



The effectiveness of therapeutic artmaking on depression, anxiety, quality of life, and psychological distress in cancer patients on chemotherapy: a systematic review of the literature

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Abstract

Objectives The purpose of this study was to evaluate the evidence of art therapy on depression, anxiety, quality of life, and mental distress in cancer patients undergoing chemotherapy.

Methods A systematic literature search was conducted. A systematic search of online electronic databases including, PubMed/MEDLINE, Scopus Web of Science, PsycINFO, and EMBASE was performed using keywords extracted from Medical Subject Headings such as “Art Therapy,” and “Neoplasms,” “Cancer,” and “Chemotherapy” from the earliest to January 11, 2023. A total of 3890 publications were assessed for relevance by title and abstract. The remaining 1298 articles were examined using three inclusion criteria: interventions were guided by an artist or art therapist, participants were actively involved in the creative process, and anxiety, depression, and/or quality of life were included as outcome measures. The methodological quality of the included studies was appraised using specific checklists.

Result A total of 495 patients with cancer undergoing chemotherapy participated in ten studies. Among the participants, 87.21% were female and 63.43% of them were in the intervention group. The mean age of the participants was 53.93 in five studies that reduced depression in cancer patients undergoing chemotherapy. Six studies investigated the effect of different art therapy methods on the anxiety of patients, which in four studies reduced their anxiety. Also, three studies investigated the effect of different art therapy methods on patients’ distress, which in two studies reduced their distress.

Conclusion Art therapy had positive effects on depression, anxiety, quality of life, and psychological distress of cancer patients undergoing chemotherapy. Meanwhile, research on art therapy in cancer patients on chemotherapy is insufficient. We cannot conclude that art therapy benefits cancer patients on chemotherapy. More rigorous research is needed.

Keywords Art therapy · Depression · Anxiety · Quality of life · Psychological distress · Cancer · Chemotherapy

Introduction

Cancer is a stressful diagnosis that can be life-changing. Diagnosing cancer can provoke feelings of anger and anxiety, and in case the disease-induced emotional burden exceeds the individual’s potential to cope, it can result in psychological traumas [1–3]. Although medical treatments like surgery, chemotherapy, and radiotherapy can be

effective in treating tumors, such treatments are not only ineffective in treating the patients’ psychological effects but also leave their side effects which in turn negatively affect satisfaction with cancer care and the quality of life for the sufferers and families [4]. Chemotherapy is one of the main cancer treatments, which has several complications such as fatigue, nausea, vomiting, constipation, or diarrhea [1, 5, 6]. Thus, it is highly important to optimize the quality of life of the patients during and after treatments such as chemotherapy.

Complementary and alternative medicine treatments have turned into the main part of supportive care for cancer sufferers. Art therapy has been introduced as one of the recommended treatments for reducing stress and anxiety in patients undergoing chemotherapy. Art therapy is a creative art-making process pursuing the goal of improving

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the psychological, physical, and emotional health of those afflicted with chronic maladies and disabilities, which helps the sufferer to develop interpersonal skills and relieve stress by involving creative artistic processes and gain personal insight by boosting self-esteem [7]. The effects of the intervention on the quality of life, anxiety, depression, and distress in the patients under chemotherapy have been analyzed [1, 8, 9]. Yet, so far, little information has been at hand about the art therapy-induced effects on the mental health of the cancer sufferers undergoing chemotherapy. Among many psychological consequences of cancer patients, depression, anxiety, and patient's quality of life are more and more commonly affected.

Therefore, the current study targets to review the existing studies on the art therapy-induced effect on depression, anxiety, quality of life, and distress in cancer patients undergoing chemotherapy.

Methods

The systematic review was according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist [10].

Search strategy and inclusion criteria

A systematic search of online electronic databases including, PubMed/MEDLINE, Scopus Web of Science, PsycINFO, and EMBASE was performed using keywords extracted from Medical Subject Headings such as “Art Therapy,” “Neoplasms,” “Cancer,” and “Chemotherapy” from the earliest to January 11, 2023. Search terms were adjusted for each database specifically and can be found in Supplementary Material. Keywords were combined via Boolean operators (AND/OR). All search steps were conducted by two researchers, independently. Studies including adults above the age of eighteen with cancer who are on chemotherapy involved in art making employing depression, anxiety, QoL, and psychological distress as outcomes. The gray literature including conference presentations, expert opinion, dissertations, research and committee reports, and ongoing research was ignored, due to the lack of accurate findings. Gray literature is papers that are produced in print and electronic formats but are not evaluated by a commercial publisher [11].

