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Research Article

Effectiveness of Group Cognitive Behavioral Therapy on Depression, Cognitive Flexibility, and Cognitive Regulation of Emotion in Women with Breast Cancer

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Abstract

Background: In this research, the effectiveness of group cognitive behavioral therapy on depression, cognitive flexibility, and cognitive regulation of emotion in women with breast cancer was discussed.

Methods: This research was a quasi-experimental study with two experimental and control groups, conducted on 30 women with breast cancer in Tehran who participated in the study willingly and knowingly. The subjects were divided into two groups based on random sampling. This research used Beck Depression Questionnaire, Dennis and Vander Wal Cognitive Flexibility Questionnaire, Garnefski, Kraaij and Spinhoven Cognitive Emotion Regulation Questionnaire, and the Leahy group cognitive behavioral protocol. The treatment protocol was conducted during eight 90-minute sessions. Finally, a post-test was taken from both groups two months later. The collected data was entered into the SPSS-20 program and analyzed with covariance statistical tests and a significance level of 0.05.

Results: The results indicated a significant difference between the scores of the two groups in depression, cognitive flexibility, and cognitive regulation of excitement ($P < 0.05$).

Conclusions: Based on the findings, it was concluded that increasing the cognitive flexibility and cognitive regulation of emotions of women with breast cancer can enhance the cognitive behavioral therapy group method.

Keywords: Group Cognitive Behavioral Therapy; Depression; Cognitive Flexibility; Cognitive Regulation of Emotion; Women with Breast Cancer

1. Background

Breast cancer patients are particularly vulnerable to the psychological complications that can arise from the disease and its treatment. Between 1.5% and 50%, and on average around 30%, of these people suffer from depression. According to reports (1) citing Iranian research, the majority of breast cancer patients have some degree of depression. One study even indicated that 69.4% of patients with breast cancer experienced severe depression (2).

Depression is a common and troublesome disorder characterized by a lack of flexibility in various fields, affecting a person's cognitive processes (3). One of these processes is the concept of psychological flexibility. A depressed person is said to be the opposite of internal and external experiences. This personality trait is observed in varying degrees in different people and impacts how people react to new events (4). Researchers believe that psychological flexibility training will improve people's ability to connect with their experiences in the present time, allowing them to act in a way that is consistent with their chosen values. On the other hand, research has shown that any problem in the regulation of emotions can make a person vulnerable to mental disorders such as depression, anxiety, and stress. Berking et al., in their five-year longitudinal study entitled "prediction of emotion regulation and depression in women," concluded that deficiency in emotion regulation is a significant risk factor for depression (5).

Cognitive regulation of emotion refers to the cognitive method of managing and manipulating the input of information called emotion (6). Research results show that emotions affect attention, decision-making, memory,

physical responses, and social interactions at any moment. Therefore, various approaches, including drug treatments and psychosocial interventions, or a combination, have been introduced to treat depression in breast cancer patients (7).

Psychological intervention programs, especially those in a group format, significantly reduce cancer-related emotional distress, provide valuable social support, increase adaptive coping skills and cognitive group therapy, leading to patient insight, new experiences in the group, communicating with others, group cohesion, emotional discharge, and self-confidence (8).

Cognitive-behavioral therapy (CBT) is a combination of behavioral therapy and cognitive approaches, which are based on Pavlovian conditioning, knowledge, and cognition. Many findings by researchers and psychologists in the last two decades have shown that cognitive behavioral therapy can teach people how to change their lifestyles. Also, this therapeutic approach has had positive effects on cancer patients, including reducing depression, sleep problems, anxiety, and stress (9). For example, Mayr et al.'s study on reducing the heart radiation dose from radiation therapy for breast cancer with breathing training and cognitive behavioral therapy showed that training and psychotherapy interventions could improve sleep conditions and physical cooperation and reduce emotional distress, anxiety, and depression related to radiation therapy in breast cancer patients (10). This treatment strategy is also beneficial for cognitive flexibility and emotional regulation, as demonstrated by the Bomyea et al. study, which sought to investigate the impact of cognitive behavioral therapy on emotion regulation activation in individuals with anxiety disorders. CBT has an effect on the parahippocampal cortex, resulting in decreased nervousness and emotional regulation (11). By investigating the effectiveness of cognitive behavioral therapy on mental failure and cognitive flexibility in patients with panic disorder, Nagata et al. found that, before CBT, the mental failure and cognitive flexibility scores of the patients were significantly higher on the mental failure and flexibility scales. Participants in the control group had lower cognitive adaptability. Furthermore, the patients' average mental failure scale scores decreased significantly, while their average cognitive flexibility score increased (12).

