RESEARCH ARTICLE

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Effect of Mandala Art Therapy on Quality of Life in Breast Cancer Patients

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Abstract

Objective: Cancer diagnosis and treatment tends to negatively impact a person's Quality of Life (QoL). Art therapy can serve as a complementary measure to oncology care. This study aimed to examine the effect of mandala art therapy on the QoL of breast cancer patients. **Methods:** The present quasi-experimental study was conducted on 70 breast cancer patients recruited from a teaching hospital in Tehran, Iran. Eligible patients were assigned non-randomly to the control and intervention groups. The EORTC QLQ-C30 was used to assess QoL before and immediately after the intervention period. The intervention consisted of six coloring sessions over two weeks. Data were analyzed through SPSS (v. 20). **Results:** While the two groups' mean global QoL scores were not significantly different prior to the intervention (P=0.693), they were after the intervention (44.76±16.67) in the intervention group versus 34.28±19.04 in the control group), indicating a statistically significant improvement in QoL in the intervention group relative to the control (P=0.001). Comparing the dimensions of the EORTC QLQ-C30 between the two groups revealed statistically significant differences in all functional scales except Role and multiple symptom scales, including Fatigue, Pain, Appetite Loss, and Insomnia (P<0.05). **Conclusion:** Mandala art therapy in the form of coloring mandala patterns can improve the QoL of breast cancer patients and is therefore recommended as a non-invasive, supportive, complementary treatment for these patients in clinical and palliative settings.

Keywords: Art therapy- Mandala- quality of life- breast cancer- palliative care- integrative oncology

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Introduction

Breast cancer is the most common type of cancer and the leading cause of cancer-related death among women [1]. According to a 2022 report published by the Global Cancer Observatory (GCO), breast cancer accounts for 11.5% of all new cancer cases worldwide [2]. In Iran, this ratio is 11.3% and breast cancer is the most common type of cancer among women, accounting for 25.5% of all cancers in the female population [3].

Being diagnosed with cancer often puts a person under a lot of stress, which may have a great impact on their behaviors and performance in a wide range of areas [4]. Even after surgical and other types of treatment, cancer patients tend to experience a variety of physical problems [5] as well as emotional problems such as melancholy, depression, anxiety, fear of relapse, fear of death and change in mental body image, which can threaten their mental health [6]. Furthermore, cancer and its treatment can disrupt the patient's social functions, especially in young women [7], and impose a financial burden that may turn into an additional source of psychological pressure for the patient and their family [8]. Thus, the psychological impacts of being diagnosed with cancer and undergoing treatment can impair a person's functional capacity and directly affect their QoL [9, 10]. In a 2017 study conducted by Mirzaie et al. in Iran, only 18% of Iranian breast cancer patients had a good QoL and the ratio of patients with a poor QoL was as high as 51% [11].

QoL refers to a person's subjective perception of their physical, mental, and cognitive health, social and sexual functions, and ability to work. In recent years, this concept has been increasingly viewed as a key measure of not only health but also the effectiveness of treatments in breast cancer patients [1, 12]. Thus, one of the major goals of cancer management is to improve the patients'

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QoL through supportive interventions. These interventions help patients improve their ability to cope with problems and adapt to stressful situations [13]. In the case of cancer patients, these supportive interventions include relaxation exercises, touch therapy, laughter therapy, yoga, meditation, and art therapy [14].

