REVIEW ARTICLE

Effects of Creative Arts Therapies on Psychological Symptoms and Quality of Life in Patients With Cancer

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Importance: Creative arts therapies (CATs) can reduce anxiety, depression, pain, and fatigue and increase quality of life (QOL) in patients with cancer. However, no systematic review of randomized clinical trials (RCTs) examining the effects of CAT on psychological symptoms among cancer patients has been conducted.

Objectives: To estimate the effect of CAT on psychological symptoms and QOL in cancer patients during treatment and follow-up and to determine whether the effect varied according to patient, intervention, and design characteristics.

Evidence Review: We searched ERIC, Google Scholar, MEDLINE, PsycInfo, PubMed, and Web of Science from database inception to January 2012. Studies included RCTs in which cancer patients were randomized to a CAT or control condition and anxiety, depression, pain, fatigue and/or QOL were measured pre- and post-intervention. Twenty-seven studies involving 1576 patients were included. We extracted data on effect sizes, moderators, and study quality. Hedges *d* effect sizes were computed, and random-effects models were used to estimate sampling error and population variance.

Findings: During treatment, CAT significantly reduced anxiety (Δ=0.28 [95% CI, 0.11-0.44]), depression (Δ=0.23 [0.05-0.40]), and pain (Δ=0.54 [0.33-0.75]) and increased QOL (Δ=0.50 [0.25-0.74]). Pain was significantly reduced during follow-up (Δ=0.59 [95% CI, 0.42-0.77]). Anxiety reductions were strongest for studies in which (1) a non-CAT therapist administered the intervention compared with studies that used a creative arts therapist and (2) a waiting-list or usual-care comparison was used. Pain reductions were largest during inpatient treatment and for homogeneous cancer groups in outpatient settings; significantly smaller reductions occurred in heterogeneous groups in outpatient settings.

Conclusions and Relevance: Exposure to CAT can improve anxiety, depression, and pain symptoms and QOL among cancer patients, but this effect is reduced during follow-up.

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Approximately 40% of adults in the United States report using at least 1 complementary and alternative medicine (CAM) therapy, with prevalence estimates among patients with cancer ranging from 18% to 91%.[1-7] Various CAM therapies have improved psychological symptoms frequently associated with cancer and cancer treatment, including cancer-related fatigue,[8] pain,[9] and symptoms of anxiety and depression.[10,11]

Creative arts therapies (CATs), including music therapy,[12-14] dance/movement therapy,[15-18] and various forms of art therapy,[19-21] have received less empirical attention than other CAM therapies more commonly used among adults, such as vitamin and nonvitamin supplements and mind-body therapies.[1] Although CAT research has been predominately qualitative, clinical research on CAT has expanded from purely observational science to a wider, cross-disciplinary approach that includes fields such as neuropsychiatry.[16,22] Prior reviews have suggested that

See Invited Commentary at end of article

CAT may be a useful adjuvant therapy to improve cancer- and treatment-related symptoms during and after treatment.[23,24] For example, recent systematic reviews of CAT among cancer patients concluded that music interventions may have beneficial effects on anxiety, pain, and mood, whereas music and dance therapies may improve quality of life (QOL).[15,25] However, no sys-

tematic review of randomized clinical trials (RCTs) examining the effects of CAT on psychological symptoms among cancer patients has been conducted.

This systematic review used the results of RCTs to evaluate the effect of exposure to CAT on psychological symptoms and QOL among patients with cancer. The aims of this meta-analysis were to estimate the effect size of exposure to CAT on psychological symptoms (ie, anxiety, depression, pain, cancer-related fatigue) and on QOL among cancer patients during and after treatment and to determine how potential moderators may influence the efficacy of CAT during and after cancer treatment.

METHODS

DATA SOURCES AND SEARCHES

The review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.[26] Electronic searches of databases were conducted via ERIC (Educational Resource Information Center), Google Scholar, MEDLINE, PsycInfo, PubMed, and Web of Science from database inception to January 2012 using the search terms *cancer* and (*anxiety* or *depression* or *pain* or *fatigue* or *quality of life*) and (*art* or *art therapy* or *creative arts therapy* or *dance* or *drama* or *music* or *writing*). Searches were restricted to English-language RCTs. Supplemental searches of reference lists from retrieved articles were performed manually.

STUDY SELECTION

Included studies compared CAT with no treatment, waiting list, usual care, or placebo control in cancer patients regardless of age, sex, cancer type, cancer stage, or treatment type. Patients could have been receiving treatment, in long-term follow-up, or receiving palliative care. Interventions could take place in an inpatient or outpatient setting and be group or individual based. The authors considered art, dance, drama, music, writing, or combined creative arts modalities. Outcomes included measures of anxiety, depression, pain, fatigue, and/or QOL assessed before and during and/or after exposure to CAT.

Excluded studies explicitly examined mind-body techniques (eg, yoga, meditation, qigong) without including additional features of CAT and/or compared CAT only with an active therapy (eg, pharmacotherapy, counseling). A flowchart of study selection is presented in **Figure 1**.

