

BMJ Open Emergency medical services and palliative care: a scoping review

Caleb Hanson Gage ¹, Charnelle Stander,¹ Liz Gwyther,² Willem Stassen ¹

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¹Division of Emergency Medicine, University of Cape Town Faculty of Health Sciences, Observatory, Western Cape, South Africa

²Division of Interdisciplinary Palliative Care and Medicine, University of Cape Town Faculty of Health Sciences, Observatory, Western Cape, South Africa

Correspondence to

Caleb Hanson Gage;
caleb.gage@gmail.com

ABSTRACT

Objectives The aim of this study was to map existing emergency medical services (EMS) and palliative care literature by answering the question, what literature exists concerning EMS and palliative care? The sub-questions regarding this literature were, (1) what types of literature exist?, (2) what are the key findings? and (3) what knowledge gaps are present?

Design A scoping review of literature was performed with an a priori search strategy.

Data sources MEDLINE via Pubmed, Web of Science, CINAHL, Embase via Scopus, PsycINFO, the University of Cape Town Thesis Repository and Google Scholar were searched.

Eligibility criteria for selecting studies Empirical, English studies involving human populations published between 1 January 2000 and 24 November 2022 concerning EMS and palliative care were included.

Data extraction and synthesis Two independent reviewers screened titles, abstracts and full texts for inclusion. Extracted data underwent descriptive content analysis and were reported according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for scoping reviews guidelines.

Results In total, 10 725 articles were identified. Following title and abstract screening, 10 634 studies were excluded. A further 35 studies were excluded on full-text screening. The remaining 56 articles were included for review. Four predominant domains arose from included studies: (1) EMS' palliative care role, (2) challenges faced by EMS in palliative situations, (3) EMS and palliative care integration benefits and (4) proposed recommendations for EMS and palliative care integration.

Conclusion EMS have a role to play in out-of-hospital palliative care, however, many challenges must be overcome. EMS provider education, collaboration between EMS and palliative systems, creation of EMS palliative care guidelines/protocols, creation of specialised out-of-hospital palliative care teams and further research have been recommended as solutions. Future research should focus on the prioritisation, implementation and effectiveness of these solutions in various contexts.

INTRODUCTION

Emergency medical services (EMS) and palliative care function with unique respective aims. EMS are designed to preserve life and limb in out-of-hospital emergency situations by immediate intervention and hospital conveyance.^{1 2} Palliative care is, according

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ A thorough search string was piloted and employed in conjunction with a wide range of databases, meeting recommendations for optimal combinations and providing a comprehensive view of contemporary literature.
- ⇒ The performance and report of this review was completed according to the quality standards of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for scoping reviews guidelines.
- ⇒ Limitations to this review include those common to scoping reviews such as human error in article selection.
- ⇒ A formal risk of bias assessment was not performed; therefore, data reliability lacks evaluation.

to the WHO, 'an approach that improves the quality of life (QoL) of patients and their families facing the problem associated with life-threatening illness, through the prevention and relief of suffering by means of early identification and impeccable assessment and treatment of pain and other problems, physical, psychosocial and spiritual'.³ This includes a variety of situations such as chronic/life-limiting illnesses, end-of-life (EoL) care and any condition (physical, psychosocial, spiritual) causing suffering.³ Thus, the EMS approach is curative, whereas the palliative approach is supportive.

Despite these seemingly conflicting approaches, EMS and palliative care often intersect.⁴⁻⁷ As they progress towards EoL, patients with palliative needs experience worsening symptoms for which EMS are often contacted.^{8 9} Furthermore, the role of EMS has expanded in recent years to include more intricate forms of healthcare beyond emergency care such as community-based primary care and palliative care.¹⁰ Global ageing populations and subsequent increases in chronic non-communicable diseases are well-documented reasons for this expanded role as demand for palliative care rises and EMS are more frequently confronted with these patients.¹¹

Contemporary EMS and palliative care literature recommends integration between the two fields to improve palliative care provision as their differing aims may, in fact, complement one another.¹² Nevertheless, a lack of integration persists. Typically, EMS are not trained in palliative care nor do palliative care systems make formal use of EMS to deliver care.¹³ This results in disregarding of patient autonomy, performance of aggressive, futile interventions and overall poor management of those requiring a palliative approach to care by EMS providers.¹²⁻¹⁴ However, should the two fields integrate, potential benefits include early palliative care delivery, provision of homecare, respect for patient autonomy, improved patient and family satisfaction, confidence and quality of life (QoL), decreased healthcare costs and setting correct trajectories of care.^{5 15 16}