Art therapy is known to improve self-awareness and cognitive function, strengthen social support, and help patients develop positive coping strategies [15]. Art therapy can be administered in many forms including playing music, sculpting, painting, and coloring [16]. Mandala art therapy is a painting-type art therapy that involves drawing or painting circular art designs. Meaning "circle of healing" in Sanskrit, mandalas originally emerged in Buddhist and Hindu cultures, where they were being viewed as a symbol of the universe [17]. Painting a mandala is a great way to relax and reduce stress, and its positive impact on anxiety has been acknowledged by many physicians and psychologists [18]. In cancer treatment centers of the California University of Pennsylvania, for example, cancer patients are encouraged to participate in mandala art therapy sessions in order to relax [19]. There is strong evidence of the effectiveness of mandala art therapy interventions in reducing stress and anxiety in cancer patients [20] and in reducing psychological symptoms, anxiety, and depression in adolescent cancer patients [21]. In a study by Wiswell et al. art therapy in the form of painting was found to be a great way to stop the decline in the QoL of gynecological cancer patients during chemotherapy [22]. Also, a study by Khademi et al. [23] reported that mandala art therapy was effective in reducing the anxiety of COVID-19 patients. However, no study has so far been conducted on the effectiveness of mandala art therapy on breast cancer patients. The most of the studies about mandala art therapy have focused on the psychological consequences of patients and showed its usefulness. But until now, no study has been done specifically on the effects of mandala art on the quality of life of patients.

Supportive interventions such as art therapy can greatly help patients manage the psychological, physical, and social consequences of being diagnosed with cancer and undergoing treatment, which tend to adversely affect their QoL. In recent years, there is growing support for the use of these complementary interventions alongside primary cancer treatments. In Iran, many patients use such methods to relieve symptoms and improve their QoL. Considering the evidence on the positive effects of mandala art therapy on various aspects of health and the Lack of evidence of the effectiveness of this intervention on the quality of life of breast cancer patients, this study investigated the effect of mandala art therapy on the QoL of breast cancer patients.

Materials and Methods

Study design and participants

The study was designed as a quasi-experimental. The participants were patients with definitive breast cancer diagnoses who were about to undergo treatment in oncology and radiotherapy wards of a teaching and cancer referral hospital in Tehran, Iran. Sampling took place between August 2021 and December 2021. Using the sample size formula for interventional studies with two sided α=0.05 and test power of 0.80, effect size with the study of Boscuk et al. as the reference was 0.7 [23], the minimum sample size based on ,comparison test of the mean of two groups, was calculated to 32 patients per group, but increased to 35 per group (70 in total) to account for possible drop-outs. The participants were recruited through purposive sampling from eligible patients. Inclusion criteria were the age of 30 years or older, consent to participate, the ability to read and write in Persian, access to the WhatsApp application, interested in painting and coloring, no lymphedema in the arm for coloring designs, being in stages 1 to 3 and not being end-stage. Exclusion criteria were the occurrence of any major emotionally distressing event (death of loved ones, divorce, etc.) during the study, not attending at least two sessions, and the patient's death. Out of 96 patients attending the hospital for chemotherapy and radiotherapy, 72 patients who were eligible according to the inclusion criteria were recruited and divided non-randomly into two groups of 36. Since the sampling was done in a hospital, in order to avoid contact between the groups, the sampling of the intervention group was done first, and then the control group patients were selected. Also, considering the type of intervention, which was art therapy, and like previous studies, the interest of the participants was important. Therefore, Operationally, randomization was not possible. The intervention group was formed from patients attending the hospital on even days and the control group was formed from those attending on odd days. In the intervention group, one person was excluded because of dropping out of the intervention. In the control group, one person was excluded because of not completing the questionnaire. Overall, the data of 70 patients were analyzed (Figure 1).

Data collection

The study used two questionnaires. The first was the questionnaire of demographic and clinical information (age, marital status, education level, occupation, number of children, economic status, disease stage, disease duration, type of treatment, and comorbidity). Demographic and clinical items in the first questionnaire were extracted by reviewing the studies conducted in the field of breast cancer and quality of life and then validated by 10 experts in the field of cancer, including nursing professors and oncology doctors. The second was the European Organization for Research and Treatment of Cancer QoL Questionnaire (EORTC QLQ-C30). This questionnaire has 30 items in three dimensions (Functional Scales, Symptom Scales, and Global QoL). Out of these 30 items, 28 are scored on a 4-point Likert and 2 are scored on a 7-point Likert scale. The total score of each dimension ranges from 0 to 100. For Functional Scales and Global QoL, a higher score indicates higher functionality and better health. But a higher score for Symptom Scales means the patient is suffering from more symptoms. In general, scores of 75 and above in this questionnaire are interoperated as favorable, 50-75 as moderate, and below 50 as unfavorable [24].

