

Culturally specific ethnic dance interventions for psychosocial outcomes in cancer patients: a systematic review and meta-analysis

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Abstract: Background: People living with cancer carry a substantial psychosocial burden, and dance has attracted growing interest as a non-pharmacological supportive intervention. Existing reviews, however, tend to pool heterogeneous dance forms together and overlook whether the cultural specificity of a given form contributes to its effects. Objective: To evaluate the effects of culturally specific ethnic dance on psychosocial outcomes in people with cancer, and to examine whether these effects differ across cultural regions. Methods: Following PRISMA 2020, five databases were searched from inception to 2 July 2026. Randomised and controlled quasi-experimental studies were included and assessed with RoB 2 or ROBINS-I. Standardised mean differences (SMDs) were pooled using random-effects models, with exploratory cultural-region subgroup and sensitivity analyses for DMT-labelled studies lacking explicit cultural-specificity evidence. Results: Twenty studies were included; 13 contributed to quantitative or sensitivity analyses. Low-certainty evidence suggested improvements in quality of life (SMD 0.67, 95% CI 0.45 to 0.88; $I^2 = 48.6\%$) and cancer-related fatigue (SMD -0.76 , 95% CI -1.16 to -0.35 ; $I^2 = 71.1\%$). Evidence for depression was very uncertain after restricting the primary analysis to two culturally specific studies (SMD -1.81 , 95% CI -3.30 to -0.32 ; $I^2 = 89.8\%$). Anxiety and prespecified secondary outcomes could not be pooled. Regional subgroup analyses were underpowered and did not establish cross-cultural equivalence. Conclusion: Low-certainty evidence suggests that culturally specific ethnic dance may improve quality of life and fatigue in people with cancer. Evidence for affective and secondary psychosocial outcomes remains very uncertain. Better powered trials with explicit reporting of cultural intervention components are needed.

Keywords: ethnic dance 1; cancer 2; psychosocial outcomes 3; quality of life 4; meta-analysis 5; cultural congruence 6

1. Introduction

Cancer remains one of the most pressing global health burdens, with close to 20 million new cases recorded worldwide in recent estimates [1]. Beyond the physical toll of the disease and its treatment, a substantial share of patients carry a heavy psychosocial load. Evidence synthesised across large bodies of literature indicates that anxiety, depression, and related distress affect a considerable proportion of people living with cancer, often at levels well above those seen in the general population [2]. This burden is especially pronounced in women with breast cancer, among whom anxiety, depression, and stress are highly prevalent [3]. These symptoms rarely occur in isolation; an overview drawing on more than one hundred meta-analyses has shown that psychological distress tends to cluster and persist across the illness trajectory [4]. Such distress is not merely an emotional side note. It has been linked to poorer treatment adherence, slower recovery, and a diminished quality of life, and younger

survivors appear particularly vulnerable to its lasting effects [5]. Cancer-related fatigue and reduced quality of life compound this picture, making the psychosocial dimension of survivorship a clinical priority rather than an afterthought.

As the limitations of purely pharmacological approaches to distress have become clearer, interest in non-pharmacological, mind–body interventions has grown. Physical activity, in particular, is now recognised as a feasible and beneficial component of supportive cancer care, with current guidelines endorsing exercise-based strategies for managing fatigue and emotional symptoms [6]. Umbrella-level evidence links regular physical activity to better psychological, physical, and social wellbeing in cancer survivors [7], and its psychosocial correlates have been mapped across diverse survivor populations [8]. Dance occupies a distinctive place within this movement. Unlike conventional exercise, it weaves together physical exertion, music, rhythm, and social interaction, and this combination is thought to engage several therapeutic pathways at once, including embodied self-expression, emotional regulation, and social connectedness [9]. Related work on mind–body practices suggests that these mechanisms may translate into meaningful improvements in quality of life and psychological well-being during and after treatment [10], including reductions in cancer-related fatigue among breast cancer patients [11]. The social fabric of group-based movement may be especially important, since supportive relationships formed through shared activity appear to reinforce both engagement and psychological benefit [12].

Despite this promise, the existing evidence base has been assembled in a way that obscures an important distinction. Prior reviews have tended to pool heterogeneous dance forms under broad labels such as “dance” or “dance movement therapy”, treating a tango class and a community folk dance as interchangeable [13,14]. This aggregation sidesteps a question that matters both theoretically and practically: whether the cultural rootedness of a given dance form contributes to its effects. The concern is compounded by geographic imbalance. Dance practices that are deeply embedded in East Asian communities, such as square dancing and Tai Chi–based movement, are widely practised yet remain largely absent from English-language syntheses, leaving a substantial portion of the relevant evidence outside the analytical frame.

A useful lens for addressing this gap comes from research on culturally adapted interventions, which has found that aligning an intervention with the cultural context of its recipients can shape its acceptability and effectiveness [15]. If cultural fit influences outcomes in psychological therapies, it is reasonable to ask whether the same principle applies to culturally grounded dance. Yet no synthesis has isolated culturally specific ethnic dance as a distinct category or examined whether effects vary across cultural regions. This study was designed to address that omission. It reviews and quantitatively synthesises randomised and controlled trials of culturally specific ethnic dance interventions in adults with cancer, focusing on quality of life, cancer-related fatigue, depression, and anxiety, and it further examines whether the cultural region of the intervention moderates these outcomes. By narrowing the scope to culturally rooted dance and incorporating evidence from East Asian settings that earlier work overlooked, this review aims to clarify both the size and the consistency of the psychosocial benefits, and to test whether such benefits are confined to particular cultural traditions or hold more broadly across them. In doing so, it offers clinicians and researchers a more precise basis for judging where, and for whom, culturally grounded dance may serve as a supportive care option.

2. Methods

2.1. Protocol and registration

This review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement [16]. The protocol was registered in advance with PROSPERO (registration number: CRD420261452324) to define the research question, eligibility criteria, and analytical approach before data collection began, thereby reducing the risk of post hoc changes and selective outcome reporting. Protocol deviations and prespecified outcomes that could not be synthesised are reported in the relevant Methods and Results sections.

2.2. Eligibility criteria (PICOS)

Eligibility was defined using the PICOS framework (**Table 1**). Eligible participants were adults aged 18 years or older with a confirmed diagnosis of any type of cancer, regardless of stage, treatment phase, or survivorship status. The intervention of interest was culturally specific ethnic dance, operationally defined as a structured dance form rooted in a particular ethnic, regional, or cultural heritage and carrying recognisable markers of cultural identity, such as traditional movement vocabulary, culturally identified music or rhythm, symbolic movement content, regional origin, or group cultural identity. Examples included Argentine tango, Greek traditional dance, belly dance, Chinese square dance, Tai Chi-based dance, and hula. Generic dance movement therapy, contemporary dance, freestyle dance, and culturally neutral aerobic routines were not eligible for the primary culturally specific synthesis unless the original report explicitly documented culturally rooted movement content or cultural adaptation. Eligible comparators included usual care, waitlist control, health education, or an alternative active intervention. The primary outcomes were quality of life, cancer-related fatigue, depression, and anxiety, while secondary outcomes comprised body image, psychological stress or distress, and well-being. Randomised controlled trials were prioritised as the core evidence base, but controlled quasi-experimental studies were also included and analysed within a separate stratum, given that much of the relevant evidence, particularly from East Asian settings, has been generated through non-randomised designs. This inclusive yet stratified approach was intended to broaden coverage without conflating designs of differing methodological rigour.