Although controlled and comparative studies have shown the efficacy of cognitive therapies, especially cognitive-behavioral therapy, in the last few decades (13, 14), some treatments focusing on cognitive deficits and biases may hinder recovery and break therapy continuity for some patients. Integrating the positive aspects of mental functioning in patients helps them understand that psychotherapy is about reducing clinical symptoms and learning to use strengths, skills, and abilities to deal with problems. Therefore, new treatments not only lead to the improvement of depression symptoms but also increase the cognitive symptoms of a person (15).

According to the mentioned cases, it can be concluded that unlike other treatment approaches that seek to reduce the symptoms of mental disorders, positive therapeutic behavior seeks to improve and optimize treatment methods to help people reduce pain. It also focuses on positive mental functions and guiding patients toward growth, prosperity, self-control, and emotions (16).

2. Objectives

This study aimed to investigate the effectiveness of cognitive behavioral therapy on depression, cognitive flexibility, and emotion regulation in women with breast cancer. Examining this approach and its results is important for families, the government, hospitals, and service providers.

3. Methods

The study's statistical population consisted of female patients with breast cancer referred to Milad hospital in 2022. The sample size was determined according to Delavar's suggestion and similar studies (17). In this study, the Beck Depression Questionnaire, the Dennis and Vander Wal Cognitive Flexibility Questionnaire, and the Garnefski, Kraaij and Spinhoven Cognitive Emotion Regulation Questionnaire were utilized to collect data. In this way, after obtaining the code of ethics, going to Milad hospital in Tehran, and using the available method, 30 women with breast cancer who met the criteria for entering the study were randomly divided into two groups of 15 people. The first group was trained using the group cognitive behavioral therapy method provided in the training package, but the control group did not receive any intervention. Both groups answered questionnaires on depression, emotion regulation, and cognitive flexibility. Then the data was collected and the information was analyzed using SPSS statistical software with a covariance method and significance level of 0.05.

The entry criteria for the study included having completed at least one month of chemotherapy, being between the ages of 25 and 50, married, having at least a high school graduation, and having a depression score higher than the 16th grade level. All individuals gave their complete agreement to participate in the study. The exclusion criteria included a history of psychiatric and psychological interventions in the last year and the use of psychiatric drugs, having a physical disease such as diabetes, epilepsy, and kidney problems, and having at least two sessions of absence or unwillingness to participate in training sessions.

3.1. Data Collection Instruments

3.1.1. Beck Depression Questionnaire

This questionnaire contains 21 groups of questions. It was compiled for the first time in 1961 by Aaron Beck, Backward, Mendelsohn, Mark, and Arbaugh. The validity of this questionnaire were examined and proved in 1971,

1979, 1985, and 1986. The 21 items of this measure include 94 questions, arranged in sequential phrases where each item is related to a specific symptom of depression. In this test, 4 to 6 sentences are written for each substance in question, which characterizes one of the pathological symptoms of depression, indicating the mildest to the most severe aspect of that characteristic. The subjects read the article carefully and mark the sentence that describes their current state.

Since the formulation of BDI, researchers have conducted many evaluations of it. The correlation of this test with the Hamilton rating scale for depression (0.73), the Zong depression self-assessment scale (0.76), and the MMPI depression scale (0.76) has been obtained (15). The research by Rahimi on 2260 undergraduate and graduate students of Shiraz University showed the acceptable validity and reliability of the Beck Depression Test in Iranian students (18).

