

# Are spiritual interventions beneficial to patients with cancer?

## A meta-analysis of randomized controlled trials following PRISMA

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### Abstract

**Background:** In addition to the physical burden, the quality of life and survival in patients with cancer may also be reduced because of psychological distress, such as spiritual crisis, anxiety, and depression. Many studies have verified that spirituality could reduce anxiety and depression and improve quality of life and adjustment to cancer. However, there is uncertainty regarding the effectiveness of spiritual interventions in patients with cancer. The purpose of this meta-analysis is to use randomized controlled trials (RCTs) to evaluate the effects of spiritual interventions on spiritual and psychological outcomes and quality of life in patients with cancer.

**Methods:** All RCTs using spiritual interventions relevant to the outcomes of patients with cancer were retrieved from the following databases: Embase, PubMed, PsycINFO, Ovid, Springer Online Library, Wiley Online Library, Oxford Journals, the Cochrane Database of Systematic Reviews, and the Cochrane Central Register of Controlled Trials. The reference lists of identified RCTs were also screened. The Cochrane risk of bias tool was used to evaluate the quality of the studies, RevMan (5.3) was used to analyze the data, and GRADE (3.6.1) was used to evaluate the evidence quality of the combined results.

**Results:** Ten RCTs involving 1239 patients were included. Spiritual interventions were compared with a control group receiving usual care or other psychosocial interventions. The weighted average effect size across studies was 0.46 ( $P = .003$ ,  $I^2 = 78%$ ) for spiritual well-being, 0.19 ( $P = .005$ ,  $I^2 = 46%$ ) for quality of life,  $-0.33$  ( $P = .01$ ,  $I^2 = 50%$ ) for depression,  $-0.58$  ( $P = .03$ ,  $I^2 = 77%$ ) for anxiety, and  $-0.38$  ( $P = .008$ ,  $I^2 = 0%$ ) for hopelessness. In subgroup analysis according to the type of cancer, only the weighted average effect size of spiritual well-being in patients with breast cancer had statistical significance (standardized mean difference 0.78,  $P = .01$ ,  $I^2 = 70%$ ).

**Conclusion:** Spiritual interventions may improve spiritual well-being and quality of life, and reduce depression, anxiety, and hopelessness for patients with cancer. However, due to the mixed study design and substantial heterogeneity, some evidence remains weak. More rigorously designed research is needed.

**Abbreviations:** CI = confidence interval, RCT = randomized controlled trial, SMD = standardized mean difference.

**Keywords:** cancer, depression, meta-analysis, quality of life, spirituality

## 1. Introduction

Currently, cancer is highly prevalent in the world. It caused 13% of all deaths in 2015 and is the 2nd-leading cause of mortality after cardiovascular diseases.<sup>[1]</sup> Although the survival of cancer has

improved with advancements in medical sciences, the diagnosis of cancer is still regarded as a tragic and life-threatening event. Emotional problems may be caused by hearing “cancer,” informing relatives about the disease, planning for treatment and surgery, and side effects of treating. Therefore, in addition to the physical burden, patients with cancer may also be susceptible to suffering from deep psychological distress, such as spiritual crisis, depression, anxiety, phobia, and anger,<sup>[2–6]</sup> which in turn can lead to adverse outcomes.<sup>[7,8]</sup> So maintaining spiritual and psychological well-being is an important issue for patients with cancer.

Currently, an increasing number of patients with cancer tend to seek complementary therapies to cure their disease and relieve their discomfort, and spirituality has been described as the most commonly used complementary therapy by patients with cancer.<sup>[9]</sup> Till now, because spirituality has been defined from various perspectives by different researchers, it does not have a consensus definition.<sup>[10,11]</sup> A relatively comprehensive and accurate definition of spirituality is “the aspect of humanity that refers to the way individuals seek and express meaning and purpose, and the way they experience their connectedness to the moment, to self, to others, to nature and to the significance of the sacred.”<sup>[12]</sup>

Previous studies have reported the following: spirituality is a strong predictor and promoter of psychological health<sup>[13]</sup>; it can increase resistance against mental health crises following the diagnosis and treatment of cancer in patients<sup>[14]</sup>; and its effects on

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decreasing anxiety and depression, slowing the progression of cancer, encouraging a healthier lifestyle, and improving quality of life and adjustment to cancer have also been confirmed.<sup>[15–19]</sup> In addition, 2 previous literatures suggested that nearly 85% to 90% of the patients with cancer have reported they are spiritual and that spirituality is important in their lives.<sup>[20,21]</sup> In another study, 78% of patients with cancer reported that spirituality was important to help them cope with their cancer experience.<sup>[22]</sup> Therefore, spirituality is very important for the illness and in healthcare practice.

However, the conclusions of the efficacy of spiritual interventions on spiritual and psychological outcomes in patients with cancer are inconsistent. In some studies, spiritual interventions demonstrated significant improvement in the psychological outcomes of patients with cancer,<sup>[23–25]</sup> but others have failed to find any improvement. For example, a study showed that in 85 patients with cancer, improving spirituality could not statistically relieve levels of depression and anxiety.<sup>[26]</sup> Koszycki et al<sup>[27]</sup> also reported that spiritually based intervention had no impact on psychological adjustment improvement among patients with cancer. Therefore, the purpose of this meta-analysis is to use randomized controlled trials (RCTs) to evaluate the effects of spiritual interventions on the spiritual and psychological outcomes and quality of life of patients with cancer.

## 2. Methods

All analyses were based on previously published studies. Thus, ethical approval and patient consent were not necessary.

### 2.1. Study selection

All the studies were screened and selected by 2 independent review authors (LX and XG). The prespecified eligibility criteria were as follows—types of studies: RCTs that compared the effects of spiritual interventions with a control group on patients with cancer; types of participants: patients aged above 18 and diagnosed with cancer; we accepted each individual trial's exclusion criteria of participants; types of spiritual interventions: psychosocial or psychological interventions in which the primary or secondary aim is to enhance spirituality, that is, including at least one active spiritual component that aims to directly increase spirituality or spiritual well-being; types of control groups: wait-list control group, standard care, alternative intervention, and no treatment were included; types of outcome measures: spiritual well-being, quality of life, degree of depression, anxiety, and hopelessness of interventional and control groups must be evaluated at post-treatment (for any measure used); sample size: no requirement; type of journal: published in peer-reviewed journals; and publication language: English only. If a duplicate publication was identified, we used the most relevant publication. We excluded retracted studies. After assessment, we resolved disagreements between the 2 authors through discussion with a third reviewer (JC).

### 2.2. Search method

We developed and conducted a comprehensive search of published and unpublished RCTs using a wide range of scientific medical and psychological databases, including Embase (1980 to January 2018), PubMed (1966 to January 2018), PsycINFO (1806 to January 2018), Ovid (1966 to January 2018), Springer Online Library (1997 to January 2018), Wiley Online Library

(1997 to January 2018), Oxford Journals, the Cochrane Database of Systematic Reviews, 2018, and the Cochrane Central Register of Controlled Trials, 2018. The search terms consisted of MeSH (medical subject headings) and the following keywords: (spirituality OR (spiritual intervention OR spiritual care OR religiosity)) AND (neoplasms OR (tumor OR cancer OR malignant neoplasms OR benign neoplasms)) AND (randomized controlled trial OR randomized). We also searched the reference lists of original reports, case reports, guidelines, letters to the editor, reviews, and meta-analyses retrieved through electronic searches for additional articles.