Table 1. Eligibility criteria (PICOS).

Domain	Inclusion criteria	Exclusion criteria
Population	Adults (≥ 18 years) with a confirmed diagnosis of any type of cancer, at any stage, treatment phase, or survivorship status	Non-cancer populations; paediatric patients (< 18 years); mixed samples in which cancer patients could not be separated
Intervention	Culturally specific ethnic dance: a structured traditional or culturally rooted dance form with recognisable markers of cultural identity, such as traditional movement vocabulary, culturally identified music/rhythm, symbolic movement content, regional origin, or group cultural identity.	Generic dance movement therapy without documented cultural specificity; contemporary, freestyle, or culturally neutral aerobic/fitness routines; dance interventions whose cultural markers could not be verified for the primary synthesis.
Comparator	Usual care, waitlist control, health education, or an alternative active intervention	No comparator group (single-arm studies)

Continuation Table:

Domain	Inclusion criteria	Exclusion criteria
Outcomes	Primary: quality of life, cancer-related fatigue, depression, anxiety. Secondary: body image, psychological stress/distress, well-being	Studies reporting none of the predefined outcomes
Study design	Randomised controlled trials; controlled quasi-experimental studies (analysed in a separate stratum)	Single-arm studies, protocols, reviews, conference abstracts, qualitative studies

2.3. Information sources and search strategy

A comprehensive search was performed across five electronic databases: PubMed, Cochrane CENTRAL, Web of Science, China National Knowledge Infrastructure (CNKI), and Wanfang. The inclusion of two major Chinese-language databases was a deliberate choice, intended to capture evidence on East Asian dance forms that has been underrepresented in earlier English-language syntheses. Each database was searched from inception to 2 July 2026, combining terms for cancer populations, dance-based interventions, and psychosocial outcomes, adapted to the syntax of each platform. The full search strings and database-specific search dates are provided in the Supplementary Material. To reduce the risk of missing relevant records, the reference lists of eligible studies and prior reviews were screened manually, and supplementary searches were conducted in trial registries (ClinicalTrials.gov and the Chinese Clinical Trial Registry) and Google Scholar. No restrictions were placed on publication year, and eligible reports in English and Chinese were considered.

2.4. Study selection and data extraction

All records were imported into reference management software, where duplicates were removed before screening. Study selection proceeded in two stages. Two reviewers independently screened titles and abstracts against the eligibility criteria, retaining any record judged potentially relevant by either reviewer to minimise premature exclusion. The full texts of the remaining records were then assessed independently by the same two reviewers, and each excluded report was assigned a single primary reason for exclusion. Inter-rater agreement at the title and abstract stage was high (Cohen's $\kappa = 0.92$), and disagreements at both stages were resolved through discussion or, where consensus could not be reached, by consultation with a third reviewer. Where several publications reported the same trial, these were treated as a single study unit to avoid double-counting participants.

Data were extracted independently by two reviewers using a standardised, piloted form, with discrepancies resolved by discussion. Extracted items covered study characteristics (author, year, country, design), participant details (cancer type, treatment phase, sample size), intervention parameters (dance form, frequency, duration, and explicit cultural markers), the comparator condition, and all reported outcomes with their measurement instruments and post-intervention means and standard deviations. For each intervention, we recorded whether the original report described traditional movement vocabulary, culturally identified music, regional or ethnic origin, symbolic movement content, or explicit cultural adaptation. When outcome data were reported only as figures, medians, or model-based estimates, the corresponding authors were contacted, and records that remained unusable

were reserved for narrative synthesis. Prespecified secondary outcomes were extracted where available and were either synthesised narratively or recorded as not synthesised when fewer than two studies reported compatible data. The belly-dance rehabilitation data attributed to Szalai 2015 were checked against the original quantitative report rather than the later 2017 qualitative social-support analysis. Particular attention was paid to linked publications: several trials had generated multiple reports, and each such cluster was counted as a single study unit with its sample tallied only once. This applied to the Brazilian free-dance cluster (ReBEC 0RBR-772ktp), the tango trial, the MoveMama trial, and the dance movement therapy series, preventing the same participants from contributing more than once to a pooled estimate.

2.5. Risk of bias assessment

The methodological quality of each included study was appraised according to its design. Randomised controlled trials were assessed with the revised Cochrane risk-of-bias tool (RoB 2), which examines the randomisation process, deviations from intended interventions, missing outcome data, measurement of the outcome, and selection of the reported result [17]. Controlled quasi-experimental studies were appraised with the ROBINS-I tool, covering the seven bias domains it specifies for non-randomised interventions, including confounding and selection into the study [18]. Two reviewers conducted the appraisals independently, and disagreements were settled through discussion. For the Brazilian free-dance cluster (ReBEC), which followed a non-standard randomised design, RoB 2 was applied while acknowledging its crossover features. Given that blinding of participants is not feasible in dance interventions, this domain was judged conservatively across studies.

2.6. Data synthesis and statistical analysis

Because the included studies measured each outcome with a variety of instruments, effect sizes for continuous outcomes were expressed as the standardised mean difference (SMD) with 95% confidence intervals, calculated as Hedges' *g* to correct for small-sample bias. Scale directions were harmonised so that a consistent sign indicated benefit from dance for each outcome. The primary synthesis was restricted to interventions that met the operational definition of culturally specific ethnic dance. Studies labelled only as dance movement therapy, without explicit evidence of culturally rooted movement content or cultural adaptation in the original report, were not used to define the primary culturally specific estimate; where outcome data were otherwise usable, they were retained for sensitivity analyses to examine the influence of borderline intervention classification.

Adjusted estimates and change-score standard deviations were not consistently available across studies; therefore, the main analyses used post-intervention means and standard deviations. To address the risk that baseline imbalance in non-randomised studies could influence pooled effects, sensitivity analyses excluding quasi-experimental studies were conducted where at least two randomised studies remained. Given the anticipated clinical and methodological diversity across dance forms, populations, and settings, random-effects models were applied throughout, following the guidance of the Cochrane Handbook [19]. Random-effects estimates were examined with Hartung-Knapp adjustment and prediction intervals where feasible, particularly for outcomes with few studies, to assess the stability of statistical

inference. Statistical heterogeneity was quantified using the I^2 statistic alongside the χ^2 test, with I^2 values interpreted as low, moderate, and high at approximate thresholds of 25%, 50%, and 75%.

