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Review Article

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

Renske Kruizinga[1]*, Iris D. Hartog[2], Marc Jacobs[2], Joost G. Daams[3], Michael Scherer-Rath[4], Johannes B. A. M. Schilderman[4], Mirjam A. G. Sprangers[2] and Hanneke W. M. Van Laarhoven[1]

[1]*Department of Medical Oncology, Academic Medical Center, University of Amsterdam, Amsterdam, The Netherlands*
[2]*Department of Medical Psychology, Academic Medical Center, University of Amsterdam, Amsterdam, The Netherlands*
[3]*Medical Library, Academic Medical Center, University of Amsterdam, Amsterdam, The Netherlands*
[4]*Faculty of Philosophy, Theology and Religious Studies, Radboud University Nijmegen, Nijmegen, The Netherlands*

**Correspondence to: Department of Medical Oncology, Academic Medical Center, University of Amsterdam, Meibergdreef 9, 1105, AZ Amsterdam, The Netherlands. E-mail: r.kruizinga@amc.uva.nl*

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Abstract

***Objective*: The aim of this study was to examine the effect of spiritual interventions on quality of life of cancer patients.**

***Methods*: We conducted our search on June 6, 2014 in Medline, PsycINFO, Embase, and PubMed. All clinical trials were included that compared standard care with a spiritual intervention that addressed existential themes using a narrative approach. Study quality was evaluated by the Cochrane Risk of Bias Tool.**

***Results*: A total of 4972 studies were identified, of which 14 clinical trials (2050 patients) met the inclusion criteria, and 12 trials (1878 patients) were included in the meta-analysis. The overall risk of bias was high. When combined, all studies showed a moderate effect (*d*) 0.50 (95% CI = 0.20–0.79) 0–2 weeks after the intervention on overall quality of life in favor of the spiritual interventions. Meta-analysis at 3–6 months after the intervention showed a small insignificant effect (0.14, 95% CI = −0.08 to 0.35). Subgroup analysis including only the western studies showed a small effect of 0.17 (95% CI = 0.05–0.29). Including only studies that met the allocation concealment criteria showed an insignificant effect of 0.14 (95% CI = −0.05 to 0.33).**

***Conclusions*: Directly after the intervention, spiritual interventions had a moderate beneficial effect in terms of improving quality of life of cancer patients compared with that of a control group. No evidence was found that the interventions maintained this effect up to 3–6 months after the intervention. Further research is needed to understand how spiritual interventions could contribute to a long-term effect of increasing or maintaining quality of life.**

Background

Spirituality within the context of a healthcare environment is defined as that 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 significant or sacred [1]. Spirituality expresses the reflective human quest for identity and meaning beyond a purely pragmatic approach to life [2]. In defining spirituality as a broad notion of finding meaning, purpose and making sense of one's own existence, religion might be a part of this, but that is not necessarily the case [3].

Provision of spiritual care is regarded as part of palliative care [4] and aims at addressing the existential needs of patients, including questions about meaning of life and death, as well as the search for peace, spiritual resources, hope and help in overcoming fears [5]. Indeed, spiritual needs can become of particular importance when one is facing the finitude of life [6,7]. The possibility to discuss existential questions is one of the unmet needs of advanced cancer patients who are confronted with the end of life [5,8–10].

One way of alleviating existential needs may be found in the telling of stories. Such stories, or narratives, are more than just an enumeration of events in serial order: they organize these events into an intelligible whole [11,12]. A narrative can be defined as 'the creation of a world by picturing particular events and making that world coherent and intelligible by evoking a network of relations–causal links, psychological motivations, goals, plans–among the events' [13]. In this way, meaning and purpose as well as experiences of connectedness to the moment, to self, to others, to nature, and to the significant or sacred may be expressed. Narrative interventions in public health are aimed at letting the patient talk and letting them construct their own meaningful framework by the power of storytelling [14].

Telling one's life story in such a way is thus believed to have a positive impact on patients' quality of life (QoL) near death [1,15,16]. However, the evidence to support this statement is scarce. Little is known about the effect of spiritual interventions using narrative approaches on quality of life of patients. Some studies show that existential therapies are beneficial [17], but others have pointed out the gaps in this research field, including lack of knowledge and discrepancies between spiritual care as theoretical value and as it is practiced in a healthcare setting [18,19]. Therefore, we conducted a systematic review and meta-analysis to address the question whether spiritual interventions that address existential needs using a narrative approach improve QoL of cancer patients.

Methods

This review was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement [20] (Appendix A).

Eligibility criteria

Interventions were limited to those addressing existential issues using a narrative approach. Study population of the intervention should include >50% cancer patients, with all types of cancer, and aged 18 years and older. Studies had to include a control group of either no intervention or a placebo intervention. The outcome should include QoL or subjective well-being measured with a validated questionnaire. No publication date or publication status restrictions were imposed. Language restrictions were imposed: all languages other than English, German and Dutch were excluded. Relevant studies were identified by comprehensive searches in PubMed, PsycINFO, Embase, and by selecting relevant trials from the Cochrane Library.