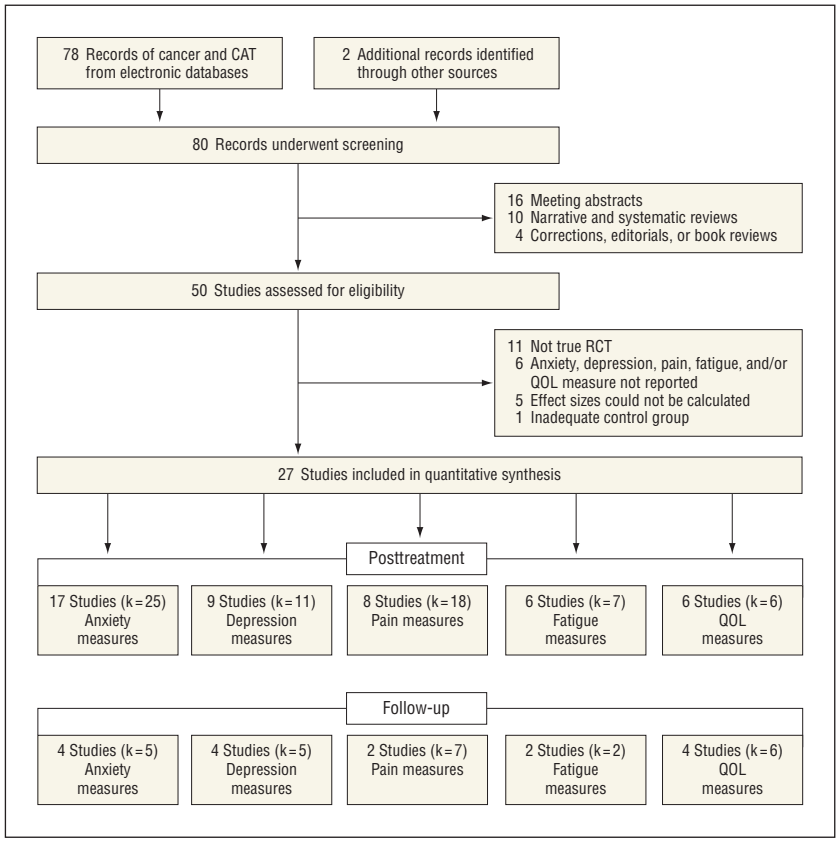

Figure 1. Flowchart of study selection. CAT indicates creative arts therapies; k, number of effects; QOL, quality of life; and RCT, randomized clinical trial.

DATA EXTRACTION AND QUALITY ASSESSMENT

The authors independently extracted data and resolved discrepancies by consensus judgment. Effect sizes were calculated by subtracting the mean change in the control condition from the mean change in the treatment condition and dividing the difference by the pooled standard deviation of preintervention scores.[27] Effect sizes were adjusted using the Hedges small-sample bias correction and calculated so that decreased anxiety, depression, pain, and fatigue and increased QOL resulted in positive effect sizes.[26] When precise means were not reported, effect sizes were estimated[28] from *F* tests[29] or Figures.[30,31] When precise standard deviations were not reported,[31-34] the standard deviation was drawn from published norms or the largest other study using the same measure.

Study quality was assessed using a 15-item scale[35] and addressed randomization, sample selection, quality of outcome measures, and statistical analysis. Quality assessment was independently performed by the authors (T.W.P. and M.P.H.) and showed high concordance between raters (intraclass correlation coefficient [3,2], 0.94 [95% CI, 0.87-0.99]).[36] According to the Bland-Altman method for limits-of-agreement,[37,38] the mean disagreement was close to zero (−0.22 [95% CI, −0.05 to −0.40]), suggesting no evidence for systematic disagreement bias. Quality scores were not used as weights or moderators because of the potential disparity in results that depends on the specific quality scale used.[39]

DATA SYNTHESIS AND ANALYSIS

To better understand the effect of exposure to CAT on psychological symptoms and QOL during the course of treatment and recovery, separate analyses were performed for investigations assessing anxiety, depression, fatigue, pain, and QOL. Analyses were further subdivided by posttreatment and follow-up outcomes.

The MeanES macro (SPSS, version 19.0; SPSS, Inc) was used to calculate the aggregated mean effect size delta value

Table 1. Characteristics of Included Trials

Characteristic	Outcome Measure									
	Anxiety		Depression		Pain		Fatigue		Quality of Life	
	Posttreatment	Follow-up	Posttreatment	Follow-up	Posttreatment	Follow-up	Posttreatment	Follow-up	Posttreatment	Follow-up
Study Characteristics										
Effects, k	25	5	11	5	18	7	7	2	6	6
Total sample, No.	1413	246	584	246	1237	750	359	102	275	359
Patient Characteristics[a]										
Age, mean (SD), y	52.7 (10.7)	54.3 (3.1)	54.27 (3.3)	54.3 (3.1)	49.7 (16.0)	48.6 (9.6)	55.0 (2.6)	53.5 (1.9)	56.9 (6.3)	55.0 (4.3)
Female sex, %	60.5	90.7	76.7	90.7	59.3	85.7	56.6	76.8	91.7	100
Cancer site, %										
Blood	21.9	72.0	14.4	72.0	18.2	. . .	22.3	67.6	. . .	. . .
Breast	44.2	28.0	52.5	28.0	42.4	96.0	31.7	32.4	70.9	100.0
Colorectal	3.7	. . .	4.2	. . .	1.9	. . .	5.8	. . .	. . .	. . .
Gynecologic	2.8	. . .	5.1	. . .	2.3		3.2	. . .	. . .	. . .
Head and neck	3.1	. . .	4.9	. . .	10.4	. . .	9.1	. . .	. . .	. . .
Kidney	3.3	. . .	7.4	. . .	. . .	. . .	13.6	. . .	. . .	. . .
Lung	8.9	. . .	2.8	. . .	3.8	. . .	5.2	. . .	. . .	. . .
Prostate	7.0	. . .	2.8	. . .	5.1	4.0	5.2	. . .	. . .	. . .
Other	5.1	. . .	6.0	. . .	15.9	. . .	3.9	. . .	29.1	. . .
Cancer treatment, %										
Surgery	30.2	42.7	34.5	32.9	63.2	96.0	40.3	85.3	32.1	. . .
Chemotherapy	41.5	17.5	10.6	20.5	6.3	. . .	15.6	. . .	28.3	12.9
Radiotherapy	23.9	17.9	42.0	21.0	17.3	4.0	39.4	. . .	26.7	13.2
Hormone therapy	1.5	7.3	4.2	8.6	. . .	. . .	. . .	. . .	9.6	. . .
Combination therapy	2.9	14.6	8.7	17.1	13.1	. . .	4.7	14.7	3.2	73.9
Baseline T score, mean (SD)	49.2 (7.8)	48.3 (3.0)	53.4 (8.1)	47.2 (7.3)	41.15 (6.9)	46.1 (3.7)	59.1 (5.4)	58.3 (4.3)	52.5 (7.9)	51.8 (8.3)

