

META-ANALYSIS

Meta-analysis of Palliative Care on End-stage Quality of Life in Cancer Patients

Jianfang Zhang, BM; Hui Fang, BM; Yajun Sun, MM; Wenting Wang, BM; Yafen Yuan, BM; Kaixi Zheng, BM

ABSTRACT

Objective • This study aimed to investigate the impact of palliative care on the quality of life, depressive state, and physical and psychological symptoms of patients with end-stage cancer.

Methods • A systematic literature search of PubMed, Embase, and Scopus databases was conducted for randomized controlled trials (RCTs) published from May 2000 to June 2023, focusing on the impact of palliative care on end-stage cancer patients. The search utilized terms such as “palliative care,” “cancer/tumor/malignancy,” “terminal/end-stage/advanced,” to identify studies meeting our inclusion criteria. Selected RCTs were evaluated for quality, and relevant data were extracted for meta-analysis.

Results • Meta-analysis of 16 RCTs revealed that palliative care significantly improved depressive states [OR=-0.88, 95%CI (-1.55, -0.20), $P = .01$] and alleviated physical and psychological symptoms [OR=-2.38, 95%CI (-3.95, -0.81), $P = .003$] in end-stage cancer patients compared to conventional oncology care. However, the improvement in overall quality of life was not statistically significant ($P > .05$).

Conclusion • Palliative care significantly enhances the mental and physical well-being of end-stage cancer patients by reducing depressive states and symptom burden, although its impact on overall quality of life requires further exploration. (*Altern Ther Health Med*. [E-pub ahead of print.]

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INTRODUCTION

As per the International Agency for Research on Cancer (IARC) of the World Health Organization (WHO), the global cancer burden is expected to reach 19.29 million new cases and 3 million fatalities in 2023, underlining the critical need for effective care and support measures.¹ The insidious nature of cancer often leads to diagnoses at advanced stages, where curative treatment options are limited. This reality shifts the

focus towards palliative care to enhance the remaining quality of life for those affected. The late diagnosis of cancer poses significant challenges, as over 80% of patients are identified in the middle to late stages of the disease, at a point when a cure is no longer feasible.² As cancer progresses, the reduction in patients' self-care abilities leads to severe physical and mental suffering, emphasizing the importance of quality of life as a primary concern for those with advanced cancer. The aging global population and the rise in chronic diseases contribute to an increasing number of deaths and complicate the management of end-of-life care, thereby heightening the societal demand for palliative care.³

Palliative care, involving a multidisciplinary team, aims to provide comprehensive support—physical, psychological, social, and spiritual—to patients and their families during the end stages of life. This approach focuses on symptom control, pain relief, and emotional support, helping patients die peacefully and with dignity while also supporting their families to enhance the quality of life for both patients and their loved ones.⁴ While some studies underscore the benefits of palliative care in improving the quality of life for terminally ill patients, others suggest a less clear impact, especially in community settings.⁵ This discrepancy indicates the need for a deeper examination of this crucial healthcare service. The varied outcomes of palliative care in existing research, with findings

ranging from significant improvements to minimal effects on patients' quality of life, highlight the complexity of its impact.⁶

This study seeks to synthesize existing research through a meta-analysis to assess the overall impact of palliative care on the quality of life of terminal cancer patients. Our aim is to provide a comprehensive, evidence-based perspective to inform and enhance palliative care practices, addressing the urgent global challenge posed by cancer and its late-stage diagnosis consequences.

METHODS

Search strategy

Our literature search targeted the PubMed, Embase, and Scopus databases, chosen for their extensive coverage of medical and health sciences literature, ensuring a comprehensive collection of research on palliative care and advanced cancer. These databases are renowned for their relevance to our research, providing access to a wide range of high-quality studies in the fields of oncology and palliative care. The period from May 2000 to June 2023 was selected based on significant advancements in palliative care practices around the turn of the millennium, marking a pivotal evolution point in the field. Our keyword selection, including 'advanced cancer' AND 'palliative care', was meticulously designed to encompass all relevant aspects of our research topic. We used combinations like 'palliative care/end of life care/terminal care' and 'cancer/neoplasms/oncology/tumor/malignancy' with 'terminal/end-stage/advanced', applying them to titles, abstracts, and full texts. This strategy, combining both subject headings and free words, aimed for exhaustive coverage to capture the most pertinent studies without omissions.