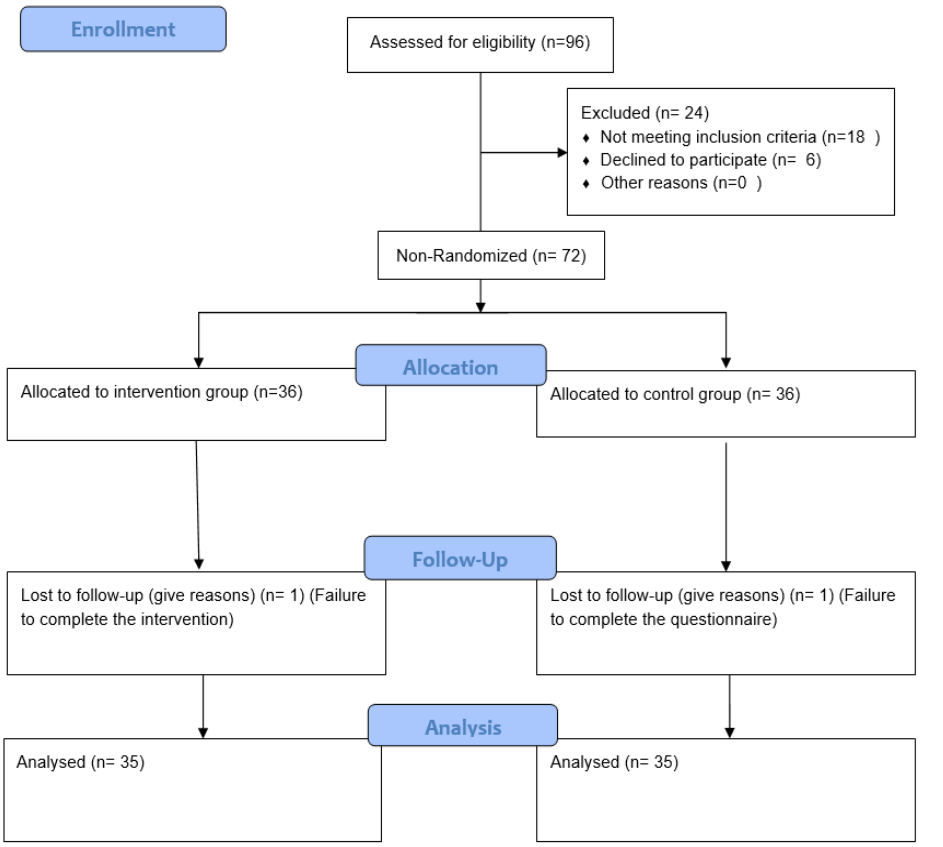

Figure 1. Consort Diagram

The face validity, content validity, construct validity, convergent validity, and divergent validity of this tool in Iran have been confirmed by Safaei and Dehkordi [25]. The questionnaire was provided to experts in this field (6 nursing faculty, 2 oncology physicians, and 2 oncology nurses) and they were asked to express their opinions regarding the grammar, wording, and understandability of the items. In this study, the reliability of the tool in terms of internal consistency was confirmed with a Cronbach's alpha of 0.81.

Intervention procedure

The intervention involved instructing patients to color mandala patterns taken from a mandala design book for adults in six 45-minute sessions held every other day [26]. Before the intervention, informed consent was obtained and the participants were asked to fill out the questionnaire of demographic and clinical information followed by EORTC QLQ-C30. Because of the COVID-19 pandemic, one of the sessions was held in the hospital when the patients came to the hospital for treatments. This varied according to the conditions of the patients, for example, patients who referred to the oncology department for chemotherapy on the first day of hospitalization, completed the questionnaires and did the coloring before the chemotherapy started.

