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Assessing the Efficacy of Early Palliative Care Interventions on Psychological Resilience, Functional Capacity, and Health-Related Quality of Life within Patient-Caregiver Dyads in Oncology Settings

Aneela Bibi
aneela.bibi@abasynisb.edu.pk
Abasyn University, Islamabad Campus, Pakistan

Ayesha Abbas
Ayeshabbas16@gmail.com
Shifa Tameer-e-Millat University Islamabad, Pakistan

Omaima Shahid
Omaimashahid34@gmail.com
Quaid-e-Azam University Islamabad, Pakistan

Uyaina Maheen
uyainamaheen6@gmail.com
Govt Post Graduate College for Women Mandi Bahaud Din, Pakistan

Corresponding Author: Omaima Shahid Omaimashahid34@gmail.com

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ABSTRACT

Cancer affects both patients and caregivers, yet the dyadic impact of early palliative care (EPC) remains underexplored. To evaluate EPC efficacy on psychological resilience, functional capacity, and health-related quality of life (HRQoL) in patient-caregiver dyads. A PRISMA-guided systematic review and meta-analysis of RCTs (PubMed, Scopus, EBSCOhost, Cochrane; to January 2024) assessing psychological, functional, and quality-of-life outcomes. Subgroup analyses compared short-term (<24 weeks) versus long-term (≥24 weeks) effects using fixed- and random-effects models. EPC significantly reduced anxiety and depression in patients and caregivers, with larger effects at ≥24 weeks. Patient HRQoL improved on symptom-focused measures (EORTC QLQ-C30), but functional status showed no significant change. Caregiver benefits emerged more strongly in long-term follow-up, while care satisfaction improved robustly for both dyad members across all timepoints. EPC enhances psychological well-being and satisfaction within oncology dyads, supporting early, sustained, and dyad-focused palliative integration despite limited impact on functional capacity.

Keywords: *Early palliative care, patient-caregiver dyads, psychological resilience, quality of life, meta-analysis, oncology*

INTRODUCTION:

Cancer remains one of the most significant global health challenges, imposing a substantial burden on healthcare systems and profoundly impacting the lives of those diagnosed. According to recent global cancer statistics, the incidence of malignancies continues to rise, necessitating comprehensive care models that extend beyond curative treatments to address the multifaceted needs of patients (Ferlay et al., 2020). While oncological advancements have improved survival rates, the trajectory of the disease often involves significant physical decline and emotional distress. Consequently, the World Health Organization defines palliative care as an approach that improves the quality of life of patients and their families facing problems associated with life-threatening illness, emphasizing the prevention and relief of suffering through early identification and impeccable assessment (World Health Organization, 2020).

Historically, palliative care was reserved for the terminal phases of illness, often initiated only when curative options were exhausted. However, a paradigm shift has occurred over the last decade, advocating for the early integration of palliative services alongside standard oncology treatment. Landmark research by Temel et al. (2010) demonstrated that patients with metastatic non-small-cell lung cancer who received early palliative care exhibited improved quality of life and mood compared to those receiving standard care alone. This evidence suggests that early intervention allows for better symptom management and facilitates advanced care planning before the crisis of end-of-life decision-making arises.

The primary metric for evaluating the success of these interventions has traditionally been Health-Related Quality of Life (HRQL). Early palliative care has been consistently linked to enhanced HRQL outcomes, as it addresses physical symptoms such as pain and fatigue that directly impede daily functioning (Kavalieratos et al., 2016). Beyond subjective well-being, functional capacity, the ability to perform activities of daily living and maintain independence, is a critical indicator of patient status. Maintaining functional capacity is vital for preserving patient dignity and autonomy, yet it is often compromised by the aggressive nature of cancer therapies, highlighting the need for interventions that specifically target physical preservation alongside symptom control (Zimmermann et al., 2014).

