapy across eight 90-minute sessions, while the control group was placed on a waiting list. The research instruments included the Fear of Cancer Recurrence Inventory (Simard & Savard, 2009) and the Body Image Scale (Cash, 1994). Data analysis was conducted using SPSS version 27 in two phases: descriptive and inferential statistics (ANCOVA and MANCOVA).

Findings: The findings indicated that EMDR therapy had a significant impact on components of fear of cancer recurrence and body image compared to the control group in both the posttest and follow-up phases ($P < 0.05$).

Conclusion: It can be concluded that EMDR therapy, through its specialized techniques, was effective in improving fear of cancer recurrence and body image, and its integration alongside pharmacological treatments is recommended.

Keywords: *Fear of cancer recurrence, body image, Eye Movement Desensitization and Reprocessing (EMDR), breast cancer.*

1. Introduction

Breast cancer is one of the most common and concerning types of cancer among women and is recognized as a serious public health challenge (Cinek, 2025; Pehlivan & Eyı, 2024). Given the increasing prevalence of this disease in recent years, attention to its psychological and social aspects has gained growing importance (Hamzehrad et al., 2024; Tunç et al., 2023). A breast cancer diagnosis not only affects the patient's physical condition but may also lead to various psychological and emotional issues that impact the quality of life of patients (Tamannayi Far et al., 2023; Thakur et al., 2022). Medical and surgical treatments alone are not sufficient, and there is a need for psychological interventions to assist patients in managing the emotions and psychological challenges associated with this illness (Doori et al., 2022; Üyesi & Kâtip, 2021).

Fear of cancer recurrence is one of the most common issues among breast cancer survivors (Zhao et al., 2024). This fear can significantly affect patients' quality of life and mental health. Studies have shown that many patients are continuously exposed to concerns about the return of the disease, which may lead to anxiety, depression, and a decrease in self-confidence (Hinz et al., 2024; Londoudi, 2024). Fear of recurrence not only influences health behaviors and adherence to follow-up treatments, but it can also create a negative cycle of worry and stress, acting as a risk factor for the development of further psychological problems (Tauber et al., 2022; Tutelman et al., 2022).

Body image concerns are another important psychological aspect faced by patients with breast cancer (Tanch, 2023). Physical changes resulting from cancer treatments, such as surgery, chemotherapy, and radiotherapy, may lead to feelings of unattractiveness and reduced self-worth. These changes can negatively impact patients' social and emotional relationships, distancing them from social activities and human interactions (Karimi Mohajeri et al., 2025; Tamannayi Far et al., 2023). Consequently, body image concerns may exacerbate psychological and emotional issues and adversely affect the patients' quality of life (Tahir & Khan, 2021; Üyesi & Kâtip, 2021).

Eye Movement Desensitization and Reprocessing (EMDR) therapy has been recognized as an effective method for managing psychological problems in patients with breast cancer. EMDR is particularly effective in reducing fear of recurrence and improving body image because it helps patients process traumatic experiences and reduce negative emotions. This method can assist patients in coping more effectively with their fears, thereby enhancing their quality of life (Bloomgarden & Calogero, 2008; Capezzani et al., 2013; Pourjaberi et al., 2023).

Given the importance of these two therapeutic targets, comparing the effectiveness of EMDR therapy in reducing fear of recurrence and improving body image among patients with breast cancer may contribute to the development of more effective interventions and the enhancement of patients' quality of life. Therefore, the present study was conducted to determine the effectiveness of Eye Movement Desensitization and Reprocessing (EMDR) therapy on fear of recurrence and body image in patients with breast cancer.

2. Methods and Materials

2.1. Study design and Participant

The present study employed a quasi-experimental design using a pretest-posttest-follow-up format with a control group. The statistical population consisted of women with breast cancer undergoing chemotherapy in Tehran who visited the Specialized and Subspecialized Breast Disease Clinic of Jihad Daneshgahi during the second half of 2023. Cluster random sampling was used to select participants. To determine sample size, Cohen's table was utilized. Considering an effect size of 0.7 based on previous studies, a test power of 0.91, and a significance level of 0.05, the minimum sample size required for each group was 15 participants, totaling 30 patients for a power of 0.91. To account for potential attrition during the study, the sample size was increased to 40 breast cancer patients. Accordingly, 40 patients were randomly assigned (random replacement based on group matching using baseline data) to two intervention groups and one control group, based on inclusion and exclusion criteria.