Given the growing body of EMS and palliative care literature, and potential integration benefits, a need exists to review current evidence. Previous reviews have focused on singular aspects such as specialised community paramedic roles in the provision of palliative care in patient homes,¹¹ however, a more extensive review of EMS in the broader out-of-hospital setting is lacking. Thus, this review aimed to map existing EMS and palliative care literature by answering the question, what literature exists concerning EMS and palliative care? The sub-questions regarding this literature were (1) what types of literature exist?, (2) what are the key findings? and (3) what knowledge gaps are present? For the purposes of this study, EMS are defined as those systems and personnel providing medical care in the out-of-hospital setting using ambulance-based services. The out-of-hospital setting includes all areas to which EMS may be called, from patient homes to any public space.

METHODS

Design

A scoping review of EMS and palliative care literature was performed, the protocol for which has been published previously,¹⁷ detailing the methodological framework of Arksey and O'Malley used for this review.¹⁸ The steps of this employed framework were (1) identifying the research question, (2) identifying relevant studies, (3) selecting eligible studies, (4) charting data and (5) collating, summarising and reporting results.¹⁸ The optional sixth step of expert consultation was not included as this review forms the first part of an overarching investigation in which expert consultation will be subsequently performed. As this review aimed to simply map existing literature, in-depth quality appraisal of eligible studies was not performed, though limitations were noted.

Search strategy and eligibility criteria

An a priori search strategy, developed in line with the recommendations of Aromataris and Riitano, was used.¹⁹ This strategy employed keyword combinations and their synonyms (see online supplemental material 1).

The following databases were originally searched on 28 September 2021 with an updated search on 24 November 2022: MEDLINE via Pubmed, Web of Science, CINAHL, Embase via Scopus and PsycINFO. The University of Cape Town Thesis Repository and Google Scholar were searched to identify grey literature. These databases met the recommendation of Bramer *et al* for optimal database combinations.²⁰ Furthermore, Embase, CINAHL and PsycINFO provided access to unique palliative care literature not indexed in MEDLINE as highlighted by Tieman *et al*.²¹ Additional articles were sought from hand-searching reference lists of eligible studies. This search strategy was piloted to ensure appropriateness of keyword combinations in the selected databases.

Eligible studies were selected based on the following criteria:

- Inclusion: empirical, English studies involving human populations published between 1 January 2000 and 24 November 2022 concerning EMS and palliative care. The EMS and palliative care interface was the primary focus for eligibility.
- Exclusion: studies involving the in-hospital setting, including emergency departments (EDs), those where the full text was unobtainable, editorial and discussion articles, opinion papers and studies involving exclusively EMS or palliative care.

Data management

All identified studies were uploaded to Mendeley reference software²² and duplicates removed. Remaining studies were exported to the Rayyan web application²³ where two authors (CHG, CS) independently screened titles and abstracts for inclusion. CHG and CS then screened the full texts of included studies for final inclusion in the review. Agreement achieved between authors was >99%. On discussion, complete agreement was reached for all studies. This process was overseen by LG and WS. All authors agreed on the final inclusion list.

Data extraction and analysis

An a priori data extraction matrix was used to gather the following data from each included study which were charted by CHG using Microsoft Word (Microsoft Corporation, Redmond, Washington, USA): title, authorship, publication year, setting, including country income status divided into high-income countries (HICs) and low-to-middle income countries (LMICs), aims, population and sample, EMS palliative care training, methodology, conclusions, significant findings, limitations. To ensure consistency in application of this extraction matrix, CS double coded 10% of included articles. In line with the recommendations of Arksey and O'Malley, extracted data underwent basic numerical analysis concerning the distribution of studies and descriptive content analysis where the literature was organised according to major domains.¹⁸ These domains were identified through an inductive-dominant approach. Findings are presented in accordance with the Preferred Reporting Items for