### 2.3. Data extraction and quality assessment

Titles and/or abstracts of studies retrieved using the above-mentioned search strategy and those from additional sources were screened independently by 2 review authors (XG and LB) to identify studies that potentially met the inclusion criteria outlined above. For studies that potentially fulfilled the inclusion criteria, we searched the full papers, which were assessed independently by the same 2 authors. The same 2 authors also used a predesigned data collection form (Microsoft Office Excel 2013, Microsoft, Redmond, WA) to extract all the data independently. The following information was collected: study design, study site, participant inclusion and exclusion criteria, cancer type, sample size (the 2 groups and the total size), mean and standard deviation of the 2 groups, spiritual interventions (method, frequency, durations of each session, and total interventions), control interventions, outcomes, and measures. Information used to evaluate the risk of bias for each study was also collected, including methods used to generate the randomization, allocation concealment, blinding, incomplete outcome data, and selective reporting. The data were entered twice into Review Manager (RevMan, Version 5.3, The Cochrane Collaboration, London). We defined spiritual well-being and quality of life at post-treatment as our primary outcomes (for any measure used). As associated symptoms of spiritual distress in patients with cancer, degree of depression, anxiety, and hopelessness at post-treatment were combined as secondary outcomes. After extraction, all data were checked by another author (JC), and discrepancies were resolved by discussion. We sent letters to the authors of the studies retrieved to clarify missing or unclear data.

The risk of bias assessment was conducted independently by 2 authors (LX and JQ), and disagreements were discussed with a third author (JC). The Cochrane risk of bias tool was used for the assessment of random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting, and other bias. Each domain was rated as low (unlikely to seriously alter the results), unclear, or high (seriously weakens confidence in the results). The possibility of bias is minimal when all the criteria are met (grade A), and grade B has a medium possibility of bias occurring. If the criteria are not met at all, the possibility of bias is high and the grade is C. We acknowledge that it may be difficult to achieve blinding of participants, therapists/investigators, and outcome evaluators in trials using spiritual interventions.

### 2.4. Data synthesis and statistical analysis

Two review authors entered data separately (LB and JQ), and we conducted the meta-analysis using RevMan.

For RCTs, heterogeneity was analyzed by conducting the chi-squared test ( $P$  of .05 was used for statistical significance) and the

$I^2$  test. The higher the percentage was, the higher the level of heterogeneity.<sup>[28]</sup> If  $P > .10$  and  $I^2 < 50\%$ , we considered the heterogeneity to be insufficient, and a fixed-effects model was used to pool data; if  $P < .10$  and  $I^2 > 50\%$ , we considered the heterogeneity to be substantial, so we used a random-effects model to summarize the results.

Continuous data were pooled as the standardized mean difference (SMD) with a 95% confidence interval (CI). We used forest plots and funnel plots. The funnel plots can indicate possible publication bias, evidence of asymmetry, and other small study effects.<sup>[29]</sup> In addition, GRADE (3.6.1, The GRADE Working Group) was adopted to rank the evidence quality. Because some included studies examined patients with all kinds of cancer and some studies recruited patients with a specific kind of cancer, we used subgroup analysis to check whether spiritual interventions are beneficial to patients with different kinds of cancer. Finally, we followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to report our findings.<sup>[30]</sup>

### 3. Results

#### 3.1. Results of the search

We identified 1087 records and ultimately recruited 10 studies (Fig. 1). All 10 studies were RCTs involving a total of 1239 patients with cancer for quantitative synthesis, and all were reviewed by an institutional ethics committee before implementation. Among the 1239 patients, 624 and 615 patients were allocated into the intervention and control groups, respectively, after randomization.

#### 3.2. Study characteristics

The participants in the 10 RCTs were all patients with cancer. Of these, 7<sup>[24,25,31-35]</sup> and 5<sup>[31-34,36]</sup> studies identified spiritual well-being and quality of life, respectively, as the main outcome. Of the 10 studies, 6 adopted five types of spiritual interventions, including meaning-centered psychotherapy,<sup>[31,32]</sup> mindfulness-based intervention,<sup>[35]</sup> imagination,<sup>[33]</sup> meditation,<sup>[37]</sup> and prayer;<sup>[34]</sup> the other 4<sup>[7,24,25,36]</sup> did not focus on a specific spiritual intervention method; rather, they included a specifically designed integrated intervention called a spiritual care program or a spirituality-based intervention. No matter what spiritual interventions were used, these methods had a large degree of overlap. All studies described their control methods. Among them, 2 trials used wait-list control,<sup>[33,35]</sup> 2 trials used other psychotherapy methods,<sup>[31,32]</sup> and another trial used no treatment<sup>[36]</sup> as a control. Standard care was performed in the other 5 trials, which was described as routine treatment and education<sup>[25]</sup> and usual care<sup>[7,24,34,37]</sup> in the original studies. For the measures, 4 trials<sup>[25,31,32,35]</sup> used the FACIT-SWB (Functional Assessment of Chronic Illness Therapy Spiritual Well-Being Scale) to assess spiritual well-being, whereas Musarezaie et al<sup>[24]</sup> used the SWB Questionnaire (the Palutzian and Ellison Spiritual Well-Being Questionnaire), Olver and Dutney<sup>[34]</sup> and Freeman et al<sup>[33]</sup> adopted the FACIT-Sp (the Functional Assessment of Chronic Illness Therapy Spiritual Scale). For quality of life, the McGill Quality of Life Questionnaire and the Functional Assessment of Cancer Therapy were used in 2<sup>[31,32]</sup> and 3<sup>[33,34,36]</sup> trials, respectively. Regarding the types of spiritual interventions, there were various frequencies and durations of interventions. The characteristics of the recruited studies are presented in Table 1.

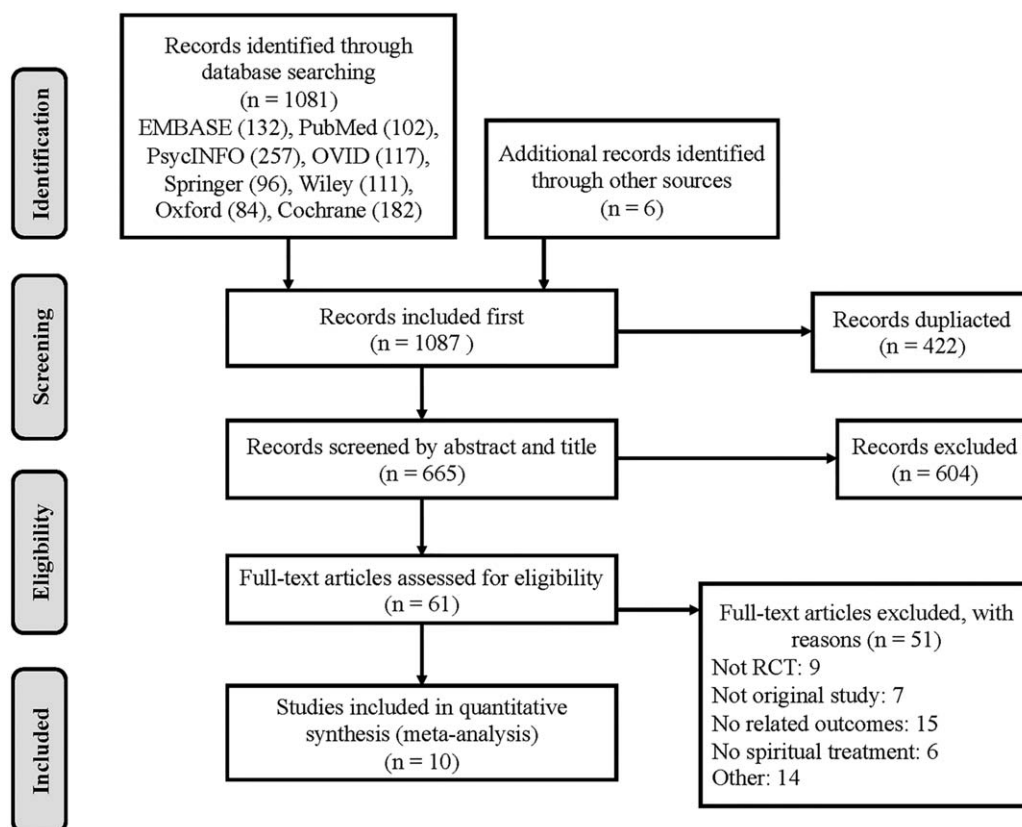


Figure 1. Study flow diagram. RCT=randomized controlled trial.

