Hospital-initiated palliative care interventions for adults with frailty: findings from a systematic review and narrative synthesis

Phoebe Sharratta*, p.sharratt@lancaster.ac.uk; Antony Zachariasb, antony.zacharias@doctors.org.uk; Amara Callistus Nwosua,c,d, a.nwosu@lancaster.ac.uk; Amy Gadouda, a.gadoud@lancaster.ac.uk

[a]Health Innovation Campus, Lancaster University<< Q1 - Query >><< Q2 - Query >><< Q3 - Query >><< Q4 - Query >><< Q5 - Query >>, Bailrigg, Lancaster LA1 4YW, UK
[b]~~University~~bDivision of Medicine, University College London, London, UK<< Q6 - Query >>
[c]~~Marie~~c Integrated Specialist Palliative Care Service, Marie Curie Hospice, Liverpool, Liverpool, UK<< Q7 - Query >>
[d]~~Liverpool~~d Integrated Specialist Palliative Care Service, Liverpool University Hospitals NHS Foundation Trust, Liverpool, UK<< Q8 - Query >>

*Address correspondence to: Phoebe Sharratt, Health Innovation Campus, Lancaster University, Bailrigg, Lancaster LA1 4YW, UK. Email: p.sharratt@lancaster.ac.uk

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Appendix 1.

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Appendix 2.

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Appendix 7.

Abstract

Background: Adults with frailty have palliative care needs ~~(What is the evidence that people with frailty have needs for palliative care at the end of life? A systematic review and narrative synthesis. *Palliat Med* 2019;**33**:399–414)~~[1] but have disproportionately less access to palliative care services ~~(Why do older people get less palliative care than younger people? *Eur J Palliat Care* 2016;**23**:132–7)~~[2]. Frailty affects ~4000 patients admitted to hospital per day in the UK [3]~~(NHS Right Care. NHS RightCare: Frailty Toolkit, 2019)~~, making the hospital admission a unique opportunity to assess palliative care needs and deliver interventions.

Objectives: Synthesise the evidence regarding hospital palliative care (HPC) for patients with frailty. Narratively analyse the evidence regarding methods used to identify palliative care needs; types of palliative care interventions studied; and whether HPC improves outcomes.

Methods: Systematic literature review and narrative synthesis of experimental, observational and systematic review articles investigating palliative care interventions for hospitalised adults aged ≥65 years with frailty. Electronic search of five databases from database inception to 30 January 2023. Included studies analysed using narrative synthesis according to Popay *et al*. ~~(Guidance on the Conduct of Narrative Synthesis in Systematic Reviews, 2006)~~ [4]<< Q9 - Query >>.

Results: 15 465 titles retrieved, 12 included. Three studies detailed how they identified palliative

care needs; all three used prognostication e.g. the ‘surprise question’. Most papers (10/12) investigated specialist palliative care interventions. These interventions addressed a wider range of care needs than non-specialist interventions. Evidence suggested an improvement in some symptom burden and healthcare utilisation outcomes following HPC.

Conclusion: Prognostication was the main method of identifying palliative care needs, rather than individuals’ specific needs. Specialist palliative care interventions were more holistic, indicating that non-specialist palliative care approaches may benefit from specialist team input. Despite suggestions of improvement in some outcomes with palliative care, heterogenous evidence prevented establishment of conclusive effects.

Key points

- Frail patients are most commonly identified for palliative care interventions using prognostication.
- Specialist palliative care approaches are most commonly studied in the hospital setting.
- Evidence suggested an improvement in some symptoms and reduction in pharmacy costs with palliative care interventions, but study quality and outcome heterogeneity prevented firm conclusions being made.
- In practice, there are limits to the identification of palliative care needs using prognostication and delivery of specialist palliative care to all patients with frailty. Future research could focus on alternative methods of identification and palliative care interventions.
- Further research is needed to determine the impact of hospital palliative care for patients with frailty.

Key words: frailty; palliative; hospital; systematic review; older people

Introduction

Frailty has rapidly<< Q10 - Query >> increased in incidence in recent years [5]. It describes the loss of physiological reserve which can accompany ageing and multimorbidity, resulting in an increased risk of adverse effects following stressor events [6]. This means an event such as a fall or infection can lead to a decline in both physical functioning and psychological wellbeing [7, 8].

Frailty has a unique illness trajectory, with gradual decline accompanied by risk of severe deterioration and even death in the presence of any acute stressor [7]. Therefore, each individual's trajectory is unpredictable [9]. What is clear is that frailty is a chronic, life-limiting condition and many agree that affected individuals should receive palliative care [10].

Palliative care is holistic care aimed at enhancing the quality of life of individuals with life-limiting illnesses, provided by specialist and non-specialist teams [11–13]. Although traditionally focused on the end-of-life [14], a palliative care approach is increasingly recognised to be beneficial alongside life-sustaining treatment [12].

Individuals with frailty have holistic problems which could benefit from a palliative care approach i.e. palliative care needs [1]. These include physical and psychological needs (e.g. pain, breathlessness and anxiety), functional changes, psychosocial needs and care preferences [1].

Unfortunately, older frail adults have less access to palliative care than younger individuals [2]. Frailty's unpredictable trajectory means healthcare teams have difficulty identifying when to deliver a palliative care approach [9, 10]. Although existing literature provides guidance for a palliative approach in frailty [15], the potential benefits have not previously been synthesised.