Literature inclusion and exclusion criteria

Literature screening inclusion criteria were meticulously outlined, with studies selected based on subjects diagnosed with terminal solid tumors and interventions focusing on palliative care. Notably, the most authoritative scales in palliative care, such as the Palliative Outcome Scale (POS) and the Edmonton Symptom Assessment System (ESAS), were utilized for assessments, providing a clear understanding of the tools used.

Inclusion Criteria: (1) Study Subjects: patients diagnosed with terminal solid tumors (including primary and metastatic malignant tumors) by pathological and laboratory examinations, with the age of onset and current actual age >18 years; (2) Interventions: palliative care in the intervention group; conventional or holistic care in the control group; (3) Study design: randomized controlled trial (RCT); (4) Research tools: The scales used were the most authoritative scales in the field of palliative care; (5) Blinded or not; (6) Intervention sites included hospital outpatient clinics, community outpatient clinics, and patients' homes; (7) The language of the literature was restricted to English; (8) The evaluation indicators were those containing at least one of the Quality of Life Rating Scale, the Emotion-Related Rating Scale, and the Symptom Rating Scale.

Exclusion criteria: (1) Literature with only abstracts or incomplete and unusable data; (2) Literature with incomplete and unusable research data; (3) Repeated publications, conference papers, and poor quality literature; (4) Research protocols.

Literature Screening and Data Extraction

All relevant literature initially searched was extracted and organized according to the above inclusion and exclusion criteria. Trained researchers independently reviewed the studies, with disagreements resolved through consensus discussion. In instances where consensus was not achieved, adjudication by a third researcher, trained in evidence-based methodology and unaware of the initial assessments, was sought. This protocol ensured unbiased and objective resolution of discrepancies. The consensus include the basic information of the study, the study population, the intervention, the control, the intervention time, the outcome measures, and the time of measurement of the indicators. The above criteria were repeated to screen out all the literature that met the study criteria, and those that did not meet the criteria after the second screening were excluded, and the final count of research literature that met the inclusion criteria was finalized.

Evaluation of the quality of the literature

To evaluate the quality of randomized controlled trials, we used the bias risk assessment tool recommended by the Cochrane Handbook 5.1.0.7. The assessment encompassed several key elements: generation of the randomized sequence, concealment of the allocation plan, blinding of participants and intervention personnel, blinding of outcome assessors, integrity of outcome data, selective result reporting, and other potential sources of bias. Researchers underwent specific training and calibration exercises to ensure consistent application of the assessment criteria across studies. This preparation aimed to maintain a high level of objectivity and rigor in our evaluation process, with the risk of bias judged as "low", "high", or "unclear" for each study. Discrepancies between researchers' assessments were resolved through discussion and consensus. If a study fully met the criteria, it was deemed to have a low probability of bias (grade A quality level). Studies partially meeting criteria were considered to have moderate bias probability. Those failing to meet the criteria were categorized as having a high probability of bias, corresponding to a grade C quality level. In this process, we ensured that researchers conducting the quality assessment were blinded to specific details of the studies, such as authors and institutions, to prevent any potential bias in the evaluation. This approach aimed to maintain objectivity and rigor in the quality assessment of the literature.