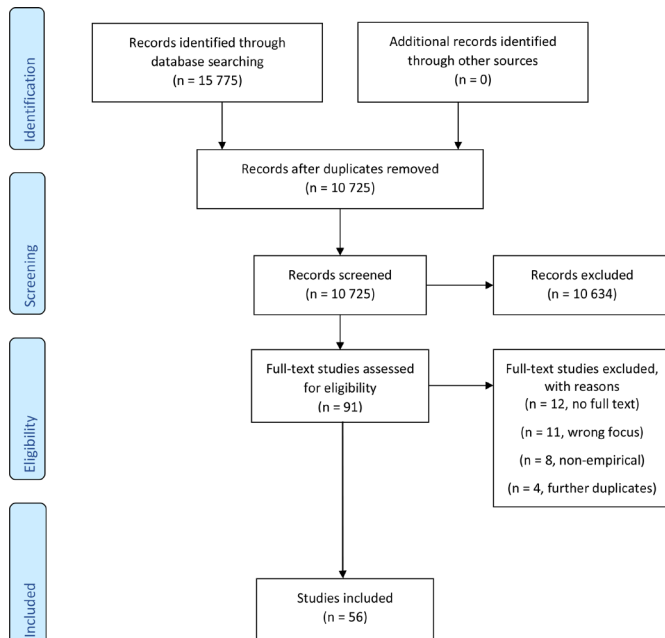


Figure 1 PRISMA selection process flow diagram.²⁵ PRISMA, Preferred Reporting Items for Systematic Reviews and Meta-Analyses.

Systematic Reviews and Meta-Analyses extension for scoping reviews.^{24 25}

Patient and public involvement

No patients were involved in this study.

RESULTS

After duplication removal, 10 725 studies were identified. Following title and abstract screening, 10 634 studies were excluded. A further 35 studies were excluded on full-text screening. Of the full-text exclusions, 12 full texts were unavailable, the EMS and palliative care interface was not the primary focus in 11 studies, 8 studies presented non-empirical evidence and the remaining 4 studies were previously undetected duplicates. Hand-searching of included reference lists revealed no further studies. No grey literature fitting inclusion criteria was identified. In total, 56 studies were included for analysis. **Figure 1** details the selection process while a summary of included studies is provided in online supplemental material 2.

Study characteristics

Included studies were performed in the USA (n=16),^{16 26–39} the UK (n=9),^{7 14 40–46} Germany (n=10),^{8 47–55} Australia (n=8),^{2 4 11 56–60} Canada (n=4),^{15 61–63} France (n=1),⁵ Switzerland (n=1),¹³ New Zealand (n=2),^{64 65} Finland (n=2),^{66 67} Czech Republic (n=1),⁶⁸ Brazil (n=1)⁶⁹ and South Africa (n=1)¹⁶ between 2002 and 2022. The majority of studies (96%, n=54) were performed in HICs with only Brazil and South Africa representing LMICs, and most (63%, n=35) were published between 2018 and 2022.

Methodologically, most studies were quantitative (55%, n=31) while the remainder used a

qualitative (27%, n=15) or mixed-methods (18%, n=10) approach. Quantitative studies comprised of surveys (n=12),^{1 8 30 32 38 41 43 48 49 51 56 58} retrospective cohorts (n=9),^{5 33 34 40 52 54 55 57 66} literature reviews (n=5),^{11 46 61 64 68} case series/reports (n=3),^{6 13 35} a pre-intervention and post-intervention study (n=1)²⁹ and a prospective cohort (n=1).⁸ Qualitative studies contained individual interviews (n=12),^{7 14 16 26–28 31 42 44 47 65 69} focus group interviews (n=2)^{2 63} and deliberative dialogues (n=1),⁶² while the mixed-methods studies^{4 15 36 37 39 45 50 59 60 67} made use of various survey and interview combinations.

EMS providers were the primary population in most studies (52%, n=29)^{1 2 4 7 8 14 16 26–31 36–39 41 43–45 47–49 51 56 58 67 69} including paramedics, doctors and nurses involved in out-of-hospital emergency care dependant on EMS system model: paramedic-led (Anglo-American), physician-led (Franco-German).¹¹ Other investigations were performed using patient records (n=10),^{5 8 33 34 40 52 54 55 57 66} published literature (n=5),^{11 46 61 64 68} case reports/series (n=3),^{6 13 35} stakeholders and experts (n=3),^{42 50 62} mixed populations including patients, families, paramedics, caregivers, palliative providers and patient records (n=3),^{15 59 63} EMS agencies (n=2)^{32 60} and family caregivers (n=1).⁶⁵