This review will synthesise and analyse the existing literature regarding identification, delivery and outcomes of palliative care for individuals with frailty. As the acute events which risk deterioration in frailty frequently require hospitalisation [16], this review focuses on interventions in the hospital setting. The review objectives are as follows:

1. Identify the clinical tools and assessment methods used to determine palliative care needs for hospitalised patients with frailty.
2. Describe the types of palliative care approaches available for hospitalised patients with frailty.
3. Analyse whether hospital palliative care approaches improve quality of life, symptom burden and healthcare utilisation for patients with frailty.

Methods

This systematic review was conducted according to the Cochrane Handbook for Systematic Reviews of Interventions [17] and is reported according to preferred reporting items for systematic reviews and meta-analyses (PRISMA) [18]. Analysis was conducted using narrative synthesis [4].

Eligibility criteria

Included studies were randomised controlled trials, cohort, case–control and systematic review studies. Studies investigated a palliative care intervention in the hospital setting. Participants were frail, either as defined in the study or based on patient demographics. Criteria for frailty based on patient demographics were constructed using two established frailty measures [6, 19] (Appendix 1). Only studies reporting patient/carer or healthcare utilisation outcomes were eligible for inclusion. Appendix 1 details full criteria.

Search strategy

A highly sensitive search of PsycINFO, MEDLINE, EThOS, Web of Science and Cochrane Library databases was completed from database inception to 30 January 2023. Search terms for three concepts (frailty, palliative care and hospital) were developed with the help of two medical librarians, guidance on systematic reviews in palliative care and older people [20, 21] and previous relevant systematic reviews [1, 22–25] using Medical Subject Headings and synonyms (Appendix 2). English language and age (≥65) filters applied to all searches where available. Additionally, reference lists of included studies were searched.

Selection process

Reference management and de-duplication was completed using Rayyan [26]. Initial screening of titles was completed by P.S. Full reports were then screened by P.S. and A.Z. independently. Disagreements were discussed until consensus reached.

Data collection process

A data extraction tool was adapted from a Cochrane Intervention Review data collection form and piloted on five studies. No adjustments were needed prior to uploading to SRDR software [27]. Data extraction was completed by P.S.

Data items

The data extraction tool detailing all data items is available in Appendix 3.

Additional information was sought from four study investigators via email as the hospital palliative care (HPC) intervention was not described; one author responded [28]. Missing data for

other variables was extracted as ‘not reported’. Data were extracted for all results compatible with quality of life, symptom burden and healthcare utilisation outcomes (Appendix 4).

Study risk-of-bias assessment

Risk of bias was completed for included studies according to study design:

- Randomised controlled trials (RCTs)—Cochrane Risk of Bias tool for RCTs [29].
- Cohort and case control studies—Modified Newcastle Ottawa Quality Assessment Scale for non-randomised studies [30].

Risk-of-bias assessments, including reporting bias, were completed independently by P.S. and A.Z. on SRDR software [27]. Discrepancies were reviewed with consensus decision made, accounting for each reviewer’s comments. An overall judgement of high, medium or low risk of bias was made.

Effect measures

Effect measures for extraction were pre-determined using the Cochrane Handbook for Systematic Reviews [31]:

A. Quality of life:

- Any given by study authors, not pre-defined.

B. Symptom burden:

- Ordinal (scale) data = any result given by study authors.
- Dichotomous data = risk difference.

C. Healthcare utilisation:

- Mean difference, risk difference, risk ratio.

P-Values and measures of confidence were to be extracted where available.

Synthesis methods

All studies meeting inclusion criteria after reviewer discussion were synthesised. Due to heterogeneity, a narrative synthesis was completed according to the following steps [4]:

1. *Developing a theory of how the intervention works:* the synthesis drew on Nicholson *et al.*'s (2017) study outlining supportive care approaches for hospitalised older people with frailty [15].
2. *Developing a preliminary synthesis:* textual description of each study and extracted outcomes was compiled in a table.
3. *Exploring relationships in the data:*
    - Commonalities and differences in methods of assessing palliative care needs were explored narratively.
    - HPC interventions were categorised as specialist or non-specialist palliative care. Specialist interventions were defined as care delivered by multidisciplinary team members with specialised skills, competencies and training in palliative care [13]. Non-specialist interventions were defined as interventions which were not delivered by a palliative care specialist, but the intervention was clearly described as palliative/end-of-life/supportive care.
    - Framework analysis [32] of interventions was performed by mapping each study's intervention to the seven themes of supportive care approaches described by Nicholson *et al.* [15].
    - Outcome data were categorised into quality of life, symptom burden or healthcare utilisation to find commonalities in each category. Where the same outcome had been reported by ≥2 studies, findings were compared narratively.

4. *Assessing the robustness of the synthesis:* The Gough Weight of Evidence framework [33], completed by P.S., identified each study's relevance to the review as a whole. Papers were judged as high, medium or low weight of evidence.

Results

Study selection and characteristics of included studies

Of 15 465 titles identified from database and reference searching, 12 titles were included in the final synthesis. A PRISMA flow diagram [18] is presented in Figure 1.

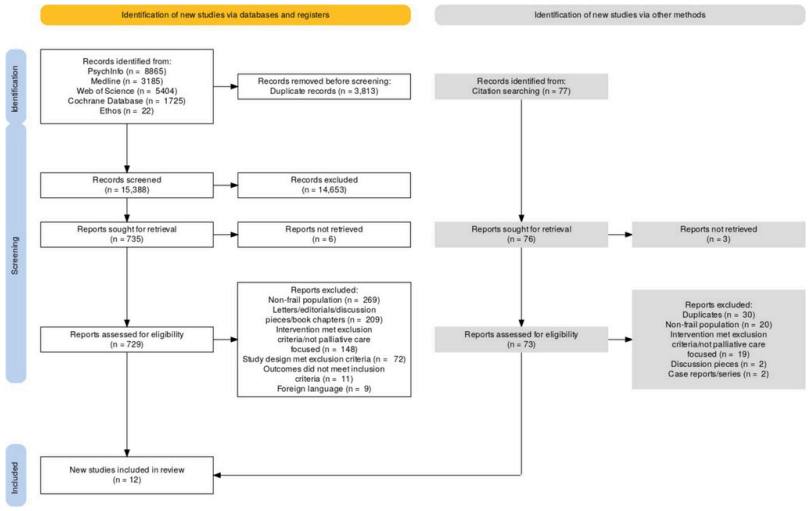

Figure 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram.