Cultural-region subgroup analysis was prespecified for outcomes with sufficient studies and was treated as exploratory because the Western/Other subgroup contained few studies. Subgroups were classified as East Asian or Western/Other according to the cultural setting in which the intervention was developed or delivered. Between-subgroup tests were interpreted as tests of detectable difference rather than evidence of equivalence. Where data permitted, additional exploratory sensitivity or subgroup analyses were planned by study design, comparator type (passive versus active control), and clinical status (active treatment versus survivorship). When fewer than two studies were available in a subgroup, results were not pooled and the issue was addressed narratively as a limitation.

For outcomes pooling at least ten studies, publication bias was to be assessed visually with funnel plots and formally with Egger's test. Outcomes that could not be combined statistically, owing to incompatible reporting or insufficient data, were summarised narratively. The certainty of evidence for each outcome was rated using the GRADE approach, considering risk of bias, inconsistency, indirectness, imprecision, and publication bias [20]. RevMan 5.4 was used to generate conventional forest plots and risk-of-bias figures. Stata was used for standard random-effects pooling and leave-one-out diagnostics. The metafor package in R was used for REML models, Hartung-Knapp adjustment, and prediction intervals.

3. Results

3.1. Study selection

The database search identified 462 records across the five databases (PubMed, 55; Cochrane CENTRAL, 111; Web of Science, 84; CNKI, 46; Wanfang, 166), with no additional records from other sources. After 81 duplicates were removed, 381 records proceeded to title and abstract screening, of which 287 were excluded as clearly irrelevant. The full texts of the remaining 94 records were assessed for eligibility, and 74 were excluded. The most common reasons were an ineligible study design ($n = 32$) and duplicate or secondary reports of an already-included trial ($n = 14$), followed by unextractable data ($n = 11$), absence of a target outcome ($n = 8$), a non-cultural dance form ($n = 8$), and a non-target population ($n = 1$). Twenty independent studies met the inclusion criteria. Thirteen contributed to quantitative or sensitivity analyses, while seven were retained for narrative synthesis (**Figure 1**).

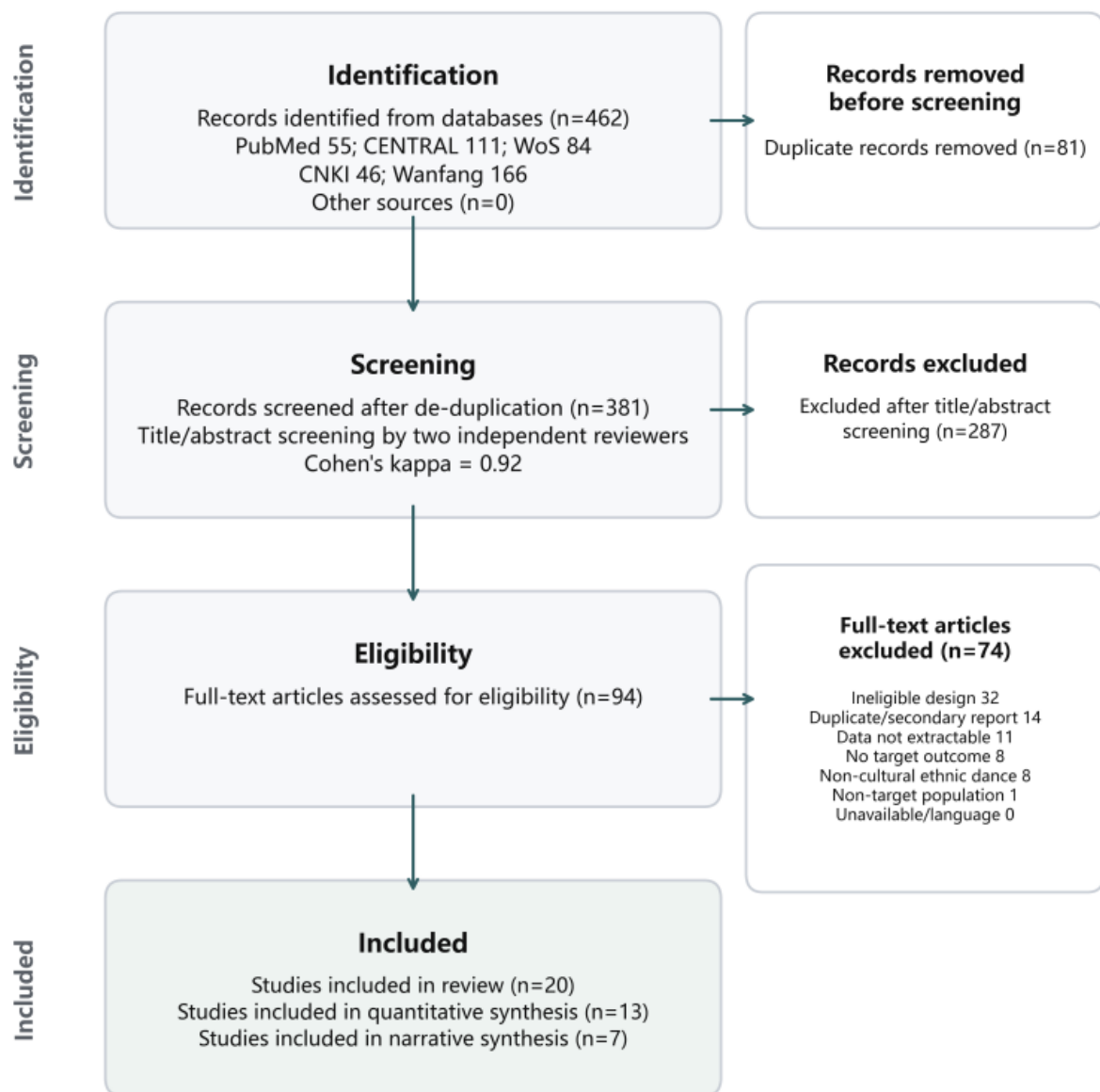


Figure 1. PRISMA 2020 flow diagram showing the identification, screening, and inclusion of studies on culturally specific ethnic dance and related dance-based interventions in cancer populations. Studies with borderline cultural-specificity classification were handled through sensitivity or narrative analyses.

3.2. Characteristics of included studies

The characteristics of the 20 included studies are summarised in **Table 2**. The studies were published between 2005 and 2025 and together enrolled participants across a range of cancer populations, with breast cancer being by far the most common. Ten studies were conducted in East Asian settings and examined square dance, group dance, or dance movement therapy, while the remaining ten originated from Western or other cultural contexts and covered a broader mix of forms, including Argentine tango, Greek traditional dance, belly dance, hula, and the Lebed Method. Twelve studies used a randomised controlled design and were appraised with RoB 2, whereas eight were controlled quasi-experimental studies assessed with ROBINS-I. Sample sizes ranged from small pilot trials of fewer than 30 participants to larger trials exceeding 170. Intervention length varied considerably, from short programmes of a few weeks to sustained interventions lasting up to a year, and comparators were most often usual care, waitlist, or health education. Quality of life and cancer-

related fatigue were the most frequently reported outcomes, followed by depression and anxiety. Thirteen studies provided data suitable for quantitative pooling, while the remaining seven were carried over to narrative synthesis owing to incompatible reporting or non-standard designs.