Since the radiotherapy was done on an outpatient department, the patients painted a design in the waiting room before undergoing the radiotherapy, and then the patients started the second session at home. For home sessions, the researcher contacted the patients with the WhatsApp application and followed up on their progress. Some patients who have children paint with their children. Each patient was given a box of 6 colored pencils (yellow, blue, green, red, orange, and brown) and 6 pre-selected mandala patterns printed separately on A4 sheets. The same set of mandalas was used for every patient. These patterns started from simple designs and gradually became more sophisticated. The patients received the necessary training and were asked to color the designs to their liking and send a picture of the fully colored design to the researcher. After the intervention, which took about two weeks, the participants were asked to complete EORTC QLQ-C30 and send it to the researcher. The patients completed and sent the questionnaires one day after the end of the intervention. The control group only received routine care and completed EORTC QLQ-C30 on the first day and two weeks later. To prevent data contamination, the control part of the study started after the completion of the intervention for the other group.

Data analysis

The collected data were analyzed in SPSS version 20 using descriptive and analytical statistical methods. After organizing the collected data using descriptive statistics such as mean and standard deviation, Chi-square test,

Mann-Whitney test, and independent t-test were used to compare the groups in terms of demographic and clinical data, paired t-test was used to compare them in terms of pre-test and post-test QoL (QoL) scores, and independent t-test and ANCOVA were used to compare QoL scores within each group.

Ethical considerations

This study is derived from the lead author's thesis for earning a master's degree in nursing. The research design was approved by the research ethics committee of Shahid Beheshti School of Nursing and Pharmacy with the code IR.SBMU.PHARMACY.REC.1399.270. According to the Declaration of Helsinki, ethical standards have been followed in the study. At the beginning of the study, the objectives were explained to the participants, they were asked to provide informed consent, and were assured that all of their information would remain confidential and they would be given access to the findings upon request.

Results

The mean age of the participants in the intervention and control groups was 43.45±8.03 and 44±8.20, respectively. Other demographic and clinical information about the participants is provided in Table 1. As this table shows, there was no statistically significant difference between the two groups in terms of demographic and clinical variables (P>0.05).

The mean QoL scores of the intervention and control groups before the intervention were 39.52±13.45 and 41.19±20.90, respectively, which were not significantly different (P=0.693). But after the intervention, the mean QoL scores changed to 44.76±16.67 in the intervention group and 34.28±19.04 in the control group, which were found to be significantly different (P<0.05), indicating the impact of the intervention on the patients' QoL. The intra-group change in the mean QoL score was also statistically significant (P<0.05), but this change was as an increase in QoL in the intervention group and the opposite in the control group (see Table 2). Comparing the two groups in terms of the dimensions of QLQ-C30 revealed a significant difference between them in terms of all functional scales except role and also multiple symptom scales including fatigue, pain, appetite loss, and insomnia (P<0.05) but not in terms of nausea/vomiting, constipation, diarrhea, and financial difficulties (P>0.05). The results of this comparison are provided in Table 2.

Also the results of the analysis of covariance are provided in Table 3. By controlling the quality of life score before the intervention, the average global quality of life score after the intervention with a 95% confidence interval, -7.87)-15.17 to -0.57 (in the intervention group was significantly higher than the control group (P=0.035).

Discussion

This study aimed to investigate the effect of mandala art therapy on the QoL of breast cancer patients. The results of the study suggest that mandala art therapy improves the QoL of breast cancer patients.

A number of studies have been conducted on the impacts of art therapy in its various forms (e.g. painting, coloring, mandala, etc.) on QoL and its various dimensions. A study by Wiswell et al. in the United States showed that painting sessions, including mandala coloring, can improve the QoL of gynecological cancer patients [22]. A study by Boscuk et al. in Turkey found that watercolor painting sessions improved the QoL of patients undergoing chemotherapy [23].A study by Murad Abdullah on the impact of art therapy on the QoL of Iraqi adolescent cancer patients also reported an improvement in the QoL of those patients who participated in the painting sessions [27]. Also, the magnitude of the effect found in studies that art therapy was in the form of painting was almost similar to our finding [28, 33].