In total, 14 635 studies were excluded at first screening. These studies did not include human adults with frailty, were not focused on palliative care or did not meet the review objectives. Papers of uncertain eligibility requiring reviewer discussion and consensus decision prior to exclusion are listed in Appendix 5.

Table 1 shows characteristics of included studies with results of risk-of-bias and weight-of-evidence assessments. Five experimental [34–38] and seven observational studies were included [28, 39–44]. Three studies identified their participants as frail [28, 35, 43]; in the remaining studies, frailty was derived from patient demographics. Most studies (10/12) were conducted in the

USA.

Table 1 Study characteristics, included outcomes and results of risk-of-bias and weight-of-evidence assessments

Author and year	Setting	Study design	Inclusion criteria	Intervention (*n* = group total)	Comparator/ control (*n* = group total)	Quality-of-life outcomes	Symptom burden/ intensity outcomes	Healthcare utilisation outcomes	Risk-of-bias assessment outcome	Weight-of-evidence assessment outcome
Ahronheim *et al*., 2000 [34]	Tertiary care and teaching hospital, New York, USA	Randomised controlled trial	Patients with advanced dementia (functional assessment stage 6d or greater), hospitalised with acute illness	Palliative care team consultation (*n* = 48)	Usual care (*n* = 51)			X	Low	Medium
Curtin *et al*., 2020 [35]	Two acute hospitals in Cork, Ireland	Randomised controlled trial	Patients aged ≥75, requiring long-term nursing home on this admission AND Prescribed ≥5	Individualised STOPP-Frail guided de-prescribing plus usual pharmaceutical care (*n* = 65)	Usual pharmaceutical care (*n* = 65)	X	X	X	Medium	High<< Q1 1 - Query >>

Author and year	Setting	Study design	Inclusion criteria	Intervention (*n* = group total)	Comparator/ control (*n* = group total)	Quality-of-life outcomes	Symptom burden/ intensity outcomes	Healthcare utilisation outcomes	Risk-of-bias assessment outcome	Weight-of-evidence assessment outcome
			long-term medications AND Severely frail as defined by: (a) ~~CFS~~Clinical Frailty Scale (CFS) ≥7 AND (b) Positive response to surprise question (from treating physician)							
Hanson *et al*., 2019 [36]	Hospital type not stated, USA	Randomised controlled trial	Patients aged ≥65 with diagnosis of advanced	Specialty palliative care consultation (*n* = 30)	Usual hospital care (*n* = 32)		X	X	High	High

Author and year	Setting	Study design	Inclusion criteria	Intervention (*n* = group total)	Comparator/ control (*n* = group total)	Quality-of-life outcomes	Symptom burden/ intensity outcomes	Healthcare utilisation outcomes	Risk-of-bias assessment outcome	Weight-of-evidence assessment outcome
			dementia (Stage 5–7 on the Global Deterioration Scale) who were hospitalised with acute illness							
Liu *et al*., 2022 [37]	Cancer hospital, China	Randomised controlled trial	Patients with stage III–IV malignant tumour, ~~ECOG-PS~~Eastern Cooperative Oncology Group - Performance Status (ECOG-	Interdisciplinary collaborative hospice care team (*n* = 83)	Life-sustaining treatment (*n* = 83)		X	X	High	Medium<< Q12 - Query >>

Author and year	Setting	Study design	Inclusion criteria	Intervention (*n* = group total)	Comparator/ control (*n* = group total)	Quality-of-life outcomes	Symptom burden/ intensity outcomes	Healthcare utilisation outcomes	Risk-of-bias assessment outcome	Weight-of-evidence assessment outcome
			PS) scores 3 points, palliative prognosis index ≥6 points							
Pantilat *et al*., 2010 [38]	Academic medical centre, San Francisco, USA	Randomised controlled trial	Patients aged ≥65 years with heart failure, cancer, chronic obstructive pulmonary disease ~~COPD~~ or liver cirrhosis	Palliative medicine consultation (*n* = 54)	Usual care (*n* = 53)		X		Low	Low<< Q13 - Query >>
Araw *et al*., 2015 [39]	Academic tertiary care hospital, New York,	Retrospective cohort study	Patients with end-stage dementia who received palliative care consultation	Palliative care consultation (*n* = 60)	–		X	X	Medium	Low

Author and year	Setting	Study design	Inclusion criteria	Intervention (*n* = group total)	Comparator/ control (*n* = group total)	Quality-of-life outcomes	Symptom burden/ intensity outcomes	Healthcare utilisation outcomes	Risk-of-bias assessment outcome	Weight-of-evidence assessment outcome
	USA									
Czerwinski, 2022 [28]	Three acute care hospitals, Wake County, USA	Retrospective cohort study	Patients aged >65 with isolated hip fracture attending emergency department	Palliative care consultation triggered by CFS >7 (*n* = 16)	Pre-screening intervention (*n* = 22)		X	X	Low	Low

(*Continued*)

