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The Use of Telehealth in Home-Based Palliative Care: An Umbrella Review of Systematic Reviews

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Abstract

Telehealth plays a vital role in home-based palliative care by enhancing the quality of life for individuals with terminal conditions. This umbrella review aimed to systematically synthesize the existing evidence from systematic reviews regarding: (a) the benefits of telehealth use on the quality of care and (b) the impact of telehealth on the quality of life of terminally ill patients. This review registered in PROSPERO (CRD420250652549) and accordance with the Joanna Briggs Institute methodology for systematic reviews. A literature search was conducted using electronic databases (PubMed, Scopus, Cochrane, and Sage), covering the period from 2014 to 2024. Eligibility criteria included: systematic review studies focusing on telehealth in home, involving terminally ill patients, and addressing quality of life and care services. The risk of bias was assessed using AMSTAR-2 criteria. A thematic analysis approach was used to analyze and synthesize the findings. Out of 1352 articles identified, 17 articles met the inclusion criteria, encompassing a total of 293 studies. Findings show that the impact of telehealth on the well-being of patients and families, includes: improvement in patients' quality of life, effects on physical and psychological symptoms, improvement of well-being, and improvement in self-management. Improving the quality of care also can optimize telehealth implementation. Finally, the implementation of telehealth in palliative care has shown positive impacts, including improvements in patients' quality of life and quality of home-based palliative care. Further research is needed to explore the effectiveness of telehealth in palliative care across various other contexts.

Keywords

palliative care, telemedicine, home care services, quality of life, quality of health care, systematic review

Background

Many individuals with terminal conditions gain advantages from palliative care, which prioritizes collaboration among healthcare professionals, patients, and families to provide optimal care.[1,2] This care support is intended for patients with multiple diseases or multimorbidity, progressive chronic diseases with a long course, as well as diseases with complex symptoms.[3] The prevalence of palliative care needs in each country increases every year. From 2012 to 2021, the number of people requiring palliative care in England and Wales increased by 5%, indicating an increase in morbidity and mortality in that region.[4] Elsewhere, Australia also experienced an increase of 16.9%, or a total of 79,932 inpatient cases.[5]

Palliative care is an approach aimed at improving the quality of life of patients and their families who are facing terminal illness through the prevention and management of symptoms through early identification, appropriate assessment, and treatment of existing symptoms.[6] The main goal of this care is to improve the quality of life of patients by alleviating suffering caused by terminal illness.[7,8] The setting of palliative or end-of-life care varies, depending on resource availability, sociodemographic factors, and the community's experience with care.[9] Patients may receive care until death in hospitals, hospices, or at home.[10] Home-based palliative care is the preferred setting for both patients and families in palliative care due to its benefits in alleviating symptoms, reducing hospitalizations, providing a supportive environment, and enhancing end-of-life support.[10,11]

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Currently, many modern technologies support the delivery of palliative care at home, 1 of which is the use of telehealth. Telehealth is the provision of remote healthcare services through various telecommunication tools.[12] Telehealth has been proven to be a valuable resource for palliative care providers, especially during the COVID-19 era. In addition, it can be used in the management of acute, post-acute, and emergency patients.[13] In the context of palliative care, telehealth is also capable of increasing the fulfillment of a person's wish to die at home, enhancing patient-healthcare provider communication, improving symptom management, increasing comfort and privacy, and enabling easier access.[14-16] The use of telehealth in home-based patient care carries a much lower burden and offers better responsibility in patient care compared to regular phone calls. This is due to the family's caregiver adaptation through consultations and continuous monitoring via telehealth care.[17] Given its many benefits, it is essential to integrate telehealth into home-based palliative care.

Telehealth in home-based palliative care can be delivered through telephone, video, remote monitoring, and web-based applications accessible via mobile phones.[18] Telehealth utilizes technology through visual and audio components, such as video for teleconsultation, as well as written components, such as mobile, or tablet applications used for monitoring patients' symptoms remotely.[16]

A literature search has been conducted and identified various pieces of evidence on the use of telehealth for palliative care delivered at home. Meta-systematic reviews have shown evidence of the role and effectiveness of telehealth in palliative care and have successfully identified and evaluated various technologies that can be used in the implementation of home-based telehealth appropriate for palliative patient care.[19,20] Other systematic review studies have investigated the benefits and challenges experienced by patients in home-based palliative care.[21] Based on several findings conducted by researchers, there have been many systematic review studies related to the implementation of telehealth in home-based palliative care; however, there has not yet been an umbrella review that specifically discusses the use of telehealth in home-based palliative care. Therefore, this review aims to systematically synthesize the available studies from systematic reviews regarding the benefits of telehealth use on the quality of care and the quality of life of terminal patients in home-based palliative care setting.

Methods

Design

This study used an umbrella review design, which is a methodological approach used to synthesize multiple systematic reviews. The methodology was based on the guidelines developed by the Joanna Briggs Institute for conducting umbrella review research.[22] The researchers ensured transparency, systematic processes, and quality in this review following the Preferred Reporting Items for Overviews of Reviews (PRIOR) guidelines.[22,23] This umbrella review was registered in PROSPERO (https://www.crd.york.ac.uk/PROSPERO/view/CRD420250652549) to identify, screen, and describe the protocol of this review. The main objective of this review was to assess the overall benefits of telehealth interventions in home-based palliative care and their impact on quality of life and quality of care. In addition, this review aimed to consolidate best practices in implementing telehealth within palliative care settings to ensure actionable recommendations for stakeholders.