Table 2. Characteristics of included studies (N = 20)

Study [Ref]	Country	Design	Dance form	Region	Sample (I/C)	Synthesis
Chang 2016 [21]	China	Quasi	Square dance	EA	51/49	QoL
Wang 2020 [22]	China	RCT	Square dance	EA	50/51	QoL, CRF
Sun 2024 [23]	China	RCT	Square dance	EA	50/48	CRF, Dep
Zhong 2019 [24]	China	RCT	DMT (cultural specificity not explicit)	EA	40/40	Dep; sens
Xie R 2022 [25]	China	Quasi	DMT/dance exercise therapy (cultural specificity not explicit)	EA	42/44	CRF; sens
Xie ZF 2024 [26]	China	RCT	DMT (cultural specificity not explicit)	EA	50/50	Narrative; sens
Zhou 2014 [27]	China	Quasi	Group dance	EA	66/58	QoL
Schad/Gross 2023 [28,29]	Germany	RCT	Argentine tango	W/O	24/28	CRF
Boing 2018 [30]	Brazil	Quasi	Belly dance	W/O	8/11	Narrative
Boing 2023 [31]	Brazil	RCT	Belly dance + Pilates	W/O	25/24	Narrative
Kaltsatou 2011 [32]	Greece	Quasi	Greek traditional	W/O	14/13	Dep
Ho 2016 [33,34]	China (HK)	RCT	DMT (cultural specificity not explicit)	EA	63/58 analysed	Narrative; sens
Sandel 2005 [35]	USA	RCT	Lebed Method	W/O	19/19	QoL
Sturm 2014 [36]	Germany	Quasi	Dance	W/O	20/20	CRF
Szalai 2015 [37]	Hungary	Quasi	Belly dance	W/O	55/59	QoL
He 2022 [38]	China	RCT	Adapted dance	EA	88/88	QoL
Rubio 2023 [39]	Colombia	Quasi	Community rumba	W/O	31/33 alloc.; 25/29 analysed	Narrative
Bantum 2023 [40]	USA	RCT	Hula	W/O	61 recruited; 42 completed	Narrative
Yang 2025 [41]	Taiwan	RCT	Remote dance	EA	33/33	QoL, CRF
ReBEC cluster [42,43]	Brazil	RCT	Free dance	W/O	11/11; reference 12	Narrative

Abbreviations: I, intervention; C, control; EA, East Asian; W/O, Western/Other; DMT, dance movement therapy; QoL, quality of life; CRF, cancer-related fatigue; Dep, depression; RCT, randomised controlled trial; Quasi, quasi-experimental; NR, not reported; HK, Hong Kong. All RCTs assessed with RoB 2; quasi-experimental studies with ROBINS-I. DMT-labelled studies were flagged for cultural-specificity adjudication unless the original report documented culturally rooted movement content or cultural adaptation; sens, flagged for cultural-specificity sensitivity analysis.

3.3. Risk of bias

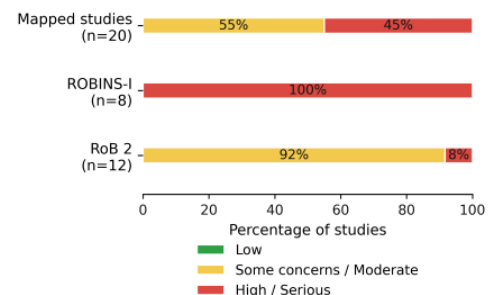
The risk-of-bias assessments are summarised in **Figure 2**. Among the twelve randomised controlled trials appraised with RoB 2, most were rated as raising some concerns, chiefly because the nature of dance interventions precludes blinding of participants and personnel, which introduced potential bias in deviations from intended interventions and in outcome measurement. Only the Brazilian free-dance cluster, with its non-standard crossover design and use of a healthy reference group, was judged to be at high risk overall. None of the randomised trials reached a low overall rating across all domains, reflecting incomplete reporting of randomisation procedures and the general absence of prospective registration. The eight quasi-experimental studies assessed with ROBINS-I were all rated at serious risk of bias, driven primarily by confounding and non-random allocation, which are inherent to this design. Taken together, the overall certainty at the study level was modest: just over half carried a some-concerns rating and the remainder a high or serious rating, a pattern consistent with earlier syntheses of dance-based interventions in oncology.

(a) Risk of bias summary

Randomized trials

RoB 2 domains	D1	D2	D3	D4	D5	Overall
C02 Wang	SC	SC	L	SC	SC	SC
C04 Sun	SC	SC	L	SC	SC	SC
C05 Zhong	SC	SC	SC	SC	SC	SC
C07 Xie	SC	SC	L	SC	SC	SC
E01 Schad/Gross	L	SC	SC	SC	L	SC
E05 Boing	L	SC	SC	SC	L	SC
E09 Ho	SC	SC	SC	SC	L	SC
E12 Sandel	L	SC	SC	SC	SC	SC
E15 He	L	SC	L	SC	L	SC
E20 Bantum	SC	SC	SC	SC	SC	SC
E21 Yang	SC	SC	L	SC	SC	SC
E24_cluster ReBEC	SC	H	SC	SC	SC	H

(b) Overall risk of bias graph



Non-randomized/quasi-experimental studies

ROBINS-I domains	D1	D2	D3	D4	D5	D6	D7	Overall
C01 Chang	S	S	L	M	NI	M	M	S
C06 Xie	S	S	L	M	M	M	M	S
C08 Zhou	S	S	L	M	NI	M	M	S
E03 Boing	S	S	L	M	M	M	M	S
E07 Kaltsatou	S	S	L	M	M	M	M	S
E13 Sturm	S	S	L	M	M	M	M	S
E14 Szalai	S	S	L	M	M	M	M	S
E19 Rubio	S	S	L	M	M	M	M	S

Figure 2. Risk of bias assessment of included studies. (a) Risk-of-bias summary showing domain-level and overall judgements; (b) overall risk-of-bias graph. Randomised controlled trials were assessed with RoB 2 and quasi-experimental studies with ROBINS-I.

3.4. Meta-analysis of primary outcomes

3.4.1. Quality of life

Seven studies contributed to the meta-analysis of quality of life (**Figure 3**). Pooled across these trials, culturally specific ethnic dance was associated with a moderate improvement in quality of life relative to control conditions, with a standardised mean difference of 0.67 (95% CI 0.45 to 0.88). Statistical heterogeneity was moderate ($I^2 = 48.6\%$), which is notably lower than that observed for the other pooled outcomes and suggests less heterogeneity than for the other pooled outcomes.