3.1.2. Emotional Regulation Questionnaire

This 36-item questionnaire was compiled by Garnefski et al. and evaluated nine strategies (19). Questions 1, 10, 19, and 28 are about self-blame; questions 2, 11, 20, and 29 are about acceptance; questions 3, 12, 2, 1, and 30 are about ruminations; questions 4, 13, 22, and 31 are about positive refocusing; questions 5, 14, 23, and 32 are about refocusing are about planning; questions 6, 15, 24, and 33 are about positive reappraisal; questions 7, 16, 25, and 34 are about perspective taking, questions 8, 17, 26, and 35 are about catastrophizing; and questions 9, 18, 27 and 36 are about blaming others. The answers are based on a Likert scale from never = 1 to always = 5. Garnefski et al. (as cited by Sharifibastan et al.) obtained the reliability of the test using Cronbach's alpha coefficient of 0.91 (6). Cronbach's alpha coefficients for self-blame = 0.85, non-acceptance = 0.92, rumination = 0.81, lack of positive refocusing = 0.79, lack of refocusing on planning = 0.79, lack of positive reappraisal = 0.83, lack of perspective taking = 0.78, catastrophizing = 0.84, and blaming others = 0.77 were determined using the internal correlation method by Jelodari et al. (2).

3.1.3. Cognitive Flexibility Questionnaire

This questionnaire was developed by Dennis and Vander Wal in 2010 (20). It is a short 20-item self-report instrument with three aspects of cognitive flexibility, including the desire to perceive difficult situations as controllable (perceived controllability factor), the ability to perceive multiple alternative justifications for life events, and human behavior (the perceived behavioral justifications factor), and the ability to create multiple measures with alternative solutions to difficult situations (perception of different options). Its scoring method is based on a 7-point Likert scale from 1 to 7. The sum of the scores of all the questions gives the total score of the cognitive flexibility test. The highest score that a person can get on this questionnaire is 140, and the lowest score is 20. A higher score indicates more cognitive flexibility, and a lower score close to 20 indicates low cognitive flexibility. The concurrent validity of this questionnaire with the Beck depression questionnaire was equal to -0.39, and its convergent validity with Martin and Robin's cognitive flexibility scale was 0.75. Cronbach's alpha coefficient of the whole scale was 0.90; for the subscales, they reported 0.87, 0.89, and 0.55, respectively. Also, the questionnaire has favorable concurrent and convergent factor validity in Iran. In Iran, Share et al. (2012) reported the retest coefficient of the whole scale as 0.71 and for the subscales as 0.55, 0.72, and 0.57, respectively. These researchers have reported Cronbach's alpha coefficients of the whole scale as 0.90 and the subscales as 0.78, 0.89, and 0.55, respectively (20). Cronbach's alpha coefficient calculated in this study was 0.77.

3.1.4. Cognitive Behavioral Protocol

In this research, the experimental group participated in cognitive behavioral therapy in eight 90-minute sessions based on the summary table presented below (Table 1) (21).

Table 1. Summary of the Educational Package of Cognitive-Behavioral Therapy

Sessions	Content	Method
1	Group members and the therapist are introduced to one another, and the group's basic rules are explained. Any questions or concerns raised by group members are addressed, and the therapist explains the goals of group sessions.	Aim
2	Teaching patients about the condition, familiarizing them with psychological models of pain-radiation therapy and its relationship to depression, behavioral activation training, and weekly assignments (having a daily schedule)	Cognitive-behavioral therapy
3	Reviewing the weekly assignment, providing feedback, answering possible questions and ambiguities, familiarizing the members with the conceptual model of classical cognitive-behavioral therapy, and giving the weekly assignment	Cognitive therapy
4	Reviewing the weekly assignment, providing feedback, answering possible questions and ambiguities, examining the role of emotions in the experience of pain, the effect of negative thoughts and emotions on aggravating depression and reducing activities, recognizing negative thoughts, presenting the weekly assignment (recording thoughts and challenging them).	Cognitive-behavioral therapy & emotional
5	Reviewing the weekly assignment, providing feedback, answering possible questions and ambiguities, introducing members to the techniques of managing negative emotions, learning and managing to deal with negative thoughts and emotions, problem-solving skills, and providing weekly exercises (dealing with negative thoughts).	Behavioral therapy