Inclusion criteria were: no formal diagnosis of major psychiatric disorders (as evaluated by a psychiatrist), no concurrent participation in other psychological interventions, at least six months since diagnosis, and no physical or psychological impairments that would hinder participation. Exclusion criteria included missing more than two therapy sessions or unwillingness to continue treatment. After identifying participants, the first session involved explaining the procedure, including the objectives, schedule, intervention process, potential benefits, and withdrawal rights. The research scales were then distributed, and instructions on completing them were provided. Participants

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were randomly allocated to the experimental and control groups, and session start dates were determined. The experimental group received eight 90-minute sessions of Eye Movement Desensitization and Reprocessing (EMDR) therapy, while the control group remained on a waiting list.

To comply with ethical standards, an informed consent form was provided, explaining the overall aim of the study. Participation was voluntary, and it was emphasized that there would be no personal misuse of information.

After obtaining the necessary approvals from Islamic Azad University of Tonekabon and the Specialized and Subspecialized Breast Disease Clinics of Jihad Daneshgahi in Tehran, the researcher visited the hospital. Forty breast cancer patients were selected through convenience sampling, coordinated with hospital authorities. Participants were randomly assigned to intervention or control groups based on inclusion/exclusion criteria and an individual interview. All participants completed the pretest questionnaires prior to the intervention. Participants were briefed about the study's objectives, the importance of responding to all items, and the confidentiality of their responses. All questionnaires were coded for the pretest, posttest, and follow-up phases, and each participant received a unique code. Participants retained the right to withdraw from the study at any stage.

An 8-session treatment protocol (EMDR) was developed for consistent intervention delivery. Each session lasted 75–90 minutes and followed Shapiro's (2002) eight-phase treatment plan, adapted for Iranian use by Hekmatian-Fard et al. (2021), and validated by experts. To gain the trust and cooperation of participants, the session rules and participation duration were explained, and session times were scheduled in agreement with them. After completing the sessions, participants from both the experimental and control groups completed the posttest questionnaires. A follow-up test was administered two months later to assess the durability of the intervention effects.

The intervention was conducted by two trained practitioners—one with a master's degree and the other a doctoral student—at the clinic. The control group did not receive any intervention during this period. Posttest and follow-up assessments were conducted three months after the intervention ended.

To adhere to ethical and professional standards, written informed consent was obtained from all participants. To motivate the control group, they were thanked for their participation and invited to attend individual or group sessions free of charge after the intervention period. They were also given access to free or discounted educational materials and workshops organized by the researcher. Some participants expressed interest in receiving feedback on their questionnaire responses, and simple interpretive reports were provided accordingly.

2.2. Measures

2.2.1. Fear of Cancer Recurrence

This self-report questionnaire was developed by Simard and Savard (2009) to assess fear of cancer recurrence over the past month. It consists of 42 items scored on a 5-point Likert scale from 0 to 4. The item "I believe I am cured and my illness will not return" is reverse-scored. The questionnaire provides clinical information on the nature of fear of recurrence and generates scores for seven subscales: triggers, severity, psychological distress, functional impairment, insight, reassurance, and coping strategies. Subscale scores are summed to obtain a total score, with higher scores indicating greater fear of recurrence. The original French version has high internal consistency (Cronbach's alpha = 0.95) and a one-month test-retest reliability of 0.89 (Simard & Savard, 2009). Concurrent validity with other self-report measures of fear of recurrence ranged from 0.68 to 0.77, with related constructs such as psychological distress from 0.43 to 0.77, and quality of life constructs from -0.20 to -0.30 (Simard & Savard, 2009). In Iran, Kiarsi et al. (2021) reported a Cronbach's alpha of 0.93 and concurrent validity of -0.32 with the SF-36 Quality of Life Questionnaire (Hosseini et al., 2023). In the present study, Cronbach's alpha for the total score was 0.84, and for the subscales ranged from 0.66 to 0.86.