Search

The final search was run on July 6, 2014. All citations were downloaded into Endnote version x7 (Thomson Reuters, New York City, NY, USA). Together with an experienced librarian (J. D.), the first author (R. K.) developed the search strategies using sensitive terms for identifying clinical studies. We pilot-tested search strategies and modified them to ensure that they identified known eligible articles. The final strategies used the following terms: spirituality, cancer, quality of life, (non)-cancer specific questionnaires, supportive care, specific therapies, and trial numbers from trial registers. Specific therapies were also included in the search: reflective journaling, dignity therapy, psycho-spiritual integrative therapy, life completion, meaning-making, meaning reconstruction, narrative therapy, reminiscence, and life review. A customized search strategy was conducted for each database (Appendix B).

Data collection process

Two researchers (I. H. and R. K.) independently screened titles and abstracts for inclusion and then read the full text of the selected articles. A senior researcher (H. v. L.) was consulted in case of disagreement or doubt. Data collection was carried out by the first author (R. K.). Authors were sent an e-mail to obtain more information about the study or study data such as standard deviations (SD) or specific QoL data at different time points. If the authors did not respond the first time, a reminder was sent, with a maximum of three. From each included trial, we extracted the following information: (1) author; (2) year of publication; (3) study design; (4) type of intervention; (5) profession of the person who performed the intervention; (6) type of patients; (7) number of patients; (8) primary study outcome; and (9) instrument used to measure quality of life.

Risk of bias in individual studies

The Cochrane Collaboration's tool for assessing risk of bias was used to assess the risk of bias on adequacy of sequence generation, allocation concealment, blinding of patients and outcome assessors, blinding of outcome assessment, reporting on incomplete outcome data, selective outcome reporting, and other sources of bias [21]. The researchers (R. K., I. H., and M. J.) assessed the risk of bias independently, and a senior researcher (H. v. L.) was consulted in case of disagreement. It is known that in narrative interventions, blinding of patients and personnel cannot be carried out because of the face-to-face intervention. Also, in most studies, outcome assessors could not be blinded for the intervention, as patients were the assessors and they knew to which group they were assigned. The allocation concealment criteria, however, are considered an important determinant for study quality [22]. Therefore, we conducted a subgroup analysis with all the studies that included the allocation concealment, as described in the Cochrane Collaboration's tool. To explore heterogeneity, we *a priori* hypothesized that the difference in effect size might be a result of the difference in the methodological quality of the studies, the duration of the intervention, the type of intervention (multidisciplinary or mono-disciplinarily), and whether a study assessed a western or non-western population.

Summary measures

The primary outcome was the mean difference in quality of life between the control group and intervention group 0–2 weeks after the intervention. The secondary outcome was the mean difference in QoL 3–6 months after the intervention. We first extracted data of all studies at the two different time points. From each study, we extracted the data on (1) mean QoL; (2) SD; and (3) sample size.

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Only one study included in the meta-analysis reported data on a placebo group in addition to a control group [23]; therefore, we selected only the data from the control group as we did for the other studies. Because the studies used different questionnaires to measure overall quality of life, meta-analyses were performed by computing standardized mean difference using the random-effects model. All scores were converted to a 0–100 scale in order to facilitate the comparison (e.g., score 2 on scale from 0–10 became 2/11*100 = 18). Cohen's d was chosen to report the effect size and p-value to assess significance; p-values less than 0.05 are reported as statistically significant [24]. We tested for heterogeneity with the I^2 statistic, which can be interpreted as the proportion of total variability explained by heterogeneity [25]. An I^2 of 25% can be considered as low heterogeneity, 50% as moderate, and 75% as high heterogeneity [26].

Synthesis of results

First, we differentiated between the western and non-western studies. Second, we conducted a meta-analysis on the studies that scored high on study quality. The last meta-analysis was conducted on subgroups for the different types of intervention. We divided all the studies into three groups as follows: (1) life-reviewing interventions (reconstructing valuable aspects of one's life); (2) multidisciplinary interventions (with a session on spirituality); and (3) meaning-making interventions (facilitating the search for meaning).

Publication bias

Publication bias was assessed by eyeballing a funnel plot of the trial standardized mean differences for asymmetry. In the absence of publication bias, the studies are expected to be distributed symmetrically around the mean effect size because the sampling error is random [24]. A strong case for publication bias is present when the funnel plot is asymmetrical and there are more studies missing at the bottom of the plot, which can result from the non-publication of small trials with negative results.

Results

Study selection

The search identified 6376 records. After removal of duplications, 4972 records remained. Four thousand nine hundred fifteen records were excluded because they did not meet the inclusion criteria. For the final selection, all 57 records were screened by reading the full text articles. After selection, 14 studies met the inclusion criteria and were included in the systematic review. Authors were sent an e-mail to obtain more information about the study: two authors responded and sent more information; three authors responded to the e-mail but did not give more information as they no longer had access to their databases or other reasons; one author did not respond at all. As a result, two of these were excluded from the meta-analysis [27,28] because of insufficient data, and for one other study [29], we calculated the average SD from two studies [30,31] that used the same questionnaire in assessing QoL (Figure 1).

Study characteristics

Intervention

All 14 studies were published between 2005 and 2013. The types of interventions ranged from only spiritual interventions to multidisciplinary interventions with spiritual components. The interventions were performed by various trained people, mostly psychologists/psychiatrists ($n = 6$) and oncology professionals ($n = 3$) or general healthcare professionals ($n = 2$). One intervention was conducted by spiritual healers. Two studies did not provide background information on the profession of the person who conducted the intervention. In two cases, a chaplain contributed to the intervention.