QoL has multiple functional dimensions concerning physical, mental, cognitive, and social ability and several symptom dimensions. In the present study, mandala art therapy managed to improve almost all functional aspects of QoL and relieve some of the symptoms. According to a 2017 paper published by the American Art Therapy Association, art therapy can enhance self-awareness, improves cognitive function, strengthen social support, and help patients develop positive coping strategies [15]. The impacts of mandala art therapy on these dimensions can be attributed to the fact that coloring geometric patterns makes the person concentrate on the design, which limits their attention to external stimuli. In other words, the act of coloring puts the person in a meditative state, which helps them escape negative thoughts and feelings and anxiety [19].

Intervention was most effective on the emotional and social aspects of QoL. This is consistent with the findings of several studies conducted in recent years on the effects of art therapy, including mandala painting and coloring. In a study by Gurcan et al. on adolescent cancer patients, mandala painting reduced patients' psychological symptoms, including anxiety and depression, which are directly related to patients' QoL[21]. A study by Yakar et al. also reported a decrease in the anxiety scores of cancer patients who attended mandala painting sessions. There is evidence showing that mandala painting and coloring can also reduce psychological symptoms in other patients [20]. In this regard, a randomized trial conducted by Khademi et al. in Iran showed that mandala coloring can serve as a non-pharmacological intervention for reducing the anxiety of COVID-19 patients [29]. In relation to the social dimensions of QoL, a study by Kim reported the positive effect of mandala art therapy on the social interactions of autism patients, which is consistent with the improvement observed in the present study in the social dimension [30]. In a study by Jalambdani et al. in Iran, mindfulness-based art therapy improved all dimensions of the QoL of breast cancer patients, but unlike in the present study, the greatest impact was observed in the physical dimension [1]. This difference could be due to the use of different types of art therapy in the two studies.

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Table 1. Comparison of the Demographic and Clinical Characteristics of the Two Groups

Variables	Category	Intervention group N (%)	Control group N (%)	P-value
Marital Status	Married	4 (11.4)	7 (20)	0.369*
	Single	27 (77.1)	27 (77.1)	
	Divorced	2 (5.7)	0 (0)	
	Widowed	2 (5.7)	1 (2.9)	
Education Level	High school	8 (22.9)	10 (28.6)	0.548**
	Diploma	13 (37.1)	13 (37.1)	
	Above the diploma	14 (40)	12 (37.3)	
Number of Children	0	5 (14.3)	8 (22.9)	0.747*
	1	9 (25.7)	5 (14.3)	
	2	17 (48.6)	14 (40)	
	3	2 (5.7)	8 (22.9)	
	4	2 (5.7)	0 (0)	
Job	Employed	11 (31.4)	10 (28.6)	0.794*
	Housewife	24 (68.6)	25 (71.4)	
Economic Status	Low	9 (25.7)	7 (20)	0.523**
	Moderate	23 (65.7)	24 (68.6)	
	High	3 (8.6)	4 (11.4)	
Stage of Cancer	1	4	3	0.189**
	2	24	18	
	3	7	14	
Other Diseases	No	28 (80)	24 (68.6)	0.347*
	Diabetes	1(2.9)	4 (11.4)	
	Hypertension	1 (2.9)	0 (0)	
	Hypothyroidism	2 (5.7)	5 (14.3)	
	Diabetes + Hypertension	1 (2.9)	2 (5.7)	
	Cholecystosis	1 (2.9)	0 (0)	
	Hypothyroidism + Hypertension	1 (2.9)	0 (0)	
Type of treatment	Surgery	2 (5.7)	0 (0)	0.060*
	Chemotherapy	14 (40)	9 (25.7)	
	Chemotherapy+ surgery	7 (20)	17 (48.6)	
	Surgery+ chemotherapy + radiotherapy	12 (34.3)	9 (25.7)	