Statistical analysis

We utilized RevMan5.3 software for our meta-analysis. For continuous data, the weighted mean difference (WMD) or standardized mean difference (SMD) was employed,

depending on the uniformity of the measurement tool used. Each effect size and its 95% confidence interval were estimated. Inter-study heterogeneity was determined by calculating the I^2 value using the Cochrane Q test. We applied the fixed-effect model in cases of no statistical heterogeneity among studies ($P > .1$, $I^2 < 50\%$). Conversely, in the presence of heterogeneity ($P < .1$, $I^2 \geq 50\%$), the sources were further explored through subgroup analysis or meta-regression. The random-effect model was used for meta-analysis without significant clinical heterogeneity. Descriptive analysis was employed for instances where heterogeneity was too large and its source indeterminable. To ensure the stability and reliability of our results, a sensitivity analysis was conducted by excluding individual studies for reanalysis. Additionally, we assessed the degree of publication bias by examining funnel plots. The funnel plot analysis revealed some asymmetry, indicating potential publication bias. This bias could arise from a preferential publication of studies with positive outcomes, a common issue in research fields. Studies yielding negative or inconclusive results might be underreported, skewing the overall picture of the effects of interventions. Furthermore, methodological differences and varying study quality could also contribute to this bias, as higher-quality studies are more likely to be published. Recognizing this potential bias is crucial for interpreting our meta-analysis results, as it may lead to overestimating the effectiveness of the interventions studied. To address potential publication bias, we planned to extend our search to include unpublished studies and grey literature, thereby mitigating the risk of bias from preferential publication of studies with positive outcomes. The funnel plot analysis, though indicative of some asymmetry, was part of a broader strategy to ensure a balanced and comprehensive review of the available evidence. Future research should aim for comprehensive reporting, including both positive and negative results, to mitigate the risk of publication bias.

RESULTS

Results of the literature search

The preliminary search obtained 871 pieces of literature, and 2 pieces of related literature were added through other means. We obtained 123 articles by EndNote X9 software after eliminating duplicates, and then after reading the title, abstract and full text, we excluded 98 articles that did not meet the inclusion criteria and finally included 16 articles, and the screening process and the study profiles of the included articles are shown in Figure 1 and Table 1⁸⁻²³. The risk of bias was assessed by the assessment form recommended by the Cochrane Evaluator’s Handbook for the included studies, and all the included studies were of high quality, in which implementation bias, measurement bias, and follow-up bias had a low risk of bias (Figure 2).

Our meta-analysis systematically reviewed and synthesized findings from 16 studies, revealing pivotal insights into the impact of palliative care on end-of-life care quality for cancer patients. Specifically, we observed significant improvements in depressive states and physical symptoms among patients receiving palliative care. Although

Figure 1. Flowchart of literature screening

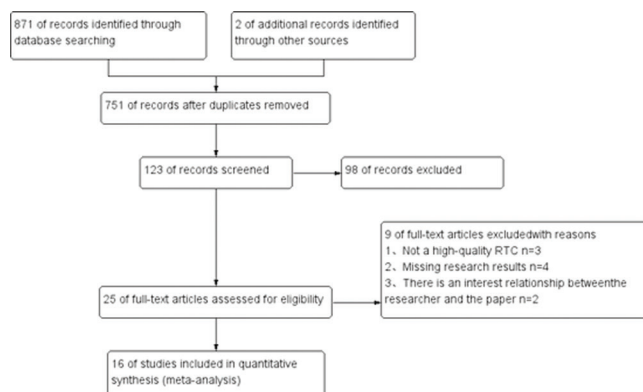


Table 1. Basic characteristics of the included literature (n=16)