Study categories were EMS provider knowledge and perspectives (54%, n=30),^{1 2 4 7 8 14 16 26–28 30 31 36–39 41–45 47–49 51 56 58 63 67 69} EMS–palliative integration (23%, n=13),^{5 6 15 29 32 34 35 40 50 59 60 62 66} EMS–palliative intersection (14%, n=8)^{8 13 33 52 54 55 57 65} and literature reviews (9%, n=5).^{11 46 61 64 68} Studies concerning EMS provider knowledge and perspectives vis à vis palliative care focused on EMS management and decision making (n=9),^{8 26 27 37 44 48 49 51 58} roles and barriers in palliative situations (n=11),^{2 14 16 28 31 42 43 45 47 63 69} understanding and education (n=6),^{1 4 30 38 39 67} identification of patients with palliative needs (n=2)^{36 41} and potential solutions to overcome barriers (n=2).^{7 56} Studies concerning EMS and palliative care integration focused on effects of integration on patient transport, patient/family satisfaction and EMS provider confidence (n=7),^{5 15 34 35 40 59 66} recommendations for integration (n=4)^{6 29 50 62} and EMS palliative care protocols (n=2).^{32 60} Studies concerning EMS and palliative care intersection focused on the characteristics and frequency of patients with palliative needs encountered by EMS providers (n=4),^{8 33 55 57} EMS provider treatment of these patients (n=3)^{13 52 54} and the experience of family caregivers.⁶⁵ Literature reviews focused on attitudes and perceptions of paramedics concerning EoL care (n=1),⁴⁶ EMS role in EoL care (n=1),⁶⁸ EMS palliative provision in community-based settings (n=1)¹¹ and rapid reviews of EMS and palliative care literature in Canada (n=1)⁶¹ and New Zealand (n=1).⁶⁴

Four predominant domains arose from included studies: (1) EMS' palliative care role, (2) challenges faced by EMS in palliative situations, (3) EMS and palliative care integration benefits and (4) proposed recommendations for EMS and palliative care integration.

EMS' palliative care role

Numerous studies (66%, n=37)^{1 2 6 8 11 14-16 26-28 31 34 35 37 41-46 48 51 53-55 57 59-61 63-69} discussed the potential role of EMS in palliative care. Most EMS providers viewed palliative care positively, regarding it as important to their role as demonstrated in studies performed in the UK,⁴³ Australia,⁵⁹ Canada¹⁵ and South Africa.¹⁶ The EMS's palliative care role was frequently highlighted due to the intersection between EMS and patients with palliative needs.^{8 54 57} For example, an Australian study found palliative situations comprised 0.5% (n=4348) of the annual EMS caseload.⁵⁷ Other studies, found palliative situations may represent up to 10% of caseload and most EMS providers had previously encountered palliative situations.^{8 47} Commonly documented reasons for EMS calls to palliative situations were sudden, unexpected patient deterioration, caregiver exhaustion and alarming signs and symptoms: dyspnoea, pain, convulsions, severe anxiety.^{15 26 47} These calls often occurred out-of-office hours or during holidays when the usual patient caregivers were unavailable.¹³ Specific EMS palliative care roles included complex care provision,⁶⁸ adjusting patient trajectory,¹⁶ decision-making within limited information environments,¹⁴ therapeutic interventions,⁵⁴ 24/7 availability, provision of homecare⁶⁶ and improving patient and family QoL, comfort and confidence.¹⁵

Challenges faced by EMS in palliative situations

Most studies (63%, n=35)^{1 2 6-8 11 13 14 16 26 27 30-33 36-38 40 41 43-47 49 51-54 58 61 67-69} highlighted various challenges EMS providers face in palliative situations. These challenges were EMS provider mindset,¹ the out-of-hospital environment,¹⁶ EMS systems,¹⁴ lack of education,⁶⁸ medico-legal confusion⁴⁹ and inter-personal conflicts.² The EMS provider mindset is to 'save lives' through a curative approach to care, whereas the palliative approach is primarily supportive through prevention and relief of suffering.¹⁻³ Other common challenges were related to the complex out-of-hospital environment: lack of information, limited time, consequent difficult decision-making.⁴⁷