6	Reviewing the weekly assignment, providing feedback, answering possible questions and ambiguities, identifying thinking errors, the role of cognition in the experience of negative feelings, and presenting the weekly exercise.	Cognitive therapy
7	Reviewing the weekly assignment, providing feedback, answering possible questions and ambiguities, teaching cognitive errors, teaching the method of discovering cognitive errors, teaching cognitive reconstruction techniques, and providing weekly practice	Cognitive therapy
8	Reviewing the weekly assignment, providing feedback, answering possible questions and uncertainties, coping with stress, teaching relaxation and pleasant mental imagery, and lifestyle, and reviewing the achievements of the course from the perspective of the participants and the importance of preventing relapse.	Behavioral therapy & emotional

4. Results

Based on demographic data, most individuals in both the experimental and control groups were between the ages of 33 and 40. The majority of the population in both the experimental and control groups held postgraduate and bachelor's degrees. Regarding economic status, most individuals in both the experimental and control groups had an average income.

Univariate analysis of covariance (ANCOVA) was performed to evaluate and test the research hypotheses. The assumptions were evaluated using the Shapiro-Wilk test assumption of normality of the distribution of scores, the Levine test assumption of variance homogeneity, and the slope homogeneity. A modified regression line was employed, and the assumptions were regarded as valid because the significance level of all three tests in all three variables was more than 0.05.

The test of effects between subjects in the post-test stage in Table 2 showed that the significance level of the group variable for depression is 0.000, which is less than 0.05, and it shows that this variable significantly affects the average. The depression score means a significant difference between the average depression score in the experimental and control groups in the post-test stage and after removing the previous effects. It can be said that the effectiveness of group cognitive behavior in reducing depression in breast cancer patients is different.

Table 2. Analysis of Covariance and Linearity of the Effect of Educational Groups

Effect	ss	df	ms	F	Sig	Eta
Corrected model	14177.57	3	4725.86	1.0251	0.000	0.967
Fixed effect	25.74	1	25.74	36.1	0.150	0.050
Pre-exam	55.92	1	55.92	97.2	0.036	0.103
Group	14052.29	1	14052.29	66.746	0.000	0.966
Error	489.41	26	82.18			
Total	44107	30				
Overall corrected mode	14666.98	29				

Bonferroni's post hoc test was used to determine the effect of the group and to find the difference between the averages in the two groups. The results showed that the average post-test depression scores in the experimental group were significantly lower than the control group.

Also, the test of effects between the subjects in the post-test stage in Table 3 reported the significance level of the group variable for the emotional disorder as 0.000, which is less than 0.05, and shows that this variable significantly affects the average score of emotional disorder. That is, there is a significant difference in the average score of emotional disorder between the experimental and control groups in the post-test phase and after removing the previous effects. It can be said that the effectiveness of cognitive behavioral therapy in increasing emotion regulation in breast cancer patients is different.

Table 3. Analysis of Covariance and Linearity of the Effect of Educational Groups

Effect	ss	df	ms	F	Sig	Eta
Corrected model	5135.01	3	1711.67	73.38	0.000	0.817
Fixed effect	152.66	1	152.66	0.453	0.025	0.117
Pre-exam	243.28	1	243.28	50.5	0.000	0.175
Group	4989.13	1	4989.13	90.112	0.000	0.813
Error	1148.99	26	19.44			
Total	447329	30				
Overall corrected mode	6284	29				

The results of Bonferroni's post hoc test showed that the mean emotional disorder scores in the post-test in the ex-

perimental group were significantly lower than the control group. In fact, the ability to regulate emotion for people in the experimental group has significantly decreased compared to people in the control group.

In addition, the test of the effects between the subjects in the post-test stage in Table 4 reported the significance level of the group variable for cognitive flexibility as 0.000, which is less than 0.05, and shows that this variable has an effect on the average score of cognitive flexibility. It has meaning. That is, there is a significant difference in the average score of cognitive flexibility between the experimental and control groups in the post-test phase and after removing the previous effects. In fact, it can be said that the effectiveness of group positive behavior therapy in increasing the cognitive flexibility of breast cancer patients is different.