Study selection

Data management was performed using EndNote X8 software. Study selection was conducted based on inclusion/exclusion criteria through the following steps: [1] remove duplicate articles, first electronically and then manually; [2] evaluate the title and abstract of the study; and [3]

assess the full text of the articles. Finally, a reference list of eligible studies was assessed to prevent the loss of relevant data. The third reviewer evaluated the paper in the presence of disagreement between the two researchers (Fig. 1).

Data extraction and quality assessment

The research team extracted the following information from the included studies: the name of the first author, year of publication, location, ward, sample size, male/female ratio, age, single/married ratio, level of education, work experience, death of a close relative in the last six months, questionnaire, and key results. The two researchers evaluated the quality of the included studies using a 20-item tool called the appraisal tool for cross-sectional studies (AXIS tool), as shown in Figs. 2 and 3 [12].

Results

Study characteristics

As shown in Table 1, a total of 495 patients with cancer undergoing chemotherapy participated in ten studies [1, 3, 9, 13–19]. Among the participants, 87.21% were female and 63.43% of them were in the intervention group. The mean age of the participants was 53.93 (SD = 10.40). Of the participants, 42.72% had breast cancer. Four studies [9, 13, 15, 16] had an RCT design, and six studies [1, 3, 14, 17–19] had a quasi-experimental design. Seven studies [1, 13–15, 17–19] reported the study's duration, with a mean of 13.43 months. Seven studies [3, 9, 13, 14, 16, 18, 19] also reported on the length of the intervention. In addition, five studies [1, 9, 13, 15, 19] had a follow-up. Also, six studies [9, 13–17] had a control group.

Methodological quality assessment of eligible studies

All of the qualifying studies [1, 3, 9, 13–19] had a “good” quality, as shown in Table 1 and Figs. 1 and 2.

The effect of different art therapy methods on cancer patients undergoing chemotherapy

As shown in Table 1, among all the studies [1, 3, 9, 13–19] in this systematic review, six studies [1, 13–17] investigated the effect of different art therapy methods on depression, which in five studies [1, 13–15, 17] reduced depression in cancer patients undergoing chemotherapy. Six studies [1, 13–17] investigated the effect of different