Abbreviation: ellipses, not applicable because the category was not reported.
[a] Percentages have been rounded and might not total 100.

(Δ), associated 95% confidence interval, and sampling error variance according to a random-effects model.[40] We used random-effects models to account for between-studies heterogeneity associated with study-level sampling error and population variance.[40] Each effect was weighted by the inverse of its variance and reestimated after the random-effects variance component was added.[31] Heterogeneity and consistency were evaluated with the *Q* statistic and the I^2 statistic, respectively.[41] Heterogeneity also was examined relative to observed variance and was indicated if the sampling error accounted for less than 75% of the observed variance.[27] Publication bias was addressed by inspection of a funnel plot[42] and quantified with rank correlation and regression methods.[42,43]

Primary Moderators Analysis

To provide focused research hypotheses about the effects of exposure to CAT on treatment symptoms among cancer patients,[44] primary moderators were selected for each model that met criteria for heterogeneity of effects. Variable selection was based on logical, theoretical, or prior empirical relation to CAT and outcomes. Two variables were selected for the anxiety model (ie, therapeutic monitoring and comparison type). Three variables were selected for the pain model (ie, intervention setting, homogeneity of the cancer group, and the intervention setting × homogeneity of group interaction). Variable definitions are provided in eTable 1 (http://www.jamainternalmed.com).

Using the MetaReg macro (SPSS, version 19.0), primary moderator variables were included in a weighted, least-squares, multiple regression analysis with maximum-likelihood estimation[27,40] adjusted for nonindependence of multiple effects contributed by single studies.[45] Test results of the regression model (the Q_R statistic) and its residual error (the Q_E statistic) are reported. Significant categorical moderators were decomposed using a random-effects model to compute mean effect sizes and 95% confidence intervals.[40]

Secondary Moderators Analysis

Secondary moderators were selected for descriptive, univariate analyses based on logical, theoretical, or prior empirical relation with CAT and/or outcomes and grouped into participant characteristics, intervention characteristics, and study design characteristics. Variable definitions are provided in eTable 1. We computed mean effect sizes and 95% confidence intervals for continuous and categorical variables using a random-effects model.[40]

RESULTS

Twenty-seven trials of 1576 patients were included in the meta-analysis and are presented in the eReferences. Characteristics of these trials and study quality assessment are presented in **Table 1**. Variables of CAT are provided in **Table 2**. Funnel plots for all models were inspected and found to be roughly symmetrical (eFigure). The Begg rank correlation and Egger regression analyses were not statistically significant for any model, suggesting absence of publication bias (eTable 2).

ANXIETY

Postintervention

Anxiety was significantly reduced after exposure to CAT interventions (Δ = 0.28 [95% CI, 0.11-0.44]; $z = 3.26$ [$P = .001$]). Distribution of the 25 effects is presented in **Figure 2**A. The effect was heterogeneous ($Q_{Total(24)} = 56.65$ [$P < .001$]). Sampling error accounted for 44.0% of the observed variance. The effect was moderately consistent across stud-

Table 2. CAT Intervention Characteristics[a]