Search Strategy

The article search process followed the systematic review method, initially identified through titles and abstracts. The search process used 4 databases: PubMed, Scopus, Cochrane, and Sage. The initial strategy in the search was to establish the PICO framework to identify relevant literature.[24] "P" or population refers to families or patients with life-threatening illnesses or terminal conditions; "I" or intervention refers to the use of telehealth; and "O" or outcome refers to the improvement of home-based palliative care services and the improvement of patients' quality of life. The search strategy did not include the "C" or comparison intervention component, as the researchers focused on the implementation of telehealth use. The keywords used in each database are presented in Table 1. Only systematic reviews were included in this umbrella review, and all were written in English. There was considerable variation in the terminology related to both palliative care and telehealth; therefore, the reviewers used Boolean operators AND/OR to combine keywords, focus the topic, and broaden the article search. This helped the reviewers extract information from various types of data and information available in the databases.[25]

Review Criteria

The review criteria were designed to align with the stated objectives. The formulation of the criteria used the PICO framework and followed the process used in systematic reviews.[24,26] Duplicate article detection was performed using Rayyan, resulting in 114 duplicates. The article selection process based on inclusion criteria was conducted after duplicates were removed and was carried out by 2 reviewers (RBS and RS). The review criteria in this study are presented in Table 2.

Data Extraction

The inclusion eligibility of the search results was screened by the researchers. Data extraction and synthesis were

Table 1. Keywords and Databases Used in Article Searches.

Databases	Keyword
PubMed	(((((Terminal Illness) OR ("Palliative")) AND (Telehealth)) OR (Telemedicine)) AND (Home Care)) AND (Quality of Care)
Scopus	"palliative" OR "palliative care" AND "telehealth" OR "electronic health" OR "technology" OR "application" AND "home based" OR "home care" AND "quality of care"
Science Direct	((((Terminal Illness) OR (Palliative)) AND (Telehealth)) OR (Telemedicine)) AND (Home Care)) AND (Quality of Care)
Sage	Terminal Illness AND Palliative care AND Telehealth AND Application AND Electronic AND Home based AND quality of Care

Table 2. Inclusion and Exclusion Criteria.

Criteria	Inclusion	Exclusion
Population	Patients with terminal illnesses receiving care at home.	Hospital care setting.
Intervention	The use of telehealth in palliative care process (telenursing, telemedicine, apps).	Conventional care that does not use technology.
Outcome	• Improved quality of care in homebased palliative care. • Improved patient quality of life.	Did not measure the benefits or process of using telehealth in palliative care at home.
Study design	Review using systematic review to minimize bias.	Review (Scoping review, integrative review, narrative review, literature review).
Language	English	Non English
Year	2014-2024	$<$2014
Full Text	Full text articles	Non full text

conducted by 2 researchers (RBS and RS) from January 14 to 15, 2025, using Rayyan.[27] Three other researchers reviewed and approved the included articles (RAR, AAD, RL). The article search process is presented in the PRISMA flowchart. Information was collected from each selected systematic review: (1) Author(s) and year of publication; (2) Type of study; (3) Study objective; (4) Number of included studies; (5) Subjects; (6) Type of technology; (7) Study outcomes; and (8) Main findings. The results of data extraction are presented in Table 3.

Systematic Review Appraisal

The researchers conducted a review appraisal stage to reduce the possibility of bias using the AMSTAR 2 (Assessment of Multiple Systematic Reviews) checklist.[44] This assessment tool consists of a 16-item checklist with 6 critical domains: (1) Protocol: Was the protocol registered before the review began; (2) Literature search: Was the literature search adequate; (3) Study exclusion: Was the justification for excluding individual studies clearly stated; (4) Risk of bias: Was the risk of bias from the included studies considered; (5) Meta-analysis: Were appropriate methods used for the meta-analysis; and (6) Publication bias: Was the presence and likely impact of publication bias assessed.[44,45] The appraisal process was carried out independently by 2 reviewers (RL and AAD), who recorded any disagreements found and resolved them through discussion. The assessment of each systematic review was categorized into 4 levels: High (no or only 1 non-critical weakness), Moderate (more than 1 non-critical weakness), Low (1 critical weakness with or without non-critical weaknesses), and Critically low (more than 1 critical weakness with or without non-critical weaknesses).[44] The interpretation of AMSTAR 2 results focused on the impact of the limitations mentioned above concerning the validity of the research. Systematic reviews without critical weaknesses produce results that are considered reliable and valid.[45]

Data Analysis

The researchers used a thematic analysis approach to analyze the data that had been obtained. This approach is suitable for analyzing secondary data because it provides access to a large amount of data without the need for a time-consuming data collection process.[46] The researchers carefully read the findings from the articles that met the criteria, created codes from those findings, classified the codes and analyzed them into sub-themes, and extracted themes from the identified sub-themes. The final stage involved interpreting the identified themes and linking them back to the research question. The lead researcher (RBS) consulted with the other researchers regarding the codes, sub-themes, and themes that had been developed. Any disagreements regarding the resulting themes were discussed until a consensus was reached by all team members.[47] The analysis results in the form of identified themes are presented in Table 4.

Table 3. Data Extractions.