2.2.2. Body Image

This 46-item scale was developed by Cash (1994) and is scored on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). It assesses the individual's evaluative and emotional experience of their physical appearance. It includes two subscales: items 1–37 evaluate appearance assessment, with a test-retest reliability of 0.81 and Cronbach's alpha of 0.88; items 38–46 assess satisfaction with specific body parts, with a test-retest reliability of 0.86 and Cronbach's alpha of 0.77 (Cash, 1994). Total scores range from 46 to 230, with lower scores indicating lower levels of positive appearance-related experiences (Cash & Pruzinsky, 1990). In Iran, Raigan, Shaeiri, and Asghari-Moghaddam (2006) reported a validity

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coefficient of 0.55 between body image and self-esteem, while Raqibi and Minakhani (2011) reported Cronbach's alpha of 0.84 (Karimi Mohajeri et al., 2025). In the present study, Cronbach's alpha was 0.86.

2.3. Intervention

2.3.1. Eye Movement Desensitization and Reprocessing (EMDR)

Based on Shapiro's (2002) eight-phase treatment model, which was adapted and validated in Iran by Hekmatian-Fard et al. (2021), the intervention was carried out with minor modifications and expert approval over five weekly sessions, each lasting 75–90 minutes.

The intervention protocol based on the Eye Movement Desensitization and Reprocessing (EMDR) approach was implemented over eight structured sessions. In the first session (history-taking), essential information was gathered about the client, their core beliefs were assessed, a safe place was identified, and therapeutic goals were established. The second session (preparation) focused on educating the client about EMDR, teaching relaxation techniques, and introducing metaphors to help visualize distressing scenes from a psychological distance—such as viewing them on a television screen or through a train window. In the third session (assessment), the client selected a painful memory, identified a related negative cognition (e.g., "I am alone"), and proposed a corresponding positive cognition to be installed later in therapy. The fourth session (desensitization) involved guided dual attention stimulation through eye movements while the client concentrated on distressing images, emotions, bodily sensations, and negative beliefs. The therapist performed 15–30 bilateral movements using hand motions, followed by client feedback and repeated exposure to the traumatic memory. In the fifth session (installation), the focus shifted to strengthening the positive cognition until the Subjective Units of Distress (SUD) reached 1–2 and the Validity of Cognition (VOC) scaled to 6–7, indicating significant emotional relief and cognitive alignment. The sixth session (body scan) involved a full-body check from head to toe to identify and address any residual physical tension or discomfort associated with the memory. The seventh session (closure) helped the client return to a state of calm, ensuring emotional and physiological stability before concluding. Finally, the eighth session (re-evaluation) assessed whether therapeutic goals had been achieved and informed planning for any future sessions.

2.4. Data Analysis

To analyze the data, the following statistical methods were used: descriptive statistics (mean, standard deviation), Levene's test (to assess homogeneity of variances), skewness and kurtosis tests (to assess normality of score distributions), ANCOVA and MANCOVA (depending on the hypotheses), repeated measures ANOVA, and Bonferroni correction for pairwise comparisons. All statistical analyses were conducted using SPSS version 27.

3. Findings and Results

Descriptive indicators (mean and standard deviation) of scores on fear of cancer recurrence and body image in the Eye Movement Desensitization and Reprocessing (EMDR) group and the control group at the pretest, posttest, and follow-up stages are presented in Table 1.

Table 1

Mean and Standard Deviation of Research Variables by Assessment Phase Across Groups

Group	Variable	Index	Pretest	Posttest	Follow-up
EMDR	Fear of Cancer Recurrence	Mean	107.80	90.40	94.40
		Standard Deviation	11.97	13.13	11.64
		Skewness	-0.24	0.20	-0.13
		Kurtosis	-0.18	-0.88	0.01
Control	Fear of Cancer Recurrence	Mean	108.50	109.05	109.15
		Standard Deviation	10.13	13.73	15.44
		Skewness	0.04	0.10	-0.50
		Kurtosis	-0.02	-0.93	-0.69
EMDR	Appearance Evaluation	Mean	90.60	105.60	103.20
		Standard Deviation	15.32	11.25	14.12
		Skewness	1.27	0.01	0.17
		Kurtosis	1.56	-0.97	-1.50
Control	Appearance Evaluation	Mean	91.20	89.85	91.30
		Standard Deviation	16.93	15.54	14.76