Characteristic	Outcome Measure									
	Anxiety		Depression		Pain		Fatigue		Quality of Life	
	Post-treatment	Follow-up	Post-treatment	Follow-up	Post-treatment	Follow-up	Post-treatment	Follow-up	Post-treatment	Follow-up
Setting, %										
Inpatient	8.0	20.0	9.1	20.0	44.4	85.7	14.3	50.0	0	0
Outpatient	92.0	80.0	90.9	80.0	55.6	14.3	85.7	50.0	100.0	100.0
Monitoring, %										
Therapist present	28.0	60.0	72.7	60.0	16.7	0	57.1	50.0	100.0	50.0
No therapist present	72.0	40.0	27.3	40.0	83.3	100.0	42.9	50.0	0	50.0
Modality[b]										
Art	12.0	20.0	27.3	12.0	5.6	. . .	14.3	. . .	16.7	16.7
Dance	8.0	40.0	18.2	8.0	. . .	. . .	14.3	50.0	33.3	. . .
Music	72.0	40.0	45.5	72.0	88.9	85.7	57.1	50.0	50.0	33.3
Writing	8.0	. . .	9.1	8.0	5.6	14.3	14.3	. . .	. . .	50.0
Program length, mean (SD), wk	5.5 (3.0)	7.0 (4.6)	5.9 (3.3)	7.0 (4.6)	5.8 (2.5)	6.4 (2.4)	4.5 (1.1)	4.5 (2.1)	9.3 (4.9)	5.5 (5.9)
Program session duration, mean (SD), min	53.4 (52.3)	107.5 (84.1)	77.0 (66.0)	107.5 (84.1)	39.9 (32.8)	28.6 (3.8)	55.7 (1.1)	102.5 (109.6)	71.3 (33.3)	45.0 (43.3)
Program frequency, mean (SD), d/wk	1.0 (0.4)	0.8 (0.4)	0.9 (0.3)	0.8 (0.4)	5.2 (2.7)	6.6 (1.1)	1.0	1.0	1.2 (0.7)	2.4 (1.8)
Retention rate, median (range), %	100 (8.0-100.0)	94.4 (57.1-100.0)	94.4 (57.1-100.0)	94.4 (57.1-100.0)	100.0 (81.8-100.0)	100.0 (90.0-100.0)	100.0 (90.5-100.0)	97.2 (94.4-100.0)	91.0 (57.1-100.0)	84.4 (57.1-100.0)
Adherence, median (range), %	95.0 (25.0-100.0)	90.0	88.0 (86.0-90.0)	90.0	100 (96.9-100.0)	100	93.0 (86.0-100.0)	. . .	90.0	97.6 (90.0-97.6)
Study quality, mean (SD), rating[c]	10.2 (2.2)	11.5 (2.6)	11.1 (2.0)	11.5 (2.6)	11.8 (1.5)	12.6 (1.1)	10.4 (2.5)	11.5 (2.8)	10.3 (3.0)	11.0 (3.1)

Abbreviations: CAT, creative arts therapy; ellipses, not applicable because the category was not reported.
[a] Percentages have been rounded and might not total 100.
[b] Based on the number of studies identified with the criteria matching the trial type.
[c] Based on randomization, sample selection, quality of outcome measures, and statistical analysis as described in the Data Extraction and Quality Assessment subsection of the Methods section.

ies (I^2 = 59.4% [95% CI, 49.2%-67.6%]).

The overall multiple regression model for anxiety was significantly related to effect size ($Q_{R(3)}$ = 17.44 [$P < .001$]; R^2 = 0.41; $Q_{E(21)}$ = 24.76 [P = .26]). Therapeutic monitoring (β = 0.46; z = 2.99 [P = .003]) and type of comparison (β = 0.51; z = 3.12 [P = .002]) were independently related to effect size. When the number of effects allowed decomposition of these variables, larger improvements were found for studies in which (1) the intervention was administered by a non-CAT therapist (Δ = 0.32 [95% CI, 0.13-0.51]) compared with those delivered by a CAT therapist (Δ = 0.17 [−0.12 to 0.46]) and (2) a waiting-list or usual-care comparison (Δ = 0.37 [0.20-0.54]) compared with a placebo condition was used (Δ = −0.04 [−0.35 to 0.28]).

Follow-up

Anxiety was not significantly reduced during the period after exposure to CAT interventions (Δ = 0.08 [95% CI, −0.26 to 0.42]; z = 0.46 [P = .64]). Distribution of the 5 effects is presented inFigure 2A. The effect was homogeneous ($Q_{Total(4)}$ = 6.92 [P = .14]). Sampling error accounted for 58.3% of the observed variance. The effect was moderately consistent across studies (I^2 = 56.7% [95% CI, 24.8%-75.0%]).

DEPRESSION

Posttreatment

Depression was significantly reduced after exposure to CAT interventions (Δ = 0.23 [95% CI, 0.05-0.40]; z = 2.49 [P = .01]). Distribution of the 11 effects is presented inFigure 2B. The effect was homogeneous ($Q_{Total(10)}$ = 11.47 [P = .32]). Sampling error accounted for 87.3% of the observed variance. The effect was consistent across studies (I^2 = 21.5% [95% CI, 0.0%-45.1%]).

Follow-up

Depression was not significantly reduced during the period after exposure to CAT interventions (Δ = −0.09 [95% CI, −0.42 to 0.22]; z = 0.61 [P = .54]). Distribution of the 5 effects is presented in Figure 2B. The effect was homogeneous ($Q_{Total(4)}$ = 6.16 [P = .19]). Sampling error accounted for 65.2% of the observed variance.