Author/year	Type study	Review objectives	Number of participants	Subject	Type of technology	Outcome measure constructs	Findings
Steindal et al[21]	Systematic mixed studies	To critically appraise and synthesize the findings from studies that investigated patients' use of telehealth in home-based palliative care.	41/21,953	Cancer & Non Cancer patients	Telehealth	Patients' subjective and objective outcomes.	There are 4 analytical themes: potential for a support system and self-governance at home; visibility supports interpersonal relationship of care needs; optimized information to remote caring practices; technology, relationship, and complexity as perpetual obstacles in telehealth.
Pimentel-Parra et al[28]	Systematic review	To identify, critically appraise, and synthesize the available evidence on the effectiveness of digital health interventions improve the quality of life in breast cancer survivors.	4/1233	Breast cancer patients	eHealth	Quality of life	Compared to control care, there are positive relationship between eHealth use and improved quality of live in breast cancer survivor at extended/ permanent survival stage.
Xu et al[29]	Systematic review and meta-analysis	To integrate the overall effect of eHealth on cancer related fatigue, self-efficacy, and quality of life in cancer patients.	15/1938	Cancer patients	eHealth	Cancer related fatigue, self-efficacy, quality of life	eHealth resulted in small but statistically significant effect on cancer related tagigue, self-efficacy but not on quality of life. compared to usual care, eHealth based self management had a larger effect on fatigue.
Zheng et al[30]	Systematic review and meta-analysis	To systematically evaluate the effectiveness of telehealth intervention in reducing depression symptoms among patients post stroke.	10/788	Stroke patients	Telehealth	Depression	Telehealth intervention did not effectively improve depression symptoms among patients post stroke but it is effective way to improve anxiety symptoms among patients post stroke.
Zhao et al 2024[31]	Systematic review and meta-analysis	To assess the effectiveness of applying digital health palliative care to improving physical symptoms, psychological functioning, and quality of life in patients with advanced cancer.	20/3978	Cancer patients	Digital health	Symptoms, mood, and quality of life	Compared with control care, digital health effective improving symptoms and reducing intensity of pain in patient with advanced care but no effective improvement in depressive, anxiety, and quality of life.
Peng et al 2022[32]	Systematic review and meta-analysis	To identify the effect of telehealth based exercise interventions on the physical activity of patients with breast cancer.	9/7638	Breast cancer patients	Telehealth	Physical activity	Compared with control care, telehealth based exercise intervention improved physical activity, physical performance, fatigue, and quality of life of patients with breast cancer.
Li et al 2021[33]	Systematic review and meta-analysis	To evaluate the effects of telehealth interventions on cancer survivors' quality of life and compare the effectiveness of different types.	28/12,037	Cancer patients	Telehealth	Quality of life	Compared with control care, telehealth interventions can improve the level of quality of life among cancer survivors.
Liang et al 2024[34]	Systematic review and meta-analysis	To assess the effectiveness of telemedicine and mHealth interventions in managing blood pressure in stroke patients.	13/3215	Stroke patients	Telemedicine and mHealth	Blood pressure	Compared with control care, telemedicine and mHealth improved control of both systolic and diastolic blood pressures, also improved medication adherence in stroke patients.
Yang et al 2024[35]	Systematic review and meta-analysis	To evaluate the impacts of telemedicine on the burden, anxiety, depression, and quality of life of informal caregivers of patients in palliative care.	9/5456	Informal caregiver caring for patients with advanced stage or stage 4 diseases.	Internet, applications, telephone, video, or other telemedicine technologies	Caregiver burden, anxiety, depression, and quality of life	Compared with control care, telemedicine can alleviate the caregiving burden and anxiety of informal caregivers, but does not significantly reduce depression or improve their quality of life.
Holmen et al 2020[36]	Systematic mixed methods review	To identify and review the use of eHealth to communicate and support home-based pediatric palliative care and appraise the methodological quality of the published research.	7/1642	Children with palliative care needs.	eHealth	Experiences, perceptions, and effects of using eHealth.	Evaluating eHealth interventions in pediatric palliative care poses specific methodological and ethical challenges. eHealth to facilitate remote pediatric palliative care was acknowledged both as an intrusion and as a support at home. eHealth poses many possible advantages and can play an important role in home-based pediatric palliative care.

(continued)

Table 3. (Continued)

Author/year	Type study	Review objectives	Number of participants	Subject	Type of technology	Outcome measure constructs	Findings
Hayes Bauer et al 2024[37]	Systematic integrative review	To synthesize evidence on patients and families' perspectives on telepalliative care.	44/6185	Adult patients with palliative care needs.	Telepalliative	Perspectives on telepalliative care.	There are five themes result; the effect of the Covid-19 pandemic on telepalliative care, adding value for patients and families, synchronous and asynchronous telepalliative care, the integration of telepalliative care with other services and the tailoring and timing of telepalliative care.
Caputo et al 2023[38]	Systematic review	To identify studies investigating telemedicine based interventions for HNC patients to determine whether there is a consensus concerning the cost-effectiveness, clinical utility, and accessibility of this model for rehabilitation.	16/696	Head and Neck Cancer patients.	Telehealth	Self-management, knowledge, quality of life, physical symptoms , psychiatric symptoms, and cost.	Compared with control care, telehealth interventions had better effects on self-management and knowledge, quality of life, physical and psychiatric symptoms, and cost-efficient in the management of HNC patients.
Sarfo et al 2018[39]	Systematic review	To provide an updated systematic review on the efficacy of tele-rehabilitation interventions for recovery from motor, higher cortical dysfunction, and poststroke depression among stroke survivors.	22/1331	Stroke patients	Telemedicine, telecommunication, videoconferencing, tele-rehabilitation system, robot- assisted rehabilitation, and virtual and augmented reality therapy.	Activity daily living, motor function, quality of life, caregivers stress, satisfaction, and cognitive function.	Compared with control care, telerehabilitation interventions were associated with significant improvements in recovery from motor deficits, higher cortical dysfunction, and depression.
Tunnard et al 2022[40]	Systematic review	To identify and explore the components, acceptability and effectiveness of eHealth interventions for people with dementia, families and staff to support assessment and decision-making in care homes.	26/1988	Dementia patients	eHealth	Improve assessment and decision-making on care.	Use of eHealth interventions indicates an improvement in resident outcomes in appropriate prescribing and advance care planning. Staff knowledge, confidence, and wellbeing were also improved.
Kim et al 2023[41]	Systematic review and meta-analysis	To systematically review existing telenursing interventions for patients with colorectal cancer and determine the effects of such interventions on health-related quality of life and health care service utilization.	7/221	Colorectal Cancer patients.	Telenursing	Quality of life and health care service utilization.	Telenursing intervention did not different from usual care in terms of health-related quality of life while reducing readmission and emergency department visits.
Archer et al 2021[42]	Systematic review and narrative synthesis	To identify and synthesize the literature exploring the impact of all digital health interventions on the psychological outcomes of patients and families receiving pediatric palliative care.	3/2928	Patients and families receiving pediatric palliative care.	Digital health	Psychosocial	All studies looked at the psychological impact of telehealth interventions. Papers demonstrated fair or good quality reporting but had small sample sizes and varied designs.
Maguraushe and Ndlovu 2024[43]	Systematic review	To systematically review the existing literature to conceptualize the role of various key smart technologies in palliative care, and their benefits and make recommendations on how smart technologies can enhance healthcare in palliative care.	19/1358	Chronical illness patients	Telemedicine, wearables, mobile apps.	Patient satisfaction, management of symptoms, and quality of life.	Smart technologies enhance the quality of life and efficiency of palliative care. They reduce hospital visits and carer stress by improving patient doctor communication, enabling remote monitoring, and forecasting health outcomes.