**Table 1**

**Characteristics of the included studies.**

Study	Sample			Intervention			Measures						
	Inclusion criteria	Exclusion criteria	Inclusion group, n	Control group, n	Study design	Study site		Intervention group	Frequency	Duration of once	Duration of total	Control group	Outcomes
Breitbart et al <sup>[61]</sup>	Stage III or IV solid tumor cancers or non-Hodgkin lymphoma; being ambulatory; age > 18 years; speaking English	Significant cognitive impairment, psychosis, Karnofsky performance scores below 50, other physical limitations that precluded participation	40	37	RCT	Outpatient clinics at Memorial Sloan-Kettering Cancer Center	IMCP: individual meaning-centered psychotherapy	1/wk	1 h	7 wk	TW: therapeutic massage	Spiritual well-being Quality of life Depression Anxiety	SWB MOOL HADS HADS
Breitbart et al <sup>[62]</sup>	Stage IV cancer (or stage II cancer if diagnosed with poor-prognosis disease); English speaking; age > 18 years; ambulatory	Significant cognitive impairment or psychotic symptoms; physical limitations that impeded completion of intervention	67	58	RCT	Outpatient clinics at Memorial Sloan-Kettering Cancer Center	MCSP: meaning-centered group psychotherapy	1/wk	—	8 wk	SGP: supportive psychotherapy	Hopelessness Spiritual well-being Quality of life Depression Anxiety	BHS SWB MOOL BDI HADS HAI
Cole et al <sup>[67]</sup>	Diagnosed with unresectable metastatic melanoma	Not physically able to attend the intervention sessions; cognitive impairment; were hospitalized for treatments	13	19	RCT	University of Pittsburgh Melanoma Center, Pittsburgh, PA	SPM: spiritually focused meditation	5/4 月	1 h	16 wk	UUC: usual care control	Hopelessness Quality of life Depression	MOOL HAI CES-D
Freeman et al <sup>[68]</sup>	Diagnosis of breast cancer; age ≥ 18; with no major psychiatric illness; visual and hearing capable; able to read; write and speak English; demonstrate an orientation to person, place, and time	—	48	47	RCT	University of Pittsburgh Melanoma Center, Pittsburgh, PA Anchorage, AK; Seattle, WA	Imagery-based behavioral intervention	1/wk	4 h	5 wk	WL: waitlist control	Spiritual well-being Quality of life	FACT-Sp-Ex FACT-B
Jafari et al <sup>[69]</sup>	Age > 18 years; breast cancer diagnosis within the last 12 months; a treatment recommendation of radiation therapy of at least 2 wk	With concomitant chronic disease and major depression disorder; absent in 2 consecutive sessions	34	31	RCT	Breast Cancer Research Center, St. S. Al-Shohada Hospital	Spiritual therapy intervention	1/wk	2–3 h	6 wk	Standard management and treatment and routine educational program	Spiritual well-being Quality of life	FACT-Sp12 EORTCQLQ-C30
Moerini et al <sup>[7]</sup>	Definitely diagnosed with leukemia by a hematologist; consented to participate; Shiite, native Iranian, and Persian speaker	Unaware of disease; had mental retardation, blindness, deafness, or active mental diseases; undergoing chemotherapy, radiotherapy, or surgery; unwillingness to continue the study; cannot participate or transfer patients to another hospital	32	32	RCT	Intensive care unit of Sayed-Al-Shohada Hospital	Spiritual care program: supportive presence and support for religious rituals	1/d	4 h	3 d	Given treatment and routine care	Anxiety	DASS-42
Musarezaie et al <sup>[24]</sup>	A definite diagnosis of leukemia by a hematologist; undergoing chemotherapy, radiotherapy, or surgery; consent to participate; Shiite; age ≥ 18 years; native Iranians and Persian speaking	Unaware of their disease; mental retardation, blindness, deafness, or active mental diseases; unwillingness to continue the study; cannot participate or transfer patients to another hospital	32	32	RCT	Isfahan Oncology Health Center	Spirituality-based intervention: supportive presence and support for religious rituals	1/d	4 h	3 d	Given treatment and routine care	Spiritual well-being	SWB Questionnaire
Omer et al <sup>[64]</sup>	A cancer diagnosis; age ≥ 18; the ability to read English and give consent; a prognosis of over 6 months for survival; no participation in other studies	With significant cognitive impairment or psychiatric impairment	324	322	RCT	Royal Adelaide Hospital Cancer Centre, South Australia	Intercessory prayer	—	—	—	Usual treatments	Spiritual well-being Quality of life	FACT-Sp FACT-G
Rausch et al <sup>[66]</sup>	Underwent initial surgical treatment; about to begin adjuvant chemotherapy for stage I or II breast cancer; age ≥ 21; read and speak English; physically capable of participating; providing informed consent	—	4	5	RCT	Specialty clinics of Massey Cancer Center	Spiritual growth group	1/wk	150 min	10 wk	No-treatment and standard health care	Quality of life Depression	FACT-B CES-D
Zemiske et al <sup>[65]</sup>	Age ≥ 18; speak and read English; could complete questionnaires; diagnosis of any type/stage of cancer; completed primary cancer treatment within the last 3 years; exhibited at least moderate distress as established by Distress Thermometer score of 4 or greater (out of 10); no access to an F2F MBCR program; access to high-speed Internet; resident of Alberta	Concurrent self-reported diagnosis by medical professional of psychosis, bipolar disorder, substance abuse, or suicidality (however, self-reported diagnosis of a depressive, anxiety, or adjustment disorder did not prevent enrollment); previous participation in F2F MBCR	30	32	RCT	Tom Baker Cancer Centre in Calgary, Alberta, Canada	MBCR: mindfulness-based cancer recovery	1/wk	2 h	8 wk	Treatment-as-usual wait-list control	Spiritual well-being	FACT-Sp

BDI = Beck Depression Inventory, BHS = the Beck Hopelessness Scale, CES-D = the Center for Epidemiological Studies-Depression scale, DASS-42 = 42-item depression, anxiety, and stress scale, EORTCQLQ-C30 = European Organization for Research and Treatment of Cancer Quality of Life, FACT-Sp = the Functional Assessment of Chronic Illness Therapy-Spiritual Scale, FACT-Sp12 = the Persian version of 12-item Functional Assessment of Chronic Illness Therapy-Spiritual Well-Being questionnaire, FACT-Sp-Ex = the Functional Assessment of Chronic Illness Therapy-Spiritual Anxiety and Depression Scale, HAI = Hopelessness Assessment in Illness Questionnaire, MOOL = McGill Quality of Life Questionnaire, RCT = randomized controlled trial, SWB = Functional Assessment of Chronic Illness Therapy Spiritual Well-Being Scale.

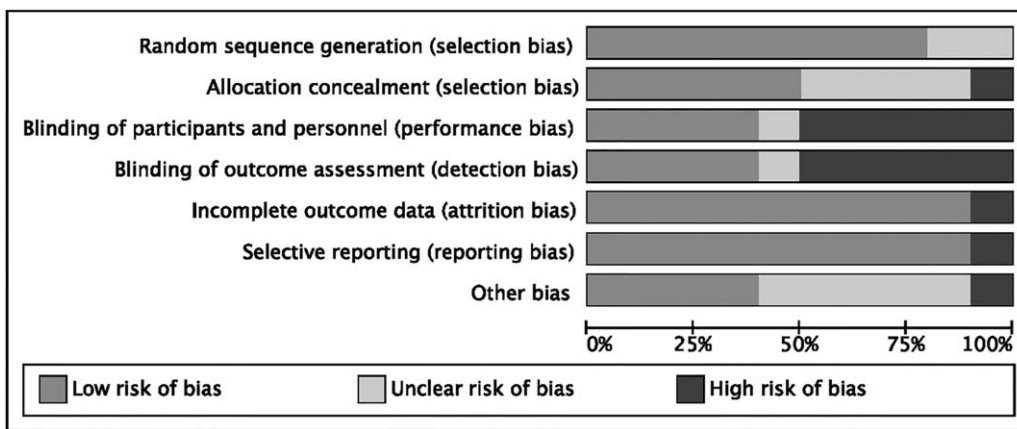


Figure 2. Risk of bias graph: review authors' judgments about each risk of bias item, presented as percentages across all included studies.