Author	Year of publication	Nations	Research target	number of people		Sex (female)		Age		Treatment time	Indicator measurement time	Treatment method	
				IG	CG	IG	CG	IG	CG			IG	CG
Greer ⁸	2022	USA	Patients with advanced breast cancer	61	59	61	59	55.33±10.71	58.54±11.63	24 weeks	Every four weeks	palliative care	Standard Oncology Care
Schenker ⁹	2021	USA	terminal cancer patient	336	336	172	188	68.8±9.7	69.8±10.6	3 months	Third month	counseling + palliative care	Standard Oncology Care
Nicholas ¹⁰	2021	USA	terminal cancer patient	31	32	21	19	55.5 ± 14.2	55.5 ± 13.7	24 weeks	Every month	palliative care	Standard Oncology Care
Rebecca ¹¹	2023	USA	terminal cancer patient	182	177	73	90	64.57±10.90	64.72±10.40	3 months	Every month	palliative care	Standard Oncology Care
Fraser ¹²	2019	Australia	Malignant pleural mesothelioma	87	87	20	15	72.1 (66.7, 77.7)	72.8 (69.0, 78.9)	3 months	Every month	palliative care	Standard Oncology Care
Bakitas ¹³	2015	USA	terminal cancer patient	72	83	56	53	64.03±10.28	64.6±9.59	3 months	Every month	counseling + health promotion + palliative care	Standard Oncology Care
Temel ¹⁴	2010	USA	Non-small cell lung cancer patients	60	47	36	42	64.98±9.73	64.87±9.41	12 weeks	Week 12	palliative care	Standard Oncology Care
Johnsen ¹⁵	2019	Denmark	terminal cancer patient	145	152	63	90	-	-	8 weeks	2 and 8 weeks	palliative care	Standard Oncology Care
Chung ¹⁶	2022	USA	Patients with advanced pancreatic cancer	26	16	18	11	60.0 (21.0-83.0)	64.7 (44.0-78.0)	12 weeks	4 and 12 weeks	palliative care	Standard Oncology Care
Treshita ¹⁷	2023	India	Patients with advanced cervical cancer	42	45	42	45	49 (27-66)	-	3 months	Each month	palliative care	Standard Oncology Care
Bakitas ¹⁸	2009	USA	terminal cancer patient	161	161	96	91	64.7±10.8	65.4±11.6	12 weeks	Every four weeks	palliative care	Standard Oncology Care
Enrique ¹⁹	2020	Mexico	terminal cancer patient	50	46	35	34	61.8 (14.2)	59.2 (13.1)	12 weeks	4 and 12 weeks	palliative care	Standard Oncology Care
Matthew ²⁰	2013	USA	terminal cancer patient	65	66	24	21	58.7 ± 10.6	59.9 ± 10.9	4 months	Every month	palliative care	Standard Oncology Care
Ruth ²¹	2015	USA	terminal cancer patient	80	66	35	47	-	-	3 months	1 and 3 months	palliative care	Standard Oncology Care
Zimmermann ²²	2014	Canada	Patients with malignant tumors	228	233	136	125	61.2 (12.0)	60.2 (11.3)	4 months	Every two months	early palliative care	Standard Oncology Care
Vanbusele ²³	2018	Belgium	Patients with malignant tumors	92	94	33	25	64.5 (57.3-71.0)	65.0 (57.0-71.0)	8 weeks	3 and 8 weeks	interventional palliative care	Standard Oncology Care

Figure 2. Risk of bias summary chart

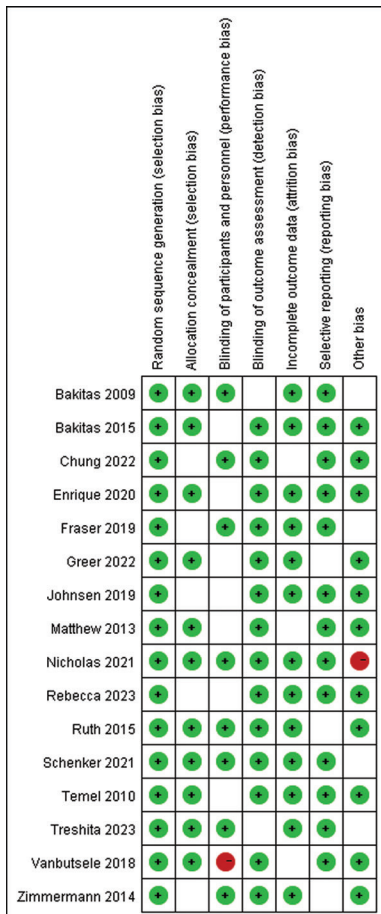


Figure 3. Forest plot of Meta-analysis comparing QoL scale scores at the end of life in the two groups of patients