Patients

The patients included in the studies were mostly advanced cancer patients without a specific cancer diagnosis mentioned ($n = 10$); breast cancer patients ($n = 1$); cancer patients at least 1 month diagnosed ($n = 1$); cancer patients with depressive disorder ($n = 1$); and advanced ovarian cancer patients ($n = 1$). The total number of patients included was 2050.

Outcome

In the selected studies, quality of life or subjective well-being was assessed by the Functional Assessment of Cancer Therapy-General ($n = 3$), the McGill Quality of Life Questionnaire ($n = 3$), the European Organization for Research and Treatment of Cancer Quality of Life Questionnaire ($n = 2$), two-item Quality of Life Scale ($n = 2$), the Edmonton Symptom Assessment System ($n = 1$), Linear analogue self-assessment ($n = 1$), the Quality of Life at the end of life questionnaire ($n = 1$), and the Quality-of-life Concerns in the End-of-life ($n = 1$). Characteristics of included studies are shown in Table 1.

Risk of bias within studies

The Cochrane Risk of Bias tool was used to assess the risk of bias [21]. Five studies scored high on study quality [23,32–35]. Risk of bias within studies is shown in Appendix C.

Results from the meta-analysis

All studies included

The overall mean effect size for 12 studies on quality of life 0–2 weeks after intervention was $d = 0.50$ (95% CI:

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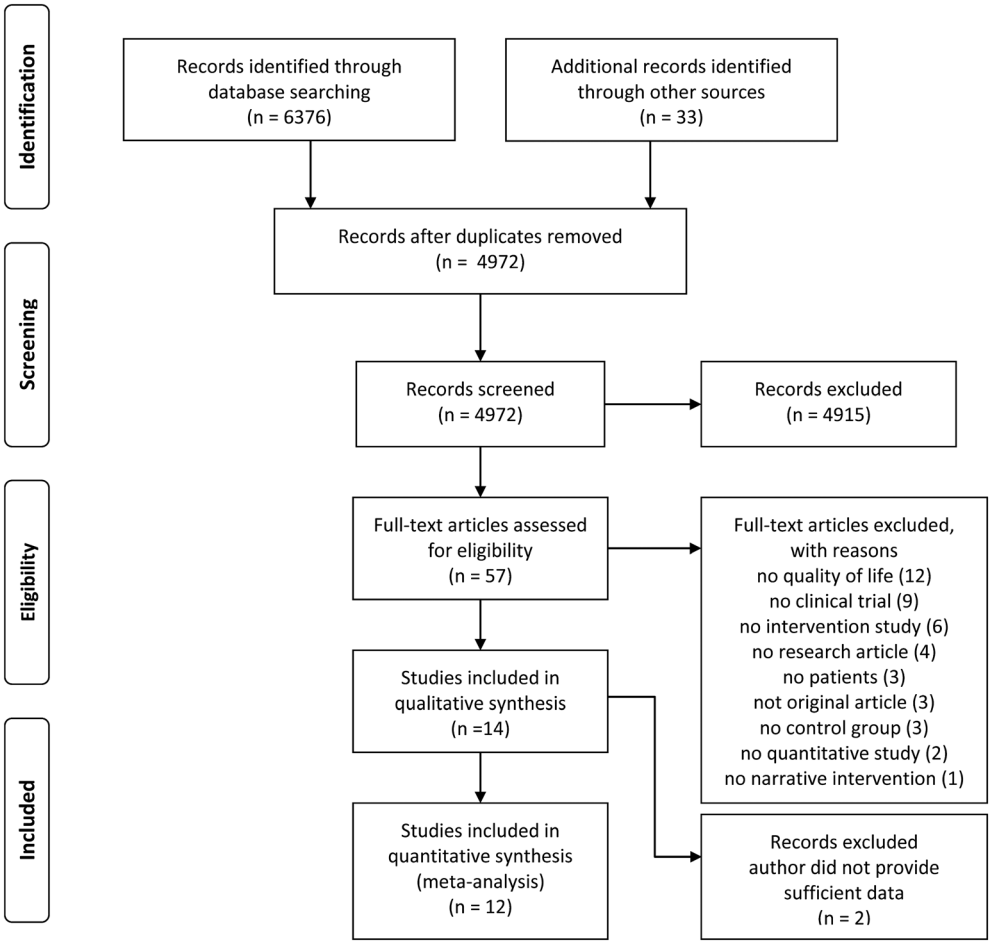

Figure 1. Flow diagram of study selection

0.20–0.79). This effect was statistically significant ($p=0.001$) and can be considered a moderate effect size [36]. Heterogeneity was very high ($I^2=84\%$.) (Figure 2a). The overall effect size of the five studies that assessed quality of life 3–6 months after intervention was $d=0.11$ (95% CI:−0.08 to 0.35), a small and insignificant effect ($p=0.21$). Heterogeneity was low ($I^2=0\%$) (Figure 2b).

Western versus non-western studies

At 0–2 weeks after intervention, a small, non-significant effect ($d=0.17$; 95% CI:−0.05 to 0.29) was observed within the subgroup of western studies (Canada, USA, Australia, UK, and Spain); the heterogeneity was low ($I^2=0\%$). The non-western studies (Iran, China, and Hong Kong) showed a large effect ($d=1.37$), but within a large range (0.26–2.47) and with high heterogeneity ($I^2=92\%$) (Figure 2c).