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Breitbart 2012	+	+	?	-	+	+	+
Breitbart 2015	+	?	-	-	+	+	+
Cole 2012	+	?	+	?	+	-	?
Freeman 2015	+	-	-	-	+	+	?
Jafari 2013	+	?	-	-	-	+	-
Moeini 2014	+	+	+	+	+	+	+
Musarezaie 2015	+	+	-	+	+	+	?
Olver 2012	?	+	+	+	+	+	+
Rausch 2007	?	?	-	-	+	+	?
Zernicke 2014	+	+	+	+	+	+	?

Figure 3. Risk of bias summary: review authors' judgments about each risk of bias item for each included study.

### 3.3. Risk of bias in the included studies

We used the Cochrane risk of bias tool to assess the risk of bias of each study. We present them using a “risk of bias graph” (Fig. 2) and a “risk of bias summary” (Fig. 3). For the 10 RCTs that we included, only 1<sup>[7]</sup> was grade A, and the other studies were all grade B. All studies were described as “randomized,” but 2 of the studies did not report the randomization methods and procedures in detail (20.0%). In addition, 5 of the studies did not describe the allocation concealment in detail (50.0%), which may have produced selection bias and prevented us from assessing the influence of allocation concealment in the remaining studies. Thus, the generalization of results may have been influenced. Furthermore, because of the nature and method of the implementation of spiritual interventions, it was difficult to perform blinding, especially the blinding of participants and personnel. Blinding of the participants and therapists/investigators only occurred in 4 studies (40.0%), and 4 studies conducted the blinding of outcome assessment (40.0%). This lack of blinding may have induced performance bias in the original articles. Except for the study by Jafari et al,<sup>[25]</sup> the other 9 studies described the dropouts and the reasons for these dropouts, which could help to prevent attrition bias to some extent, and all of them used intent-to-treat analysis to analyze the data except for Rausch.<sup>[36]</sup> All studies clearly reported all expected results to avoid reporting bias except for Cole’s research.<sup>[37]</sup> Moreover, all studies reported that there were no statistically significant differences in age, sex, and other demographic data between the intervention and control groups at baseline ( $P > .05$ ). Finally, the funnel plot for the primary outcomes “spiritual well-being” and “quality of life” at post-treatment (Figs. 4 and 5) did not appear to be totally asymmetrical, but because the number of trials included was insufficient, the assessment of publication bias may be inaccurate.

### 3.4. Efficacy of spiritual interventions

**3.4.1. Spiritual well-being.** Seven studies<sup>[24,25,31–35]</sup> involving 1134 patients (575 in the intervention group and 559 in the control group) reported the effect of spiritual interventions on the spiritual well-being of patients with cancer at post-treatment, indicating a statistically significant difference between the effects of the spiritual intervention and the control (SMD 0.46, 95% CI 0.16–0.76,  $P = .003$ ;  $I^2 = 78\%$ ,  $P = .0001$ ) (Fig. 6). However, the estimate was associated with a high level of uncertainty due to severe heterogeneity after a random-effects model was adopted.

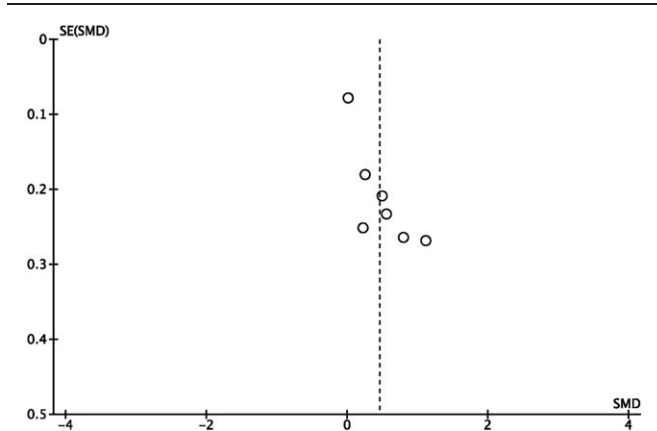


Figure 4. Funnel plot of comparison: spiritual intervention versus control condition, outcome: spiritual well-being at post-treatment. SE=standard error, SMD=standardized mean difference.

**3.4.2. Subgroup analysis of spiritual well-being.** Because the included studies recruited patients with different kinds of cancer, including breast cancer,<sup>[25,33]</sup> leukemia,<sup>[24]</sup> and other kinds of cancer,<sup>[31,32,34,35]</sup> we used subgroup analysis to check whether spiritual interventions can improve spiritual well-being for different cancer patients. We found that there was a significant difference between the 2 groups only in patients with breast cancer (SMD 0.78, 95% CI 0.17–1.39,  $P=.01$ ,  $I^2=70%$ ,  $P=.07$ ), but not among patients with all types of cancer (SMD 0.24, 95% CI  $-0.02$  to 1.39,  $P=.07$ ,  $I^2=57%$ ,  $P=.07$ ) or leukemia (SMD 0.23, 95% CI  $-0.26$  to 0.73,  $P=.35$ ) (Fig. 7).

**3.4.3. Quality of life.** Five studies<sup>[31–34,36]</sup> involving 923 patients (466 in the intervention group and 457 in the control group) reported the effect of spiritual interventions on quality of life at post-treatment in patients with cancer. As shown in Fig. 8, there was a statistically significant difference between the intervention and the control groups (SMD 0.19, 95% CI 0.06–0.32,  $P=.005$ ;  $I^2=46%$ ,  $P=.12$ ).

**3.4.4. Degree of depression.** Four studies<sup>[31,32,36,37]</sup> involving 242 patients (124 in the intervention group and 118 in the control group) reported the effect of spiritual interventions on cancer patients' degree of depression at post-treatment, indicating a statistically significant difference between the spiritual intervention and the control groups (SMD  $-0.33$ , 95% CI  $-0.59$  to  $-0.08$ ,  $P=.01$ ;  $I^2=50%$ ,  $P=.11$ ) (Fig. 9).

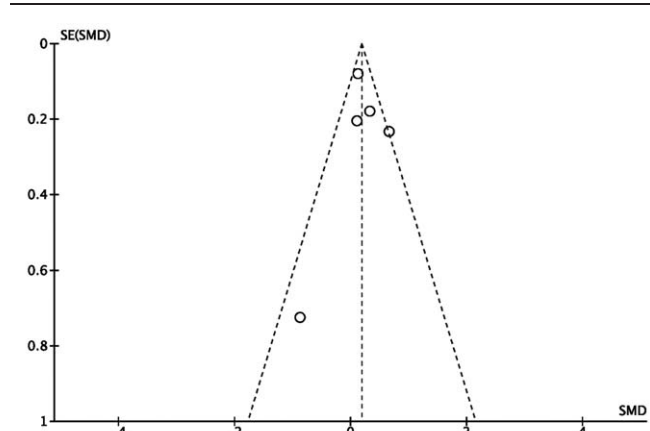


Figure 5. Funnel plot of comparison: spiritual intervention versus control condition, outcome: quality of life at post-treatment. SE=standard error, SMD=standardized mean difference.

**3.4.5. Degree of anxiety.** Three studies<sup>[7,31,32]</sup> involving 266 patients (139 in the intervention group and 127 in the control group) reported the effect of spiritual interventions on cancer patients' degree of anxiety and showed a significant difference between the intervention and the control groups (SMD  $-0.58$ , 95% CI  $-1.12$  to  $-0.05$ ,  $P=.03$ ;  $I^2=77%$ ,  $P=.01$ ) (Fig. 10). However, the estimate was associated with a high level of uncertainty due to severe heterogeneity after a random-effects model was adopted.