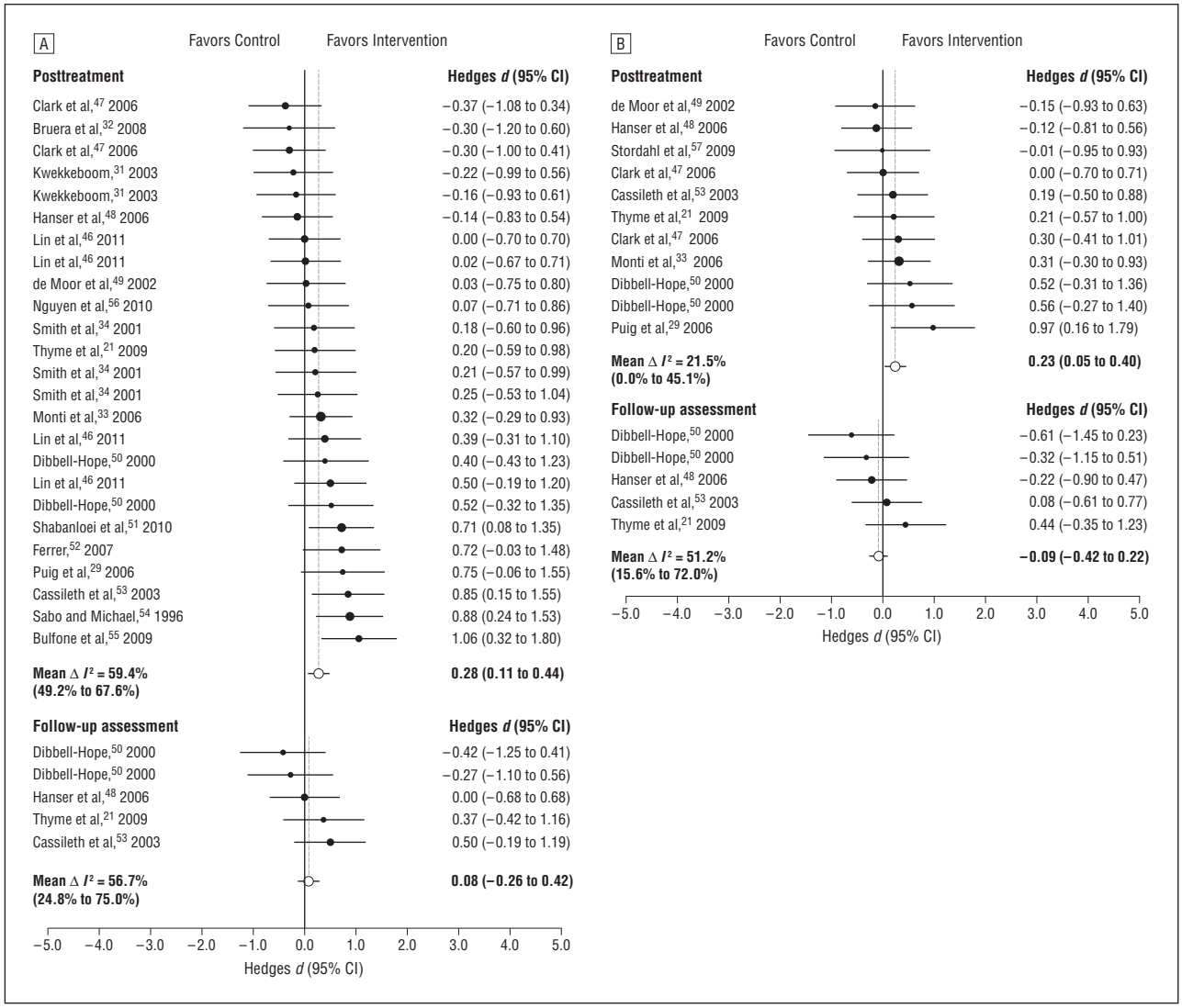

Figure 2. Forest plots of the unweighted distribution of Hedges *d* effect sizes (95% confidence intervals) for studies assessing anxiety (A) and depression (B).

The effect was moderately consistent across studies (I^2 = 51.2% [95% CI, 15.6%-72.0%]).

PAIN

Posttreatment

Pain was significantly reduced after exposure to CAT interventions (Δ = 0.54 [95% CI, 0.33-0.75]; z = 5.04 [$P < .001$]). Distribution of the 18 effects is presented in **Figure 3**A. The effect was heterogeneous ($Q_{Total(17)}$ = 52.15 [$P < .001$]). Sampling error accounted for 36.5% of the observed variance. The effect was moderately consistent across studies (I^2 = 69.3% [95% CI, 60.6%-76.1%]).

The overall multiple regression model for pain was significantly related to effect size ($Q_{R(4)}$ = 33.98 [$P < .001$]; R^2 = 0.65; $Q_{E(13)}$ = 18.07 [P = .16]). The intervention setting × homogeneity of patient interaction was independently related to effect size (β = 0.71; z = 1.30 [P = .02]). Significantly smaller effects were found in studies with heterogeneous cancer groups exposed to CAT in outpatient settings (Δ = 0.10 [95% CI, −0.12 to 0.31]) compared with the average effect for all other groups (Δ = 0.81 [0.65-0.96]; $Q_{Between(1)}$ = 27.95 [$P < .001$]) (**Figure 4**).

Follow-up

Pain was significantly reduced during the period after exposure to CAT interventions (Δ = 0.59 [95% CI, 0.42-0.77]; z = 6.51 [$P < .001$]). Distribution of the 7 effects is presented inFigure 3A. The effect was homogeneous ($Q_{Total(6)}$ = 8.59; P = .20). Sampling error accounted for 70.3% of the observed variance. The effect was consistent across studies (I^2 = 41.8% [95% CI, 7.5%-63.4%]).

FATIGUE

Fatigue was not significantly reduced after exposure to CAT interventions (Δ = 0.16 [95% CI, −0.04 to 0.37]; z = 1.54 [P = .12]). Distribution of the 7 effects is presented inFigure 3B. The effect was homogeneous ($Q_{Total(6)}$ = 2.22 [P = .90]). Sampling error accounted for 99.9% of the observed variance. The effect was consistent across studies (I^2 = 0.0% [95% CI, 0.0%-7.6%]).