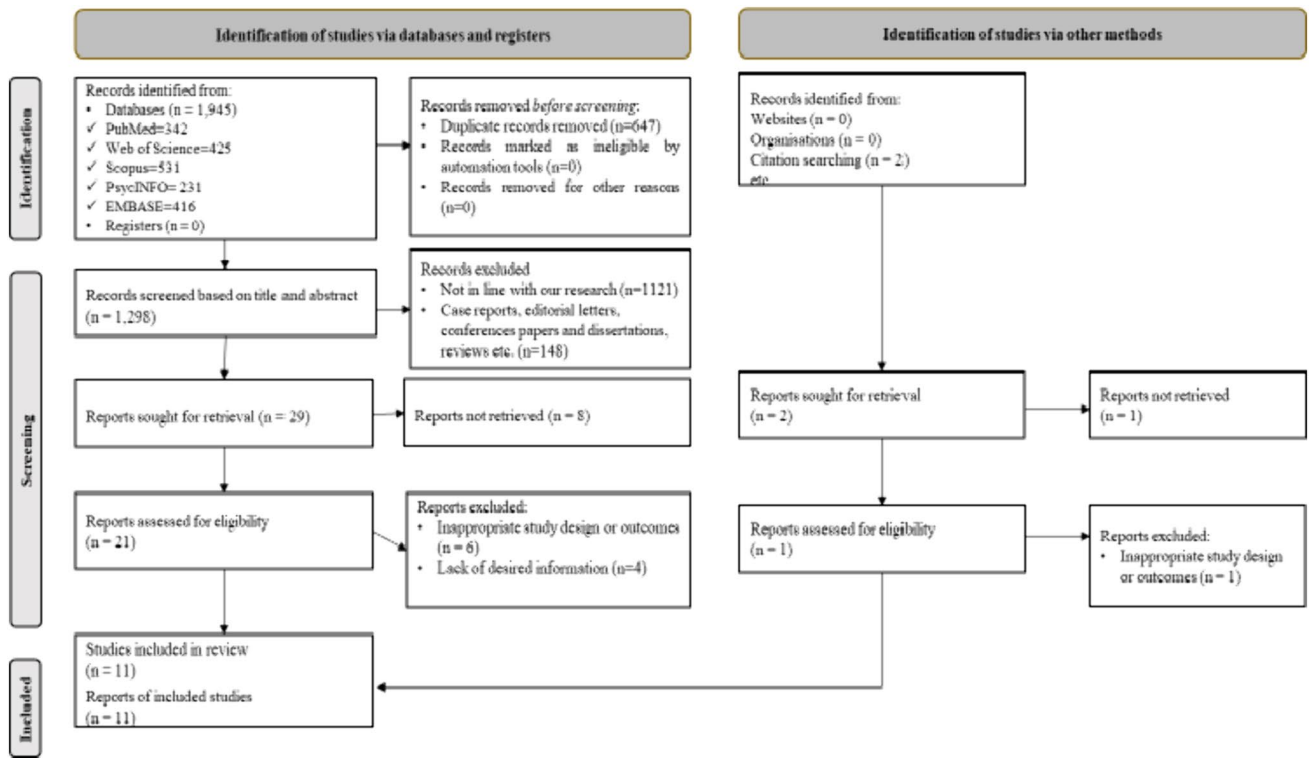


Fig. 1 The flow diagram of the study selection process

	Meun et al., 2006	Thoms et al., 2009	Jiang et al., 2016	Shi et al., 2018
RCT	Y	Y	Y	Y
Was true randomization used for assignment of participants to treatment groups?	Y	Y	Y	Y
Was allocation to treatment groups concealed?	Y	Y	Y	Y
Were treatment groups similar at the baseline?	Y	Y	Y	Y
Were participants blind to treatment assignment?	Y	Y	Y	Y
Were those delivering treatment blind to treatment assignment?	Y	Y	Y	Y
Were outcomes assessors blind to treatment assignment?	Y	Y	Y	Y
Were treatment groups treated identically other than the intervention of interest?	Y	Y	Y	Y
Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	Y	Y	Y	Y
Were participants analyzed in the groups to which they were randomized?	Y	Y	Y	Y
Were outcomes measured in the same way for treatment groups?	Y	Y	Y	Y
Were outcomes measured in a reliable way?	Y	Y	Y	Y
Was appropriate statistical analysis used?	Y	Y	Y	Y
Was the trial design appropriate, and any deviations from the standard RCT design (individual randomization, parallel groups) accounted for in the conduct and analysis of the trial?	Y	Y	Y	Y

Fig. 2 Methodological quality assessment of RCT studies using JBI

art therapy methods on the anxiety of patients, which in four studies [1, 13, 15, 17] reduced their anxiety. Also, three studies [1, 9, 19] investigated the effect of different art therapy methods on patients' distress, which in two studies [1, 19] reduced their distress. Also, four studies [3, 16–18] investigated the effect of different art therapy methods on the QOL of patients, which improved their QOL in two studies [16, 17].

The characteristics of the art therapy intervention in the included studies are presented in Table 2.

	Bis Seb et al., 2007	Borucki et al., 2017	Naghani et al., 2018	Waywell et al., 2019	Elmehrikian et al., 2020	Joshi et al., 2021
Quasi-Experimental	Y	Y	Y	Y	Y	Y
Is it clear in the study what is the 'cause' and what is the 'effect' (i.e. there is no confusion about which variable comes first)?	Y	Y	Y	Y	Y	Y
Were the participants included in any comparisons similar?	Y	Y	Y	Y	Y	Y
Were the participants included in any comparisons receiving similar treatment/care, other than the exposure or intervention of interest?	Y	Y	Y	Y	Y	Y
Was there a control group?	Y	Y	Y	Y	Y	Y
Were there multiple measurements of the outcome both pre and post the intervention/exposure?	Y	Y	Y	Y	Y	Y
Was follow up complete and if not, were differences between groups in terms of their follow up adequately described and analyzed?	N	N	N	N	Y	Y
Were the outcomes of participants included in any comparisons measured in the same way?	Y	Y	Y	Y	Y	Y
Were outcomes measured in a reliable way?	Y	Y	Y	Y	Y	Y
Was appropriate statistical analysis used?	Y	Y	Y	Y	Y	Y