Table 1 Continued

Author and year	Setting	Study design	Inclusion criteria	Intervention (*n* = group total)	Comparator/ control (*n* = group total)	Quality-of-life outcomes	Symptom burden/ intensity outcomes	Healthcare utilisation outcomes	Risk-of-bias assessment outcome	Weight-of-evidence assessment outcome
O'Mahony	Urban	Retrospective	Patients >65 years with:	Clinical	No clinical	X		X	Low	Low

Author and year	Setting	Study design	Inclusion criteria	Intervention (*n* = group total)	Comparator/ control (*n* = group total)	Quality-of-life outcomes	Symptom burden/ intensity outcomes	Healthcare utilisation outcomes	Risk-of-bias assessment outcome	Weight-of-evidence assessment outcome
et al., 2008 [41]	community teaching hospital, Bronx, USA	cohort study	a) Uncontrolled chronic pain b) Multiple organ failure (not for ICU admission) c) Hospice eligible with symptoms d) Chronic incurable illness requiring access to community resources PLUS, positive response to one	consultation from palliative care nurse practitioner in the emergency department (*n* = 291)	consultation from palliative care nurse practitioner [pre-intervention period] (*n* = 125)					

Author and year	Setting	Study design	Inclusion criteria	Intervention (*n* = group total)	Comparator/ control (*n* = group total)	Quality-of-life outcomes	Symptom burden/ intensity outcomes	Healthcare utilisation outcomes	Risk-of-bias assessment outcome	Weight-of-evidence assessment outcome
			of the following triggers: a) ‘Does this patient have a progressive incurable illness that is in its later stages?’ b) ‘Do you know if the patient is expected to die on this hospital admission?’ c) ‘Would you							

Author and year	Setting	Study design	Inclusion criteria	Intervention (*n* = group total)	Comparator/ control (*n* = group total)	Quality-of-life outcomes	Symptom burden/ intensity outcomes	Healthcare utilisation outcomes	Risk-of-bias assessment outcome	Weight-of-evidence assessment outcome
			be surprised if this patient were to die in the next year?'							
Reyes-Ortiz *et al*., 2015 [43]	Hospital type not stated, USA	Retrospective cohort study	Patients reviewed by the hospital palliative care service who were aged ≥65 with palliative performance scale of ≤50	Early palliative care (within 3 days of admission) (*n* = 300)	Late palliative care (received on or after day 4 of admission) (*n* = 231)			X	Medium	Low
Sharda<< Q 14 - Query >> *et al*.,	Tertiary academic hospital	Retrospective cohort study	Patients aged ≥65 with International Classification of Diseases (ICD) diagnosis of	Inpatient palliative care	No IPCC received (*n* = 157)		X	X	Medium	Low

Author and year	Setting	Study design	Inclusion criteria	Intervention (*n* = group total)	Comparator/ control (*n* = group total)	Quality-of-life outcomes	Symptom burden/ intensity outcomes	Healthcare utilisation outcomes	Risk-of-bias assessment outcome	Weight-of-evidence assessment outcome
2020 [44]	and community hospital, Durham, USA		dementia	consultation (IPCC) received (*n* = 157)						
Campbell and Guzman, 2004 [40]	Hospital type not stated, Detroit, USA	Case–control study	Patients with dementia whose pre-hospital functional status included factors consistent with late-stage disease such as: • Bedbound • Largely non-verbal • Incontinent • Unable to self-nourish/ nourished by tube • Decubitus ulcer	Palliative care service consultation (*n* = 26)	Medical ICU care (*n* = 26)			X	Low	Low
Rashidifard	Level 1	Case–control	Patient aged ≥65 who had	Placement of	Traditional		X	X	Medium	Medium

Author and year	Setting	Study design	Inclusion criteria	Intervention (*n* = group total)	Comparator/ control (*n* = group total)	Quality-of-life outcomes	Symptom burden/ intensity outcomes	Healthcare utilisation outcomes	Risk-of-bias assessment outcome	Weight-of-evidence assessment outcome
et al., 2019 [42]	trauma centre, USA	study	sustained a femoral neck fracture that was treated non-operatively	continuous indwelling ropivacaine catheter for symptom management (*n* = 23)	pain management (*n* = 10)					

Results of syntheses by objective

1. Clinical assessment methods used to identify palliative care needs

Three studies [35, 37, 41] explicitly reported a method of identifying whether included participants had palliative care needs; all three used prognostication. Curtin *et al.* [35] used a positive response to the 'surprise question' [45]. Liu *et al.* [37] used a palliative prognostic index [46] of six or more (survival <3 weeks). O'Mahony *et al.* [41] used a positive response to the 'surprise question' or 'does this patient have a progressive incurable illness that is in its later stages' or 'do you know if the patient is expected to die on this hospital admission?'

Of the other studies, two included participants referred to the HPC service by a physician [43, 44]; therefore, needs were determined outside of the study. The remaining studies presumed that participants had needs based on disease stage. For example, four studies included participants with advanced dementia [34, 36, 39, 40], while one study [28] included participants with a clinical frailty score [6] of ≥7. Although not explicitly stated, the indication was that poor prognosis determined participants' need for HPC. For example, Ahronheim *et al.* reported:

'Survival time of most patients with advanced dementia falls within traditional hospice guidelines of 6 months' ([34] page 266).

Overall, this review found that prognosis was employed to identify palliative care needs, either using established tools or based on disease stage.

2. Types of HPC approaches

Interventions were classified as specialist palliative care (SPC) or non-SPC. There were 10 SPC intervention studies [28, 34, 36–41, 43, 44]. The two non-SPC interventions were de-prescribing [35], and indwelling analgesic catheter for palliative, non-operative management of femoral neck fracture [42].