High-quality studies

Five studies met the allocation concealment criteria. In these studies, a small, non-significant effect of the intervention was visible ($d=0.14$; 95% CI:−0.05 to 0.33) with low heterogeneity ($I^2=0\%$) (Figure 2d).

Interventions

Furthermore, we conducted a meta-analysis with the interventions grouped into three subgroups as follows: (1) life reviewing interventions; (2) multidisciplinary interventions; and (3) meaning-making interventions. All studies showed a trend towards a positive outcome on QoL of cancer patients in favor of the intervention. The strongest effect was seen in subgroup 3: meaning-making interventions ($d=0.63$; 95% CI: 0.01–1.26, $p=0.05$) (Figure 2e).

Risk of bias across studies

The graphical funnel plot of the 12 controlled trials appears symmetrical, except for the two outliers; therefore, we assume no publication bias.

Discussion

Summary of evidence

To the best of our knowledge, this is the first systematic review and meta-analysis that examines the effect of spiritual interventions that address existential needs on QoL of

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Table 1. Study characteristics

Nr	Author	Year	Study design	Intervention	Intervention performed by	Patients	Sample size	Primary outcome	Measuring instrument
1	Breitbart, W.	2012	Pilot RCT	Individual meaning centered psychotherapy	Trained clinical psychologist or psychologist doct. students	Advanced cancer patients	120	Spiritual WB QoI	MQOL
2	Chochinov, H. M.	2011	RCT	Dignity therapy	Trained psychologist/ psychiatrist or palliative care nurse	Advanced cancer patients	441	Distress, end-of-life experience	QOL-S
3	Daly, B. J.	2013	Clinical trial	Multidisciplinary intervention	Experienced oncology professionals	Advanced cancer patients	610	QoL	FACT-G
4	Hall, S.	2011	R. phase II trial	Dignity therapy	Trained professionals working in palliative care	Advanced cancer patients	45	Distress	QOL-S
5	Henry, M.	2010	Pilot RCT	Meaning-making intervention	One psychologist	Advanced ovarian cancer patients	28	Existential well-being	MQOL
6	Jafari, N.	2013	RCT	Spiritual therapy	Three experienced spiritual healers	Breast cancer patients	68	QoL	EORTC C30
7	Kristeller, J. L.	2005	Clinical trial	Oncologists assisted spiritual intervention	Four trained oncologists-hematologists	Cancer patients (>1 m diagnosed)	118	Patients satisfaction	FACT-G
8	Loyd-Williams, M.	2013	pilot RCT	Focused narrative interview	One researcher, no background information	Advanced cancer patients	100	Anxiety, depression	ESAS
9	Mok, E.	2012	RCT	Meaning of life intervention	Trained healthcare professionals	Advanced cancer patients	84	QoL	QOLC-E
10	Piderman, K. M.	2013	RCT	Multidisciplinary intervention	Psychologist/psychiatrist (chaplain co-facilitated)	Advanced cancer patients	131	Spiritual QoL	FACT-G
11	Rummans, T. A.	2006	RCT	Multidisciplinary intervention	Trained psychologist/ psychiatrist (chaplains co-facilitated)	Advanced cancer patients	103	QoL	LASA
12	Steinhauser, K. E.	2008	pilot RCT	Preparation, life compl. intervention (outlook)	One research assistant	Seriously ill patients; 84% cancer patients	82	Functioning	QUAL-E
13	Vega, B. R.	2010	RCT	Narrative therapy	Trained psychologist/ psychiatrist	Cancer patients with depressive disorder	72	QoL, depression	EORTC C30
14	Xiao, H.	2013	RCT	Life review intervention	One trained oncology nurse	Advanced cancer patients	80	QoI	MQOL

RCT, randomized controlled trial; QoL, quality of life; MQOL, McGill QoL questionnaire; QoL-S, QoL Scale; FACT-G, Functional Assessment of Cancer Therapy-General; EORTC QLQ-C30, European Organization for Research and Treatment of Cancer Quality of Life Questionnaire; ESAS, Edmonton Symptom Assessment System; QUAL-E, QoL at the end of life questionnaire; LASA, Linear analogue self-assessment.

cancer patients. We included a total of 12 controlled clinical trials. Our results show that spiritual interventions increase patients' QoL directly after the intervention. However, our results do not support a long-term effect. A possible explanation is that the effect of the spiritual intervention is negated by the deteriorating physical and mental condition due to disease progression. Based on our findings, we cannot conclude which kind of interventions is most contributing to QoL of cancer patients. It should be noted that only five studies scored high on study quality. This indicates that the field of spiritual interventions could be improved by adopting a more stringent methodology.

Other research

A meta-analysis of the effects of existential therapies also reported on the low quality of the included studies [17]. As a result, researchers are not able to identify which intervention works best for which patient groups. The variety of the studies included in our meta-analysis supports the findings of Henoch and Danielson that underscored the need for more knowledge on how to target existential interventions to specific patient groups [18]. Yet, our finding of a positive effect on overall QoL in favor of the interventions is consistent with the literature review on evidence-based spiritual care that Kalish conducted from June 2010 to December 2011 [19]. She found 10 original research studies with oncology patients, of which four studies pointed out the importance of meeting patients' spiritual needs. One study found a short-term life review effective for alleviating distress [37]. The other five studies showed positive correlations between the provision of spiritual care or meeting the spiritual needs and QoL of cancer patients and therefore conclude that addressing spiritual needs in clinical settings is critical in enhancing QoL [38–42].