EMS system barriers to palliative provision were mandated hospital transport,¹⁶ limited scope of practice⁴⁷ and lack of alternative care pathways.¹⁴ Despite patient and family wishes and better clinical judgement, EMS providers often conveyed palliative patients to hospital due to system rigidity, fear of consequences and a lack of alternative care pathways.¹⁴ Hospital transport was described as a safety net for EMS providers and, thus, their default decision in palliative situations.⁴⁴

Many studies identified a lack of EMS provider education concerning palliative care^{2 16 36 43 47} and only five studies mentioned EMS providers with additional palliative or hospice care training in their samples.^{4 8 36 53 56} The additional palliative training ranged from short course to postgraduate diploma level. This lack of education

was identified in both physician and paramedic-led EMS systems.^{8 16}

Highlighted medico-legal challenges for EMS providers in palliative situations were fear of litigation⁴⁷ and confusion surrounding legal documentation such as advance directives.^{13 38 49} EMS providers were sometimes unaware of the presence of legal documentation due to lack of available information at incidents.^{6 26 27} Furthermore, where legal documentation was presented, EMS providers were uncertain of legal implications in emergencies.^{2 49}

Finally, EMS providers described various conflicts requiring management in palliative situations. Conflicts arose with other healthcare providers, patients, families and within EMS providers themselves.² These conflicts were due to competing interests: patient wishes, family wishes, EMS protocols, EMS provider clinical judgement, medico-legal considerations.^{16 26}

EMS and palliative care integration benefits

Many studies (36%, n=20)^{5 6 8 11 15 16 29 34 35 40-42 47 53 54 59 61-63 66} described benefits of EMS and palliative care integration: early palliative provision, home-based care, respect of patient autonomy, improved patient and family QoL, increased patient and family satisfaction and confidence, improved EMS provider confidence and decreased healthcare costs. Conversely, the consequences of non-integration were disregard of patient autonomy, performance of aggressive or futile interventions and poor management of palliative patients by EMS.^{13 14}

Provision of early, home-based palliative care by EMS was found to improve patient and family QoL, satisfaction and confidence as demonstrated by Carter *et al.*¹⁵ This study found high patient and family satisfaction with palliative provision from EMS providers, observing their compassion and skill in symptom management.¹⁵ Furthermore, knowledge of the 24/7 availability of EMS providers in this programme provided confidence and peace of mind.¹⁵ Paramedic comfort and confidence in palliative provision likewise improved during the study.¹⁵

Collaboration between EMS and palliative care networks was found to improve respect of patient autonomy.⁵ An example was provided in a case study by Clemency *et al.* where a terminally ill patient was transported home from hospital, extubated and allowed to die at home according to her wishes.³⁵ This was facilitated by EMS under the guidance of palliative care specialists and in conjunction with a broader multidisciplinary team.³⁵

Several studies discussed the potential decreased healthcare costs resulting from EMS and palliative integration.^{41 59 61 66} The decreased costs would, theoretically, result from provision of homecare, thus avoiding expensive and unnecessary hospital admissions.⁶¹ A Finnish study evaluating the integration of paramedics in EoL care argued that healthcare costs may be diminished through provision of homecare by paramedics in particular.⁶⁶

Proposed recommendations for EMS and palliative care integration

All 56 included studies made recommendations for EMS and palliative care integration. These were EMS provider education,⁴ EMS and palliative system collaboration,⁵ EMS palliative care guideline/protocol creation,¹⁶ specialised out-of-hospital palliative care teams³⁴ and further research.⁵⁷ The following topics were highlighted as areas for EMS provider education: identifying patients with palliative needs,⁴¹ palliative therapeutic goals,⁴⁴ legal documentation and advance care planning, ethics,¹³ withholding and withdrawing treatment,^{38 51} patient and family communication (including caregiver support),⁴⁷ symptom management,⁵⁴ interdisciplinary teamwork⁵⁹ and current palliative system structures.⁵⁸

Lamba *et al* detailed four steps for EMS and palliative care integration: (1) identify EMS 'champions', (2) review protocols and literature, (3) perform a needs assessment and (4) create an action plan.⁶ The authors argued that optimal palliative care begins out-of-hospital and, therefore, palliative and EMS systems should collaborate.⁶ Such collaborations between palliative and EMS systems, making use of newly developed palliative care guidelines and protocols for EMS providers, were successfully deployed in Canada,¹⁵ Finland⁶⁶ and the USA.³⁴

Concerning further research, the following areas were recommended: educational interventions,⁴⁶ development of EMS palliative care protocols,¹⁶ defining the role of EMS in palliative situations,² development of EMS palliative care policies and clarifying palliative care referral pathways,² cost-effectiveness of EMS and palliative care integration.^{40 59 66}

DISCUSSION

This scoping review aimed to map existing EMS and palliative literature by identifying study types, extracting key findings and noting limitations, thereby providing a summary of current evidence, context for EMS and palliative care integration and identifying knowledge gaps for future research.