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		Skewness	1.35	0.46	0.22
		Kurtosis	1.80	-0.96	-0.85
EMDR	Satisfaction with Body Areas	Mean	18.50	24.10	23.80
		Standard Deviation	3.61	3.75	4.30
		Skewness	0.12	-0.56	-0.63
		Kurtosis	-0.64	-1.20	-0.16
Control	Satisfaction with Body Areas	Mean	17.30	16.20	17.10
		Standard Deviation	3.69	4.71	4.56
		Skewness	0.24	0.07	0.03
		Kurtosis	-0.64	-1.31	-0.74

As observed, the mean scores in the EMDR group show changes from pretest to posttest. Based on the results in the table, it can be stated that Eye Movement Desensitization and Reprocessing has led to changes in the components of fear of cancer recurrence and body image in women with breast cancer.

Initially, as the first assumption, the normality of data distribution for fear of cancer recurrence and body image was tested using the Shapiro-Wilk test. The Shapiro-Wilk test was selected due to the sample size in each group being fewer than 50 participants. The results of the Shapiro-Wilk test for examining the normal distribution of the dependent variables (fear of cancer recurrence and body image) showed that the significance level in all three phases (pretest, posttest, and follow-up) was greater than 0.05. Thus, it can be concluded that the distribution of data was normal, and this assumption is confirmed.

Another assumption tested was the homogeneity of variances across groups for the dependent variables (fear of cancer recurrence and body image) at different time points (pretest, posttest, follow-up) using Levene's test. The results indicated that the significance levels for all three variables across all groups and time points were greater than 0.05, supporting the assumption of homogeneity of variances.

Another essential assumption in repeated measures multivariate analysis of variance is the homogeneity of the variance-covariance matrix. This assumption holds that the variance-covariance matrix for each group should be equal, meaning that the variances and correlations among dependent variables should be consistent across all levels of independent variables. The results of Box's M test showed that the within-group significance levels for the dependent variables (fear of cancer recurrence and body image) in each group and phase (pretest, posttest, follow-up) were greater than 0.05. Therefore, the assumption of variance-covariance matrix homogeneity is confirmed.

Another key assumption in repeated measures multivariate analysis is sphericity of within-group variances. This assumption requires the variances of the differences between every pair of repeated measurements (i.e., time points) to be equal. In this study, three levels (time phases) of the independent variable (group: EMDR or control) are involved. Hence, the variance of the differences between pretest, posttest, and follow-up must be equal or nearly equal.

To test this assumption, Mauchly's test of sphericity was conducted. The findings showed that the significance level for all three dependent variables was less than 0.05. Thus, the assumption of sphericity is not met. Therefore, to obtain a more accurate approximation in hypothesis testing, the Greenhouse-Geisser correction was used, and the results of within-group variance analysis were calculated accordingly.

Based on the above assessments of all required assumptions for repeated measures multivariate analysis of variance, it can be concluded that the results of the multivariate analysis are reliable.

To examine the effect of Eye Movement Desensitization and Reprocessing (EMDR) therapy on fear of cancer recurrence scores across the pretest, posttest, and follow-up stages, a mixed-design ANOVA (with one within-subjects factor and one between-subjects factor) was conducted. The three time stages (pretest, posttest, and follow-up) were considered the within-subjects factor, and group assignment (experimental vs. control) was considered the between-subjects factor. A summary of the mixed-design ANOVA results for both within- and between-group factors is presented in Table 2.

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Table 2

Mixed ANOVA for Fear of Cancer Recurrence Scores (Greenhouse-Geisser Correction)

Variable	Factor	SS	df	MS	F	Sig	Effect Size
Fear of Cancer Recurrence	Within-group	1544.32	1.67	923.44	9.57	0.001	0.20
	Interaction	1782.72	1.67	1065.99	11.05	0.001	0.23
	Between-group	3876.03	1.00	3876.03	11.78	0.001	0.24

The results presented in Table 2 indicate that the computed F-value for the within-subjects factor (assessment stages: pretest, posttest, and follow-up) is statistically significant at the 0.05 level for fear of cancer recurrence ($P < 0.05$). Therefore, there is a significant difference between the mean scores of fear of cancer recurrence across the three assessment stages. Bonferroni post-hoc test results showed that there is a significant difference between pretest and posttest scores, as well as between pretest and follow-up scores. However, no significant difference was found between posttest and follow-up scores, indicating that fear of cancer recurrence scores remained stable after the intervention.