Table 4. Analysis of Covariance and Linearity of the Effect of Educational Groups

Effect	ss	df	ms	F	Sig	Eta
Corrected model	6906.20	3	2302.06	10.57	0.000	0.868
Fixed effect	151.45	1	151.45	75.3	0.019	0.126
Pre-exam	393.62	1	393.62	76.9	0.000	0.273
Group	6885.12	1	6885.12	801.70	0.000	0.868
Error	1048.25	26	31.40			
Total	311355	30				
Overall corrected mode	7954.44	29				

In Bonferroni's post hoc test, the mean scores of cognitive flexibility in the post-test in the experimental group were significantly higher than the control group.

5. Discussion

The results showed that the effectiveness of group cognitive behavioral therapy in reducing depression in breast cancer patients is different. We may point to the research of Jaffary et al. (22) and Wang et al. (23) that is consistent with the results by comparing prior research and the results of the research hypothesis. To explain the results of this research, it should be said that the thought system of a depressed person is formed by his negative thoughts about himself, his current experience, and his future. The depressed individual believes he is imperfect and incapable and will never be satisfied. Recent studies support this model, emphasizing the relationship between the nature of depressive events and patients' interpretations of these events. By challenging negative thoughts, cognitive behavioral techniques strengthen planning to achieve goals and reduce depression. In fact, group cognitive behavioral therapy in depression emphasizes the negative bias in the information process, which is caused by distorted interpretations of the self, the environment, and the future, which is related to the incompatible beliefs that are aroused by the individual. Cognitive behavioral techniques strengthen planning to achieve goals and reduce depression by challenging negative thoughts.

Also, the findings showed that the effectiveness of group cognitive-behavioral therapy in reducing cognitive disorders of emotions in patients with breast cancer is different. By comparing the previous research and the results of the research hypotheses, it is possible to refer to the native research on the parahippocampal cortex, neural responses, and the regulation of emotional responses (11). Wang et al. noted anxiety, neurological deficits, and daily activities (23). Since an emotional response can cause a change in a situation, this model includes a feedback loop from the response to the situation. This feedback loop suggests that emotion generation can occur recursively and is continuous and dynamic (24). Group cognitive behavioral therapy emphasizes emotions and uses experimental and emotional procedures. Thus, these techniques assist a person in finding, accepting, and managing his feelings. Emotional techniques help the patient to prepare for the correct use of more adaptive emotion regulation strategies through emotional reorganization, new learning, interpersonal emotion regulation, and self-soothing. Studies have shown that one of the problems of these patients is in regulating their emotions related to self-blame, which can aggravate the symptoms of the disease. Self-blame means holding oneself responsible and guilty for bitter experiences.

Group cognitive behavioral therapy helps people become aware of their feelings and cognitions and abandon their previous incompatible strategies to achieve better and more compatible goals. This therapy frees clients from self-destructive struggles, which may lead them to harm themselves and others by resorting to emotion-oriented solutions such as risky social and personal behaviors. Among these patients' other emotional regulation problems are issues related to blaming others, which can make the patient think that others are responsible and guilty for the bad things that happened to him. The approach of acceptance and commitment, instead of focusing on removing traumatic factors, helps clients to accept their controlled emotions and cognitions and free themselves from the control of the verbal rules that caused their problems and allows them to stop arguing with themselves. In explaining the problems related to the admission of these patients, it can be said that accepting the bitter event and experience and withdrawing from the event can accelerate the disease process.

Also, based on the results, the effectiveness of group cognitive-behavioral therapy in increasing the cognitive flexibility of breast cancer patients is different.

Comparing the previous research and the results of the research hypotheses, we can point out the following realizations that are in line with the results obtained. In 2018, Nagata and colleagues (12) showed the patients' mental failure and cognitive flexibility scores before CBT in the failure scale. Mentally was significantly higher and lower on the cognitive flexibility scale than participants in the control group. In addition, the mean scores of the mental failure scale of the patients decreased significantly, while their mean cognitive flexibility score increased.