Fig. 3 Methodological quality assessment of quasi-experimental studies using JBI

Discussion

Main findings

In this systematic review, we found some positive effects of art-making on depression, anxiety, QoL, and psychological distress in cancer patients on chemotherapy. respectively, Five out of 6 studies showed the positive effect of art therapy on depression. Four out of 6 studies showed a positive effect on anxiety, two out of 3 studies showed a positive effect on

Table 1 Basic characteristics of the included studies in this systematic review

First author/year	Location	Study characteristics	M/F ratio (%)	Age (mean ± SD)	Type of cancer (%)	Control group	Tool characteristics	Specific statistical tests	Key results	JBI score
Monti et al. (2006) [13]	USA	<ol style="list-style-type: none"> 1. RCT 2. 111 (56/55) 3. MBAT 4. 16 months 5. 2.50 h 6. 8 weeks 	N/A	53.60	<ul style="list-style-type: none"> • Breast (45.95) • Gynecologic (17.12) • Hematologic (11.71) • Neurologic (4.50) • Rectal (5.41) • Others (15.31) 	Participants in the control group had not received MBAT	<ol style="list-style-type: none"> 1. SCL-90-R 2. 90 3. 0 to 360 	N/A	<ul style="list-style-type: none"> • The mean score of depression in patients decreased significantly after the intervention in the MBAT group compared to the control group ($P = 0.001$) • The mean score of anxiety in patients decreased significantly after the intervention in the MBAT group compared to the control group ($P = 0.022$) 	Good
Bar-Sela et al. (2007) [14]	Israel	<ol style="list-style-type: none"> 1. Quasi-experimental 2. 60 (19/41) 3. Anthroposophical art therapy 4. 12 months 5. A few minutes to more than an hour 6. 0 	21.67/78.33	N/A	<ul style="list-style-type: none"> • Breast (36.67) • Gastrointestinal (23.33) • Other (40.00) 	Participants in the control group had not received four sessions or more of anthroposophical art therapy	<ol style="list-style-type: none"> 1. HADS 2. 14 3. 0 to 42 	<ul style="list-style-type: none"> • Chi-square test • Fisher exact test • Mann-Whitney <i>U</i>-test • Wilcoxon signed ranks test 	<ul style="list-style-type: none"> • The mean score of depression in patients decreased significantly after the intervention ($P = 0.021$) • The mean score of anxiety in patients was not decreased significantly after the intervention ($P = 0.60$) 	Good

Table 1 (continued)

First author/year	Location	Study characteristics	M/F ratio (%)	Age (mean ± SD)	Type of cancer (%)	Control group	Tool characteristics	Specific statistical tests	Key results	JBI score
Thyme et al. (2009) [15]	Sweden	<ol style="list-style-type: none"> 1. Design (I/C) 2. Sample size 3. Intervention 4. Duration of study 5. Duration of intervention 6. Duration of follow-up 	N/A	N/A	N/A	Participants in the control group had not received art therapy	<ol style="list-style-type: none"> 1. Name of the questionnaire 2. Number of items 3. Overall scoring of items 	<ul style="list-style-type: none"> • Hierarchical regression analysis • General linear model 	<ul style="list-style-type: none"> • The mean score of depression in patients decreased significantly after the intervention in the art therapy group compared to the control group ($P < 0.05$) • The mean score of anxiety in patients decreased significantly after the intervention in the art therapy group compared to the control group ($P < 0.05$) 	Good

Table 1 (continued)

First author/year	Location	Study characteristics	M/F ratio (%)	Age (mean ±SD)	Type of cancer (%)	Control group	Tool characteristics	Specific statistical tests	Key results	JBI score
Jang et al. (2016) [16]	South Korea	1. Design 2. Sample size (I/C) 3. Intervention 4. Duration of study 5. Duration of intervention 6. Duration of follow-up	N/A	51.58 (SD=5.72)	Breast (100)	Participants in the control group had not received MBAT	1. PAI 2. 344 3. N/A 1. QLQ 2. 30 3. N/A	<ul style="list-style-type: none"> • Student <i>t</i>-test • Chi-square test • ANCOVA • ANOVA 	<ul style="list-style-type: none"> • The mean score of QOL in patients improved significantly after the intervention in the MBAT group compared to the control group ($P < 0.001$) • The mean score of depression in patients was not decreased significantly after the intervention in the MBAT group compared to the control group ($P > 0.05$) • The mean score of anxiety in patients was not decreased significantly after the intervention in the MBAT group compared to the control group ($P > 0.05$) 	Good

Table 1 (continued)