Additionally, the interaction effect between time stages and group membership was statistically significant ($P < 0.05$), suggesting that changes over time in fear of cancer recurrence differed between the EMDR and control groups. Furthermore, the between-group effect was also significant at the 0.05 level ($P < 0.05$), indicating that there was a significant difference in the overall mean scores of fear of cancer recurrence between the EMDR and control groups.

Table 3

Mixed ANOVA for Body Image Components Scores (Greenhouse-Geisser Correction)

Variable	Factor	SS	df	MS	F	Sig	Effect Size
Appearance Evaluation	Within-group	1161.72	1.57	738.35	7.14	0.001	0.16
	Interaction	1461.32	1.57	928.77	8.98	0.001	0.19
	Between-group	2439.01	1.00	2439.01	4.97	0.03	0.12
Satisfaction with Body Areas	Within-group	155.40	1.83	84.82	10.78	0.001	0.22
	Interaction	255.27	1.83	139.33	17.70	0.001	0.32
	Between-group	832.13	1.00	832.13	22.70	0.001	0.37

As shown in Table 3, the computed F-values for the within-subjects factor (assessment stages: pretest, posttest, and follow-up) are statistically significant for both components of body image ($P < 0.05$). This indicates that the mean scores for appearance evaluation and satisfaction with body areas changed significantly over the three stages of the intervention.

Bonferroni post-hoc test results confirmed that significant differences exist between pretest and posttest scores, as well as between pretest and follow-up scores for both components. However, no significant differences were found between posttest and follow-up scores, suggesting that the improvements in body image components were maintained over time.

Regarding the interaction between assessment stages and group membership, the F-values for both body image components were significant at the 0.05 level ($P < 0.05$), indicating that the pattern of change in appearance evaluation and satisfaction with body areas differed significantly between the EMDR and control groups. Additionally, the between-group effect was also statistically significant for both components, indicating that the overall mean scores of body image components differed significantly between the EMDR and control groups.

4. Discussion and Conclusion

The results indicated that Eye Movement Desensitization and Reprocessing (EMDR) therapy was effective in reducing fear of cancer recurrence among women with breast cancer in Tehran. These findings are consistent with the prior results (Bloomgarden & Calogero, 2008; Capezzani et al., 2013; Pourjaberi et al., 2023).

To explain these findings—that EMDR is effective in reducing fear of cancer recurrence among women with breast cancer—it can be stated that EMDR is a therapeutic approach combining desensitization and imagery exposure. Individuals learn to focus on anxiety-provoking situations and the associated thoughts and emotions in order to reprocess and correct disturbing cognitions (Spicer, 2024).

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The most compelling explanation for EMDR's effectiveness lies in its underlying hypothesis, the Accelerated Information Processing model. According to this model, desensitization and cognitive restructuring occur simultaneously. When desensitization begins through eye movements, it activates physiological mechanisms in the brain that facilitate information processing. If such information is not processed, it forms dysfunctional emotional, behavioral, cognitive, and physiological patterns. These unresolved experiences become stuck in the nervous system, contributing to intrusive thoughts and avoidant behaviors. When the traumatic memory becomes accessible, the information processing system is activated, which concurrently transforms associated emotions, thoughts, and sensations (Aleksic et al., 2025; Walker, 2024). While this process primarily pertains to past memories, Shapiro argues that anxiety-related disorders can be treated without reference to past trauma by working on future-oriented situations the individual anticipates (de Roos et al., 2025). It appears that EMDR helps desensitize individuals to triggering stimuli and diminishes discouraging responses and anxiety-related behaviors toward the possibility of cancer recurrence (Hatoum & Burton, 2024).

Furthermore, EMDR therapy encourages patients to repeatedly visualize their trauma and confront it, helping them escape the confusion it causes. Recalling traumatic memories alongside reassurance from the therapist facilitates repeated exposure, which contrasts with avoidance behaviors that reinforce disorders. Confrontation fosters a sense of mastery, enabling the patient to identify internal traumatic triggers and work toward change. Linking the initial aspects of trauma—through focusing on imagery, negative cognitions, and bodily sensations—helps individuals access dysfunctional information. This information is later integrated with corrective emotional experiences during the installation phase by means of positive cognitions (de Jongh et al., 2024; Fernández et al., 2024).