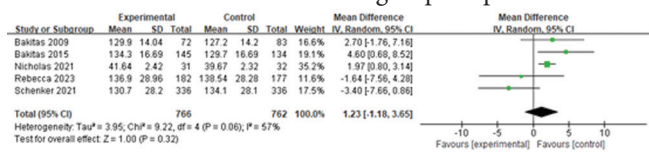


Figure 4. Meta-analytic forest plot comparing hospital anxiety scale scores of the two groups of patients

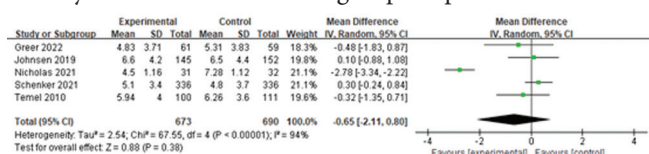
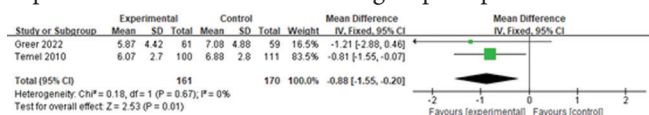
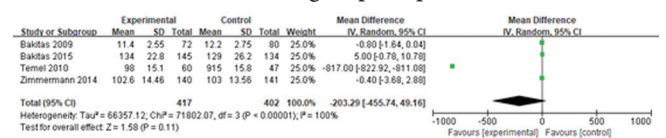


Figure 5. Meta-analytic forest plot comparing hospital depression scale scores of the two groups of patients



variations in quality of life and psychological symptoms were reported, these did not consistently reach statistical significance across studies. This section summarizes the outcomes related to depressive states, physical and psychological symptoms, and overall quality of life, providing

Figure 6. Forest plot of Meta-analysis comparing QoL scores at the end of life in the two groups of patients



a clear overview of the trends and implications of our findings.

Meta-analysis results

FACIT-Pal. A total of 5 studies and 1528 patients were included in the analysis of patient’s QoL at the end of life before and after treatment, using a random-effects model due to the results of the test of heterogeneity between studies ($P = .06$, $I^2=57%$). The results showed that patients in the intervention group had higher FACIT-Pal scores than those in the control group, and the test results were different but not statistically different, [OR=1.23, 95%CI (-1.18,3.65), $P = .32$] (Figure 3).

Impact of palliative care on patients’ hospital anxiety.

A total of 5 studies and 1363 patients were included in the analysis of patients’ hospital anxiety before and after treatment, using a random-effects model due to the results of the heterogeneity test between studies ($P < .01$, $I^2=94%$). The results showed that patients in the intervention group had lower HANDS scores than those in the control group, and there was a difference in the test results but not statistically different, [OR=-0.65, 95%CI (-2.11, 0.80), $P = .38$] (Figure 4).

Impact of palliative care on patient hospital depression.

A total of 2 studies and 331 patients were included in the analysis of patient hospital depression before and after treatment, using a fixed-effects model due to the results of the heterogeneity test between studies ($P = .67$, $I^2=0%$). The results showed that patients in the intervention group had lower HANDS scores than those in the control group, and the test results were statistically different, [OR=-0.88, 95%CI (-1.55, -0.20), $P = .01$] (Figure 5).

QUAL-E

A total of 4 studies and 819 patients were included in the post-treatment analysis of patients’ QoL at the end of life, using a random-effects model due to the results of the heterogeneity test between studies ($P < .01$, $I^2=100%$). The results showed that patients in the intervention group had lower QUAL-E scores than those in the control group, and there was a difference in the results of the test but not statistically different, [OR=-203.29, 95%CI (-455.74, 49.16), $P = .11$] (Figure 6). The heterogeneity observed in these analyses suggests that variations in study designs, patient populations, or palliative care interventions might have influenced these outcomes.

ESAS

A total of 3 studies and 1232 patients were included in the analysis of the improvement of physical and psychological

symptoms before and after the patient's treatment, using a fixed-effects model due to the results of the test of heterogeneity between studies ($P = .92, I^2=0\%$). The results showed that patients in the intervention group had lower ESAS scale scores than those in the control group, and the test results were statistically different, [OR=-2.38, 95%CI (-3.95, -0.81), $P = .003$] (Figure 7).