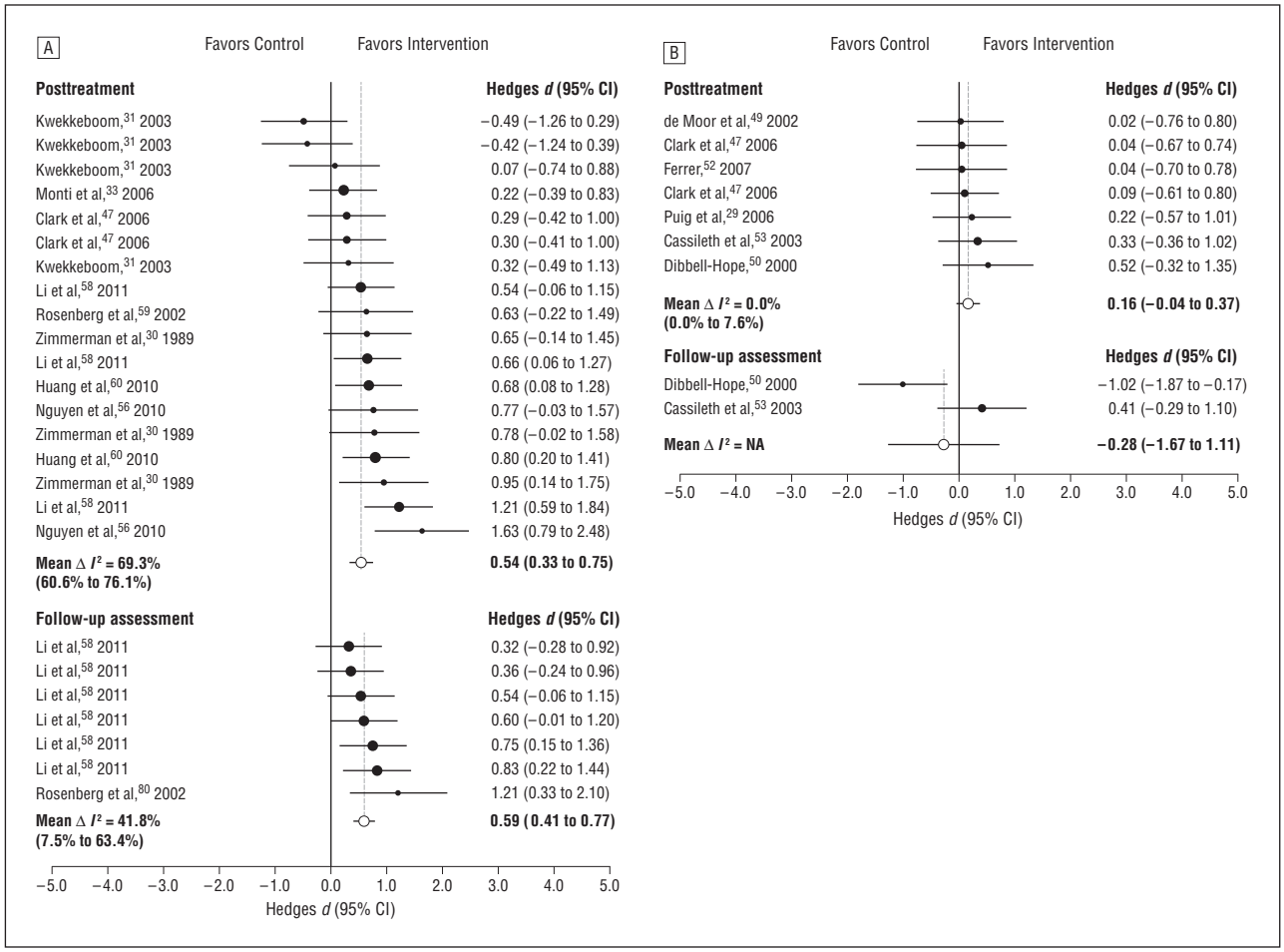

Figure 3. Forest plots of the unweighted distribution of Hedges *d* effect sizes (95% confidence intervals) for studies assessing pain (A) and fatigue (B). NA indicates not applicable.

QUALITY OF LIFE

Posttreatment

Quality of life was significantly increased after exposure to CAT interventions (Δ = 0.50 [95% CI, 0.25-0.74]; z = 3.98 [$P < .001$]). Distribution of the 6 effects is presented in **Figure 5**. The effect was homogeneous ($Q_{Total(5)}$ = 5.09 [P = .41]). Sampling error accounted for 98.1% of the observed variance. The effect was consistent across studies (I^2 = 21.4% [95% CI, 0.0%-49.1%]).

Follow-up

Quality of life was not significantly increased during the period after exposure to CAT interventions (Δ = 0.22 [95% CI, −0.09 to 0.54]; z = 1.40 [P = .16]). Distribution of 6 of the effects are presented inFigure 5. The effect was homogeneous ($Q_{Total(5)}$ = 10.11; P = .16). Sampling error accounted for 52.7% of the observed variance. The effect was moderately consistent across studies (I^2 = 60.4% [95% CI, 35.4%-75.8%]).

SECONDARY MODERATORS

The number of effects (k), mean effect size (Δ), 95% confidence interval, P value, and I^2 value for each level of each moderator for the anxiety, depression, pain, fatigue, and QOL models are presented in eTables 3 through 7, respectively. These results represent descriptive, univariate analyses and should be interpreted accordingly.

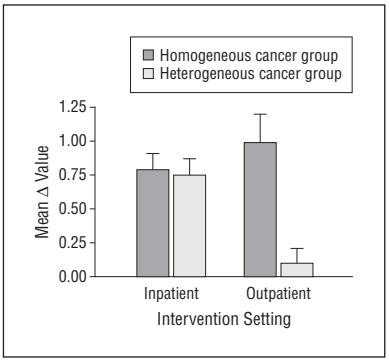

Figure 4. Interaction of cancer group (homogeneous vs heterogeneous) and intervention setting. Error bars indicate standard error.