The results indicated that EMDR therapy improved body image among women with breast cancer in Tehran. These findings align with prior findings (Bloomgarden & Calogero, 2008; Capezzani et al., 2013; Pourjaberi et al., 2023). Thus, recalling past body image-related events is essential for reprocessing. The selection of body image as a therapeutic target for EMDR in breast cancer patients appears justified. Reported evidence indicates that EMDR therapy, through memory processing, can reduce distress associated with negative body image memories. From a biological perspective, this treatment can be interpreted through findings by Vogdd (2018), who suggests that EMDR influences the integration of neocortical and amygdala activity. This form of processing gradually reduces hyperactivity in the limbic and pontine areas, thereby facilitating executive cortical functioning. Vogdd showed that eye movements deactivate the amygdala and enhance cognitive control. During EMDR, recalling painful or traumatic memories increases arousal levels, which are rapidly reduced by initial eye movements. Reduced amygdala activity allows deeper memory processing, which contributes to treatment efficacy (de Roos et al., 2025).

Wu (2021) reported that EMDR reduces symptoms of negative body image. The study attributes the effects to inhibitory learning mechanisms that suppress negative cognitions while facilitating the formation of positive cognitions through connection with adaptive memory networks. Shapiro stated that when a traumatic or distressing experience occurs, it may impair normal coping pathways. Unprocessed memories stored in isolated memory networks may be re-experienced upon activation. EMDR activates these networks through bilateral stimulation (eye movements, bilateral sounds, or tactile stimulation) paired with cognitions, imagery, and bodily sensations, thereby facilitating cognitive processing of distressing memories (Walker, 2024). Consequently, breast cancer patients who are preoccupied with their appearance—and for whom this preoccupation disrupts functioning—may benefit from EMDR. Bilateral stimulation triggers a physiological state that facilitates information processing.

EMDR operates through three main mechanisms:

1. It engages working memory through effortful recall.
2. It stimulates reflective bias and a parasympathetic response.
3. It mimics processes similar to those occurring during REM sleep.

As shown in this study, processing negative body image-related memories reduced their emotional charge, making them less distressing and no longer capable of triggering negative emotions or cognitions related to appearance.

5. Limitations and Suggestions

This study was conducted in Tehran, and caution must be taken when generalizing the findings to other contexts due to potential situational and cultural differences. The study population was a limited sample of breast cancer patients

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undergoing chemotherapy in Tehran, and findings should not be generalized to other populations. The study relied solely on questionnaires, which may be affected by inattention, lack of motivation, or subjective interpretation by respondents. The honesty of participants in answering questions is beyond the researcher's full control. Some respondents may have answered carelessly or out of fatigue, and some were reluctant to participate due to not receiving feedback from previous studies or questionnaires.

Based on the study findings, individualized counseling programs can be developed for patients focusing on reducing fear of recurrence and improving body image. These counseling sessions may incorporate EMDR and cognitive-behavioral techniques tailored to individual needs. Workshops can be organized where patients share their experiences with EMDR and CBT and learn effective techniques to manage fear of recurrence and illness perception. These workshops could enhance patients' ability to manage negative emotions and thoughts. Informational brochures and online resources (educational videos, articles) should be created to familiarize patients with EMDR and CBT methods for managing fear of recurrence and body image concerns.

Establishing follow-up programs to assess patients' psychological well-being post-treatment—via phone calls or counseling sessions—can help monitor progress. Support groups for breast cancer patients could provide a space for sharing experiences related to fear of recurrence and treatment effects. These groups can reduce feelings of isolation and enhance illness perception.

Future studies are recommended in different regions of the country and among women of various ages and cancer treatment stages to explore the influence of cultural, social, and economic factors on treatment outcomes and behavior. To improve validity and generalizability, future research should involve larger samples of cancer patients from diverse treatment centers and backgrounds.

To enhance data richness and accuracy, future research should supplement questionnaires with in-depth interviews, focus groups, and standardized scales. Greater attention should be paid to confounding variables such as cognitive schemas, personality traits, family history, and sociocultural factors, as these may influence treatment outcomes and the validity of findings.

Authors' Contributions

Authors contributed equally to this article.

Declaration

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

Transparency Statement

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

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

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

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