**3.4.6. Degree of hopelessness.** Two studies<sup>[31,32]</sup> involving 202 patients (107 in the intervention group and 95 in the control group) reported the effect of spiritual interventions on cancer patients' degree of hopelessness and showed a statistically significant difference between the 2 groups (SMD  $-0.38$ , 95% CI  $-0.65$  to  $-0.10$ ,  $P=.008$ ;  $I^2=0%$ ,  $P=.85$ ) (Fig. 11).

**3.5. Quality of evidence**

GRADE was used to evaluate the quality of evidence. As shown in Table 2, the outcomes for spiritual well-being—leukemia were graded as high evidence; meanwhile, the evidence grades for other spiritual well-being were moderate. The evidence grades for degree of depression, anxiety, quality of life were low, and the evidence quality for degree of hopelessness was very low.

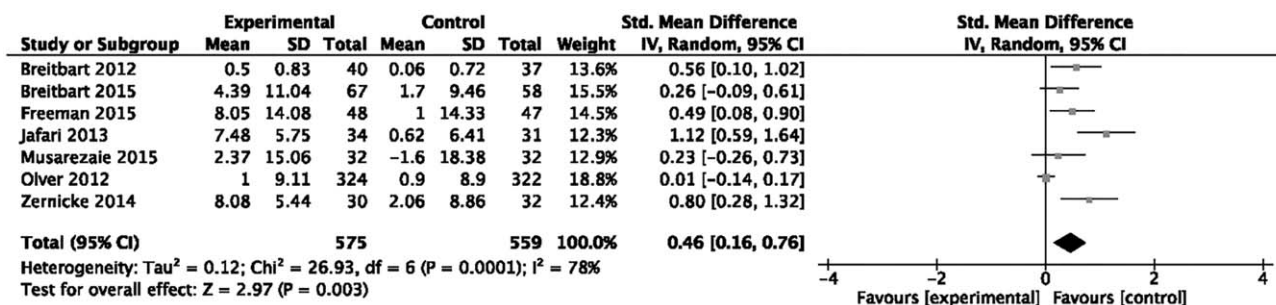


Figure 6. Forest plot of comparison: spiritual intervention versus control condition, outcome: standardized mean difference for spiritual well-being at post-treatment. CI=confidence interval, SD=standard deviation.

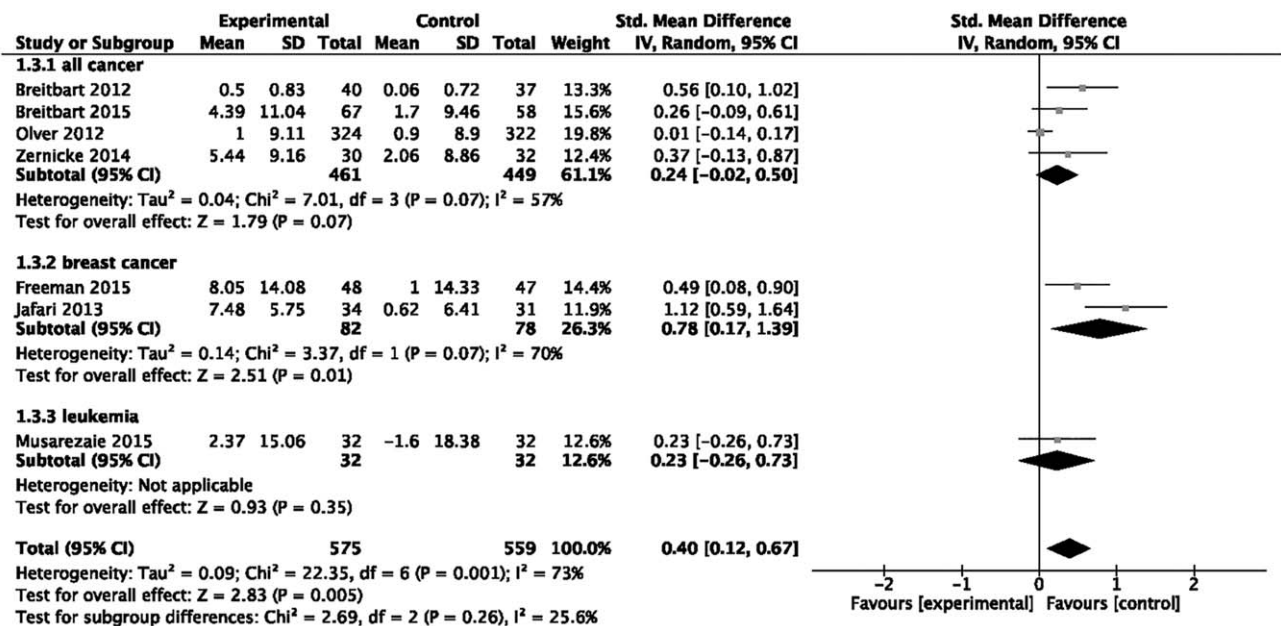


Figure 7. Forest plot of comparison: spiritual intervention versus control condition, outcome: standardized mean difference for spiritual well-being at post-treatment by subgroup analysis. CI=confidence interval, SD=standard deviation.

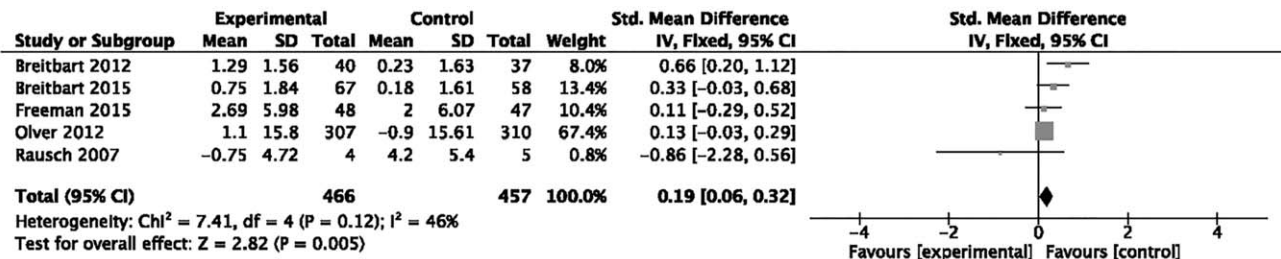


Figure 8. Forest plot of comparison: spiritual intervention versus control condition, outcome: standardized mean difference for quality of life at post-treatment. CI=confidence interval, SD=standard deviation.

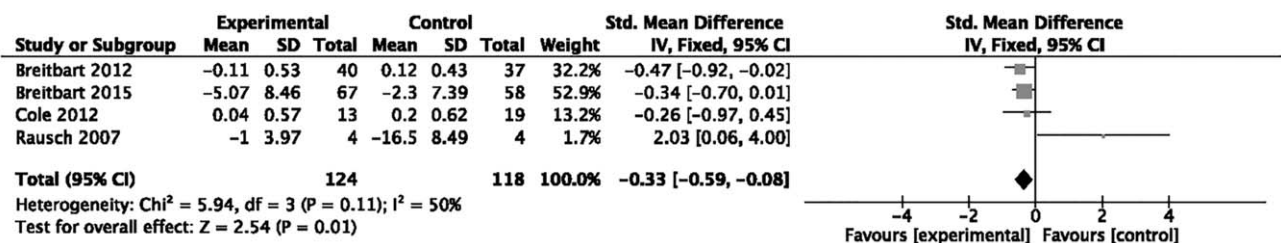


Figure 9. Forest plot of comparison: spiritual intervention versus control condition, outcome: standardized mean difference for degree of depression at post-treatment. CI=confidence interval, SD=standard deviation.