The topic of EMS and palliative care has gathered momentum in recent years as the role of EMS systems in out-of-hospital care has expanded; most studies included in this review (63%, n=35) being published between 2018 and 2022. While the body of literature has grown, there remains a relative dearth of empirical evidence, with only 56 such studies identified here since the turn of the millennium. Many of these studies are small in scale, presenting limited findings. Common limitations include small sample sizes, limited external validity, use of unvalidated survey instruments, self-selection bias, recall bias and those resulting from retrospective approaches.

Despite these limitations, the literature, when aggregated, is consistent across various contexts. For example, similar challenges to EMS palliative provision, such as a lack of on-scene patient information, have been documented in both paramedic²⁶ and physician-led systems.⁴⁷

Moreover, findings regarding EMS role, challenges and integration benefits in palliative situations appear similar across HICs⁶⁸ and LMICs,¹⁶ demonstrating the ubiquitous nature of the out-of-hospital environment.

Of importance, only two studies in this review (3.5%) were performed in LMICs,^{16 69} revealing a significant knowledge gap. Due to disproportionately high burdens of disease and contemporaneous resource constraints, challenges and integration benefits in LMICs may be amplified when compared with HICs.^{70 71} HICs have reported that 0.5%–10% of EMS caseload comprises palliative situations.^{47 57} With their greater disease burdens, this proportion is likely much larger within LMICs.¹⁶ LMICs require novel approaches to this problem given their resource constraints. The development of new, specialised out-of-hospital palliative care teams, for example, may not be feasible in LMICs. Capacitating already existing structures, EMS and palliative, to collaborate via alternative means may represent a more efficient use of scarce resources to achieve integration benefits.⁵⁹ Simply improving communication between the two systems may confer benefit as demonstrated by Dent *et al* where palliative telephonic advice provided to EMS resulted in decreased rates of hospital conveyance.⁴⁰ Similar integrative approaches have been successfully employed in HICs for mental health emergencies, linking mental health-care workers with EMS and police to provide consult at point of care.⁷²

The 1990 Commission on Health Research for Development affirmed that strengthening LMIC research capacity is 'one of the most powerful, cost-effective, and sustainable means of advancing health and development'.⁷³ Not only would LMICs benefit greatly from further research, but the cost-effective solutions developed would likewise benefit HICs where increasing healthcare costs remain a challenge.⁷⁴ Considering amplified LMIC problems, solutions and the need for contextually suitable approaches, the need for, and yet lack of, EMS palliative care LMIC research is striking.

While further research is needed, the existing literature supports, and indeed recommends, the integration of EMS and palliative care services whatever the context (paramedic vs physician-led, HIC vs LMIC).^{5 16} Such integration would be congruous with the multidisciplinary approach espoused by palliative care³ and recommended by the WHO.⁷⁵ The WHO has noted a growing demand for palliative care worldwide, with an insufficient corresponding supply of specialist palliative services.⁷⁵ Integration between palliative services and other disciplines is required to meet the need. Given the multidisciplinary requirement of palliative care and the significant EMS palliative care intersection, integration between the two appears essential.

Though a need for integration exists the question as to precise EMS roles in palliative situations remains. Whatever the specifics, several unique features of EMS may compliment palliative care provision: first-responder role, 24/7 availability, homecare provision and emergency

capabilities.^{6 10 76 77} The earlier palliative care is implemented, the greater its efficacy.⁷⁸ EMS have the capability to both identify palliative needs and initiate palliative care immediately in their role as first responders.^{6 76} Often patients with palliative needs wish to be treated at home but lack this option.¹⁵ They may also suffer deleterious symptoms at any time of day or night requiring a hospital visit.¹⁵ Out-of-hospital palliative care services frequently function exclusively during office hours leaving these patients without support.¹³ The 24/7 availability of EMS, coupled with their homecare expertise, could ameliorate these gaps within palliative care provision and, in the not unlikely event of patient deterioration, EMS expertise in emergencies would be beneficial.⁶⁶