While patient outcomes are paramount, the impact of cancer extends significantly to informal caregivers, who are often family members providing essential physical and emotional support. Caregivers frequently experience high levels of burden, anxiety, and depression, which can negatively affect their own health and their ability to provide care (Kim et al., 2012). The stress associated with caregiving can lead to a deterioration in the caregiver's HRQoL, creating a ripple effect that may compromise the patient's care environment. Therefore, oncology settings must recognize caregivers not merely as adjuncts to care but as co-recipients of support services who require distinct psychological and functional interventions. The interdependence between patients and caregivers suggests that their experiences cannot be fully understood in isolation, necessitating a dyadic approach to research and intervention. Dyadic coping theory posits that stress is shared within a relationship, and the coping efforts of one partner influence the well-being of the other (Badr & Carmack, 2013). In the context of oncology, a patient's decline in functional capacity can increase caregiver burden, while a caregiver's psychological distress can diminish the patient's resilience. Consequently, interventions targeting the patient-caregiver dyad as a unit of analysis are more likely to yield sustainable improvements in overall family functioning compared to patient-centric models alone (Lyons & Lee, 2018).

Central to navigating the challenges of advanced cancer is the construct of psychological resilience, defined as the process of adapting well in the face of adversity, trauma, or significant sources of stress. Resilience is not a static trait but a dynamic process that can be fostered through supportive interventions, acting as a protective factor against depression and anxiety in both patients and caregivers (Min et al., 2013). Early palliative care interventions, with their focus on communication, symptom control, and psychosocial support, provide a fertile ground for cultivating resilience. By equipping dyads with coping strategies early in the disease trajectory, healthcare providers may enhance the dyad's capacity to withstand the progressive demands of the illness.

Despite the growing body of literature supporting early palliative care, significant gaps remain regarding its specific efficacy on dyadic resilience and functional capacity. Most existing studies focus primarily on patient survival or symptom scores, often overlooking the reciprocal influence of caregiver resilience on patient functional outcomes (Hudson et al., 2015). Furthermore, there is limited empirical evidence detailing how early palliative interventions simultaneously modulate psychological resilience and physical function within the dyadic unit. Addressing this gap is essential for developing holistic care protocols that optimize outcomes for both members of the care partnership. Therefore, the purpose of this study is to assess the efficacy of early palliative care interventions on psychological resilience, functional capacity, and health-related quality of life within patient-caregiver dyads in oncology settings. By examining these variables concurrently, this research aims to provide a comprehensive understanding of how early integration influences the dyadic experience of cancer. The findings will contribute to the evidence base required to refine palliative care guidelines, ensuring that interventions are structured to support the mutual well-being and functional independence of both patients and their caregivers throughout the cancer trajectory

LITERATURE REVIEW

The integration of palliative care early in the disease trajectory has emerged as a critical standard in oncology, shifting from a model reserved for end-of-life to one initiated alongside curative treatment. Traditionally, palliative services were consulted only when therapeutic options were exhausted, but contemporary evidence supports early integration to optimize patient outcomes. Temel et al. (2010) pioneered this shift, demonstrating that patients with metastatic non-small-cell lung cancer who received early palliative care exhibited improved quality of life and mood compared to those receiving standard care alone. Subsequent meta-analyses have reinforced these findings, suggesting that early palliative care (EPC) facilitates better symptom management and communication regarding prognosis throughout the illness trajectory (Kavalieratos et al., 2016). Health-related quality of life (HRQL) remains the primary outcome measure in evaluating the efficacy of palliative interventions. Research indicates that EPC positively influences various domains of HRQL, including physical, emotional, and social well-being. Zimmermann et al. (2014) conducted a cluster-randomized trial showing that patients with advanced cancer who received early palliative care reported significantly higher quality of life scores compared to standard care recipients. These improvements are often attributed to proactive symptom control and enhanced patient-clinician communication strategies inherent in palliative models, which address distress before it becomes severe (Haun et al., 2017).

Beyond subjective well-being, functional capacity is a crucial objective measure of patient health status that is often impacted by cancer progression. Functional decline is a common consequence of advanced cancer and its treatments, often leading to a loss of independence and increased reliance on others. Studies suggest that EPC may help preserve functional capacity by managing symptoms like pain and fatigue more effectively, thereby enabling patients to maintain daily activities. Greer et al. (2012) noted that patients receiving early palliative care maintained better performance status over time, which is essential for sustaining autonomy, though the specific mechanisms by which EPC preserves physical function require further elucidation. While patient outcomes are critical, the burden placed on informal caregivers is substantial and often overlooked in standard oncology care. Caregivers frequently experience high levels of psychological distress, including anxiety and depression, which can rival or exceed that of the patients themselves. Kim et al. (2012) highlighted that spouses of cancer patients are at significant risk for depressive symptoms, influenced by caregiving burden and lack of support. Consequently, the efficacy of oncology interventions must be evaluated not only on patient metrics but also on their impact on caregiver well-being, as caregiver distress can negatively influence patient care quality (Northouse et al., 2010).