Table 4. Themes, Subthemes, Codes.

Themes	Subthemes	Codes
The Impact of Telehealth on Patient and Family Well-Being	The effect of telehealth on quality of life	Improved quality of life No improvement in quality of life
	The effect of telehealth on physical symptoms	Decreased physical symptoms Increase the positive effects of physical activity Increase aerobic capacity Improved upper body function Increases muscle strength Reduces fatigue Improved systole and diastole blood pressure control Reduces pain intensity Recovery of motor function Decreased cancer related fatigue No improvement in limb function No improvement in ADL No effect on pain No effect on blood pressure
	The effect of telehealth on psychological symptoms	Decrease in fear Decrease in psychicological problems Decrease in depression Decrease in anxiety Increased peace of mind Stress reduction Decrease in cancer patient pressure Does not increase depression Does not affect depression Does not affect anxiety
	Improvement of patient and family well-being	Improving support systems Building supportive relationships Supporting families to increase control Increased family empowerment Provides support for patients and families Meeting patient and family needs Reduces caregiver burden Reduces caregiver anxiety Does not affect caregiver depression
	Improvement of self-management	Improved self-efficacy Improved medication adherence Supports the child to be more autonomous Improved medication adherence Increased patient confidence
Optimization of Telehealth in Home Based Palliative Care	Improvement of Interpersonal communication	Improved contact with healthcare professionals Supports interpersonal relationships Improved clear communication Improved patient-healthcare professional communication
	Improvement of patient knowledge	Improved understanding of care needs Improved patient understanding of their disease Improved patient understanding of symptoms Sharing information Providing information
	The use of telehealth in alignment with palliative care goals	Improving comfort Symptom detection Provide symptom management care for patients and families
	Improvement of the quality of home based palliative care	Saves time Facilitates home care Cost-efficiency Precise drug prescription Better follow-up care planning Reduced hospitalization Improved efficiency of palliative care Remote monitoring Improve palliative team effectiveness Improve access to health services Reduce errors

Results

Review Selection and Characteristics of Studies

The electronic database search identified a total of 1352 articles, with 148 duplicates. After title screening, 1199 articles were excluded, and 153 articles were included. Following abstract screening, 17 articles met the eligibility criteria and were included in the study. The article selection process followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension (PRISMA) guidelines.[48] The article selection process is illustrated in Figure 1.

Overall, 47% (n = 8) of all studies were Systematic Review and Meta-Analysis studies,[29-35,41] 29.4% (n = 5) were Systematic Review studies,[28,38-40,43] 11.8% (n = 2) were Systematic Mixed Studies Reviews,[21,36] 5.9% (n = 1) was a Systematic Integrative Review study,[37] and 5.9% (n = 1) was a Systematic Review and Narrative Synthesis study.[42] The total number of participants from 13 studies was 24,011.[21,28-36,38,39,41] Four other studies did not report the number of participants.[37,40,42,43] Regarding the focus of the reviews, 12 reviews focused on adult patients and/or their family members.[21,28-34,37-39,41] Two reviews focused on pediatric patients and/or their family members and/or caregivers and/or health care professionals.[36,42]

Regarding patients' illnesses, 7 reviews included patients with cancer conditions.[28,29,31-33,38,41] Five reviews focused on both cancer and non-cancer conditions,[21,35-37,43] 3 reviews on stroke,[30,34,39] 1 review on dementia,[40] and 1 review on pediatric palliative care (which did not specify patients' illness conditions).[42] Regarding the type of technology, 5 reviews used Telehealth.[21,30,32,33,38] One review specifically used Telepalliative.[37] Three reviews used Telemedicine.[34,35,39] One review used Telenursing.[41] Three reviews used Digital Health.[31,42,43] Four other reviews used e-Health.[28,29,36,40]

Quality of Evidence

The AMSTAR 2 critical appraisal tool was used for the systematic reviews, and only 1 review was rated as high quality,[31] while 7 reviews were rated as moderate quality.[28,33-35,38,40,42] Nine other reviews had 1 or more weaknesses in the critical items as detailed in the methods section above. The results of the critical appraisal are presented in Table 5.