The individual estimates were positive throughout, ranging from a small effect in the home-based remote programme to a large effect in one group-dance trial, and all but two of the confidence intervals excluded the null. When the analysis was stratified by study design, the direction and magnitude of the effect remained stable across randomised and quasi-experimental studies, indicating that the benefit was not driven solely by the less rigorous designs. Taken together, these findings provide the clearest signal in this review that culturally rooted dance may improve quality of life, although the certainty of evidence remains limited by risk of bias and clinical heterogeneity.

SMD, random-effects model; $\tau^2 = 0.040$; $Q = 11.67$, $df = 6$; $I^2 = 48.6\%$; $Z = 6.10$, $p = 0.000$

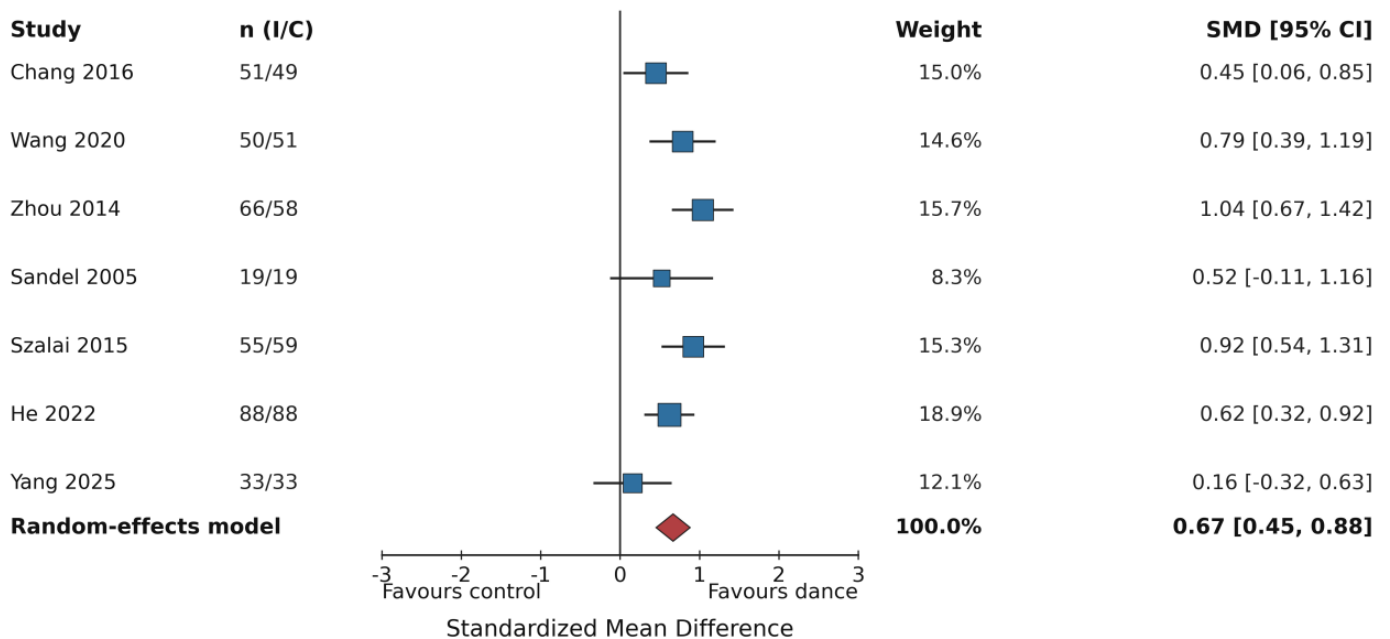


Figure 3. Forest plot of the primary culturally specific analysis for quality of life. Standardised mean differences (SMD) with 95% confidence intervals were pooled using a random-effects model. Positive values favour dance.

3.4.2. Cancer-related fatigue

Five studies met the stricter culturally specific definition and contributed to the primary meta-analysis of cancer-related fatigue after excluding one DMT-labelled study without explicit cultural-specificity evidence (**Figure 4**). The pooled estimate favoured culturally specific dance, with a standardised mean difference of -0.76 (95% CI -1.16 to -0.35), although heterogeneity was substantial ($I^2 = 71.1\%$). Hartung-Knapp adjustment yielded a wider but still negative interval, supporting the direction of effect while indicating uncertainty around its magnitude. In a sensitivity analysis that reintroduced the borderline DMT-labelled study, the estimate was similar to the original pooled result, suggesting that the fatigue finding was not driven solely by that study. These results suggest that culturally specific dance may reduce cancer-related fatigue, but the evidence remains low certainty because of risk of bias, heterogeneity, and mixed intervention and comparator contexts.

SMD, random-effects model; $\tau^2 = 0.152$; $Q = 13.84$, $df = 4$; $I^2 = 71.1\%$; $Z = -3.63$, $p = 0.000$

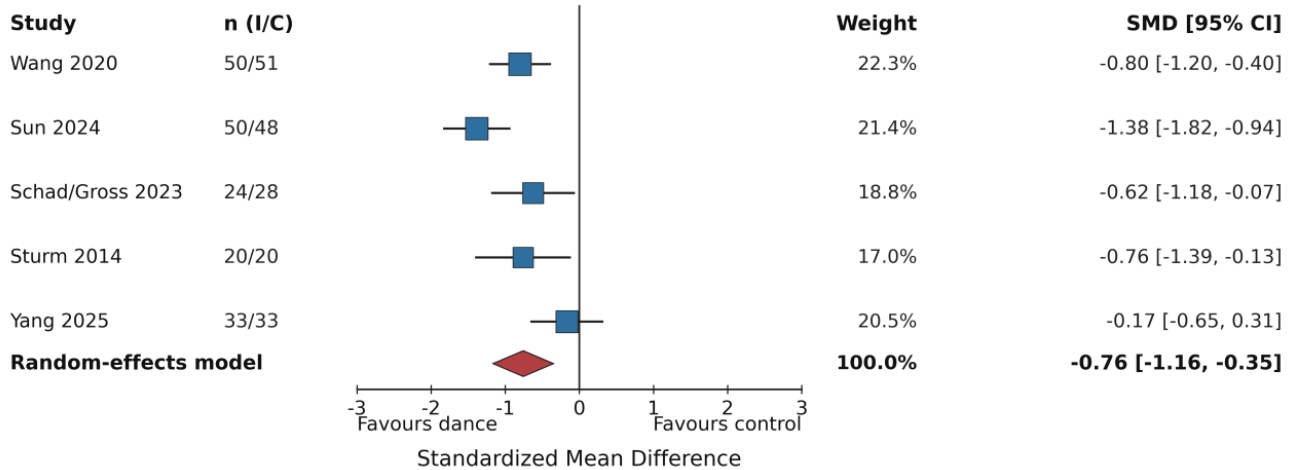


Figure 4. Forest plot of the primary culturally specific analysis for cancer-related fatigue. Standardised mean differences (SMD) with 95% confidence intervals were pooled using a random-effects model. Negative values favour dance. One DMT-labelled study without explicit cultural-specificity evidence was excluded from the primary estimate and retained for sensitivity analysis.