Dehnabi and Radsepehr showed that compared to the control group, the cognitive-behavioral therapy group had a significant reduction in stress and concern about body image and improved cognitive flexibility, while the subjects of the experimental group had a higher level of satisfaction compared to the control group. They evaluated their treatment and overall recovery as significantly higher, and their recovery in all research variables was higher than the control group (25). Honarmand Zadeh and Sajjadian also showed that psychological well-being, resilience, and happiness are more in the experimental group than in the control group. In addition, in the follow-up phase, this effect maintained its stability (26). Fanaee and colleagues showed that in the post-test phase, cognitive-behavioral therapy significantly increased mental health and decreased psychological flexibility problems. These effects continued in the follow-up phase as well (27).

Bomyea et al. believes that cognitive flexibility is affected by short and long term stress, so stress can adjust the levels of stimulation for adaptive responses through peripheral and central neuronal mechanisms. Therefore, by activating hormones of arousal and other mechanisms, stress leads to both facilitation and weakening of cognitive functions, which include the speed of processing and inhibition of important and salient information. According to the reverse diagram, stress at an optimal level can keep a person active, but if the stress is continuous and its intensity is increasing, it reduces the efficiency and causes a feeling of exhaustion in the person (11).

Cognitive-behavioral therapy has an effective role in increasing cognitive flexibility and the ability of a person to adapt to existing conditions and helps a person to return to normal life after passing the course of the disease. The present research freed the participants from adopting ineffective thinking methods and styles and improved the skill of choosing different thinking styles. It also can help people to make a mental turn by certain techniques and freeing themselves from the pressure placed on them. By using the profit and loss technique, the voluntary inhibition of the cerebral cortex, and the use of beliefs against new situations, the participants could leave the framework of their current thoughts and behaviors and experience more options. During this approach, patients can gain fresh experiences and break the vicious cycle created by the outcomes of their behaviors and ideas, allowing them to consider alternatives to negative biases and generalizing failures to the totality. In addition to these skills, their self-awareness of behavioral motives and failure to achieve desired results despite continuous efforts, especially in interpersonal relationships, also helps to change existing conditions and benefit from cognitive flexibility.

5.1. Conclusions

Because the reduction of depression, dysregulation of excitement, and increase of cognitive flexibility are considered very important factors in cancer patients' recovery and morale, and the effectiveness of group cognitive-behavioral therapy in all three variables has been demonstrated in breast cancer patients it is suggested that the centers implement medical and clinical treatments. Psychologists and group therapy methods should be employed to improve treatment quality while lowering the financial burden because these programs lead to increased self-management and control rather than retreating from situations and difficulties. It also aids in the resolution of current problems; it is also recommended that counselors, therapists, and patients' families have the essential training in the field of patient communication; because it is critical to improve these components in the mental health of patients. As a result, it is advised that educational workshops be held for families and relatives, as well as cancer patients, in order to enhance and improve the degree of health with the aforementioned method.

All study has limits, which necessitate interpreting the findings in the light of those restrictions. The current study has limitations as well, including the use of a limited sample size for each group due to the COVID-19 epidemic. The need for the proper distance between individuals limited the generalizability of the results. A follow-up, on the other hand, was not possible due to the short time between the pre-test and post-test stages and the lack of samples from other cities due to the COVID-19 pandemic. As a result, given the limits of the current study, it is advised that in future studies, a larger number of samples be explored, and similar research with a follow-up period be conducted, so that generalization of the results may be done with more confidence. It is also proposed that researchers compare the efficiency of these treatments with other psychological treatments in persons with other similar disorders in order to build on the findings of this study.

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Authors' Contribution:

Study design, conceptualization, validation, review, and editing: Samaneh Sadat Tabatabai; implementation, writing, and drafting of the article: Mona Danai Kosha; analy-

sis method, data processing review: Fatemeh Shahabizadeh; review of sources and tools: Qasim Ahi. All authors reviewed and approved the final version of the article.

Conflict of Interests:

The authors declared no conflict of interest.

Ethical Approval:

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