The Impact of Telehealth on Patient and Family Well-Being

The effect of telehealth on quality of life. There were 11 out of 17 articles that reviewed the effect of telehealth use on the quality of life of patients with terminal conditions. The results showed that 6 articles reported a positive effect of telehealth use on patients' quality of life.[28,32,33,38,41,43] All positive results were found in articles with cancer patients as subjects. The review results indicated that telehealth had a greater impact on the quality of life of breast cancer patients compared to other types of cancer.[33] These results are in contrast with 5 articles that stated there was no effect of telehealth on quality of life in the intervention group.[29-31,35,42] Quality of life (QoL) is a multidimensional variable influenced by various factors; therefore, no direct results were obtained from the telehealth intervention on QoL.[29]

The effect of telehealth on physical symptoms. The physical symptoms experienced by patients varied, as this review involved patients with cancer, stroke, dementia, heart disease, and terminal illness in children. In general, patients experienced a reduction in physical symptoms, motor recovery, and improvement in physical function.[28,32,38,39] This improvement was associated with the positive effects of physical activity, increased aerobic capacity, and improved muscle strength.[32] Results in cancer patients also showed a reduction in fatigue, which is the most commonly reported symptom among cancer patients.[29,32] Another symptom experienced by cancer patients is severe pain. With the use of telehealth, there were 2 different review results: 1 review showed a reduction in pain intensity,[31] while the other showed no effect on pain.[32] Other patients with stroke showed results of motor function recovery[39] as well as an improvement in systolic and diastolic blood pressure control.[34] However, this did not affect cancer patients; the review results showed that telehealth had no impact on blood pressure.[32]

The effect of telehealth on psychological symptoms. Seven articles examined the impact of telehealth on psychological conditions in palliative care. Depression, psychological distress, anxiety, stress, and fear are conditions that may occur in patients with terminal illnesses.[28,30,31,41,43] Telehealth was effective in reducing psychological problems or stress and in increasing calmness in patients.[28,42,43] Patients with terminal conditions are vulnerable to experiencing fear about their condition, and the presence of telehealth can reduce fear and the burden of their illness.[28] Depression is a psychological issue that is frequently reviewed because it is related to the quality of life of patients. Five articles reviewed the effect of telehealth on depression in patients. The results showed a decrease or absence of depression during care using telehealth.[28,41] Other results showed that telehealth did not affect depression.[30,31,39] Anxiety is also an outcome measured in several articles related to the psychological symptoms of terminal patients.[28,30,31,41] The review results showed that the presence of telehealth could reduce anxiety in patients with terminal conditions because patients became more aware of their condition, which made them feel calmer.[28,30,41] Other results in stroke patients showed the recovery of cortical dysfunction in the intervention group. This could help improve aphasia and spatial neglect through a telerehabilitation program.[39]

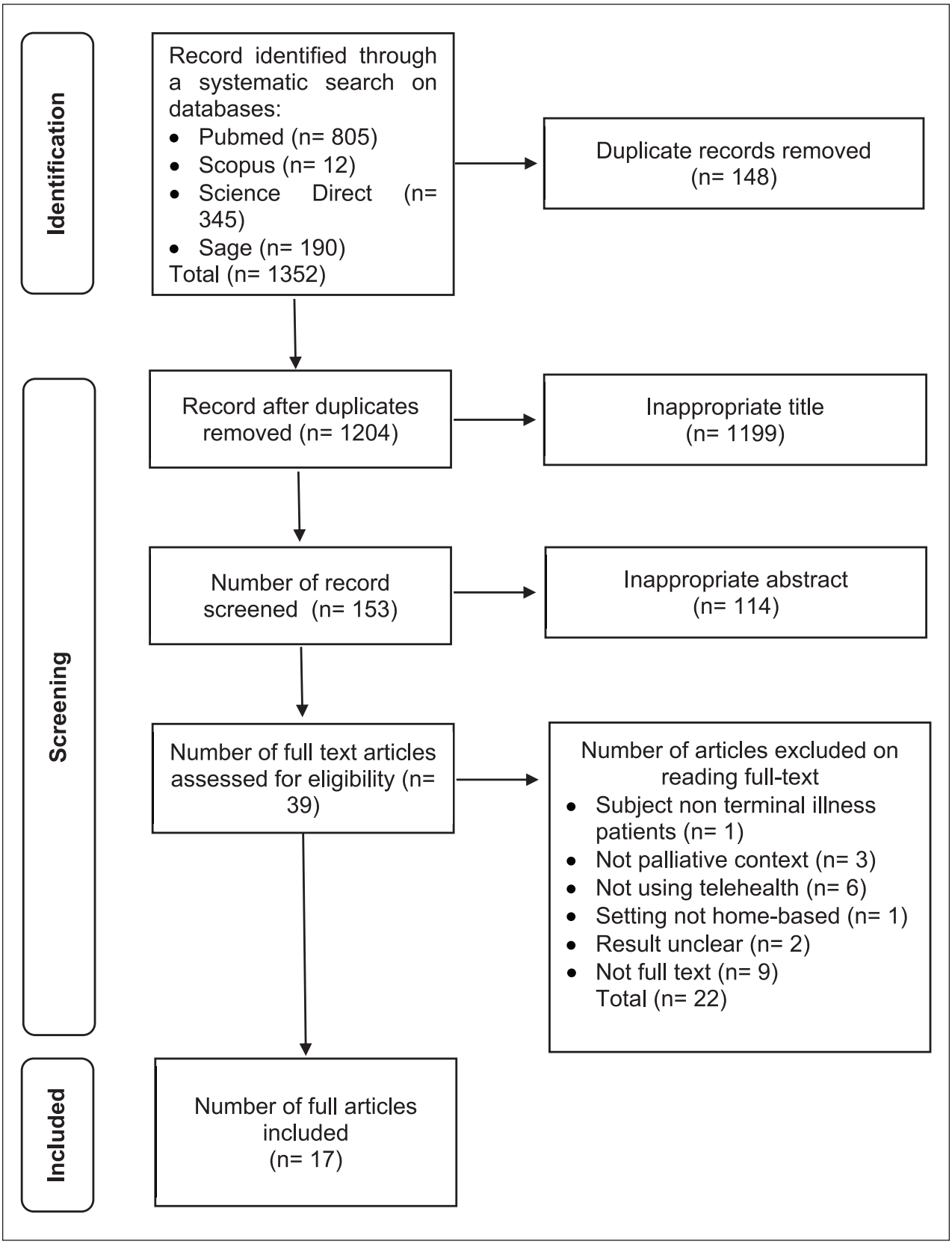

Figure 1. PRISMA flow diagram, preferred reporting items for systematic reviews and meta-analysis.