3.4.3. Depression

The primary depression analysis, shown in **Figure 5**, included two studies after excluding one DMT-labelled study without explicit cultural-specificity evidence. The conventional random-effects estimate favoured dance (SMD -1.81 , 95% CI -3.30 to -0.32), but heterogeneity was very high ($I^2 = 89.8\%$) and the Hartung-Knapp interval was extremely wide and crossed the null (**Table 3**). The result therefore cannot support a firm conclusion about depression. When the excluded DMT-labelled study was reintroduced in sensitivity analysis, the pooled estimate became larger, similar to the original three-study result, indicating that the apparent depression effect was sensitive to intervention classification and study context (**Table 3**). Depression findings should therefore be interpreted as exploratory and supported by very low-certainty evidence.

SMD, random-effects model; $\tau^2 = 1.033$; $Q = 9.82$, $df = 1$; $I^2 = 89.8\%$; $Z = -2.39$, $p = 0.017$

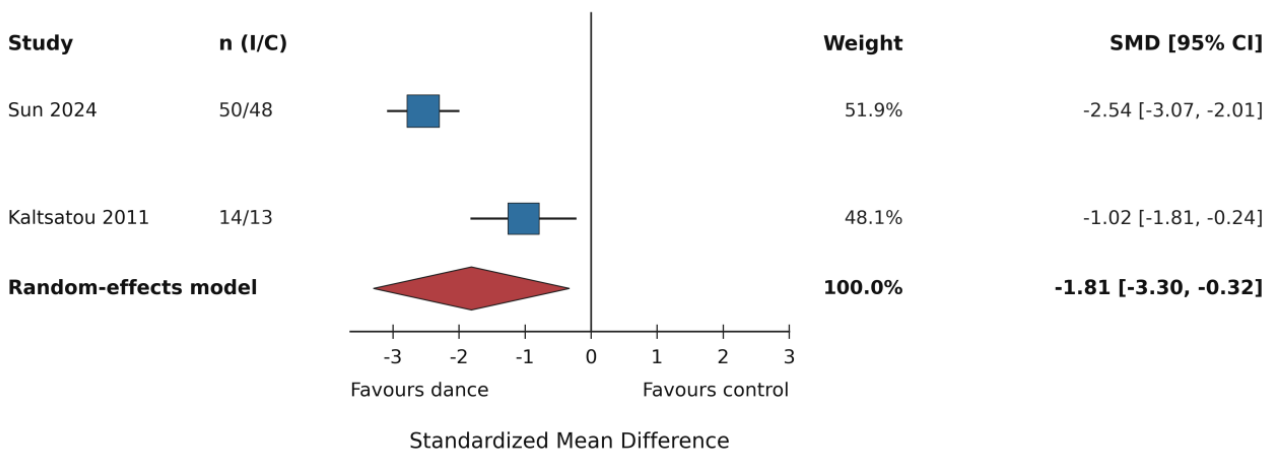


Figure 5. Forest plot of the primary culturally specific analysis for depression. Standardised mean differences (SMD) with 95% confidence intervals were pooled using a random-effects model. Negative values favour dance. One DMT-labelled study without explicit cultural-specificity evidence was excluded from the primary estimate and retained for sensitivity analysis. Given the small number of studies and high heterogeneity, this estimate should be interpreted as exploratory; sensitivity diagnostics are shown in **Table 3**.

Table 3. Depression sensitivity and classification analyses

Analysis	k	SMD	95% CI	I ² (%)	HK 95% CI	Interpretation
Primary excluding DMT	2	−1.81	−3.30 to −0.32	89.8	−11.44 to 7.82	Exploratory; unstable
Sensitivity including DMT	3	−2.09	−2.97 to −1.21	82.9	−4.24 to 0.07	Larger; unstable
Chinese SDS only	2	−2.56	−2.95 to −2.16	0.0	−5.13 to 0.01	Scale/context sensitive
Kaltsatou only	1	−1.02	−1.81 to −0.24	NA	NE	Single-study estimate

Note. DMT, dance movement therapy; HK, Hartung-Knapp; NA, not applicable; NE, not estimable; SDS, Self-Rating Depression Scale; SMD, standardised mean difference. The primary depression estimate excluded DMT-labelled studies without explicit evidence of culturally rooted movement content or cultural adaptation. Conventional random-effects estimates suggested benefit, but Hartung-Knapp intervals crossed the null, indicating very unstable evidence.

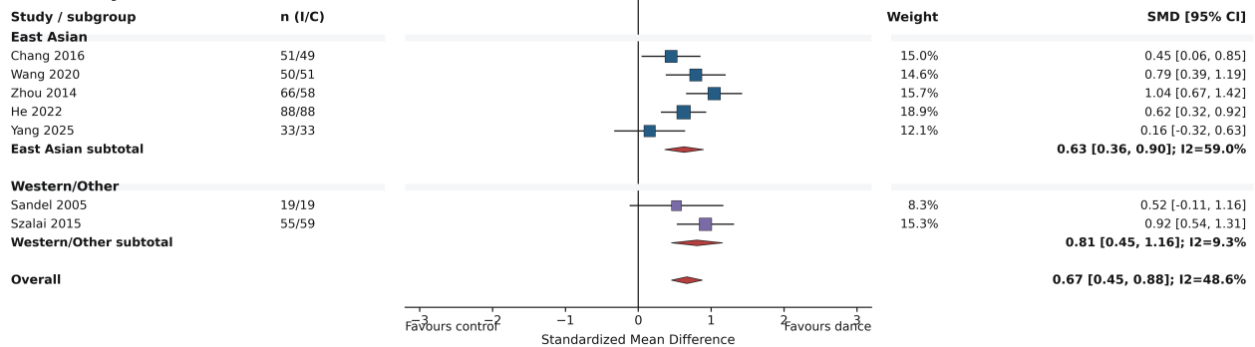
3.5. Narrative synthesis of anxiety

Anxiety could not be pooled quantitatively, as the eligible studies reported the outcome with incompatible measures and statistical formats. The findings were therefore summarised narratively. Some East Asian studies, including square-dance and DMT-labelled interventions, reported reductions in anxiety-related scores, whereas Western/Other studies showed mixed findings, often limited to within-group changes or non-significant between-group differences. This pattern should not be interpreted as evidence of a cultural-region effect, because the studies differed in measurement instruments, control conditions, intervention classification, treatment phase, and risk of bias. The narrative evidence for anxiety remains very low certainty and insufficient for a firm conclusion.