Limitations

Our finding that the overall quality of all included studies was quite poor can be related to the specific field of spiritual care, in which performing evidence-based research is relatively new. In spite of a rapidly growing interest in research on

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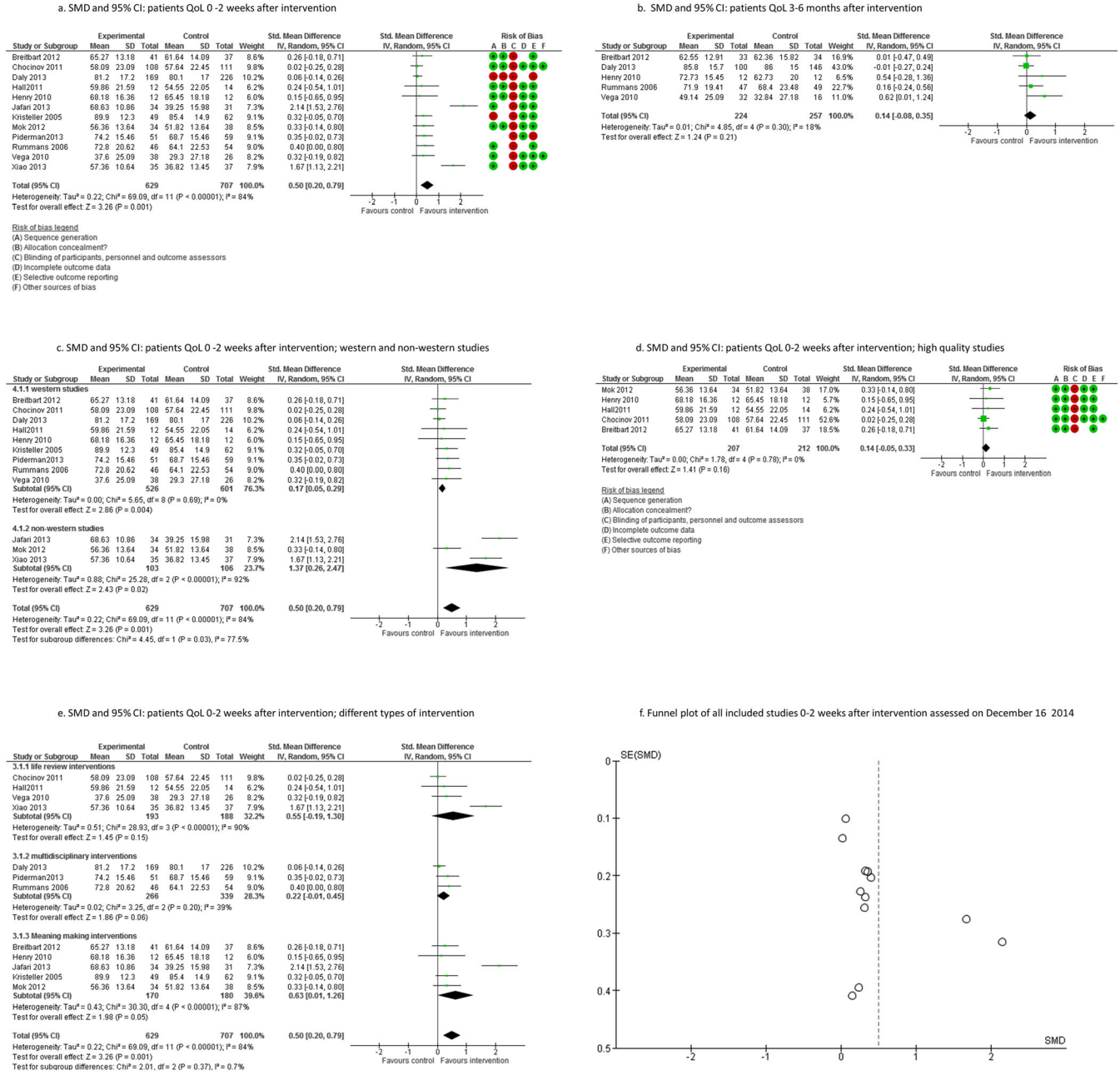

Figure 2. Forest plots and a funnel plot of all included studies. (a) Standardized mean difference (SMD) and 95% CI: patients' quality of life (QoL) 0–2 weeks after intervention; (b) SMD and 95% CI: patients QoL 3–6 months after intervention; (c) SMD and 95% CI: patients QoL 0–2 weeks after intervention; western and non-western studies; (d) SMD and 95% CI: patients QoL 0–2 weeks after intervention; high-quality studies; (e) SMD and 95% CI: patients QoL 0–2 weeks after intervention; different types of intervention; (f) funnel plot of all included studies 0–2 weeks after intervention assessed on December 16, 2014

religion, spirituality, and health since 2000 [43], there is still much heterogeneity among the different spiritual intervention studies, for instance, the variety of instruments used to measure patients' quality of life and the timing of the assessments. Also, the duration of the interventions greatly varied (1 day to 12 weeks) as well as the training of people who performed the intervention. These limitations were also touched upon by Kalish, as she concludes in the literature review that clarity and consensus are still lacking regarding what the best methods are for providing spiritual care [19]. Furthermore, the included studies did not distinguish between type and stage of cancer, while these factors may impact perceived QoL.