Table 5. AMSTAR-2 Ratings for Included Systematic Review Displayed as Risk of Bias.

Author/year	1.PICO components	2.Protocol Statement	3.Study design explanation	4.Search strategy	5.Duplicate study selection	6.Duplicate study extraction	7.List of excluded studies	8.detail included studies	9.RoB Assessment	10.Study funding source	11.Appropriate meta-analysis	12.Impact of RoB on MA results	13.Discussion of RoB impact	14.Heterogeneity discussion	15.Reporting of publication bias	16.Reporting of conflict of interest	AMSTAR Assessment
Steindal et al. 2023	Y	PY	Y	Y	Y	Y	PY	Y	PY	N	NM	NM	Y	Y	NM	Y	LOW
Parra et al. 2023	Y	Y	Y	Y	Y	Y	PY	Y	Y	Y	NM	NM	Y	Y	NM	Y	Moderate
Xu et al. 2019	Y	Y	Y	Y	Y	Y	PY	PY	Y	Y	Y	Y	Y	Y	N	Y	Critically low
Zheng et al. 2023	Y	Y	Y	Y	Y	Y	PY	Y	Y	Y	Y	Y	Y	Y	N	Y	LOW
Zhao et al. 2024	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	High
Peng et al. 2022	Y	Y	Y	PY	Y	Y	PY	Y	PY	Y	Y	Y	Y	Y	N/A	Y	LOW
Li et al. 2021	Y	Y	Y	Y	Y	Y	PY	Y	Y	Y	Y	Y	Y	Y	Y	Y	Moderate
Liang et al. 2024	Y	Y	Y	Y	Y	Y	PY	Y	Y	Y	Y	Y	Y	Y	Y	Y	Moderate
Yang et al. 2024	Y	PY	Y	Y	Y	Y	PY	Y	Y	Y	Y	Y	Y	Y	Y	Y	Moderate
Holmen et al. 2020	Y	Y	Y	Y	Y	Y	PY	Y	Y	PY	NM	NM	Y	Y	NM	Y	LOW
Bauer et al. 2024	Y	Y	Y	Y	Y	Y	PY	Y	PY	Y	NM	NM	Y	Y	NM	Y	LOW
Caputo et al. 2023	Y	Y	Y	Y	Y	Y	PY	Y	Y	Y	NM	NM	Y	Y	NM	Y	Moderate
Safro et al. 2018	Y	N	Y	Y	Y	Y	PY	Y	PY	PY	NM	NM	Y	Y	NM	Y	Critically low
Tunard et al. 2022	Y	Y	Y	Y	Y	Y	PY	Y	Y	Y	NM	NM	Y	Y	NM	Y	Moderate
Kim et al. 2023	Y	Y	Y	Y	Y	Y	PY	Y	Y	Y	Y	Y	Y	Y	N/A	Y	LOW
Archer et al. 2021	Y	Y	Y	Y	Y	Y	PY	Y	Y	Y	NM	NM	Y	Y	NM	Y	Moderate
Maguraushe et al. 2024	Y	N	Y	Y	Y	Y	PY	Y	PY	Y	NM	NM	Y	Y	NM	Y	LOW

Note. MA = meta-analysis; N = No; N/A = not applicable; NM = no meta-analysis; PY = partial yes; RoB = risk of bias; RCT = randomized controlled trial; Y = yes.

Improvement of patient and family well-being. Well-being is one of the outcomes that needs to be measured in palliative care. The improvement of patient well-being can be built by strengthening the support system, establishing supportive relationships, and providing support for both patients and families.[21,37,40] Well-being is not only focused on the patient; in palliative care, it is also necessary to improve the well-being of the family or caregiver. Telehealth can improve family well-being by reducing the caregiver's burden in patient care.[35,43] Anxiety also appeared to decrease in family members due to the use of this technology.[35] The presence of telehealth can support families in improving control over patient care and actively involving or empowering families in the care process.[36,42] The well-being achieved by both patients and families is a result of telehealth's ability to meet the needs of patients and families in the care provided.[37,41]

Improvement of self-management. From the 5 reviewed articles, good self-management was shown in terminal patients who integrated telehealth into their care.[29,34,36,38,40] Self-efficacy was a positive point for patients after using telehealth.[29] Medication adherence is 1 important aspect of self-efficacy, which showed improved activity in stroke patients.[34,38] In pediatric patients, telehealth was able to enhance autonomy or help children become independent in their care.[36] Another result was an increase in self-confidence among patients with dementia.[40]

Optimization of Telehealth in Home-Based Palliative Care

Improvement of interpersonal communication. Palliative care using telehealth is highly beneficial for implementation in a home-based setting. Three articles discussed the improvement of coordination and communication in such care.[21,42,43] Telehealth can enhance communication between patients and healthcare providers.[21,42] With this technology, communication becomes clearer and can strengthen interpersonal relationships between patients and healthcare professionals.[21,43]

Improvement of patient knowledge. The implementation of telehealth in palliative care has been proven to improve patient knowledge.[40] In telehealth, some features provide information about the disease or appropriate care for the patient.[36,37] With these features, patients can improve their understanding of their illness, the symptoms they experience, and the needs required in their care.[21]

The use of telehealth in alignment with palliative care goals. The results of 4 reviewed journals showed that the use of telehealth in palliative care is relevant to the goals of palliative care itself.[21,31,37,41] Comfort is an important aspect of palliative care. The review results showed an increase in comfort among patients in the intervention group compared to the control group.[21,37] Symptoms are also an important aspect to consider because the focus of palliative care is to manage patients' symptoms. The review results showed that the use of telehealth has been proven to improve or effectively manage symptoms in patients.[21,31,37,41] It can be concluded that the use of telehealth is in accordance with the goals of palliative care, which are to improve comfort and symptom management in patients.