DISCUSSION

The cumulative evidence summarized in this review indicates that exposure to CAT reduces symptoms of anxiety, depression, and pain and improves QOL among cancer patients after treatment. The magnitude of the effects is generally diminished during follow-up. Exposure to CAT did not significantly reduce symptoms of fatigue after treatment or during follow-up (**Figure 6**). These findings are consistent with the findings of previ-

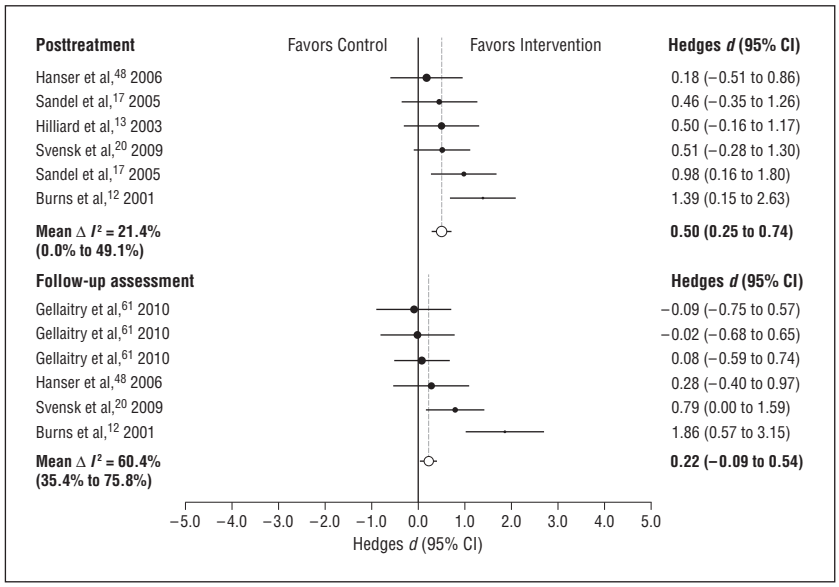

Figure 5. Forest plot of the unweighted distribution of Hedges *d* effect sizes (95% confidence intervals) for studies related to quality of life.

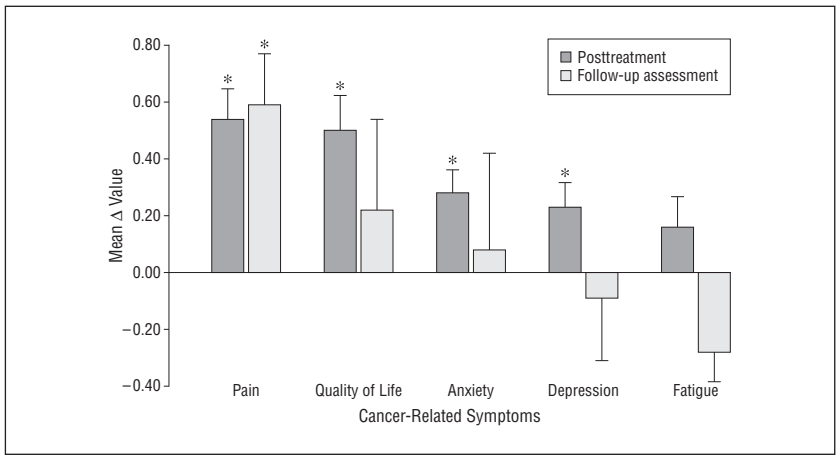

Figure 6. Mean delta effect size for posttreatment and follow-up assessments across psychological symptoms and quality of life. $*P < .05$.

ous reviews of the positive effects of CAT on anxiety, pain, mood, and QOL among cancer patients.[15,25] The magnitude of the overall effects of CAT exposure on symptoms of anxiety, depression, pain, and QOL was small but similar to improvements reported for other CAM therapies among cancer patients, including (1) mindfulness-based therapy on anxiety and depression[62]; (2) acupuncture and massage therapy on pain intensity[63]; (3) yoga on anxiety, depression, and QOL[46,64]; and (4) exercise on anxiety,[65] depression,[66,67] and QOL.[68] The effects of CAT exposure on cancer-related fatigue is more difficult to interpret. These effects may be modality dependent such that movement-based creative expression has effects more comparable to those seen in exercise studies than other CAT modalities.[15,69,70] Although exposure to CAT elicited significant improvements in depression and QOL, the mean effects were found to be homogeneous and therefore were not subjected to moderator analyses. Significant findings for anxiety and pain are discussed in the following sections.

ANXIETY

Anxiety reduction was strongest for studies in which (1) the intervention was administered by a non-CAT therapist and (2) a waiting-list or usual-care comparison was used. Why larger anxiety reductions resulted from CAT interventions not administered by CAT therapists is uncertain. Treatment differences may result from interventions administered by CAT therapists who have undergone the rigorous training and credentialing expected of nationally certified CAT therapists compared with interventions administered by non-CAT therapists. Another possibility is related to the need to reduce tension in the perceived polarization of CAM and biomedicine in medical settings. Such tension can be an important factor in shaping cancer patients' first impressions and influencing their confidence in CAM practices.[71-73] Although openness to experience may predicate the use of provider-directed CAM, clinical distress has predicated the use of self-directed CAM.[74] This perception of openness is likely related to a need for better integration of CAM and conventional medicine in medical settings. Patients do not necessarily expect clinicians to believe in the philosophy of CAM, but they do want medical approval and to know that their CAM choices are reasonable and safe.[72,73] Therefore, material used by practitioners to explain CAM to potential patients should avoid challenging patients' beliefs about the perceived disadvantages and instead focus on the positive and preventive effects of CAM.[75]