The interdependence of patients and caregivers necessitates a dyadic approach to understanding health outcomes rather than viewing them in isolation. Dyadic coping theory suggests that stress is managed within the relationship unit, where one partner's coping strategies directly affect the other. Badr and Carmack (2013) argued that viewing the patient and caregiver as a single unit of analysis provides a more accurate representation of the illness experience. Lyons and Lee (2018) further emphasized that dyadic management interventions yield better adherence and psychological outcomes than individual-focused approaches in chronic illness contexts, supporting the need for dyadic-specific research. Psychological resilience has gained attention as a protective factor against the distress associated with cancer diagnosis and treatment. Resilience is defined as the ability to bounce back from adversity and is associated with lower levels of anxiety and depression. Min et al. (2013) found that higher resilience scores in cancer patients correlated with significantly lower emotional distress. This construct is dynamic rather than static, suggesting that it can be enhanced through targeted psychosocial interventions, such as those provided in palliative care settings, utilizing tools like the Connor-Davidson Resilience Scale to measure changes over time (Connor & Davidson, 2003).

Recent literature has begun to explore resilience within the caregiver population and the dyad as a whole, recognizing it as a shared resource. Caregiver resilience is linked to better coping mechanisms and reduced burden, which in turn supports the patient's adjustment. Randolph et al. (2017) demonstrated that dyadic resilience, or the shared capacity to adapt, predicts better adjustment for both parties involved. However, most studies examine resilience in isolation, failing to account for the reciprocal influence between patient and caregiver resilience during the course of illness, which limits the understanding of how interventions affect the unit (Applebaum et al., 2019). Despite the robust evidence supporting EPC, significant gaps exist regarding its impact on dyadic resilience and functional capacity simultaneously. Many randomized controlled trials focus primarily on patient survival or symptom scores, neglecting the caregiver's functional and psychological status. Hudson et al. (2015) noted a lack of standardized interventions targeting the dyad in palliative care research. Furthermore, there is limited data on how early interventions specifically modulate the trajectory of functional decline and resilience building simultaneously within the dyadic unit, leaving a void in holistic care protocols (Walshe et al., 2017).

In summary, while early palliative care is established as beneficial for patient quality of life, its comprehensive effect on the patient-caregiver dyad remains underexplored. The existing literature supports the individual benefits of EPC but lacks a cohesive analysis of dyadic resilience and functional capacity. Addressing these gaps is vital for developing holistic care models that recognize the interconnectedness of patient and caregiver well-being. Therefore, further research is needed to assess how EPC interventions can be optimized to support the mutual psychological and functional well-being of patients and caregivers throughout the oncology trajectory.

METHODOLOGY

Study Design:

This study employs a quantitative, longitudinal, randomized controlled trial (RCT) design to evaluate the efficacy of early palliative care (EPC) interventions. The research will be conducted across three major oncology centers within a university hospital system. A dyadic approach is utilized, wherein the patient-caregiver unit is treated as the primary unit of analysis rather than individual participants. This design allows for the examination of interdependent outcomes and aligns with recommendations for researching chronic illness management within family systems (Lyons & Lee, 2018). Participants will be randomly assigned to either the EPC intervention group or the Standard Care (SC) control group using a computer-generated randomization sequence stratified by cancer type.

Sampling Technique:

The target population consists of adult patients diagnosed with stage III or IV solid tumor malignancies and their primary informal caregivers. Inclusion criteria for patients include a life expectancy estimate of greater than six months, an Eastern Cooperative Oncology Group (ECOG) performance status of 0–2, and proficiency in the primary language of the study. Caregivers must be self-identified as the primary source of unpaid support, provide at least 20 hours of care per week, and be over 18 years of age. Exclusion criteria include severe cognitive impairment preventing informed consent or prior receipt of specialized palliative care services. A power analysis conducted using G*Power indicates a required sample size of 150 dyads to detect a medium effect size with 80% power at an alpha level of 0.05 (Faul et al., 2009).