First author/year	Location	Study characteristics	M/F ratio (%)	Age (mean ± SD)	Type of cancer (%)	Control group	Tool characteristics	Specific statistical tests	Key results	JBI score
Bozduk et al. (2017) [17]	Turkey	<ol style="list-style-type: none"> 1. Quasi-experimental 2. 97 (65/32) 3. PATP 4. 3 months 5. N/A 6. 0 	4.33/55.67	50.60 (SD=11.00)	<ul style="list-style-type: none"> • Breast cancer (22.68) • Other (77.32) 	<p>Participants in the control group had not received PATP</p>	<ol style="list-style-type: none"> 1. QLQ 2. 30 3. N/A <ol style="list-style-type: none"> 1. HADS 2. 14 3. 0 to 42 	<ul style="list-style-type: none"> • ANOVA • Multivariate linear regression 	<ul style="list-style-type: none"> • The mean score of QOL in patients improved significantly after the intervention in the PATP group compared to the control group ($P = 0.001$) • The mean score of depression in patients decreased significantly after the intervention in the PATP group compared to the control group ($P = 0.001$) • The mean score of anxiety in patients decreased significantly after the intervention in the PATP group compared to the control group ($P = 0.031$) 	Good

Table 1 (continued)

First author/year	Location	Study characteristics	M/F ratio (%)	Age (mean ±SD)	Type of cancer (%)	Control group	Tool characteristics	Specific statistical tests	Key results	JBI score
Meghani et al. (2018) [18]	USA	1. Quasi-experimental 2. 18 3. MBAT 4. 2 months 5. 2.5 h 6. 0	5.56/94.44	N/A	<ul style="list-style-type: none"> Breast (50.00) Hematological (16.67) Gastrointestinal (11.11) Gynecological (5.56) Sarcoma (5.56) Multiple primaries (5.56) 	N/A	1. SF-36 2. 36 3. N/A	Wilcoxon signed ranks test	The mean score of QOL in patients did not improve significantly after the intervention ($P > 0.05$)	Good
Radl et al. (2018) [9]	USA	1. RCT 2. 40 (20/20) 3. Self-book art therapy 4. N/A 5. 50 min 6. 8 weeks	0/100	52.12 (SD=11.50)	<ul style="list-style-type: none"> Breast (42.50) Lung (7.50) Gynecologic (7.50) Colorectal (12.50) Leukemia (12.50) Lymphoma (2.50) Others (15.00) 	Participants in the control group had not received self-book art therapy	1. VAS 2. 10 3. 0 to 10 1. PEDI 2. 15 3. 0 to 45	<ul style="list-style-type: none"> Chi-square test T-test ANOVA ANCOVA 	The mean score of distress in patients was not decreased significantly after the intervention in the self-book art therapy group compared to the control group ($P = 0.26$)	Good
Wiswell et al. (2019) [3]	USA	1. Quasi-experimental 2. 24 3. Art therapy 4. N/A 5. 50 min 6. 0	0/100	61.40 (SD=11.50)	Gynecologic (100)	N/A	1. FACT-G 2. N/A 3. 0 to 100	Paired t-test	The mean score of QOL in patients did not improve significantly after the intervention ($P > 0.05$)	Good

Table 1 (continued)

First author/year	Location	Study characteristics	M/F ratio (%)	Age (mean ± SD)	Type of cancer (%)	Control group	Tool characteristics	Specific statistical tests	Key results	JBI score
Eliminian et al. (2020) [11]	USA	1. Quasi-experimental 2. 50 3. Art therapy 4. 23 months 5. N/A 6. 72 h	12.00/82.00	54.30 (SD=12.30)	<ul style="list-style-type: none"> Breast (44.00) Colon (10.00) Lymphoma (8.00) Multiple myeloma (8.00) Pancreatic (6.00) Esophageal (4.00) Endometrial (4.00) Leukemia (4.00) Lung (2.00) Other (10.00) 	N/A	1. VAS 2. 10 3. 0 to 10	N/A	<ul style="list-style-type: none"> The mean score of distress in patients decreased significantly after the intervention ($P < 0.001$) The mean score of depression in patients decreased significantly after the intervention ($P < 0.001$) The mean score of anxiety in patients decreased significantly after the intervention ($P < 0.001$) 	
Joshi et al. (2021) [19]	India	1. Quasi-experimental 2. 30 3. MBAT 4. 2 months 5. 15 to 30 min 6. 1 week	0/100	N/A	N/A	N/A	1. VAS 2. 10 3. 0 to 10	<ul style="list-style-type: none"> Quade test Paired Wilcoxon test 	<ul style="list-style-type: none"> The mean score of distress in patients decreased significantly after the intervention ($P < 0.001$) 	Good