Variables	Intervention group Mean±SD	Control group Mean±SD	P-value
Age	43.45±8.03	44±8.20	0.781***
Time of diagnosis (month)	7.84 ± 3.53	6.05 ± 3.62	0.100***

Note: SD, standard deviations; P-value are obtained from Chi-square test*, Mann-Whitney test**, and independent t-test***.

mandala painting and coloring. In a study by Gurcan et al. on adolescent cancer patients, mandala painting reduced patients' psychological symptoms, including anxiety and depression, which are directly related to patients' QoL [21]. A study by Yakar et al. also reported a decrease in the anxiety scores of cancer patients who attended mandala painting sessions. There is evidence showing that mandala painting and coloring can also reduce psychological symptoms in other patients [20]. In this regard, a randomized trial conducted by Khademi et al. in Iran showed that mandala coloring can serve as a non-pharmacological intervention for reducing the anxiety of COVID-19 patients [29]. In relation to the social dimensions of QoL, a study by Kim reported the positive effect of mandala art therapy on the social interactions of autism patients, which is consistent with the improvement observed in the present study in the social dimension [30]. In a study by Jalambdani et al. in Iran, mindfulness-based art therapy improved all dimensions of the QoL of breast cancer patients, but unlike in the present study, the greatest impact was observed in the physical dimension [1]. This difference could be due to the use of different types of art therapy in the two studies.

In addition to positive effects on the functional dimension of QoL, the intervention also relieved symptoms such as fatigue, pain, insomnia, and appetite loss. In other words, mandala coloring can be effective in reducing symptoms through distraction, which is a non-

Table 2. Comparison of QoL scores of the Intervention and Control Groups

Variable	Pretest Mean±SD	Posttest Mean±SD	P-value*
Physical functioning			
Intervention	21.14± 57.71	21.03±63.80	0.034
Control	21.03±63.80	19.01±60.57	0.03
P-value	0.060**	0.014***	
Role functioning			
Intervention	26.75±70.00	26.75±70.00	0.138
Control	22.11±73.38	20.91±71.90	0.889
P-value	0.686**	0.210***	
Emotional functioning			
Intervention	25.64±55.47	20.26±66.90	0.004
Control	25.56±60.23	27.79±56.42	0.225
P-value	0.440**	0.003***	
Cognitive functioning			
Intervention	27.21±59.04	20.11±71.90	0.005
Control	23.94±70.47	28.14±67.14	0.378
P-value	0.066**	0.038***	
Social functioning			
Intervention	27.85±50.47	26.92±58.09	0.03
Control	32.17±57.61	33.03±48.09	0.005
P-value	0.324**	0.001***	
Global health status/QOL			
Intervention	13.45 ±39.52	16.67± 44.76	0.037
Control	20.90±41.19	19.04± 34.28	0.011
P-value	0.693**	0.001***	
Fatigue			
Intervention	25.24±59.04	23.35±48.57	0.007
Control	22.23±53.01	20.71±58.09	0.066
P-value	0.293**	0.001***	
Nausea and vomiting			
Intervention	26.12±28.09	30.83±23.33	0.185
Control	29.79±29.04	33.85±30.95	0.706
P-value	0.887**	0.249***	
Pain			
Intervention	26.31±51.42	25.03±41.42	0.020
Control	26.00±41.42	27.26±50.47	0.065
P-value	0.114**	0.014***	
Dyspnea			
Intervention	28.17±28.57	28.56±32.38	0.422
Control	31.31±33.33	31.10±37.14	0.402
P-value	0.506**	0.751***	
Insomnia			
Intervention	31.66±48.57	32.48±38.09	0.039
Control	37.17±38.09	36.41±47.61	0.402
P-value	0.209**	0.025***	
Appetite loss			
Intervention	31.45±38.09	26.53±22.85	0.039
Control	37.37±36.19	36.48±49.52	0.106
P-value	0.818**	0.000***	
Constipation			
Intervention	36.28±38.09	36.15±33.33	0.324
Control	37.72±37.14	36.46±41.90	0.343
P-value	0.915**	0.148***	
Diarrhea			
Intervention	25.27±22.85	28.40±15.23	0.118
Control	24.52±13.32	33.52±19.99	0.128
P-value	0.114**	0.074***	
Financial difficulties			
Intervention	34.10±73.33	36.84±62.85	0.125
Control	35.31±59.04	36.84±62.85	0.11
P-value	0.090**	0.185***	