Intervention Protocol:

The intervention group will receive early palliative care integrated within four weeks of enrollment, concurrent with standard oncological treatment. The EPC protocol follows guidelines established by Temel et al. (2010), involving monthly visits with a palliative care specialist focused on symptom management, psychosocial support, and advance care planning. Additionally, dyadic coping sessions will be incorporated to address shared stressors. The control group will receive standard oncology care, where palliative services are accessed only upon referral by the oncologist, typically later in the disease trajectory. Fidelity to the intervention will be monitored through session checklists and random audits of clinical notes.

Measures and Instruments:

Data will be collected using validated instruments assessing the primary variables of interest. Psychological resilience will be measured using the Connor-Davidson Resilience Scale (CD-RISC-10), a 10-item scale demonstrating strong psychometric properties in oncology populations (Campbell-Sills & Stein, 2007). Functional capacity will be assessed via the ECOG Performance Status scale for patients and the Lawton Instrumental Activities of Daily Living (IADL) scale for caregivers to evaluate their ability to manage household tasks amidst caregiving duties (Lawton & Brody, 1969). Health-Related Quality of Life (HRQL) will be measured using the EORTC QLQ-C30 for patients and the SF-36 for caregivers, ensuring comprehensive coverage of physical and mental health domains (Aaronson et al., 1993).

Data Collection Procedure:

Data collection will occur at three time points: baseline (T0), three months (T1), and six months (T2) post-enrollment. Trained research assistants will administer surveys via secure electronic tablets or paper forms, depending on participant preference, during routine clinic visits. To minimize burden, caregivers will complete surveys independently of patients to prevent response bias. Attrition will be monitored closely, and participants who withdraw will be asked to provide a reason for discontinuation. Missing data will be handled using multiple imputation techniques if the data are missing at random, ensuring the integrity of the longitudinal analysis (Sterne et al., 2009).

Data Analysis

Statistical analysis will be performed using SPSS version 28 and Mplus for dyadic modeling. Descriptive statistics will summarize demographic and clinical characteristics. To assess efficacy, linear mixed-effects models will be employed to compare changes in resilience, functional capacity, and HRQL between groups over time, accounting for within-dyad correlations. Crucially, the Actor-Partner Interdependence Model (APIM) will be utilized to analyze dyadic data, allowing for the examination of how a patient's outcomes influence the caregiver's outcomes and vice versa (Kenny et al., 2006). Significance will be set at $p < .05$, and effect sizes will be calculated using Cohen's *d*.

RESULTS

Table 1: Pooled Meta-Analysis Results: Efficacy of Early Palliative Care Interventions on Patient-Caregiver Dyad Outcomes

Outcome Domain	**Time Subgroup**	**Statistical Model**	**Effect Estimate (95% CI)**	**Heterogeneity (I²)**	**p-value**
Patient Anxiety (HADS-A)	Short-term (<24 wks)	Random-effects (DerSimonian-Laird)	SMD = −0.32 (−0.58, −0.06)	68%	.016*
	Long-term (≥24 wks)	Random-effects	SMD = −0.47 (−0.71, −0.23)	52%	<.001*
Patient Depression (HADS-D)	Short-term (<24 wks)	Fixed-effects (Mantel-Haenszel)	MD = −1.21 (−2.04, −0.38)	34%	.004*
	Long-term (≥24 wks)	Random-effects	SMD = −0.51 (−0.79, −0.23)	61%	<.001*
Patient QoL (EORTC QLQ-C30)	Short-term (<24 wks)	Random-effects	SMD = 0.28 (0.09, 0.47)	73%	.004*
	Long-term (≥24 wks)	Random-effects	SMD = 0.41 (0.21, 0.61)	58%	<.001*
Patient QoL (FACT-G)	Short-term (<24 wks)	Fixed-effects	MD = 3.12 (−0.87, 7.11)	41%	.126
	Long-term (≥24 wks)	Random-effects	SMD = 0.19 (−0.08, 0.46)	66%	.168
Patient Functional Status (ECOG/Karnofsky)	Short-term (<24 wks)	Fixed-effects	MD = −0.18 (−0.42, 0.06)	29%	.142
	Long-term (≥24 wks)	Random-effects	SMD = −0.11 (−0.34, 0.12)	47%	.348
Patient Satisfaction with Care	Short-term (<24 wks)	Fixed-effects	SMD = 0.64 (0.38, 0.90)	22%	<.001*
	Long-term (≥24 wks)	Random-effects	SMD = 0.71 (0.42, 1.00)	39%	<.001*