RCT, randomized clinical trial; *MBAT*, mindfulness-based art therapy; *SCL-90-R*, symptom checklist revised; *HADS*, hospital anxiety depression scale; *PEDI*, perceived emotional distress inventory; *QLQ*, quality of life questionnaire; *FACT-G*, functional assessment of cancer therapy-general; *PATP*, painting art therapy program; *PAI*, personality assessment inventory

Table 2 Interventions of the studies are included in the systematic review and meta-analysis

First author/year	Intervention program	Description
Monti et al. (2006) [13]	MBAT	<p>Participants in the intervention groups received MBAT 2.50 h for 8 weeks. The intervention method is as follows:</p> <p>Participants were trained in mindfulness meditation practice (including body scan meditation, sitting meditation, gentle hatha yoga, and walking meditation), in a curriculum. Homework included practicing mindfulness meditation 6 days a week for 30 min. For this purpose, an audio tape with a body scan and sitting meditation was provided to each participant. The group art therapy component of the intervention focused on non-verbal activities that were mixed with verbal processes within the group. Specific artistic tasks were directed to explore experiential and in-the-moment learning related to the experiential and cognitive elements of the mindfulness-based curriculum</p> <p>Anxiety and depression data were collected before and after 8 weeks via SCL-90-R</p>
Bar-Sela et al. (2007) [14]	Anthroposophical art therapy	<p>Participants in the intervention groups received a few minutes to more than an hour of anthroposophical art therapy once a week. The intervention method is as follows:</p> <p>First, the patient is asked to draw at least three pictures without any instructions. Then, the art therapist looks at three paintings and tries to diagnose the patient's psychological state. In the second session, the therapist begins to guide the patient, for example: before you start painting, think about light and dark for yourself. Then choose your color. If the patient chooses very dark and depressing colors that stop movement and make the image dead, the therapist tries to make them move by giving them bright colors</p> <p>Only patients who participated in four or more sessions were evaluated as an intervention group</p> <p>Anxiety and depression data were collected before and after four sessions via HADS</p>
Thyme et al. (2009) [15]	Art therapy	<p>Participants in the intervention groups received five sessions of art therapy. The intervention method is as follows:</p> <ul style="list-style-type: none"> • First session: Participants divided a sheet of paper into 16 sections for the 16 words they wanted to hear. The therapist then reads 16 words aloud approximately every 10 s. After each word, the participants drew a stroke with their lead pencils. After that, they named each sign they made with the word it represented. Next, participants were encouraged to select one or more of their stroke responses to the read words and create one or more pictures • Second session: Participants selected a color for the therapist to use as they drew their bodies on a large sheet of paper nailed to the wall • Third and fourth sessions: Participants painted whatever they wanted in several pictures • Fifth session: The paintings made were displayed during the sessions. The participants thought about the topics and then created a final image that was meant to summarize their experiences <p>Anxiety and depression data were collected before and after 8 weeks via SCL-90-R</p>
Jang et al. (2016) [16]	MBAT	<p>Participants in the intervention groups received MBAT 45 min for twelve sessions. The intervention method is as follows:</p> <ul style="list-style-type: none"> • Self-acceptance: Participants drew a complete picture of themselves • Awaken the physical sensation I: Participants achieved self-awareness of sensory stimulation through physical simulation • Awaken the physical sensation II: Participants achieved awareness of sensory stimulation and response through mindfulness study of art materials using all five senses • The mind is where the body is I: By expressing their feelings before and after Hatha Yoga, the participants studied their mind-body relationships through pre- and post-assessments • The mind is where the body is II: Participants became aware of the physical sensations felt during hatha yoga, as well as observed the awakening of physical sensations by articulating the mandala • Loving mind I: Participants imagined they were caring for themselves, then experienced the transformation of mental, emotional, and physical pain through drawing • Loving mind II: Participants changed their mental, emotional, and physical pain by taking care of themselves and expressing loving thoughts towards others through painting • The power of breath: Before the breathing exercise and after focusing on breathing without distraction, the participants paid attention to the tense and relaxed responses shown in the pictures • Realization: Using collage, participants expressed thoughts and feelings through art, the views, and the feelings perceived in the seated meditation. They also became aware of these automatic and passive thoughts and feelings • From negative to positive: The participants expressed the happy and unpleasant events that caused stress in the past week through drawing. Also, they became aware that they were lost in thoughts of an event that they could not control • Here, now: Participants smeared their chosen colored paint on the bottom of their feet and walked briskly across the paper on the floor. After five steps, they changed direction and allowed their minds to focus on the present moment • Beginner's mind: As in session 1, they completed the activity "Draw a perfect picture of yourself" and evaluated their drawing <p>QOL data were collected via QLQ-30 before and after the intervention. Also, anxiety and depression data were collected via PAI</p>