Larger anxiety reductions also resulted from investigations that used a waiting-list or usual-care control condition rather than a placebo control. Our analysis did not permit a rigorous decomposition of this effect. However, these findings suggest that future well-designed trials may benefit from the use of a waiting-list or usual-care comparison in addition to intervention and placebo conditions to control for differences in expectancy, conditioning, and meaning.[76,77] Previous studies have highlighted the need to examine the placebo effect in alternative medicine.[77-79] Researchers need to focus on factors that influence expectancy and possible mediators of the placebo effect. For example, younger women with a higher level of education and patients with greater clinical distress or a longer duration after cancer di-

agnosis are more likely to use CAM and critically engage clinicians regarding CAM and biomedical care.[71,80] These issues of expectancy are at least partially independent of known direct biological effects of interventions and require improving clinical trial design and interpretation of nonspecific healing responses that constitute the placebo effect.

PAIN

Pain reduction was largest for studies conducting interventions during inpatient treatment and with homogeneous cancer groups in outpatient settings. Significantly smaller reductions occurred in heterogeneous cancer groups in outpatient settings. We are uncertain why less pain reduction resulted from CAT interventions in heterogeneous cancer groups in outpatient settings. One possibility is that the openness to experience predicated the use of provider-directed CAM.[74] For example, inpatient and outpatient consultation services have shown success in addressing questions raised by the possible integration of CAM therapies with conventional care, particularly among patients who have severe, chronic, or incurable conditions and likely need inpatient facilities.[81] This type of integration may explain the similar effects found in inpatient groups. The differential effect of cancer groups in outpatient settings is more difficult to interpret. Complementary and alternative medicine therapies might be more useful in augmenting traditional analgesic therapy in certain cancer outpatient groups who cannot tolerate or may be reluctant to take pain medications.[63] Integrated services may be highly valued by these types of cancer patients who have traditionally preferred their complementary health care to be provided in a nonmedicalized environment.[72] Prior reviews have provided striking observations about the paucity of well-designed trials evaluating CAM interventions for cancer-related pain.[9] Because the available literature suggests a large degree of heterogeneity regarding the design and administration of CAT related to cancer-related pain, the present findings may be particularly noteworthy with regard to methodological issues within CAT research.

LIMITATIONS

The included trials had notable limitations. Many lacked well-validated symptom assessments among cancer patients[82] and adequate information regarding features of the intervention, appropriateness of comparisons, adherence rates, and medication use. These limitations emphasize the importance of adoption of and adherence to reporting guidelines to improve the quality of future trials. To inform the design of appropriate CAT interventions and offer insight into putative biopsychosocial mechanisms of symptom reduction during and after cancer treatment, well-designed RCTs should (1) seek to better characterize the features of the CAT intervention (ie, certified instruction, frequency, session duration, program length, and modality); (2) examine CAT exposure on the interrelationship between neurobiological and psychological measures of cancer symptoms; and (3) investigate the mechanistic similarities, differences, and interactions among various CAT modalities, psychosocial interventions, and pharmacologic treatments used to improve psychological symptoms in patients with cancer.

CONCLUSIONS

This systematic review offers a unique look into the potential benefits of CAT that may guide further hypothesis-driven investigation into adjuvant treatments to improve conventional disease management. The cumulative evidence indicates that CAT can decrease symptoms of anxiety, depression, and pain and increase QOL among cancer patients after treatment. The effects are greatly diminished during follow-up. Future well-designed RCTs are needed to address the methodological heterogeneity found within this field of research.

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INVITED COMMENTARY

Creative Arts Therapies Defined

A diagnosis of cancer and subsequent treatments may result in significant emotional, physical, and social suffering, placing cancer survivors at greater risk for mental health issues.[1,2] Therefore, the care of cancer patients should incorporate services that help meet patients' psychological, social, and spiritual needs. Creative arts therapies (CATs), such as dance/movement, music, art, poetry, drama, and psychodrama, are increasingly used to aid in the care of cancer patients and in their recovery. The results of several systematic reviews, as referenced in the study by Puetz et al[3] have reported small to moderate effects of music, art, and dance/movement therapies on a variety of psychological outcomes in cancer patients. The systematic review by Puetz and colleagues aims to expand the existing evidence base by identifying potential moderators of the efficacy of CATs during and after cancer treatment.

The review included 27 randomized clinical trials (RCTs) that examined the effects of arts interventions (music, art, dance, and expressive writing) on psychological outcomes in 1576 cancer patients. The pooled estimates indicate that arts interventions significantly reduced anxiety, depression, and pain and improved the quality of life in cancer patients. The results indicate no evidence of an effect on fatigue. Moderator analyses suggest greater pain reductions during inpatient treatment and for homogeneous cancer groups. In addition, the authors report that anxiety reduction was greater for those studies "in which the arts intervention was administered by a non-CAT therapist compared with those delivered by a CAT therapist."[3]

The continuum of care in arts in health care practices ranges from performances for patients by artists to focused individualized psychotherapeutic CAT interventions. We value and applaud the use of the arts and creative processes across this continuum because they enhance patient care and well-being. Research on the efficacy of these interventions, however, requires clarity about the nature of the interventions themselves. Unfortunately, the analysis by Puetz et al[3] offers no operational definition of CATs. Instead, the authors use