Various recommendations to promote EMS and palliative care integration have been made. However, the priorities of these recommendations have not been established. It is likewise unclear from the literature whether EMS and palliative care integration itself is of high priority within individual countries or globally. Further research is required not only to prioritise recommendations for integration, but to prioritise EMS and palliative care integration within unique healthcare systems. Priorities will likely vary across disparate contexts; however, the literature suggests integration should be favourably considered as it has potential to be a low-cost, high impact intervention aligned with WHO priorities. Such integration would result in improved palliative care provision and access,¹⁶ providing these vulnerable patients with dignity through protection of their autonomy and avoidance of non-beneficial treatment. In addition, EMS and palliative care integration may result in cost and resource savings by decreasing hospital burdens.^{61 66} This in turn would free resources for additional healthcare interventions. Other causal-sequence benefits may result including a unified healthcare approach and bringing together of siloed systems (EMS, palliative, in-hospital), which would result in further improved patient experience across the healthcare spectrum.

A concern regarding this integration is that this expanded role would strain EMS resources by increasing caseload and time spent per incident.⁷⁷ Further investigation into this concern is needed across various contexts. However, existing evidence has shown no increased strain on caseload⁶⁶ and while time spent on scene does appear increased in certain palliative situations, these involve provision of homecare without conveyance.^{66 76} Total time spent per incident appears to decrease in these situations due to time-saving from avoidance of transport, hospital handover, ambulance cleaning and restocking.⁷⁶

Research priorities regarding palliative care in the ED setting have been established by Quest *et al*⁷⁹: (1) which patients are in greatest need of palliative care services in the ED?, (2) what is the optimal role of emergency clinicians in caring for patients along a chronic trajectory of illness?, (3) what are the educational priorities for emergency clinical providers in the domain of palliative care?

As EMS represent the out-of-hospital branch of emergency medicine, such priorities are germane.

Based on the included literature of this review, several specific EMS palliative care research gaps exist. There is a need for further epidemiological study, on a larger scale, across various contexts, particularly LMICs, to more accurately describe the impact of patients requiring palliative care on EMS systems. Further intervention-based studies are required to test the effectiveness of various forms of EMS and palliative care integration, including their cost-effectiveness. The potential benefit of decreased healthcare costs remains theoretical and requires investigation. Educational interventions require particular analysis as many questions remain unanswered: What EMS qualifications should be targeted? What content is most relevant? What level and type of intervention is required (ie, undergraduate vs postgraduate, informal vs formal)? Qualitative interview studies with palliative patients, family members and palliative specialists concerning EMS use in palliative care are largely lacking and would be beneficial as these are primary role players. Finally, both quantitative and qualitative data are needed from other stakeholders such as medical insurance companies which often cover the costs of both EMS and palliative services.

LIMITATIONS

This review is not without limitation. Some relevant studies, including grey literature, may have been missed due to the selection criteria, databases searched, search string employed and researcher finitude. Furthermore, only English studies were selected. However, it is unlikely many relevant studies were omitted as a comprehensive search string was developed, piloted and employed in conjunction with a broad database range, meeting recommendations for an optimal search strategy. Finally, the conclusions of this review should be observed with equipoise given the potential risk of bias, limited external validity of many included studies and the need for further contextual and empirical evidence.

CONCLUSION

Current literature suggests EMS and palliative care systems should integrate to improve palliative care provision. EMS have a role to play in out-of-hospital palliative care however, the specifics of this role require further investigation and are likely to differ across disparate contexts. Currently, when performing various functions in palliative situations, EMS providers are faced with several challenges which must be overcome to provide appropriate care. EMS provider education, collaboration between EMS and palliative systems, creation of EMS palliative care guidelines/protocols, creation of specialised out-of-hospital palliative care teams and further research have been recommended as solutions. Future research should focus on the prioritisation, implementation and effectiveness of these solutions cross-contextually; particularly

in LMICs where the need and potential impact are most significant.

Twitter Willem Stassen @willem_stassen

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ORCID iDs

Caleb Hanson Gage <http://orcid.org/0000-0001-7063-4007>

Willem Stassen <http://orcid.org/0000-0002-1486-4446>

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