Improvement of the quality of home-based palliative care. The use of telehealth is appropriate in the setting of home-based palliative care because it offers various benefits that can improve the quality and efficiency of palliative care.[43] The first result is that it can facilitate care at home, as terminal patients often have difficulty with mobility,[37] which automatically reduces hospital admissions, or visits.[40,41,43] However, this is not a reason for patients to be deprived of care; 1 article showed that the presence of telehealth can improve access to healthcare services.[43] Another benefit is that it can save time because the process is carried out digitally,[37] and healthcare professionals can also monitor remotely.[43] Another review result showed that care planning becomes better because medication prescriptions can be made accurately and errors can be reduced since everything is well documented in the application.[40,43] Another benefit is that patients can save expenses compared to hospital-based care.[38] It can be concluded that the presence of telehealth can improve the quality of home-based palliative care and enhance the effectiveness of the palliative care team.[43]

Discussion

Main Findings

This umbrella review provides a comprehensive assessment and updated evidence on the effectiveness of telehealth use on the quality of care and the quality of life of terminal patients in home-based palliative care. However, high-quality evidence regarding the effectiveness of telehealth remains limited. Results from 293 clinical trials involving 24,011 participants suggest that telehealth can be effective in improving various outcomes, including the improvement of care quality and the quality of life of palliative patients. Other positive impacts were also reported in aspects such as patient and family satisfaction, symptom management, and the reduction of healthcare professionals' workload. The majority of the methodological quality of the existing systematic reviews investigating the effects of telehealth on the quality of care and quality of life of patients was rated as low when assessed using AMSTAR-2. Although the need for more rigorous methodology is evident, the use of telehealth has shown positive results in terms of care quality, improved well-being, improved quality of life, reduced physical and psychological symptoms, and the ability to cope with their illness.

The findings from this review highlight the influence of telehealth use on the quality of life of patients with terminal conditions. Most of the subjects who experienced an improvement in quality of life were cancer patients. Telehealth is effective in monitoring patient conditions, providing services with specialists, and offering palliative care consultations. Statistical improvements in quality of life and symptom management were reported. Two-thirds of the study results showed positive experiences among patients, families, and service providers. During initial visits, patients also reported positive experiences with the use of telehealth in outpatient palliative care.[49] Monitoring symptoms remotely facilitates pain management planning and the overall improvement of physical well-being. By using telehealth, patients and families can be empowered to participate in their care.[15] The provision of palliative care at home also offers emotional and spiritual support that can be integrated into telehealth.[50] Other research findings show that telehealth can improve timely access to palliative care, enhance symptom management and patient satisfaction, provide patient-centered care, and reduce travel costs and in-person visits.[51] These reasons indicate the positive influence of telehealth on the quality of life of patients.

Improving quality of life can be achieved by managing the physical and psychological symptoms of patients with terminal illnesses. Terminal patients may experience physical, psychological, social, cognitive, spiritual, and financial problems.[52] In the physical aspect, telehealth can reduce symptoms such as pain, fatigue, and motor dysfunction by providing continuous monitoring and remote rehabilitation support that encourages physical activity.[53] Telehealth-based physical exercise is effective in improving aerobic capacity, muscle strength, and upper body function. These results are attributed to increased patient physical activity, which in turn enhances physical performance.[32] In the case of cancer patients, telehealth has been proven effective in reducing fatigue levels, and several studies reported variations in the reduction of pain intensity.[32,53] Meanwhile, in stroke patients, there was recovery of motor function and improvement in blood pressure control through self-monitoring and access to virtual training to support motor exercises at home, which were easy for patients' families to understand.[54-56]

In the psychological aspect, emotional support and education using telehealth have been proven effective in reducing stress, anxiety, and fear that are often experienced by patients with terminal conditions.[57] Easy access to online contact with healthcare professionals makes patients feel calmer when their complaints can be directly communicated to healthcare providers and receive an immediate response. The effect on depression showed varying results; some studies reported a decrease or stability in depression levels,[57,58] while other studies found no significant changes.[59] In stroke patients, telerehabilitation has a positive and effective impact on recovering cognitive impairments because families and patients can easily access training guidelines that can be directly implemented at home.[60] With these various benefits, telehealth becomes an innovative solution for improving patients' quality of life and expanding access to healthcare services, especially for patients with limited mobility or those living in remote areas.[61]

Telehealth also has the potential to improve patients' health conditions and access to care across various aspects of their lives.[62] Its convenience and adaptability make telehealth contribute to patient engagement and adherence to care plans.[63-65] The implementation of telehealth in palliative patient care must be carried out holistically while taking into account an appropriate healthcare system.[66] The healthcare system is divided into 3 levels: micro (patient environment), meso (interactions between units), and macro (community support).[67] Telehealth supports the holistic well-being of patients at all levels. At the micro level, telehealth fulfills the values of participation, protection, and safe care. At the meso level, telehealth provides care according to the patient's needs, while at the macro level, the community plays a role in providing infrastructure and resources for the implementation of telehealth.[68]