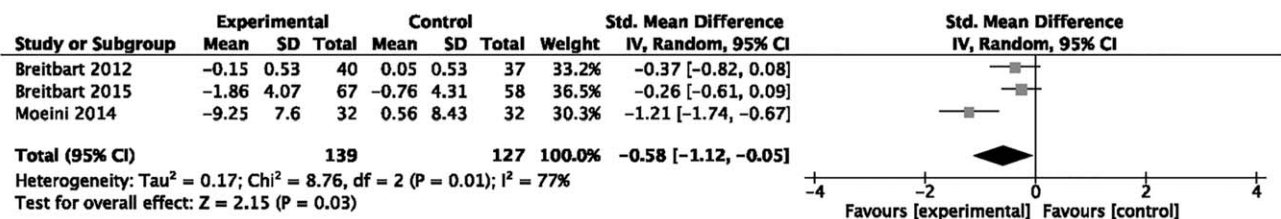


Figure 10. Forest plot of comparison: spiritual intervention versus control condition, outcome: standardized mean difference for degree of anxiety at post-treatment. CI=confidence interval, SD=standard deviation.

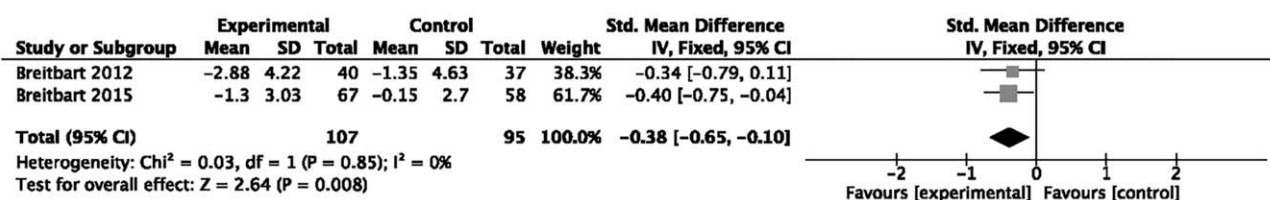


Figure 11. Forest plot of comparison: spiritual intervention versus control condition, outcome: standardized mean difference for degree of hopelessness at post-treatment. CI=confidence interval, SD=standard deviation.

## 4. Discussion

### 4.1. Summary of results

This study, which synthesized data from RCTs, is an update of a previous published meta-analysis verifying the effects of spiritual interventions on physical and psychological outcomes in patients with cancer. This meta-analysis provides evidence for doctors and nurses to potentially improve spiritual well-being and quality of life, and to reduce degree of depression, anxiety, and hopelessness via spiritual interventions with these patients. In addition to using spiritual well-being and quality of life as primary outcomes, we defined other psychological problems that cancer patients often have as secondary outcomes, including degree of depression, anxiety, and hopelessness, which made our meta-analysis more comprehensive. However, due to the methodological limitations of the included studies and the subjectivity of the assessment scales used, we failed to obtain much high-quality evidence in the present meta-analysis, as the majority of the accumulated evidence ranged from low to moderate quality.

### 4.2. Primary outcome

With the extensive application of holistic nursing, mental health and quality of life have received increasing attention from nurses and have become active research fields. Patients with cancer are subject to spiritual distress and low quality of life, so it is extremely important to keep their spiritual well-being and quality of life satisfactory.

Spiritual interventions are helpful for patients' spiritual well-being, based on the results from previous reports.<sup>[24,32]</sup> Our meta-analysis confirmed this conclusion and showed a statistically significant difference between the spiritual intervention group and the control group, indicating that spiritual interventions were able to improve the spiritual well-being of patients with cancer, which is in line with the findings of the previous

meta-analysis.<sup>[38]</sup> However, the heterogeneity of spiritual well-being was high after the random-effects model was adopted, which may be due to several reasons. First, due to the quality of spiritual intervention, the fact that 5 of the 7 included studies did not blind the participants, personnel, and outcome assessors may induce performance bias and detection bias. Second, in the study of Jafari et al,<sup>[25]</sup> the outcome data were incomplete, which may lead to some attrition bias. Third, components of the spiritual interventions used in these 7 studies differed, such as the duration, methods, and control groups, which may lead to differences in the combination of results. For example, 2 studies used supportive psychotherapy<sup>[32]</sup> and therapeutic massage<sup>[31]</sup> as the control groups, which was different from the other 5 studies (usual care or wait-list control). Finally, the scales used in these studies provide a subjective assessment of spiritual well-being, and all the studies allowed patients to complete the scale independently, which may have resulted in large differences.

And an interesting finding of our meta-analysis is that in the subgroup analysis, spiritual interventions were shown to improve spiritual well-being only in patients with breast cancer. This finding indicates that spiritual interventions can confer quick benefits in the spiritual well-being of patients with breast cancer but not other kinds of cancer, and emphasizes the need for individualization when adopting spiritual interventions. In other words, for patients with breast cancer, it may be appropriate to adopt spiritual intervention methods to improve their spiritual well-being, but for patients with other kinds of cancer, these methods are not as suitable, thus, other psychological interventions should be used to effectively improve their spiritual well-being.

Regarding quality of life, the combined results also showed a statistically significant difference between the intervention and control groups at post-treatment, indicating that spiritual interventions might improve quality of life in patients with cancer. This finding is consistent with the results of Krusinga et al<sup>[39]</sup> and de Bernardin Gonçalves et al.<sup>[40]</sup> In their reviews,

Table 2

Quality of evidence of included studies.

Outcomes	Variables					Quality of evidence
	Risk of bias	Inconsistency	Indirectness	Imprecision	Publication bias	
Spiritual well-being	Serious (-1)	No	No	No	Undetected	Moderate
Spiritual well-being—all cancer	Serious (-1)	No	No	No	Undetected	Moderate
Spiritual well-being—breast cancer	Serious (-1)	No	No	No	Undetected	Moderate
Spiritual well-being—leukemia	No	No	No	No	Undetected	High
Quality of life	Serious (-1)	No	No	Serious (-1)	Undetected	Low
Degree of depression	No	Serious (-1)	No	Serious (-1)	Undetected	Low
Degree of anxiety	Serious (-1)	Serious (-1)	No	No	Undetected	Low
Degree of hopelessness	Serious (-1)	Serious (-1)	No	Serious (-1)	Undetected	Very low



spiritual interventions had small to moderate benefits in terms of improving the quality of life of patients with cancer in comparison to the control group.

#### 4.3. Second outcome

Depression, anxiety, and hopelessness are common mental problems in patients with cancer, and sometimes, they can cause severe outcomes.<sup>[7,8,41,42]</sup> Previous studies showed that the prevalence of depression and anxiety in patients with cancer varied from 9.4% to 66.1% and from 17.9% to 33.3%, respectively.<sup>[43,44]</sup> It is thus important to reduce the symptoms of these forms of psychological distress. Determining whether spiritual interventions can reduce cancer patients' degree of depression, anxiety, and hopelessness was another aim of this meta-analysis.

Currently, antidepressants are still the main therapy for depression. The National Institute for Health and Clinical Excellence recommends treatment for at least 6 months and even for at least 2 years if patients have a risk of relapse. Many patients cannot maintain drug therapy because of its chronicity and side effects, such as drowsiness, dry mouth, tachycardia, and dependence. As a common complementary therapy, spiritual interventions are easily accepted by patients without the side effects of antidepressants. And in our meta-analysis, it is shown that spiritual interventions could reduce the degree of depression in patients with cancer, which is the same with that of the previous meta-analysis.<sup>[38]</sup> Therefore, spiritual interventions may be a good choice for patients with cancer to reduce their depression. However, we must interpret this result with caution due to the relatively high heterogeneity. The reasons for the high heterogeneity include the variety of interventions, subjectivity and the diversity of measurements used to assess depression. In addition, because of the nature of spiritual interventions, it is difficult to blind participants and therapists, and few of the included studies described allocation concealment. For instance, Rausch<sup>[36]</sup> and Breitbart et al<sup>[32]</sup> were neither blinding participants, therapists, or outcome assessors nor describing the allocation concealment method. Moreover, Breitbart et al<sup>[31]</sup> obtained results that differed from those of the other included studies, which showed that spiritual interventions could not reduce degree of depression in patients with cancer. And due to the lack of follow-up in the original studies, we failed to evaluate the long-term effects of spiritual interventions on depression in patients with cancer, it still needs to be further discussed.