Framework analysis of each intervention identified which of the seven themes of supportive care for hospitalised patients with frailty, described by Nicholson *et al.* [15], were addressed. Themes could only be analysed from nine papers [28, 34–38, 40–42] (seven SPC, two non-SPC) due to insufficient intervention descriptions. The number of papers addressing each theme was categorised by SPC or non-SPC (results in Figure 2).

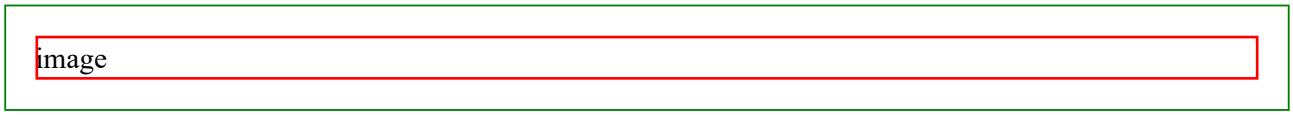

Figure 2 Number of studies addressing each of Nicholson *et al.*'s [15] themes.

The figure reveals important similarities and differences between SPC and non-SPC intervention components. Firstly, all approaches focused on fundamental care aspects and building a picture of the person. There was a lack of focus on providing self-help and wider support.

The main difference is that SPC interventions were more holistic and, across the included studies, covered all of the seven themes [15]. The non-SPC interventions were less holistic with only one or two themes addressed.

3. (A) Quality-of-life outcomes

Only two studies [35, 41] assessed quality of life (QoL) outcomes (Table 2). One study indicated the majority of participants experienced both positive and negative impacts on QoL after HPC [41]. This study was of low quality and did not measure QoL in the comparator group; therefore, its findings lend little weight to understanding the impact of HPC on QoL.

Table 2 Comparable outcomes from included studies

Study Author (year)	Outcome description	Intervention results	Comparator results	Result summary
Quality of life				
Curtin *et al.*, 2020	Mean (SD) QUALIDEM [47] instrument score (quality of life assessed by a proxy) at baseline and 3 months [higher score represents	Baseline—6.96 (2.58) 3 months—4.53 (4.23) Mean change—2.43 (4.65)	Baseline—7.58 (1.94) 3 months—4.73 (4.30) Mean change—2.85 (4.64)	*Proxy-assessed quality of life deteriorated for participants in each group from baseline to 3 months. There was no statistically significant*

Study Author (year)	Outcome description	Intervention results	Comparator results	Result summary
	better quality of life]			*difference in mean change in scores in the intervention and control groups*
Curtin *et al*., 2020<< Q15 - Query >>	Mean (SD) ICECAP-O (ICEpop CAPability measure for Older people) [48] instrument score (self-reported quality of life) at baseline and 3 months [higher score represents better quality of life]	Baseline—0.60 (0.22) 3 months—0.21 (0.33) Mean change—0.39 (0.36)	Baseline—0.60 (0.20) 3 months—0.30 (0.35) Mean change—0.30 (0.35)	*Self-reported quality of life deteriorated for participants in each group from baseline to 3 months. There was no statistically significant difference in mean change in scores in the intervention and control groups*
O'Mahony *et al*., 2008	Percentage expressing satisfaction with control of physical symptoms, measured using MVQoL Index [49] after the intervention	69%	No data	*Most participants in the intervention group had good control of physical symptoms. No comparison data collected therefore unable*

Study Author (year)	Outcome description	Intervention results	Comparator results	Result summary
				to test statistical significance
O'Mahony *et al*., 2008	Percentage expressing ability to communicate with people close to them, measured using MVQoL Index [49] after the intervention	64%	No data	*Most participants in the intervention group felt able to communicate with those close to them. No comparison data collected therefore unable to test statistical significance*
O'Mahony *et al*., 2008	Percentage describing a loss of ability to do many of the things that I like, measured using MVQoL Index [49] after the intervention	60%	No data	*Most participants in the intervention group expressed loss of ability to do things they like. No comparison data collected therefore unable to test statistical significance*
O'Mahony *et al*., 2008	Percentage expressing a general sense of loss of life's	57%	No data	*Most participants in the intervention group expressed*

Study Author (year)	Outcome description	Intervention results	Comparator results	Result summary
	value, measured using MVQoL Index [49] after the intervention			*general loss of life's value. No comparison data collected therefore unable to test statistical significance*
Symptom burden/intensity				
Use of analgesics				
Araw *et al*., 2015	Percentage of patients taking analgesic medications	Post-intervention—73.3%	Pre-intervention—55%	*There was a statistically significant (P = .009) increase in participants taking analgesic medications after the intervention*
Sharda *et al*., 2020	Percentage with opiate medication on discharge	37.5%	34.9%	*There was no statistically significant difference in percentage of participants discharged with opiate medications in the intervention and control*

Study Author (year)	Outcome description	Intervention results	Comparator results	Result summary
				groups
Sharda *et al*., 2020	Percentage with acetaminophen medication on discharge	47.9%	61%	*There was no statistically significant difference in percentage of participants discharged with acetaminophen medication in the intervention and control groups*
Pain				
Czerwinski, 2022	Percentage of patients/carers reporting adequate pain management during admission	100%	No data	*All participants in the intervention group reportedly received adequate pain management during admission. Not measured in control group so no comparisons can be made*
Liu *et al*., 2022<< Q16 - Query	Mean (SD) pain score before and after	Before treatment—86.92 (9.79)	Before treatment—86.94 (10.18)	*Participants in the intervention group had a*