3.6. Subgroup, sensitivity analyses, publication bias, and certainty of evidence

Subgroup analyses by cultural region were conducted for the two outcomes with sufficient studies, quality of life and cancer-related fatigue (**Figure 6**). For quality of life, the pooled effect favoured dance in both the East Asian subgroup (SMD 0.63, 95% CI 0.36 to 0.90) and the Western/Other subgroup (SMD 0.81, 95% CI 0.45 to 1.16), and the between-subgroup test did not detect a statistically significant difference ($p = 0.3723$). For cancer-related fatigue, after excluding one DMT-labelled study without explicit cultural-specificity evidence from the primary subgroup analysis, the pooled effects also favoured dance in both the East Asian subgroup (SMD −0.79, 95% CI −1.45 to −0.13) and the Western/Other subgroup (SMD −0.68, 95% CI −1.10 to −0.27), with no statistically significant between-subgroup difference detected ($p = 0.5891$). These exploratory subgroup analyses should not be interpreted as evidence of cross-cultural equivalence, because the Western/Other subgroup contained only two studies per outcome and the analyses were underpowered. Further subgroup analyses by dance form, study design, comparator type, and clinical status were not pooled when fewer than two studies were available in a category; these issues are therefore addressed as limitations in the Discussion.

(a) Quality of Life



(b) Cancer-Related Fatigue

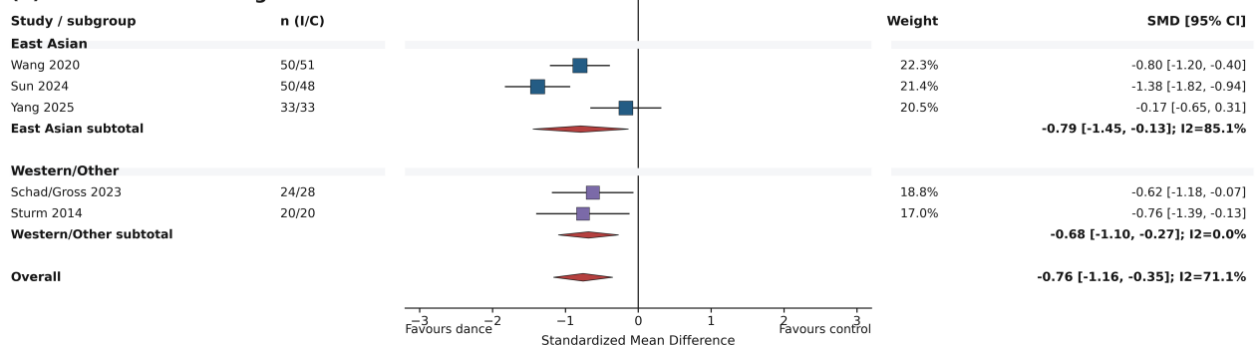


Figure 6. Exploratory subgroup analysis by cultural region for (a) quality of life and (b) cancer-related fatigue. Studies were grouped into East Asian and Western/Other cultural regions according to the cultural setting in which the intervention was developed or delivered. Standardised mean differences (SMD) with 95% confidence intervals were pooled using a random-effects model. Subgroup tests were interpreted as tests of detectable difference rather than evidence of equivalence. For fatigue, one DMT-labelled study without explicit cultural-specificity evidence was excluded from the primary subgroup analysis.

Sensitivity analyses showed that the quality-of-life estimate retained its direction after excluding quasi-experimental studies, although confidence intervals widened because fewer randomised studies remained. For cancer-related fatigue, excluding the DMT-labelled study without explicit cultural-specificity evidence produced a primary estimate similar in direction and magnitude to the original six-study synthesis, but heterogeneity remained substantial. The depression estimate was highly sensitive to intervention classification and remained unstable under Hartung-Knapp adjustment, as detailed in **Table 3**. Formal assessment of publication bias through funnel plots and Egger's test was not undertaken because no outcome included the minimum of ten studies required for reliable evaluation; small-study effects therefore cannot be excluded. The certainty of evidence, appraised with GRADE (**Table 4**), was rated low for quality of life and cancer-related fatigue, reflecting risk of bias, heterogeneity, and clinical diversity, and very low for both depression and anxiety, owing to the small number of studies, instability of the pooled estimate or narrative synthesis, and inconsistency across trials.

Table 4. GRADE summary of findings

Outcome	Studies, participants	Effect estimate (SMD, 95% CI)	I ² (%)	Certainty	Reasons for downgrading
Quality of life	7 studies, 719	0.67 (0.45 to 0.88)	48.6	Low	Risk of bias; moderate inconsistency; clinical heterogeneity

Continuation Table:

Outcome	Studies, participants	Effect estimate (SMD, 95% CI)	I ² (%)	Certainty	Reasons for downgrading
Cancer-related fatigue	5 studies, 357	−0.76 (−1.16 to −0.35)	71.1	Low	Risk of bias; substantial inconsistency; mixed intervention and comparator contexts
Depression	2 studies, 125	−1.81 (−3.30 to −0.32)	89.8	Very low	Risk of bias; serious inconsistency; imprecision; unstable Hartung-Knapp inference
Anxiety	Narrative synthesis	Not pooled	—	Very low	Inconsistent measures; insufficient data; intervention-classification uncertainty; risk of bias

Note. SMD, standardised mean difference; CI, confidence interval. Certainty assessed with GRADE. Positive SMD favours dance for quality of life; negative values favour dance for fatigue and depression. Fatigue and depression primary estimates excluded DMT-labelled studies without explicit evidence of culturally rooted movement content or cultural adaptation.

3.7. Secondary outcomes and protocol deviations

Prespecified secondary outcomes included body image, psychological stress or distress, and well-being. These outcomes could not be pooled quantitatively because too few studies reported each outcome with compatible measures, time points, and extractable between-group data. Where reported, these outcomes were retained in the extraction table and considered narratively. Body image was reported only in a small number of studies and was complicated by overlapping reports from the Brazilian free-dance/dance-therapy cluster. Psychological stress or distress was reported using heterogeneous instruments and statistical formats, including distress thermometers, perceived-stress measures, or related symptom scales. Well-being and related constructs, such as life satisfaction or social support, were reported inconsistently across studies.

The absence of quantitative synthesis for these prespecified secondary outcomes is reported here as a protocol deviation from the planned quantitative synthesis framework. This deviation reflected limitations in the available primary studies rather than selective omission of unfavourable findings. No pooled effect estimates were calculated for these outcomes.

4. Discussion

4.1. Summary of main findings

This review synthesised evidence from 20 studies on culturally specific ethnic dance and related dance-based interventions in people with cancer. After applying a stricter intervention-classification rule, low-certainty evidence suggested that culturally specific dance may improve quality of life and reduce cancer-related fatigue. The fatigue estimate remained favourable after excluding a DMT-labelled study without explicit cultural-specificity evidence, although heterogeneity was substantial. Evidence for depression was very uncertain: the primary analysis included only two culturally specific studies, showed very high heterogeneity, and became larger when the excluded DMT-labelled study was reintroduced in sensitivity analysis. Anxiety could only be synthesised narratively and remained very low

certainty. Exploratory subgroup analyses by cultural region did not detect statistically significant differences, but the available data were insufficient to draw conclusions about cross-cultural equivalence.