Future research

As this meta-analysis shows, spiritual interventions with a narrative approach can have a positive impact on QoL in cancer patients. However, from this meta-analysis, we

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cannot conclude which specific approach is most beneficial for which type of patient because of the large heterogeneity across studies in terms of the outcome measures, the times of outcome measurements and randomization. To obtain more knowledge on this topic, we should strive for more uniformity. This could be achieved by following guidelines on the design of this kind of intervention studies [44], such as standardization of the outcome measurement 'quality of life' by using the EORTC QLQ-C30 or C15-PAL questionnaire. In oncology, these questionnaires are regarded as the gold standard to measure QoL in cancer patients [45]. Other guidelines for setting up a clinical study should be followed more adequately, such as including a control-arm and applying proper randomization and allocation methods.

Our finding that the effect of spiritual interventions did not last up to 3–6 months could be explained by the dynamic nature of personal life stories. It may be hypothesized that a spiritual intervention with a narrative approach is likely to be more effective when it takes into account the ongoing process of defining and reconstructing one's life story. Using narratives, people continuously refine their stories about certain events and change it in order to fit these events into their lives [46]. This process is unlikely to be sufficiently stimulated by a one-time intervention. The report of the Consensus Conference on Spiritual Care also concludes that appropriate follow-up of patients' spirituality should be included into the treatment plan [1]. Evidence suggests that psychosocial interventions, in general, do not exert long-lasting effects [46], with the exception of cognitive behavioral therapy, which has been shown to improve quality of life in cancer survivors at both short-term and long-term follow-ups [47,48].

Westerhof and Bohlmeijer showed that a narrative approach, aimed at unraveling a sense of meaning, substantially contributed to one's well-being [49–52]. The group of nonreligious people is growing rapidly, and more people may consider themselves 'spiritual but not religious' [53–55]. Therefore, spiritual interventions within healthcare settings should be inclusive when it comes to spirituality in the broad sense, and it may be hypothesized that interventions with a focus on meaning-making aspects, rather than faith contents, will be more effective in enhancing peoples' QoL. Because we live in a late modern society where social or religious constructs no longer determine how we understand ourselves and the world around us, people create their own biographical story, which they have to (re)construct and justify for themselves [46,56–59].

Furthermore, interventions should be theoretically well substantiated and developed in a way that it is potentially reproducible. In addition, it would be of interest to look into specific approaches to remind, trigger, and stimulate patients in developing the insights they have gained by the intervention. More structured research is needed to determine whether spiritual interventions, with the focus on the ongoing process of meaning-making, could contribute to a long-term effect on QoL.

Conclusions

In conclusion, narrative spiritual interventions can improve QoL of cancer patients in the short term. However, more structured and guided research on this topic is needed to identify the type of interventions from which cancer patients benefit most and to assess which interventions may provide longer-term benefit.

Acknowledgements

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Appendix A: PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	3
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	4

(Continues)

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Appendix A: Continued

Section/topic	#	Checklist item	Reported on page #
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	n.a.
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	2
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	2
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	2
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	3
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	2
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	2, Appendix B
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	2, Appendix C
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	2, 3
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	3
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	3
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	n.a.
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	3
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	3
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	3
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	3, 4
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	3, 4
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	4
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	4
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	4, 5
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	5, 6
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	7
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	7

***From*: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097**

Appendix B: Search strategies per database

Date original search: 2014 June 6

PubMed 20140605, 2131 hits

((european organization for research and treatment of cancer[tw] OR eortc[tw] OR qlq[tw] OR Functional Assessment of Cancer Therapy[tw] OR fact g*[tw] OR fact b*[tw] OR fact c*[tw] OR fact e*[tw] OR fact h*[tw] OR fact l*[tw] OR fact m[tw] OR fact mm[tw] OR fact n*[tw] OR fact p*[tw] OR fact v*[tw] OR fact ov*[tw] OR fact o [tw]) AND ("Spirituality"[Mesh] OR "Spiritualism"[Mesh] OR "Spiritual Therapies"[Mesh] OR meaning[tw] OR spiritual*[tw] OR existential[tw]))

((Chronic Illness Therapy[tw] OR facit[tw] OR SF-36[tw] OR SF-12[tw] OR SF-8[tw] OR SF-36v2[tw] OR SF-12v2[tw] OR shortform 12[tw] OR shortform 36[tw] OR shortform36*[tw] OR short form 12[tw] OR short form

36[tw]) AND cancer[sb] AND ("Spirituality"[Mesh] OR "Spiritualism"[Mesh] OR "Spiritual Therapies"[Mesh] OR meaning[tw] OR spiritual*[tw] OR existential[tw]))

(("Quality of Life"[Mesh] OR quality of life[tw] OR life quality[tw] OR qol[tw]) AND cancer[sb] AND ("Spirituality"[Mesh] OR "Spiritualism"[Mesh] OR "Spiritual Therapies"[Mesh] OR meaning[tw] OR spiritual*[tw] OR existential[tw]))