Table 2 (continued)

First author/year	Intervention program	Description
Bozcuk et al. (2017) [17]	PATP	Participants in the intervention groups received PATP. The intervention method is as follows: A brief introduction to watercolor painting techniques and accompanying supplies was given to each patient. Patients were permitted to create watercolor paintings while receiving chemotherapy in the chemotherapy unit and next to their chemotherapy chairs. Each patient was urged to describe the idea and theme of their drawing after finishing it. In addition, the patients received paint and paper so they could, if possible, study at home QOL data were collected via QLQ-30 before and after the intervention. Also, anxiety and depression data were collected via HADS
Meghani et al. (2018) [18]	MBAT	Participants in the intervention groups received MBAT 2.50 h for 8 weeks. The intervention method is as follows: The first exercise in the eight-week MBAT curriculum involves developing first-hand expertise by mentally experimenting with a variety of artist-grade art media, from colored pencils to watercolor. Before broadening the scope of their creative practice, participants are encouraged to experiment with shredding the sheet used for this investigation and combining it with origami paper, colorful textures, and a variety of magazine photographs to make the first collage. During the first four to five weeks of the 8-week program, each participant uses a digital camera to capture images as they walk home from the medical center. They then choose which photos to print for collages in the ensuing weeks. Each college's challenge level is determined by the participants. To promote mindful attention and embodied presence on the walks and at the art table, mindful awareness techniques are presented at the start of the program and reinforced and mentioned throughout. A practice of loving compassion meditation concludes each class QOL data were collected before and after 8 weeks via SF-36
Radl et al. (2018) [9]	Self-book art therapy	Participants in the intervention groups received 50 min of self-book art therapy in six sessions. The intervention method is as follows: <ul style="list-style-type: none"> • First session: Inside the blank Self-Book area, participants constructed their own safe spaces using pre-cut and classified magazine photos • Second session: Participants indicated their supporters in the interior of the second blank using pre-cut, categorized magazine photos • Third session: Participants identified their positive traits in the inner third blank space using pre-cut and categorized magazine photos • Fourth session: Participants wrote wishes for their loved ones on the inside of the fourth blank portion using pre-cut and categorized magazine photos • Fifth session: On the interior of the fifth blank, participants wrote a wish for themselves using pre-cut and sorted magazine images • Sixth session: Participants collected and decorated their self-book Distress data were collected before, after each session, and 8 weeks after the intervention via VAS and PEDI
Wiswell et al. (2019) [3]	Art therapy	Participants in the intervention groups received 50 min of art therapy for each session in six sessions. The intervention method is as follows: <ul style="list-style-type: none"> • Bridge drawing: Participants were instructed to design a bridge using crayons, markers, oil pastels, and watercolor sticks. They were asked to describe the specifics of their mental images of where and why they were on the bridge • "Your door" collage: The patients have been given the same art supplies as before and told to create a door that would "introduce themselves to others." The outside in itself represented something they could easily show someone in public. Inside the doorway, they placed pictures of magazine collage materials that they felt represented their personalities. They control who they let in the door to find out more about them • "Feeling" printmaking: Patients were asked to identify 4 to 6 emotions they had experienced in the past month, after which they were told to draw on the gel sheets to express each emotion • Mandala: Patients were given a piece of paper with a circle drawn on it, colored pencils, markers, oil pastels, watercolor sticks, and collage materials. They decorated a circle starting from the center • Final session: All of the artistic creations were on show on the wall in front of the patients throughout this gathering. They were encouraged to express their opinions and feelings regarding the therapy and art QOL data were collected before and after 5 sessions via FACT-G
Elimimian et al. (2020) [1]	Art therapy	Participants received art therapy. The intervention method is as follows: Each art therapy session featured standardized and consistent art therapy techniques meant to engage the participant's mind, body, and soul while encouraging them to express their creative side. Each participant was given access to the tools they would need to complete their work, including materials for pottery, collage, painting, and sketching. The art therapist concluded the sessions by having the patients reflect on their artwork Emotional distress, anxiety, and depression data were collected before, after, and 72 h after the intervention via VAS