Study Author (year)	Outcome description	Intervention results	Comparator results	Result summary
>>	treatment measured using EORTC QLQ-C30 V3 (European Organization for Research and Treatment of Cancer - Core Quality of Life Questionnaire Version 3) [50]	After treatment—28.52 (9.64)	After treatment—78.13 (10.47)	*statistically significant (P < .001) improvement in pain after treatment compared to the comparator group*
Pantilat *et al*., 2010	Mean (95% CI) pain score (rated from 0 to 10; 0 being 'none' and 10 being 'the worst you can imagine') at baseline and 2 weeks	Baseline—4.9 (3.8–6.0) 2 weeks—2.4 (1.4–3.4)	Baseline—3.5 (2.4–4.8) 2 weeks—2.1 (1.1–3.1)	*There was no statistically significant additional improvement in pain at 2 weeks in the intervention group compared to the control group*
Rashidifard *et al*., 2019	Mean (SD) improvement in pain score 24 h after treatment initiated [measured using Visual	4.5 (2.19)	1.2 (2.72)	*There was a statistically significant (P = .002) greater improvement in pain score 24 h*

Study Author (year)	Outcome description	Intervention results	Comparator results	Result summary
	Analogue Scale]			*after treatment in the intervention compared to the control group*

(*Continued*)

Table 2 Continued

Study Author (year)	Outcome description	Intervention results	Comparator results	Result summary
Anxiety<< *Q17* - *Query* >>				
Liu *et al*., 2022	Mean (SD) anxiety score before and after treatment measured using HAMA (Hamilton Anxiety Rating Scale) [51]	Before treatment—37.63 (9.96) After treatment—15.75 (7.18)	Before treatment—37.16 (9.99) After treatment—34.62 (11.68)	*Participants in the intervention group had a statistically significant (P < .001) improvement in mean anxiety score after treatment*
Pantilat *et al*., 2010	Mean (95% CI) anxiety score (rated from 0 to 10; 0 being 'none' and 10 being 'the worst you can	Baseline—5.5 (4.2–5.5) 2 weeks—2.4 (1.5–3.6)	Baseline—3.8 (2.7–5.0) 2 weeks—2.5 (1.3–3.6)	*There was no statistically significant additional improvement in anxiety at 2 weeks in the intervention*

Study Author (year)	Outcome description	Intervention results	Comparator results	Result summary
	imagine') at baseline and 2 weeks			*group compared to the control group*
Dyspnoea				
Liu *et al*., 2022	Mean (SD) shortness of breath score before and after treatment measured using EORTC QLQ-C30 V3 [50]	Before treatment—75.30 (10.94) After treatment—67.54 (14.17)	Before treatment—74.98 (11.73) After treatment—73.13 (13.03)	*Participants in the intervention group had a statistically significant (P = .009) improvement in shortness of breath after treatment compared to the comparator group*
Pantilat *et al*., 2010	Mean (95% CI) dyspnoea score (rated from 0 to 10; 0 being 'none' and 10 being 'the worst you can imagine') at baseline and 2 weeks	Baseline—4.4 (3.3–5.5) 2 weeks—2.4 (1.5–3.3)	Baseline—3 (1.8–4.2) 2 weeks—1.6 (0.6–2.5)	*There was no statistically significant additional improvement in dyspnoea at 2 weeks in the intervention group compared to the control group*
Healthcare utilisation				
Length of stay				
Ahronheim *et al*., 2000	Mean average (range) length	8.8 (1–93)	9.7 (1–63)	*There was no statistically*

Study Author (year)	Outcome description	Intervention results	Comparator results	Result summary
	of stay (days)			*significant difference in the mean average length of stay in the intervention and control groups*
Campbell *et al*., 2004	Mean (SD) average hospital length of stay (days)	7.4 (1.4)	12.1 (1.6)	*Participants in the intervention group had a statistically significant (P = .007) shorter length of stay in hospital*
Czerwinski, 2022	Mean (range) average length of stay (days)	5.2 (2–11)	5.8 (2–14)	*Participants in the intervention group had similar mean length of stay to those in the control group. Statistical significance was not tested*
Hanson *et al*., 2019	Median average (range) length of stay (days)	6 (2–36)	6 (2–32)	*There was no statistically significant difference in median length of stay in the intervention and control groups*
O'Mahony *et al*., 2008	Mean average length of stay	7	7.9	*Participants in the intervention group*

Study Author (year)	Outcome description	Intervention results	Comparator results	Result summary
	(days)			*had similar mean length of stay to those in the control group. Statistical significance was not tested*
Rashidifard *et al*., 2019	Mean (SD) average length of stay (days)	5.3 (3.56)	3.8 (1.81)	*There was no statistically significant difference in mean average length of stay in the intervention and control groups*
Reyes-Ortiz *et al*., 2015	Mean (SD) length of stay (days)	5.39 (4.16)	16.60 (10.97)	*Participants who received early palliative care had statistically significant (P < .001) shorter length of stay*
Sharda *et al*., 2020	Median length of stay (days)	5.9 days	4.2 days	*Participants who received an inpatient palliative care consultation had statistically significant (P = .04) longer median length of stay*

(*Continued*)

Table 2 Continued

Study Author (year)	Outcome description	Intervention results	Comparator results	Result summary
Days from palliative care consultation to discharge				
O'Mahony *et al*., 2008	Median time from inpatient palliative care consultation to discharge (days)	4	5	*Median time from inpatient palliative care consultation to discharge was higher in the intervention group Statistical significance was not tested*
Reyes-Ortiz *et al*., 2015	Mean (SD) number of days from palliative care consult to discharge (DCDAYS)	4.18 (3.92)	5.42 (6.50)	*Participants who received early palliative care had statistically significant (P = .007) shorter DCDAYS*
Pharmacy costs				
Curtin *et al*., 2020	Mean (SD) change in monthly medication costs (converted to £	£62.23 (123.11)	£10.97 (91.63)	Mean difference (95%