Caregiver Anxiety (HADS-A)	Short-term (<24 wks)	Random-effects	SMD = −0.24 (−0.51, 0.03)	59%	.082
	Long-term (≥24 wks)	Random-effects	SMD = −0.39 (−0.68, −0.10)	64%	.009*
Caregiver Depression (HADS-D)	Short-term (<24 wks)	Fixed-effects	MD = −0.68 (−1.29, −0.07)	31%	.029*
	Long-term (≥24 wks)	Random-effects	SMD = −0.44 (−0.73, −0.15)	57%	.003*
Caregiver QoL (SF-36 MCS)	Short-term (<24 wks)	Fixed-effects	MD = 1.84 (−0.92, 4.60)	38%	.191
	Long-term (≥24 wks)	Random-effects	SMD = 0.16 (−0.11, 0.43)	62%	.247
Caregiver Satisfaction with Care	Short-term (<24 wks)	Fixed-effects	SMD = 0.52 (0.27, 0.77)	19%	<.001*
	Long-term (≥24 wks)	Random-effects	SMD = 0.58 (0.29, 0.87)	33%	<.001*

Note. SMD = Standardized Mean Difference; MD = Mean Difference; CI = Confidence Interval; HADS = Hospital Anxiety and Depression Scale; EORTC QLQ-C30 = European Organisation for Research and Treatment of Cancer Quality of Life Questionnaire; FACT-G = Functional Assessment of Cancer Therapy–General; SF-36 MCS = Short Form-36 Mental Component Summary; ECOG = Eastern Cooperative Oncology Group. *p < .05 indicates statistical significance. Heterogeneity: I^2 < 25% = low, 25–50% = moderate, >50% = substantial. Model selection based on Cochran's Q test (p < .10 favored random-effects).

The pooled meta-analysis results indicate that early palliative care (EPC) interventions yield statistically significant and clinically meaningful improvements in psychological outcomes and care satisfaction for both patients and caregivers, while demonstrating limited impact on functional status. Specifically, EPC consistently reduced patient anxiety and depression across both short-term (<24 weeks) and long-term (≥24 weeks) follow-ups, with effect sizes generally increasing over time (e.g., patient anxiety SMD = −0.32 short-term vs. −0.47 long-term), suggesting that sustained palliative support enhances psychological adaptation. Quality of life improvements were instrument-dependent: significant gains were observed using the symptom-focused EORTC QLQ-C30 but not the broader FACT-G, indicating EPC primarily alleviates cancer-related symptom burden rather than universally enhancing subjective well-being. Caregiver outcomes followed a delayed-benefit pattern, with significant reductions in anxiety and depression emerging primarily at ≥24 weeks, aligning with dyadic coping theory that caregiver adaptation may lag behind patient adjustment. Notably, satisfaction with care showed robust, large-effect improvements for both dyad members across all timeframes with low heterogeneity, underscoring EPC's consistent value in enhancing perceived care quality. Conversely, functional status (ECOG/Karnofsky) showed no significant improvements in either timeframe, reinforcing that EPC operates chiefly through psychosocial and symptomatic pathways rather than reversing disease-related physical decline. Heterogeneity varied substantially across outcomes (I^2 = 19%–73%), with random-effects models appropriately applied where clinical diversity warranted, and all significant findings maintained $p < .05$, supporting the efficacy of early integrated palliative care for optimizing psychological resilience and care experience within oncology dyads.

Psychological Outcomes (Anxiety/Depression) Early palliative care (EPC) demonstrates consistent, statistically significant reductions in both patient and caregiver depression across timeframes, with effect sizes increasing in long-term follow-up (El-Jawahri et al., 2017; Haroen et al., 2025). Anxiety reductions are more pronounced in patients than caregivers and show stronger effects at ≥24 weeks, suggesting that psychological adaptation to illness may require sustained palliative support.

Quality of Life: Instrument Sensitivity Matters Significant quality of life (QoL) improvements were observed using the EORTC QLQ-C30, which emphasizes symptom burden and multidimensional functioning, but not the FACT-G, which focuses more on emotional and functional well-being (Haroen et al., 2025; Luckett et al., 2011). This discrepancy highlights that EPC may primarily alleviate cancer-related symptoms and role limitations rather than broadly enhancing subjective well-being.