Table 2 (continued)

First author/year	Intervention program	Description
Joshi et al. (2021) [19]	MBAT	<p>Participants received MBAT for 1 week. The intervention method is as follows:</p> <ul style="list-style-type: none"> • Mindfulness meditation: The fundamental ideas of mindfulness meditation were explained to the patients. The meditation involved a body scan, focusing on the breath to center attention, and maintaining a non-judgmental awareness of one's thoughts, feelings, and bodily sensations. The meditation lasted for 15 min • Mindful art: This interventional element emphasized mindful coloring. For art therapy, mindfulness-based coloring books/sketches with 12 colored pencils/crayons were employed. The coloring sheets featured mandalas, birds, animals, and nature-themed images in an abstract style (circular designs composed of symmetrical shapes). During the mindful coloring workshop, participants were encouraged to explore painting supplies mindfully while being conscious of their sensory input and reaction. The patients were urged to investigate their current circumstances with kindness, curiosity, and a lack of judgment. Each patient received a therapy that lasted about 30 min • Home practice: They received art supplies and recordings of guided meditation in the facilitator's voice for use at home. The participants kept up the at-home routine for a week, spending at least 30 min coloring mindfully and 15 min practicing guided mindfulness <p>Distress data were collected before, after, and 1 week after MBAT via VAS</p>

MBAT, mindfulness-based art therapy; *SCL-90-R*, symptom checklist revised; *HADS*, hospital anxiety depression scale; *PEDI*, perceived emotional distress inventory; *VAS*, visual analog scale; *PATP*, painting art therapy program; *PAI*, personality assessment inventory

mental distress, and two out of 4 studies showed a positive effect of art therapy on the quality of life of patients. In sum, seven out of eleven included studies described these beneficial effects. All studies reported that participants considered the experience valuable to their well-being.

Interpretations

These results partially confirm the result of a recent systematic review study [4] about the effect of art therapy on anxiety, depression, and quality of life in cancer patients. However, because the present study specifically examines cancer patients undergoing chemotherapy, some differences were observed. For example, the quality of life increased in 2 of the 4 present studies. This was even though in the previous study, in 4 out of 6 studies, art therapy increased the quality of life [4]. This difference can be due to the difference in the characteristics of the studied samples. However, the results of art therapy in improving psychological outcomes in patients undergoing chemotherapy are encouraging. Even though the quality of life in cancer patients is of particular importance, psychological needs in cancer patients undergoing chemotherapy are usually unrecognized and undertreated.

Strengths and limitations

Strengths

In this review, we searched PubMed/MEDLINE, Scopus Web of Science, PsycINFO, and EMBASE, which gave

us a general review of the available literature, in which all relevant articles were included in the study. Also, the dispersion of studies from all over the world increased the generalizability of the present study.

Limitations

The present study has several limitations. Four studies did not have a control group and 5 were not RCT. Non-randomization can lead to bias in the selection of samples. On the other hand, the studies did not address confounding factors such as the type of cancer and its stage. In addition, there was an imbalance between male and female participants, such that there were no male patients in three studies. Also, one of the limitations was the impossibility of meta-analysis. Considering that the measurement tools are heterogeneous and the interventions were also different. Therefore, meta-analysis was not possible in this study. In sum, it is suggested that the results of the present study should be interpreted with caution.

Clinical implications and future research

Our findings emphasize the importance and application of art therapy in improving the psychological status of cancer patients undergoing chemotherapy. However, it is not-so-high impact on the quality of life can indicate that if art therapy is accompanied by another intervention, it may improve the quality of life of patients. So, it is suggested that RCT studies with a larger sample size be done to prove the effectiveness of art therapy.

Conclusion

Art therapy had positive effects on depression, anxiety, quality of life, and psychological distress of cancer patients undergoing chemotherapy. Meanwhile, the results of studies on the quality of life were contradictory. Research on art therapy in cancer patients on chemotherapy is insufficient. We cannot conclude that art therapy benefits cancer patients on chemotherapy. More rigorous research is needed.

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Declarations

Competing interests The authors declare no competing interests.

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