In addition to helping improve the well-being of patients, telehealth also helps enhance the well-being of informal caregivers, including family members, by reducing caregiving burden, and lowering anxiety. Caregiving burden consists of both subjective and objective burdens. Subjective burden refers to physical, emotional, social, and economic challenges experienced by families as a result of caring for palliative patients, while objective burden includes the time and number of tasks required to care for the patient.[69] Telehealth provides access to health education, assists in decision-making, problem-solving, and offers social support, as well as helps families manage resources and time more efficiently.[35] Telehealth reduces family anxiety by meeting informational needs, increasing confidence, and supporting patient care. In addition to health education, telehealth also offers support through interpersonal relationships, stress management training, access to assistance, self-care, and decision-making support.[70]

Overall, self-management is a factor that affects the use of telehealth in the context of palliative care, as found in this review. Self-management refers to a collaborative effort between patients and families in managing symptoms, treatments, and addressing the psychosocial, cultural, and spiritual aspects of the patient.[71] The implementation of self-management strategies in palliative care has been proven to reduce the burden on patients and improve their quality of life.[72] Previous research findings show that telehealth based on self-management has a positive impact on achieving behavioral goals, emotional conditions, mobility, clinical outcomes, and the level of acceptance among stroke patients.[73] In addition, the results of this review also indicate an improvement in the quality of care through the implementation of telehealth. This quality improvement can be evaluated through various dimensions, such as technological

capacity, diagnostic accuracy, the impact of diagnosis and therapeutic interventions, and patient clinical outcomes. The factors contributing to this quality enhancement include better service accessibility, more affordable costs, and a high level of satisfaction from both patients and healthcare professionals regarding the services provided.[74]

Advantages of This Study

This review is the only umbrella review that investigates the use of telehealth in home-based palliative care. Although there have been many studies on the use of telehealth in this context, no umbrella review has specifically addressed this topic. The article search process in this umbrella review was conducted systematically, resulting in 17 articles obtained from 4 databases. These articles were critically appraised using the AMSTAR-2 checklist to assess their eligibility and quality. The results of this review show that the use of telehealth in home-based palliative care contributes to improving the quality of life of patients with terminal conditions. These findings are supported by several sub-themes, such as the impact on physical and psychological symptoms, improvement in the well-being of patients and families, and enhancement of self-management. In addition, this review also identified an additional outcome in the form of the optimization of telehealth, which includes strategies to improve care quality through the enhancement of home-based service quality.

Limitation of This Study

First, the terminology related to palliative care and home-based care is very broad; thus, there is a possibility that some literature was missed during the screening process. Second, the researchers set outcomes in the form of patients' quality of life and the quality of home-based palliative care services. However, none of the selected articles explicitly mentioned both topics in their titles. Third, the researchers did not specify the study subjects, so the results obtained were generalized to patients with terminal conditions without referring to any particular disease. Fourth, efforts to minimize bias were made using AMSTAR-2. However, based on the results of the critical appraisal, only 1 out of 17 studies was categorized as high quality, while 7 out of 17 studies were of moderate quality. This low proportion of high-quality evidence may reduce the overall strength and reliability of the study's conclusions. Future research should prioritize including higher-quality systematic reviews to strengthen the validity and applicability of findings.

Implication for Clinicians and Health Policy Makers

This study shows that the use of telehealth in home-based palliative care has a significant impact on clinicians and health policy makers. For clinicians, the implementation of telehealth enables real-time patient monitoring, more responsive symptom management, and improved care coordination, which can potentially reduce the frequency of in-person visits to healthcare facilities. Meanwhile, for policymakers, these findings highlight the need to develop regulatory frameworks that support the integration of digital technology into the healthcare system, invest in telecommunications infrastructure, and provide specialized training for medical personnel to optimize the use of telehealth. These efforts can not only improve service efficiency and care quality but also contribute to reducing overall healthcare costs and increasing access to palliative care services for populations in need.

Implications for Research

This study highlights various opportunities for further research in the field of telehealth within the healthcare sector. More in-depth studies are needed to explore the long-term effectiveness of telehealth in improving the quality of life of palliative patients, including aspects of patient and family satisfaction, symptom management, and its impact on healthcare professionals' workload. Importantly, to strengthen the validity and reliability of future reviews, researchers should prioritize the inclusion of high-quality primary studies and employ rigorous appraisal methods. This will ensure that subsequent findings offer more robust and actionable insights for practice and policy development. In addition, further research should also assess the gaps in access to telehealth, particularly for populations with limited access to technology or those living in remote areas. Evaluations of ethical considerations, data security, and the sustainability of telehealth service funding are also important aspects that need to be studied further. With more comprehensive research, the implementation of telehealth can be continuously refined to achieve more optimal outcomes for patients, families, and the healthcare system as a whole.

Conclusion

This umbrella review highlights the use of telehealth in home-based palliative care, which shows a positive impact on the well-being of patients and families. These benefits include improved quality of life, better management of physical and psychological symptoms, and enhanced self-management ability. Quality of life is a key aspect of palliative care. The findings of this review show that the use of telehealth can improve patients' quality of life by optimizing symptom management, enhancing physical function, and reducing complaints in terminal patients. In addition, these findings also emphasize the importance of optimizing telehealth in home-based palliative care. This optimization can be carried out through improved interpersonal communication, increased patient understanding of their illness, alignment with palliative care goals, and enhanced service quality. However, future studies should establish more specific

inclusion criteria regarding particular types of diseases so that the results can be more accurately applied to those patient groups. In addition, further research is needed to explore the effectiveness of telehealth in other settings, such as hospital-based or hospice palliative care.

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Ethical Approval

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