(NCT00429117[tw] OR NCT01323309[tw] OR NCT01983956[tw] OR NCT00494910[tw] OR NCT01507571[tw] OR NCT00067288[tw] OR NCT00836992[tw] OR NCT01865396 [tw] OR NCT02007564[tw] OR NCT01927393[tw] OR NCT01990742[tw] OR NCT01996540[tw] OR NCT00255697[tw] OR NCT01741636[tw] OR NCT01883986[tw] OR NCT01360814[tw] OR NCT00823732[tw] OR NCT01612598[tw] OR NCT01628887[tw] OR NCT00960466[tw] OR CTRI/2013/12/004243 [tw] OR IRCT138904024242N1 [tw] OR IRCT201108297440N1 [tw] OR ISRCTN75243042[tw] OR ISRCTN03186168[tw] OR ISRCTN02221709[tw] OR ISRCTN34516019[tw] OR UMIN000001613[tw] OR UMIN000001140[tw] OR ACTRN12613001265763[tw] OR ACTRN12613000342718[tw] OR ACTRN12609000301268[tw] OR ACTRN12606000110583[tw])

((reflective journaling[tw] OR dignity therap*[tw] OR psycho-spiritual integrative therapy[tw] OR life completion[tw] OR meaning making[tw] OR meaning reconstruction[tw] OR narrative therap*[tw] OR reminiscence[tw] OR life review[tw]) AND cancer[sb])

((supportive care[tw] OR hospice care[tw] OR hospice program*[tw] OR "Hospice Care"[Mesh] OR "Social Support"[Mesh] OR social support[tw]) AND cancer[sb] AND ("Spirituality"[Mesh] OR "Spiritualism"[Mesh] OR "Spiritual Therapies"[Mesh] OR meaning[tw] OR spiritual*[tw] OR existential[tw]))

Remarks: some trialregisternumbers didn't yield any results. They're still included for future records that haven't been indexed. All substrategies above have been subsequently combined with an OR-operator.

Validationset:
24467861[uid] OR 23889978[uid] OR 23649656[uid] OR 23047796[uid] OR 22894887[uid] OR 21741309[uid] OR 20538183[uid] OR 19274623[uid] OR 19021487[uid] OR 16673834[uid] OR 16446335[uid] OR 18050243[uid]

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Embase, 1947 to Present, OvidSP, 20140605 (3047 hits):
religion/
spiritual*.ab,kw,ti
psychological aspect/
meaning.ab,kw,ti
existential.ab,kw,ti
or/1-5 [SPIRITUALITY]
("european organization for research and treatment of cancer" OR eortc OR qlq OR "Functional Assessment of Cancer Therapy").mp
((fact OR "functional assessment of cancer") ADJ1 (g OR general OR g7 OR gp OR b OR bl OR br OR c OR cns OR cx OR e OR en OR ga OR "h&n" OR hep OR l OR leu OR lym OR m OR melanoma OR multiple OR mm OR np OR o OR p OR v)).ab,kw,ti

((fact OR "functional assessment of cancer") ADJ4 (breast OR bladder OR brain OR colorectal OR cancer OR esophagael OR endometrial OR gastric OR head OR hepatobiliary OR lung OR leukemia OR lymphoma OR nasopharyngeal OR ovarian OR prostate OR vulva)).ab,kw,ti

or/7-9 [CANCER SPECIFIC QUESTIONNAIRES]
(Chronic Illness Therapy OR facit OR "Functional Assessment of Chronic Illness Therapy").ab,kw,ti
short form 8/ OR short form 12/ OR short form 36/

DOI: 10.1002/pon

(SF-36 OR SF-12 OR SF-8 OR SF-36v2 OR SF-12v2 OR shortform 12 OR shortform 36 OR shortform36* OR shortform8 OR short form 12 OR short form 36 OR short form 8).ab,kw,ti
or/11-13 [NON-CANCER SPECIFIC QUESTIONNAIRES]
"Quality of Life"/
("quality of life" OR life quality OR qol).ab,kw,ti
or/15-16 [QoL]
cancer.ec [CANCER]
(reflective journaling OR dignity therap* OR psycho-spiritual integrative therapy OR life completion OR meaning making OR meaning reconstruction OR reminiscence OR life review).ab,kw,ti
(narrative ADJ2 therapy).ab,kw,ti

or/19-20 [SPECIFIC THERAPIES]
social support/
hospice care/
(social support OR supportive care OR hospice care OR hospice program*).ab,kw,ti
or/22-24 [SUPPORTIVE CARE]
6 AND 10 [CANCER SPECIFIC QUESTIONNAIRES AND SPIRITUALITY]
6 AND 14 AND 18[NON-CANCER SPECIFIC QUESTIONNAIRES AND SPIRITUALITY AND CANCER]
6 AND 17 AND 18 [QoL AND CANCER AND SPIRITUALITY]
18 AND 21 [CANCER AND SPECIFIC THERAPIES]
6 AND 18 AND 25 [SPIRITUALITY AND CANCER AND SUPPORTIVE CARE]
or/26-30

Note: compared to the PubMed search the trial numbers were omitted (much errors resulted in much noise.)