FACT-G

Four studies and 340 patients were included to evaluate the QoL before and after treatment using the FACT-G in the intervention and control groups. The FACT-G total score showed a large heterogeneity among studies ($P < .01, I^2=91\%$), and Meta-analysis was performed using a random-effects model. The results showed that the FACT-G total score of the intervention group was lower than that of the control group, and the difference was not statistically significant [OR=-5.51, 95%CI (-15.35, 4.33), $P = .27$] (Figure 8).

Five studies analyzed each of their 4 dimensional subscales, namely the physical well-being (PWB), social/family well-being (SWB), emotional well-being (EWB), and functional well-being (functional well-being, FWB). The total heterogeneity of the four dimensions was large across study groups ($P < .01, I^2=78\%$), and Meta-analysis was performed using a random effects model. The results showed that across studies PWB [OR=-0.26, 95%CI (-1.28, 0.76), $P = .62$], SWB [OR=0.41, 95%CI (-0.50, 1.33), $P = .37$], EWB [OR=-1.93, 95%CI (-4.60, 0.74), $P = .16$] and FWB [OR=-2.40, 95%CI (-5.28, 0.48), $P = .10$] scores were compared and the difference was not statistically significant (Figure 9).

EORTCQLQ-C30

The EORTCQLQ-C30 was used to evaluate the global quality of life in the observation and control groups before and after treatment. The heterogeneity between the studies ($P = .25, I^2=28\%$) was analyzed by the fixed effect model. The results showed that the total score of EORTCQLQ-C30 in the observation group was lower than that in the control group, and the difference was not statistically significant [OR=1.80, 95%CI (-1.39, 5.00), $P = .27$] (Figure 10).

Two studies evaluated the cognitive and social functions, and the heterogeneity was small ($P = .15, I^2=43\%$). The fixed effect model was used for Meta-analysis. The results showed that there was no significant difference in physical function score [OR=-0.36, 95%CI (-5.66, 4.93), $P = .89$] and role function score [OR=3.78, 95%CI (-1.68, 9.25), $P = .17$] between the intervention group and the control group. (Figure 11)

DISCUSSION

This meta-analysis situates its findings within the broader context of palliative care research, shedding light on significant aspects of care for patients with end-stage cancer. In the 16 articles analyzed in this study, the observation and control groups demonstrated good baseline comparability before and after the intervention. Given the nature of the

Figure 7. Forest plot of Meta-analysis comparing Edmonton scale scores of the two groups of patients

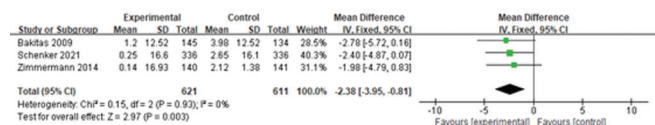


Figure 8. Meta-analytic forest plot comparing the scores of the Therapeutic Function Evaluation Scale - Total Scale between the two groups of patients

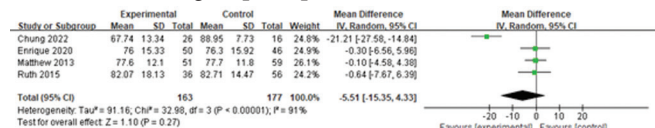


Figure 9. Meta-analytic forest plot comparing the scores of the Cancer Therapy Functional Assessment Scale - Dimension in the two groups of patients