The combined results revealed that spiritual interventions were able to significantly reduce cancer patients' degree of anxiety, which is also consistent with the findings of another review.<sup>[38]</sup> However, this result should be interpreted with caution. That may be because the majority of the included studies did not use blinding, studies used different measurements of anxiety, and the conclusions of included studies were different. Moeini et al<sup>[7]</sup> drew positive conclusions that spiritual interventions were able to reduce cancer patients' anxiety, while the other 2 studies<sup>[31,32]</sup> concluded that spiritual interventions could not reduce anxiety. All of the above could result in relatively high heterogeneity.

This meta-analysis also reported the ability of spiritual interventions to reduce cancer patients' hopelessness. Among the 2 included studies, Breitbart et al<sup>[32]</sup> drew the conclusion that patients receiving spiritual interventions showed significantly greater reductions in hopelessness compared with those in control groups, and no significant difference was observed for changes in hopelessness in the another studies.<sup>[31]</sup> But this only

represents the short-term effect of spiritual interventions on hopelessness in patients with cancer, the long-term effect remains unknown.

#### 4.4. Comparison with other published reviews

We retrieved previously published meta-analyses<sup>[39,40,45–47]</sup> that studied the effects of spiritual interventions on physical and psychological outcomes in patients with cancer, other diseases or in healthy persons. On the one hand, some of these reviews were published earlier, thus, they cannot represent the latest findings. On the other hand, some of the original studies included in those meta-analyses were not RCTs, which might influence the quality of evidence. By comparison, all RCTs that met the inclusion criteria were included in our review, and we only included RCTs to certify the evidence quality. Additionally, this meta-analysis is an update for previous reviews. We searched for and retrieved the latest studies that previous reviews did not include to obtain more accurate findings. Third, we included not only spiritual well-being and quality of life but also degree of depression, anxiety, and hopelessness as outcomes to discuss the effect of spiritual interventions more comprehensively.

#### 4.5. Implications for nursing practice

In patients with cancer, spiritual interventions may improve spiritual well-being and quality of life, and reduce the degree of depression, anxiety, and hopelessness within a short period of time. And in terms of spiritual well-being, it is especially effective for patients with breast cancer. Therefore, the current meta-analysis provides initial support for the practicability and effectiveness of spiritual interventions to some extent due to the positive outcomes, and it emphasizes the importance of individualized interventions. However, due to the lack of follow-up in the original studies, the above results may merely represent the post-treatment effects of spiritual interventions, while the long-term effects of these interventions remain unknown.

Moreover, there are various types of spiritual interventions, and some interventions are difficult to implement because of their long duration or complex content. Thus, there were many dropouts in the majority of the included studies, even though the authors had already chosen participants whose condition allowed for their participation in the entire intervention phase. To improve the adherence of patients receiving spiritual interventions, nurses must adopt the best intervention in terms of the characteristics of the patients and the culture of their society. In addition, more convenient and easier methods of spiritual interventions should be developed. For example, nurses can teach and guide patients through the Internet or an app in mobile phones, and they can develop more efficient formats to shorten the duration of interventions.

#### 4.6. Implications for future research

Because of the flaws in the original studies, such as low methodological quality, differences among the interventions and subjects, and the subjectivity of the questionnaires used, there was relatively high heterogeneity among the studies and some bias. Hence, we could not draw many conclusions based on high-quality evidence. The influences of spiritual interventions on cancer patients' spiritual well-being, quality of life, and other psychological outcomes remain to be further investigated by more rigorously designed studies. In this meta-analysis, we did

not define pharmacotherapy as a control; thus, the relative effects of drug therapies and spiritual interventions on cancer patients' psychological outcomes need to be further investigated. In addition, only a few studies included long-term follow-ups in their investigations, so we could not evaluate the long-term effects of spiritual interventions on the improvement of spiritual well-being and quality of life and on the treatment of depression, anxiety, and hopelessness in patients with cancer. As we know, improvements in spiritual and psychological health require a relatively long period of time. Thus, additional studies are recommended. In addition, we found that most of the original studies that aimed to discuss the effect of spiritual interventions in cancer patients address patients with breast cancer only or all types of cancer, while few related studies address patients with other kinds of cancer. In this meta-analysis, it was shown that the effect of spiritual interventions may be different in patients with different kinds of cancer. Therefore, in the future, it is recommended that patients with other types of cancer are recruited as study participants to allow for this topic to be examined more thoroughly. Finally, researchers should design more theoretically based and reliable implementation methods for spiritual interventions.

#### 4.7. Strengths and limitations

This meta-analysis is an update of previous published reviews and meta-analyses. In this meta-analysis, the trials we included were all RCTs, which is different from previously published reviews and improves the quality of evidence of our outcomes. Moreover, we not only evaluated spiritual well-being and quality of life, which are outcomes that have been commonly examined in previous meta-analyses, but also evaluated related psychological outcomes, such as depression, anxiety, and hopelessness. The results are highly relevant to the daily work of doctors and nurses, with substantial clinical significance. Finally, all the included studies used randomization and compared baseline information for the 2 groups. In addition, most of the included studies described dropouts, leading to some reduction in heterogeneity. It is worth mentioning that we included studies with negative results, which may help prevent some publication bias.

Nevertheless, several potential limitations should be discussed. First, the research methods of the original studies were quite different. The included studies used several types of spiritual interventions with a variety of characteristics according to actual conditions. These differences may result in a lack of comparability among studies, which may produce some bias. Second, the blinding of participants and assessors was not performed in many of the included studies, and not all studies clearly described the allocation concealment and randomization strategy, which may have led to relatively low methodological quality. Thus, we were unable to draw high-quality conclusions about the effects of spiritual interventions on patients with cancer. Finally, all the outcomes had strong subjectivity because of the use of self-administered questionnaires for assessment, so the reliability needs to be further considered.

## 5. Conclusions

This meta-analysis is an updated evidence-based study that includes all RCTs to evaluate the effects of spiritual interventions on spiritual well-being, quality of life, depression, anxiety, and hopelessness in patients with cancer. It demonstrated that

spiritual interventions may improve spiritual well-being and quality of life, and reduce degree of depression, anxiety, and hopelessness for patients with cancer. The results have substantial clinical significance because they are highly relevant to the daily work of doctors and nurses. However, because most of the scales used to measure the outcomes had strong subjectivity, the methodological quality of some of the included studies was not very high. We should thus interpret these results with caution, and more comprehensive research is needed.

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## References

- Ahmad K, Mostafa F, Sevil H, et al. Epidemiologic Assessment of Cancer Disease in East Azerbaijan 2007. *Med J Tabriz Univ Med Sci Health Serv* 2010;32:74–9.
- Cooper CL, Faragher EB. Psychosocial stress and breast cancer: the inter-relationship between stress events, coping strategies and personality. *Psychol Med* 1993;23:653–62.
- Akechi T, Okuyama T, Akizuki N, et al. Course of psychological distress and its predictors in advanced non-small cell lung cancer patients. *Psychooncology* 2006;15:463–73.
- Akechi T, Nakano T, Okamura H, et al. Psychiatric disorders in cancer patients: descriptive analysis of 1721 psychiatric referrals at two Japanese cancer center hospitals. *Jpn J Clin Oncol* 2001;31:188–94.
- Jois B, Houkans Havex J. *Nursing Internal Medicine, Surgery, Cardiology, and Hematology*. Isfahan University of Medical Sciences, Isfahan, Iran:2006.
- Carlson LE, Waller A, Mitchell AJ. Screening for distress and unmet needs in patients with cancer: review and recommendations. *J Clin Oncol* 2012;30:1160–77.
- Moeini M, Taleghani F, Mehrabi T, et al. Effect of a spiritual care program on levels of anxiety in patients with leukemia. *Iran J Nurs Midwifery Res* 2014;19:88–93.
- Eskelinen M, Korhonen R, Selander T, et al. Beck Depression Inventory as a predictor of long-term outcome among patients admitted to the breast cancer diagnosis unit: a 25-year cohort study in Finland. *Anticancer Res* 2017;37:819–24.
- Hsiao A-F, Wong MD, Miller MF, et al. Role of religiosity and spirituality in complementary and alternative medicine use among cancer survivors in California. *Integr Cancer Ther* 2008;7:139–46.
- Villagomez LR. Mending broken hearts: the role of spirituality in cardiac illness: a research synthesis, 1991–2004. *Holist Nurs Pract* 2006;20:169–86.
- Ziaei M, Nargesian A, Aibaghi ES. The role of spiritual leadership on human resource empowerment in the University of Tehran, 2009; 67–86.
- Puchalski C, Ferrell B. *Making Health Care Whole: Integrating Spirituality Into Patient Care*. Templeton Foundation Press, Philadelphia:2011.
- Davis B. Mediators of the relationship between hope and well-being in older adults. *Clin Nurs Res* 2005;14:253–72.
- Meraviglia M. Effects of spirituality in breast cancer survivors. Presented at the Oncology Nursing Forum, 2006.