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PsycINFO 1806 to Present, OvidSP, 20140605 (1194 hits)

("european organization for research and treatment of cancer" OR eortc OR qlq OR "Functional Assessment of Cancer Therapy").ab,id,ti,tm

((fact OR "functional assessment of cancer") ADJ1 (g OR general OR g7 OR gp OR b OR bl OR br OR c OR cns OR cx OR e OR en OR ga OR "h&n" OR hep OR l OR leu OR lym OR m OR melanoma OR multiple OR mm OR np OR o OR p OR v)).ab,id,ti,tm
((fact OR "functional assessment of cancer") ADJ4 (breast OR bladder OR brain OR colorectal OR cancer OR esophagael OR endometrial OR gastric OR head OR hepatobiliary OR lung OR leukemia OR lymphoma OR nasopharyngeal OR ovarian OR prostate OR vulva)).ab,id,ti,tm

or/1-3 [CANCER SPECIFIC QUESTIONNAIRES]
spirituality/
spiritual*.ab,id,ti,tm
meaning.ab,id,ti,tm
existential.ab,id,ti,tm
or/5-8 [SPIRITUALITY]
4 AND 9 [CANCER SPECIFIC QUESTIONNAIRES AND SPIRITUALITY]
(Chronic Illness Therapy OR facit OR "Functional Assessment of Chronic Illness Therapy").ab,id,ti,tm
(SF-36 OR SF-12 OR SF-8 OR SF-36v2 OR SF-12v2 OR shortform 12 OR shortform 36 OR short form 12 OR short form 36 OR short form 8).ab,id,ti,tm
or/11-12 [CANCER NON-SPECIFIC QUESTIONNAIRES]
"3293".cc
terminal cancer/
neoplasms/
(cancer OR oncol* OR neoplasm* OR tumo?r?).ab,id,ti,tm
or/14-17 [CANCER]

DOI: 10.1002/pon

9 AND 13 AND 18 [SPIRITUALITY AND CANCER NON-SPECIFIC QUESTIONNAIRES AND CANCER]
"Quality of Life"/
("quality of life" OR life quality OR qol).ab,id,ti,tm
or/20-21 [QUALITY OF LIFE]
9 AND 18 AND 22 [SPIRITUALITY AND CANCER AND QOL]
life review/
life review.ab,id,ti
(reflective journaling OR dignity therap* OR psycho-spiritual integrative therapy OR life completion OR meaning making OR meaning reconstruction OR reminiscence OR life review).ab,id,ti,tm
(narrative ADJ2 therapy).ab,id,ti,tm
existential therapy/
(existential therap* OR multidisciplinary intervention? OR multidisciplinary treatment? OR multidisciplinary therap*).ab,id,ti
good death invent*.id,tm
spiritual*.tm
or/24-31 [SPECIFIC INTERVENTIONS]
18 AND 32 [CANCER AND SPECIFIC INTERVENTIONS]
"3375".cc
social support/
hospice/
home care/
(social support OR supportive care OR hospice).ab,id,ti
or/34-38 [SUPPORTIVE CARE]
9 AND 18 AND 39 [SPIRITUALITY AND CANCER AND SUPPORTIVE CARE]
10 or 19 OR 23 OR 33 OR 40

Appendix C. Risk of bias within studies assessed by Cochrane Risk of Bias tool

Nr	Author	Year	Study design	Adequate sequence generation	Allocation concealment	Blinding of patients/ personnel	Blinding of outcome assessors	Incomplete outcome data addressed	Free of selective reporting	Free of other bias
1	Chochinov, H. M.	2011	RCT	Yes	Yes	Unclear	Unclear	Yes	Yes	Yes
2	Hall, S.	2011	Phase II trial	Yes	Yes	Unclear	Unclear	Yes	Yes	Unclear
3	Jafari, N.	2013	RCT	Yes	Unclear	Unclear	Unclear	Yes	Yes	Unclear
4	Kristeller, J.	2005	Clinical trial	No	Unclear	Unclear	Unclear	Yes	Yes	Unclear
5	Daly, B. J.	2013	Clinical trial	No	No	Unclear	Unclear	Unclear	No	Unclear
6	Piderman, K. M.	2013	RCT	Unclear	Unclear	Unclear	Unclear	Yes	No	Unclear
7	Rummans, T. A.	2006	RCT	Yes	Unclear	Unclear	Unclear	Unclear	Yes	Unclear
8	Steinhauser, K. E.	2008	Pilot RCT	Unclear	Unclear	Unclear	Unclear	Unclear	Yes	Unclear
9	Vega, B. R.	2010	RCT	Yes	Unclear	Unclear	Unclear	Yes	Yes	Yes
10	Loyd-Williams, M.	2013	Pilot RCT	Unclear	Yes	Unclear	Unclear	Unclear	No	Unclear
11	Xiao, H.	2013	RCT	Yes	Unclear	Unclear	Unclear	Yes	Yes	Unclear
12	Breitbart	2012	Pilot RCT	Yes	Yes	Unclear	Unclear	Unclear	Yes	Unclear
13	Henry, M.	2010	Pilot RCT	Yes	Yes	Unclear	Unclear	Yes	Yes	Unclear
14	Mok, E.	2012	RCT	Yes	Yes	Unclear	Unclear	Yes	Yes	Unclear

DOI: 10.1002/pon

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