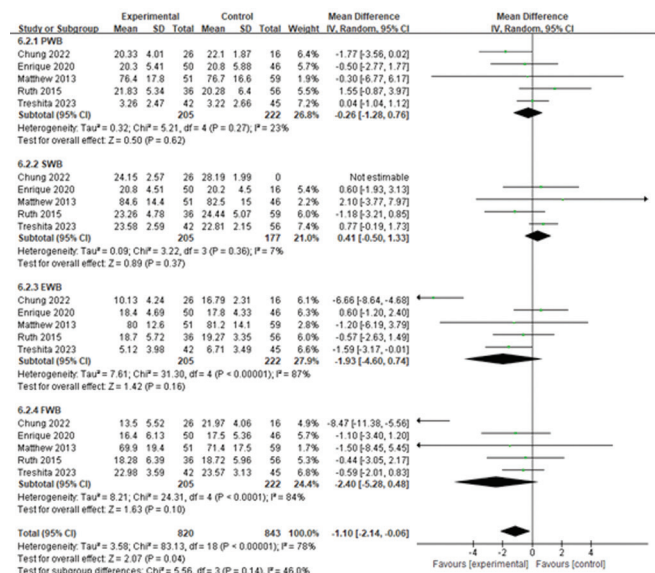


Figure 10. Forest plot of Meta-analysis comparing the total scores of the QoL Measurement Scale for Cancer Patients in the two groups of patients

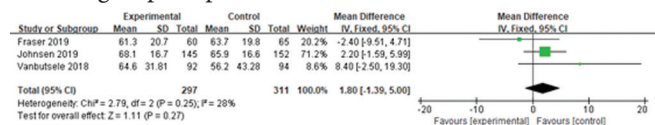
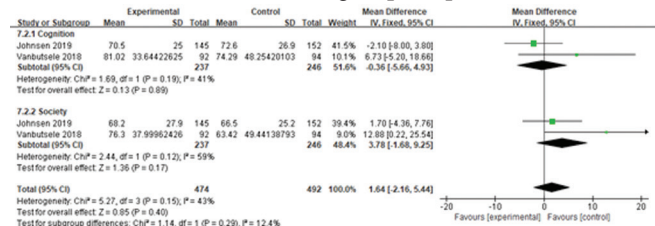


Figure 11. Meta-analytic forest plot comparing the cognitive and social functioning scores of the QoL Measurement Scale for Cancer Patients in the two groups of patients



intervention, achieving patient and investigator double-blinding was challenging, often limiting blinding to only the study examiner. A critical aspect of randomized controlled trials (RCTs) is allocation concealment, which plays a significant role in preventing selection bias and ensuring the study's validity. However, it is noteworthy that only 3 of the included articles explicitly mentioned the allocation concealment methods. The absence of detailed allocation concealment methods in the majority of the articles raises concerns about the potential for selection bias, which could impact the overall quality and reliability of the findings. As a result, this lack of information may affect the credibility of our meta-analysis results to a certain extent. All RCTs in our review were graded as quality B, indicating that the overall quality of the included studies was not high. This factor, combined with the insufficient reporting on allocation concealment, underscores the need for caution in interpreting the results and the necessity for higher-quality studies in future research to provide more reliable evidence.

Our results, indicating improvements in depressive states and symptom severity, echo the growing body of literature that underscores the potential of palliative care to enhance patient well-being. Notably, our study contributes to the discourse by quantifying the benefits of hospice care in alleviating depression [OR=-0.88, 95%CI (-1.55, -0.20), $P = .01$] and improving psychosomatic symptoms as measured by the ESAS scale [OR=-2.38, 95%CI (-3.95, -0.81), $P = .003$]. These findings highlight the clinical importance of addressing both physical and psychological symptoms in palliative care settings to improve the quality of life for patients facing terminal illness. Due to the approaching of death, physical discomfort and multiple pressures, terminal patients are easy to produce negative emotions such as anxiety and depression. Studies have shown that functional domains and general health status of quality of life of patients with advanced cancer are negatively correlated with negative emotions such as anxiety and depression.²⁴ Relevant studies have proved that hospice therapy can effectively relieve anxiety, depression, hostility and other negative emotions caused by illness and death, thereby reducing the psychological pain caused by illness and helping dying patients improve their quality of life.²⁵ Therefore, clinicians should pay attention to the emotional changes of end-of-life patients and adopt individualized interventions such as dignity therapy to reduce patients' negative emotions and improve their quality of life. Acknowledging the limitations of this study is crucial, particularly concerning the potential for publication bias and the inclusion of studies that did not detail allocation concealment methods. These limitations highlight the importance of rigorous research methodologies and the need for transparency in reporting trial protocols to bolster the reliability of meta-analytic findings.