- [15] Fallah R, Golzari M, Dastani M, et al. Spirituality, hope and mental health in breast cancer patients. *Psychooncology* 2011;20:259.
- [16] Breitbart W, Rosenfeld B, Gibson C, et al. Meaning-centered group psychotherapy for patients with advanced cancer: a pilot randomized controlled trial. *Psychooncology* 2010;19:21–8.
- [17] Frost MH, Johnson ME, Atherton PJ, et al. Spiritual well-being and quality of life of women with ovarian cancer and their spouses. *J Support Oncol* 2012;10:72–80.
- [18] Gaston-Johansson F, Haisfield-Wolfe ME, Reddick B, et al. The relationships among coping strategies, religious coping, and spirituality in African American women with breast cancer receiving chemotherapy. Presented at the Oncology Nursing Forum, 2013.
- [19] Li C-C, Rew L, Hwang S-L. The relationship between spiritual well-being and psychosocial adjustment in Taiwanese patients with colorectal cancer and a colostomy. *J Wound Ostomy Continence Nurs* 2012;39:161–9.
- [20] Holland JC, Passik S, Kash KM, et al. The role of religious and spiritual beliefs in coping with malignant melanoma. *Psychooncology* 1999;8:14–26.
- [21] Gall TL, Kristjansson E, Charbonneau C, et al. A longitudinal study on the role of spirituality in response to the diagnosis and treatment of breast cancer. *J Behav Med* 2009;32:174–86.
- [22] Peteet JR, Balboni MJ. Spirituality and religion in oncology. *CA Cancer J Clin* 2013;63:280–9.
- [23] Fallah R, Golzari M, Dastani M, et al. Integrating spirituality into a group psychotherapy program for women surviving from breast cancer. *Iran J Cancer Prev* 2011;4:141–7.
- [24] Musarezaie A, Ghasemi M, Momeni-Ghaleghasemi T, et al. A study on the efficacy of spirituality-based intervention on spiritual well being of patients with leukemia: a randomized clinical trial. *Middle East J Cancer* 2015;6:97–105.
- [25] Jafari N, Farajzadegan Z, Zamani A, et al. Spiritual therapy to improve the spiritual well-being of Iranian women with breast cancer: a randomized controlled trial. *Evid Based Complement Alternat Med* 2013;2013:353262.
- [26] McCoubrie R. Depression Advanced Cancer Patients Depression Not Correlated With Spirituality. *Obesity, Fitness and Wellness Week*, Atlanta, GA;2006.
- [27] Koszycki D, Raab K, Aldosary F, et al. A multifaith spiritually based intervention for generalized anxiety disorder: a pilot randomized trial. *J Clin Psychol* 2010;66:430–41.
- [28] Higgins JP, Thompson SG, Deeks JJ, et al. Measuring inconsistency in meta-analyses. *BMJ* 2003;327:557–60.
- [29] Guyatt GH, Oxman AD, Montori V, et al. GRADE guidelines: 5. Rating the quality of evidence—publication bias. *J Clin Epidemiol* 2011;64:1277–82.
- [30] Moher D, Liberati A, Tetzlaff J, et al. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Int J Surg* 2009;151:264–9.
- [31] Breitbart W, Poppito S, Rosenfeld B, et al. Pilot randomized controlled trial of individual meaning-centered psychotherapy for patients with advanced cancer. *J Clin Oncol* 2012;30:1304–9.
- [32] Breitbart W, Rosenfeld B, Pessin H, et al. Meaning-centered group psychotherapy: an effective intervention for improving psychological well-being in patients with advanced cancer. *J Clin Oncol* 2015;33:749–54.
- [33] Freeman LW, White R, Ratcliff CG, et al. A randomized trial comparing live and telemedicine deliveries of an imagery-based behavioral intervention for breast cancer survivors: Reducing symptoms and barriers to care. *Psychooncology* 2015;24:910–8.
- [34] Olver IN, Dutney A. A randomized, blinded study of the impact of intercessory prayer on spiritual well-being in patients with cancer. *Altern Ther Health Med* 2012;18:18–27.
- [35] Zernicke KA, Campbell TS, Specia M, et al. A randomized wait-list controlled trial of feasibility and efficacy of an online mindfulness-based cancer recovery program: the eTherapy for cancer applying mindfulness trial. *Psychosom Med* 2014;76:257–67.
- [36] Rausch SM. Evaluating the Psychosocial Effects of Two Interventions, Tai Chi and Spiritual Growth Groups, in Women With Breast Cancer. ProQuest Information & Learning, Ann Arbo;2007.
- [37] Cole BS, Hopkins CM, Spiegel J, et al. A randomised clinical trial of the effects of spiritually focused meditation for people with metastatic melanoma. *Ment Health Religion Cult* 2012;15:161–74.
- [38] Kim SH. The effects of spiritual interventions in patients with cancer: a meta-analysis. Presented at the Oncology nursing forum, 2014.
- [39] Kruizinga R, Hartog ID, Jacobs M, et al. The effect of spiritual interventions addressing existential themes using a narrative approach on quality of life of cancer patients: a systematic review and meta-analysis. *Psychooncology* 2016;25:253–65.
- [40] Gonçalves JPB, Lucchetti G, Menezes PR, et al. Complementary religious and spiritual interventions in physical health and quality of life: a systematic review of randomized controlled clinical trials. *PLoS ONE* 2017;12:e0186539.
- [41] Kissane DW, Grabsch B, Love A, et al. Psychiatric disorder in women with early stage and advanced breast cancer: a comparative analysis. *Aust N Z J Psychiatry* 2015;38:320–6.
- [42] Hassan MR, Shah SA, Ghazi HF, et al. Anxiety and depression among breast cancer patients in an urban setting in Malaysia. *Asian Pac J Cancer Prev* 2015;16:4031–5.
- [43] Maass SW, Roorda C, Berendsen AJ, et al. The prevalence of long-term symptoms of depression and anxiety after breast cancer treatment: a systematic review. *Maturitas* 2015;82:100–8.
- [44] Anish K, Muhammad F, Ammad F, et al. Prevalence of depression and anxiety amongst cancer patients in a hospital setting: a cross-sectional study. *Psychiatry J* 2016;2016:1–6.
- [45] Kaplar ME, Wachholtz AB, O'Brien WH. The effect of religious and spiritual interventions on the biological, psychological, and spiritual outcomes of oncology patients: a meta-analytic review. *J Psychosoc Oncol* 2004;22:39–49.
- [46] Thuné-Boyle IC, Stygall JA, Keshtgar MR, et al. Do religious/spiritual coping strategies affect illness adjustment in patients with cancer? A systematic review of the literature. *Soc Sci Med* 2006;63:151–64.
- [47] Oh PJ, Kim SH. The effects of spiritual interventions in patients with cancer: a meta-analysis. *Oncol Nurs Forum* 2014;41:290–301.