4.2. Interpretation: the cultural congruence hypothesis

The findings are compatible with, but do not confirm, the cultural congruence hypothesis. Culturally rooted dance may offer benefits beyond physical activity alone by embedding movement within familiar music, shared rhythms, social participation, and culturally meaningful forms of expression. These features could plausibly support acceptability, adherence, social connection, and emotional regulation during or after cancer treatment, mechanisms that are consistent with evidence on mind–body movement in oncology [44]. Related evidence on Tai Chi and Baduanjin also suggests that integrated movement practices may improve quality of life and psychological outcomes in breast cancer patients, although these findings do not isolate cultural congruence as the active component [45].

Apparent regional patterns should also be interpreted cautiously. Some East Asian studies, particularly those involving square dance, reported larger affective improvements. This is consistent with evidence that square dancing occupies a distinctive social niche in Chinese communities and may support mood through routine participation and group identity [46]. A broader review of square dance among older Chinese adults similarly described psychological benefits, although outside cancer-specific populations [47]. Population-level network evidence has also linked regular square-dance participation with lower depression and anxiety symptoms [48]. Parallel findings from qigong suggest possible reductions in psychological symptoms among women with breast cancer [49], while broader syntheses of Tai Chi and qigong in cancer populations report improvements in fatigue, mood, and quality of life [50]. However, the current review cannot determine whether these apparent patterns reflect cultural matching itself, because the affective outcomes had very low certainty and were influenced by small samples, self-rating scales, heterogeneous controls, and intervention-classification uncertainty.

In addition, several DMT-labelled studies lacked explicit evidence of culturally rooted movement content and were therefore not used to define the primary culturally specific estimates. The available evidence is best viewed as hypothesis-generating: culturally specific dance may be a promising supportive-care approach, but current studies cannot determine whether its effects depend on cultural congruence or instead reflect more general features of structured, enjoyable, group-based movement.

4.3. Comparison with previous reviews

The findings of this review partly align with earlier syntheses of dance-based interventions in cancer care while also highlighting classification issues that previous broader reviews did not address. A previous meta-analysis reported that dance movement interventions reduced fatigue and depression while showing limited effects on quality of life, a mixed picture that partly overlaps with the present findings [13]. However, the stricter intervention-classification approach used in the revised analysis led to a more cautious interpretation, particularly for DMT-labelled studies whose cultural specificity was not explicit. Broader reviews of dance and physical activity have also tended to pool heterogeneous dance forms together, treating culturally rooted practices, therapeutic dance, and general movement-based interventions as closely related categories [9,14].

The present review differs by focusing specifically on culturally specific ethnic

dance and by incorporating Chinese-language evidence that has often been missed in English-language syntheses. This broader evidence base allowed an exploratory assessment of whether available effects differed by cultural region. However, the regional comparison should not be interpreted as confirmatory, because the Western/Other subgroup contained only two studies per outcome and several borderline DMT-labelled interventions required sensitivity handling. Therefore, the main contribution of this review is not to establish cross-cultural equivalence, but to clarify the current evidence base, identify classification problems in culturally specific dance research, and show where better designed trials are needed.

4.4. Clinical and practical implications

For clinical practice, culturally specific dance may be considered as a supportive option where it is feasible, acceptable, and aligned with patient preferences. The observed effects on quality of life and cancer-related fatigue were favourable and may be clinically meaningful, but the certainty of evidence was low and the findings should not be interpreted as definitive proof of efficacy. Dance-based programmes should therefore be implemented, if used, as adjunctive and preference-sensitive supportive care rather than as substitutes for established symptom-management approaches, including exercise-based strategies recommended for cancer-related fatigue and related symptoms [6].

Practical implementation should also consider patients' treatment phase, physical capacity, symptom burden, safety needs, and cultural background. Matching the dance form to patients' preferences and cultural context may improve acceptability and adherence, but this principle remains to be tested directly in adequately powered trials. Programmes labelled as dance movement therapy or generic dance exercise should not be assumed to be culturally specific unless their cultural components are explicitly described. Future clinical use would benefit from clearer intervention manuals, safety monitoring, and transparent reporting of adherence and acceptability.

4.5. Limitations and future research

Several limitations temper these findings. First, the evidence base was small and methodologically uneven: no randomised trial assessed with RoB 2 was rated as low risk overall, and all quasi-experimental studies assessed with ROBINS-I were rated at serious risk of bias [17,18]. Second, intervention classification was challenging. Studies labelled as DMT did not always report culturally rooted movement content or cultural adaptation, and these studies had to be handled through sensitivity or narrative analyses rather than used uncritically in the primary culturally specific synthesis. Third, the analyses relied mainly on post-intervention means and standard deviations because adjusted estimates and change-score standard deviations were inconsistently reported; this is especially problematic for non-randomised studies, where baseline imbalance may bias pooled effects.

Fourth, clinical heterogeneity was substantial. Participants differed by cancer type, treatment phase, active treatment versus survivorship status, symptom burden, and physical capacity, but the small number of studies prevented stable subgroup analyses across these clinical trajectories. Fifth, comparator conditions varied from usual care or waitlist to health education and active exercise/rehabilitation controls, which may have influenced effect sizes. Sixth, the regional subgroup analyses were underpowered, with only two Western/Other studies per outcome, and therefore cannot establish cross-cultural equivalence. Seventh, small-study effects and publication bias could not be formally assessed because fewer than ten studies were

available for each outcome. Finally, prespecified secondary outcomes, including body image, psychological stress or distress, and well-being, could not be quantitatively synthesised because compatible data were insufficient.

Future studies should use clearly described culturally rooted dance protocols, report the cultural components of the intervention explicitly, and distinguish culturally specific dance from generic DMT or aerobic dance. Adequately powered, prospectively registered randomised trials are needed, with standardised outcome measures, baseline-adjusted or change-score reporting, longer follow-up, and transparent reporting of treatment phase, comparator type, adherence, safety, and cultural acceptability. Trials designed to compare culturally matched and non-matched dance forms would be especially useful for testing whether cultural congruence modifies psychosocial outcomes. Once enough comparable trials are available, comparative synthesis methods such as network meta-analysis may help assess whether different culturally specific dance forms vary in their effects [51].

5. Conclusion

This review synthesised the available evidence on culturally specific ethnic dance interventions for people living with cancer. Low-certainty evidence suggests that these interventions may improve quality of life and reduce cancer-related fatigue, but confidence in the estimates is limited by risk of bias, heterogeneity, and the small evidence base. Evidence for depression and anxiety remains very uncertain, and prespecified secondary outcomes could not be quantitatively synthesised. Exploratory subgroup analyses did not detect statistically significant regional differences, but the available data were insufficient to determine whether effects differ across cultural contexts or to establish cross-cultural equivalence.

Culturally specific dance may be a feasible and acceptable supportive-care option when aligned with patient preferences and safety needs, but current evidence does not justify firm claims of efficacy. Future trials should clearly describe the cultural components of the dance intervention, distinguish culturally specific dance from generic DMT or dance exercise, and use adequately powered, prospectively registered designs with standardised outcomes and transparent reporting.

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