In this study, all 16 randomized controlled trials (RCTs) assessed terminal cancer patients' health-related quality of life (HR-QoL). Both the observation and control groups demonstrated some improvement in quality of life and

symptom severity. The scales used for evaluation included FACIT-Pal, QUAL-E, FACT-G, and EORTC QLQ-C30. Meta-analysis results indicated that while the FACIT-Pal score was higher in the intervention group than in the control group, the difference was insignificant. Although no statistically significant difference was observed in the FACIT-Pal scores, we noted an interesting trend: scores appeared to improve slightly in the palliative care group. This trend may indicate that, despite not being significant in quantitative measures, palliative care could play a crucial role in enhancing the quality of life of end-stage cancer patients. This suggests that even minor improvements could have a significant impact on the overall well-being of patients, particularly in their final stages of life. Hence, this observation underscores the need for further exploration and refinement of palliative care approaches to optimize the quality of life for these patients. Similarly, the FACT-G score and its four dimensions (PWB, SWB, EWB, FWB) in the intervention group were lower than those in the control group, but again, not significantly. No significant differences between the two groups were observed in other scales like EORTC QLQ-C30 scores. One potential reason for these outcomes is the need for local optimization of palliative care programs and referral systems. Considering regional or contextual factors, specific areas for improvement could include: (1) Tailoring Palliative Care Programs: Palliative care programs should be customized to meet local needs. This includes considering cultural, social, and healthcare system differences that might affect the implementation and effectiveness of these programs. (2) Humanistic Care: There is a need to enhance the humanistic aspects of care. This includes better communication between healthcare providers and patients, and more empathetic and compassionate care that takes into account the psychological and spiritual needs of patients. (3) Referral Systems: The referral systems for palliative care might need improvements to ensure timely and appropriate referrals. This involves enhancing the coordination between primary care providers, oncologists, and palliative care teams. (4) Training and Resources: Providing adequate training for healthcare professionals in palliative care and ensuring sufficient resources, including staffing and equipment, tailored to the local context. (5) Community Engagement: Engaging with local communities to understand their perceptions of palliative care and educate them about its benefits, thereby reducing stigma and improving access. These improvements, adapted to local contexts, could potentially enhance the effectiveness of palliative care programs, thereby improving the quality of life for terminal cancer patients.

This study's meta-analysis explored the impact of palliative care on the quality of life (QoL) of patients with end-stage cancer. While it suggests potential benefits in reducing depressive symptoms and symptom severity, its effect on QoL improvement remains uncertain. Our research faced limitations, notably the inclusion of only published randomized controlled trials (RCTs), which raises concerns about publication bias. Variations in measurement methods,

a lack of cancer-type restriction, short intervention durations, small sample sizes in some cases, and moderate literature quality further limit the robustness of our conclusions. For future research, conducting high-quality, large-sample RCTs with standardized measurement approaches is critical. This will address the limitations noted in our study and strengthen the evidence base in the field of palliative care. In conclusion, this study underscores the potential of palliative care to alleviate depressive states and improve symptom management for patients with end-stage cancer. However, it also highlights the challenges in demonstrating significant improvements in overall quality of life. The practical implications of our findings advocate for a patient-centered, tailored approach to palliative care, emphasizing the need for ongoing research and education in the field. Healthcare professionals should integrate these insights into their palliative care strategies, ensuring that interventions are as effective and compassionate as possible, to support the complex needs of end-stage cancer patients.

CONFLICT OF INTEREST

The authors have no potential conflicts of interest to report relevant to this article.

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This study did not receive any funding in any form.

AUTHOR CONTRIBUTIONS

JZ and HF designed the study, YS and WW collected the data, YY and KZ analyzed the data, JZ prepared the manuscript. All authors read and approved the final manuscript.

ETHICAL COMPLIANCE

Not applicable.

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