Note: SD, standard deviations; P-value are obtained from paired t-test*, independent t-test** and ANCOVA*** adjusted for pretest score

Table 3. ANCOVA Analysis for the Pretest Value of the Global QOL

Parameter	Beta	Sig.	95% Confidence Interval	
			Lower Bound	Upper Bound
Intercept	30.816	0.066	-2.044	63.676
global. pretest	0.636	0	0.428	0.843
Age	-0.029	0.901	-0.501	0.442
Number of Children	-1.934	0.382	-6.331	2.462
Job	3.375	0.479	-6.109	12.86
Economic status	3.429	0.28	-2.862	9.72
Duration	-0.079	0.913	-1.515	1.358
Stage	-3.195	0.245	-8.635	2.245
Group	-7.874	0.035	-15.174	-0.574
[Treatment= Chemotherapy]	-6.12	0.324	-18.451	6.21
[Treatment= Chemotherapy+ surgery]	-11.258	0.064	-23.197	0.681
[Treatment= Surgery+ chemotherapy + radiotherapy]	0[a]	.	.	.

pharmacological method of reducing pain and overcoming sleep disorders. As in the present study, where fatigue was the least common complaint after art therapy, a study by Koom et al. in South Korea showed that painting improved the fatigue and QoL of patients undergoing radiotherapy [13]. Our findings are also constant with previous findings in relation to the effect of art therapy on pain. In this regard, a study by Choi et al. [32] reported that mindfulness-based mandala coloring reduced chronic musculoskeletal pain [31]. Also, a study by Lefevre et al. on cancer patients showed that art activities such as painting, drawing, and sculpting alleviate physical symptoms such as fatigue and pain as well as psychological symptoms such as anxiety and depression [32]. Rawtaer et al. [33] also reported that art therapy, along with other non-pharmacological and psychological methods, can help adults recover from sleep disorders.

To the best of our knowledge, all previous studies on the subject have shown that mandala art therapy can be

beneficial for a variety of patients, including those with breast cancer. Consistent with the findings of previous studies, our results also show the positive effects of art therapy on the QoL of breast cancer patients. Although no study has been conducted in the field of mandalas and the quality of life of cancer patients, various studies have shown the positive effects of other types of art therapy on the quality of life, such as crafts, mind-based art therapy, painting with watercolor. This study supports previous studies because it is a type of art therapy.

In conclusion, Mandala art therapy can serve as an effective non-pharmacological palliative intervention for improving the QoL of breast cancer patients undergoing treatment. This supportive intervention can be recommended as a complementary therapy to be adopted alongside primary treatments in home, clinical, and palliative care settings to improve the QoL of cancer patients. This intervention might also be effective in relieving symptoms and improving the QoL of patients with other chronic conditions.

Limitations

Because of the use of purposive convenience sampling in the study, it might not be possible to generalize the findings. Also, since patient allocation to groups was not completely randomized, it is recommended to further explore the subject through randomized clinical trials. Also, follow-up studies are needed to determine the long-term impacts of mandala art therapy on QoL. Therefore, the results should be interpreted with caution.

Author Contribution Statement

ND Conceptualization, methodology, investigation, writing: original draft. Lkh Supervision, review and editing. MI Methodology, review and editing. MN Formal analysis, Funding acquisition. HRM and MB review and editing. “Leila Khanali Mojen (corresponding author)”.

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Approval

The research design was approved by the research ethics committee of Shahid Beheshti School of Nursing and Pharmacy with the code IR.SBMU.PHARMACY.REC.1399.270.

Ethical Declaration

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Data Availability

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Conflict of Interest

The authors declare that they have no competing interests.

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