Study Author (year)	Outcome description	Intervention results	Comparator results	Result summary
	from $at rate of 0.83£:1$)			confidence interval (CI))—£51.24 (7.43–95.06) *Participants who received the intervention had a statistically significant (P = .02) lower monthly medication cost*
Araw *et al*., 2015	Mean (SD) and median average daily pharmacy cost (converted to £ from $at rate of 0.83£:1$)	Post-intervention—£17.29 (16.23); £14.98	Pre-intervention—£25.86 (19.77); £22.08	*Participants had a statistically significant (P < .003) lower daily pharmacy cost after the intervention*
Liu *et al*., 2022	Median (interquartile range) average daily drug cost (converted to £ from yuan at rate of 0.11£:1 yuan)	54.29 (47.86–63.05)	£78.39 (70.79–90.54)	*Participants in the intervention group had a statistically significant*

Study Author (year)	Outcome description	Intervention results	Comparator results	Result summary
				(P < .001) lower median average daily drug cost
Hospital/ED re-attendance				
Curtin *et al*., 2020	Emergency department presentations at 3 months (number of events, proportion, 95% CI)	5, 0.05 (0.01–0.13)	8, 0.08 (0.03–0.17)	Relative risk (95% CI)—0.60 (0.25–2.41) *No statistically significant differences in emergency department presentations in the intervention and control groups*
Hanson *et al*., 2019	Number of hospital/ ED visits per 60 days (no. of events/follow-up days)	0.68 (21/1843)	0.53 (21/2264)	*There was no statistically significant difference in the number of hospital/ED visits per 60 days in the intervention and control*

Study Author (year)	Outcome description	Intervention results	Comparator results	Result summary
				groups
O'Mahony *et al*., 2008	Emergency department (ED) re-attendance (percentage, months)	24% (1 month) 59% (6 months)	45% (12 months)	*Up to two-thirds of participants in the intervention group returned to the ED within 6 months. No comparison at these timepoints therefore unable to test statistical significance*
Hospital re-admission				
Ahronheim *et al*., 2000	Mean (range) number of admissions per participant over 3-year study period	1.84 (1–7)	1.90 (1–13)	*There was no statistically significant difference in the mean number of admissions per participant over the study period in the intervention*

Study Author (year)	Outcome description	Intervention results	Comparator results	Result summary
				and control groups
Curtin *et al*., 2020	Unplanned hospital admissions at 3 months (number of events, proportion, 95% CI)	10, 0.14 (0.07–0.24)	6, 0.08 (0.01–0.17)	Relative risk (95% CI)—1.80 (0.64–5.08) *No statistically significant differences in unplanned hospital admissions in the intervention and control groups*
Czerwinski, 2022	Number of re-admissions at 30 days	0	0	*Number of re-admissions at 30 days were the same in the intervention and control groups*

Another study found no statistically significant difference in QoL between HPC and comparator groups using two validated measures [35]. There is certainty in the results of this study as it was of medium quality and had high weight of evidence. However, this, and one other poor-quality study, are not sufficient evidence to draw firm conclusions about the impact of HPC on QoL.

4. (B) Symptom burden/intensity outcomes

Thirty symptom burden outcomes were identified (Appendix 6). Comparable outcomes were analgesia use, pain, anxiety and dyspnoea (Table 2).

Two studies reported on analgesia use. One found no significant difference in analgesic prescriptions in HPC and comparator groups [44]; one found a statistically significant increase in analgesia use in the HPC group [39]. Neither study lent greater weight to this review; therefore, no firm conclusions can be drawn about the impact of HPC on analgesia use.

Four studies reported on pain. Half of these found a statistically significant improvement in pain with HPC [37, 42], while one found no statistically significant difference [38] and one did not collect data in the comparator group [28]. As those which found an improvement in pain were of higher quality, the evidence suggests that HPC can improve pain.

Two studies reported on dyspnoea and anxiety. One found no statistically significant difference in either symptom between HPC and comparator groups [38], while one higher quality study found a statistically significant improvement in both symptoms with HPC [37]. This evidence suggests that HPC can improve anxiety and dyspnoea but is not sufficient to determine its true impact.

5. (C) Healthcare utilisation outcomes

Thirty-two healthcare utilisation outcomes were extracted (Appendix 6). Comparable outcomes were length of stay (LOS), days from palliative care consultation to discharge, pharmacy costs, emergency department (ED) attendance and hospital re-admissions (Table 2).

LOS was reported in eight studies. Results varied, with three studies finding no statistically significant difference in LOS with HPC [34, 36, 42], two studies finding a statistically significant decrease [40, 43], one study finding a statistically significant increase [44] and two studies not testing statistical significance [28, 41]. Overall, the evidence of higher quality suggests that HPC has no significant impact on LOS.

Two studies reported days from palliative care consultation to discharge. One study of ED initiated HPC found no statistically significant difference in days to discharge [41] while one study found a statistically significant difference when HPC was delivered within 3 days of admission [43]. As both studies lent low weight of evidence to this review, no conclusions can be made about this outcome.

Two studies found a statistically significant reduction in pharmacy cost during admission with HPC [39, 41], while one study found a statistically significant reduction in medication cost 3 months post-discharge

with HPC [35]. This evidence suggests that HPC can reduce medication costs.

Three studies measured hospital/ED re-attendance. Two studies found no statistically significant difference in re-attendance with HPC [35, 36], while one study did not test statistical significance [41]. Incorporating the weight of evidence of these studies suggests no significant impact of HPC on hospital/ED re-attendance.