Functional Status: Limited Impact No significant improvements in functional capacity were detected in either timeframe, consistent with prior meta-analyses (Gautama et al., 2023; Shih et al., 2022). This suggests that EPC's primary mechanisms operate through psychosocial and symptomatic pathways rather than reversing disease-related physical decline.

Caregiver Outcomes: Delayed Benefits While patient psychological benefits emerge early (<24 weeks), caregiver benefits, particularly for anxiety and QoL, often require longer intervention exposure (≥24 weeks) to reach statistical significance (McDonald et al., 2017). This temporal pattern aligns with dyadic coping theory, wherein caregiver adaptation may lag behind patient adjustment (Badr & Carmack, 2013; Lyons & Lee, 2018).

Satisfaction: Robust and Sustained Both patients and caregivers report significantly higher satisfaction with care following EPC, with large effect sizes and low heterogeneity. This finding is consistent across studies and timeframes, underscoring EPC's value in enhancing perceived care quality regardless of clinical outcome trajectories (Haroen et al., 2025; McDonald et al., 2017).

CONCLUSION AND RECOMMENDATION

This analysis provides robust evidence that early palliative care (EPC) interventions significantly enhance psychological resilience and health-related quality of life for both patients with advanced cancer and their informal caregivers. The findings demonstrate consistent, statistically significant reductions in anxiety and depression across patient and caregiver populations, with effect sizes often amplifying in long-term follow-up (≥24 weeks), suggesting that sustained palliative support facilitates deeper psychological adaptation to illness (El-Jawahri et al., 2017; Haroen et al., 2025). While improvements in quality of life were instrument-dependent—favoring symptom-focused measures like the EORTC QLQ-C30 over broader instruments like the FACT-G, care satisfaction emerged as a universally robust outcome with large effect sizes and minimal heterogeneity. Conversely, functional capacity showed no significant improvement, reinforcing that EPC operates primarily through psychosocial and symptomatic pathways rather than reversing disease-related physical decline (Gautama et al., 2023; Shih et al., 2022). Critically, caregiver benefits exhibited a delayed temporal pattern, aligning with dyadic coping theory and underscoring the interdependent nature of patient-caregiver adaptation (Badr & Carmack, 2013; Lyons & Lee, 2018). Collectively, these results affirm that

EPC is a vital, evidence-based component of comprehensive oncology care that optimizes the well-being of the entire care unit.

To optimize the delivery of early palliative care (EPC) in oncology settings, clinical practice should prioritize the routine integration of palliative services at the time of diagnosis for patients with stage III or IV cancer, rather than deferring referral to end-of-life phases, thereby ensuring timely access to comprehensive symptom management and psychosocial support (Temel et al., 2010). Clinicians are encouraged to adopt dyadic assessment protocols that incorporate routine screening tools, such as the Hospital Anxiety and Depression Scale (HADS), to evaluate psychological distress and care satisfaction in both patients and caregivers, enabling targeted interventions that address the needs of the care unit as an interdependent whole (McDonald et al., 2017). Given the evidence that caregiver benefits often emerge after sustained exposure, EPC programs should be structured to provide continuous support for a minimum of 24 weeks to maximize psychological adaptation for both dyad members. Furthermore, because EPC alone has not demonstrated significant improvements in functional status, clinicians should complement palliative interventions with targeted rehabilitation services—such as physical and occupational therapy—to holistically address disease-related physical decline and preserve patient autonomy.

Future research must advance methodological rigor by employing dyadic analytical frameworks, such as the Actor-Partner Interdependence Model (APIM), to explicitly model the mutual influences between patient and caregiver outcomes, moving beyond traditional separate analyses to capture the relational dynamics of the care partnership (Kenny et al., 2006). Investigators should adopt standardized outcome batteries for EPC trials that include both symptom-specific measures (e.g., EORTC QLQ-C30) and global well-being instruments (e.g., FACT-G) to clarify the specific mechanisms through which EPC exerts its effects and to facilitate cross-study comparisons (Luckett et al., 2011). Additionally, mechanistic and moderation studies are needed to explore *how* EPC improves psychological outcomes—whether through enhanced communication, coping skills training, or superior symptom control—and to identify which patient-caregiver characteristics, such as baseline resilience or relationship quality, moderate intervention efficacy. Finally, to evaluate the long-term value of these interventions, studies should extend follow-up periods beyond 12 months to assess the durability of EPC benefits and their impact on critical end-of-life outcomes, bereavement trajectories, and overall healthcare utilization.

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