Similarly, no statistically significant difference in hospital re-admissions following HPC was found in two studies [34, 35], with a further study not testing statistical significance [28]. This evidence, though of less weight than for re-attendance, also suggests no impact of HPC on re-admissions.

Risk of bias, reporting bias and certainty of evidence

Full assessments are presented in Appendix 7.

Discussion

This review has identified and synthesised evidence regarding palliative care identification, interventions and outcomes for hospitalised adults with frailty.

Clinical assessment methods used to identify palliative care needs

The most common method to determine palliative care needs is prognostication. However, only three studies formally reported how they identified palliative care needs. This incomplete reporting shows a lack of consensus regarding which patients will benefit from HPC.

Prognostication in frailty overlooks the changing needs associated with the gradual decline seen in its trajectory [7–9]. Evidence shows that prognosis-based methods such as the ‘surprise question’ perform poorly for patients with non-cancer illnesses such as frailty and prevent differentiation between shortened prognosis and unmet palliative care needs [52]. This suggests a need to move away from prognostication.

Instead, assessment could focus on identifying specific palliative care needs known to be present in frailty. Tools to identify condition-specific palliative care needs have been successful in other conditions [53]; therefore, this is a feasible approach in frailty. A holistic approach would be most appropriate to identify these needs, which suggests that comprehensive geriatric assessment (CGA) could be appropriate for this purpose. This would remove the need for additional tools. However, identification of palliative care needs is not currently recognised as a component of CGA [54]. This indicates that further research is needed to understand the potential limits and added value of use of CGA for this purpose.

Types of HPC approaches

A previous review of identification and implementation of palliative care for patients with frailty found no intervention studies [55]. This review focused on the last year of life and only included studies using an established measure to identify frailty. Our review, by including patients from a frail demographic and interventions delivered at any timepoint, has built on this prior review to identify and characterise palliative care interventions. We have found that SPC is the most common approach in hospital and that SPC approaches are more holistic.

Although SPC is most delivered in the literature, this may not be feasible in practice. SPC is under increased demand and often has inequitable access [56]. An alternative is a hybrid approach to care involving both generalists and specialists, such as ~~the~~the short-term integrated palliative and supportive care (SIPS)<< Q18 - Query >> model trialled in the community with positive results [57]. Studies of one aspect of palliative care (advance care planning) for patients with frailty show that non-SPC delivery, e.g. community nurses [58] and trained facilitators [59], can improve outcomes. This evidence indicates that although our review found that SPC is most common in hospital, examples from other settings show that hybrid/non-SPC approaches can perform well.

The impact of HPC on outcomes

Overall, this review was able to identify evidence suggesting an improvement in pharmacy costs and some symptoms (pain, anxiety and dyspnoea), and evidence suggesting HPC has no impact on LOS or re-admission/re-attendance. Existing evidence in other conditions supports the findings regarding reduction in pharmacy costs [60] and improvement in symptoms [61], but indicates that hospital re-attendance/re-admission can be reduced by HPC [62, 63]. Additionally, despite the evidence in other illnesses that HPC can improve QoL [64], this review was unable to find sufficient evidence for this outcome.

Several issues with the reporting of outcomes have prevented meaningful conclusions regarding the impact of HPC. The main limitations ~~were~~were: the dearth of QoL outcomes; the heterogeneity of outcome measurement and reporting (e.g. use of different timepoints for measuring pharmacy costs); and quality of analysis (e.g. not controlling for confounders when analysing LOS). This shows a gap in rigorous outcome data for HPC interventions for frailty, as seen in prior research [55].

Strengths and limitations

This is the first comprehensive review of HPC for this group, establishing the evidence base for future researchers to improve outcomes.

To provide a comprehensive synthesis of the evidence, this review had a broad search strategy and inclusion criteria, resulting in heterogenous studies of participants with a wide variety of comorbidities. However, this authentically represents patients with frailty, therefore providing a realistic view of this heterogenous patient group.

The broad search strategy also resulted in a high number of titles and, as only one reviewer completed initial screening, this could have resulted in studies being missed for inclusion. However, because only one further title was identified from reference screening, this indicates high sensitivity of the search.

The evidence base of this review is limited by including only English-language papers. This resulted in the majority of included studies (10/12) being from the USA, where there is a focus on delivering care by specialist teams [65]. This may explain the finding that most interventions involved SPC.

Implications for policy, practice and future research

The evidence collated suggests improvements in some symptoms and costs when HPC is delivered to patients with frailty, without increases in LOS. The findings are not robust enough to influence policy changes but, on the background of similar findings in other conditions, could encourage hospital teams to consider palliative care provision for frail patients.

Future research should focus on developing a palliative care needs assessment targeted to the specific needs of those with frailty, e.g. testing use of CGA for the purpose of identifying palliative care needs. In addition, future research should consider novel holistic interventions involving non-palliative specialists with SPC support [9]. Lastly, the volume and heterogeneity of outcomes in this review reflects the absence of a palliative care outcome set for frailty [66]. Therefore, future research could aim to develop this.

Conclusion

This review has found that identification of need for palliative care for hospitalised adults with frailty is based on prognosis, rather than individuals' palliative care needs. SPC interventions were most common and were more holistic than non-SPC, indicating that support from specialist teams may be needed when non-specialists deliver palliative care. Lastly, although HPC improved some outcomes, inconsistent outcome measurement and poor-quality evidence prevented establishment of conclusive effects.

We suggest that individuals with frailty may benefit from symptom-based assessments, such as comprehensive geriatric assessment, to determine their palliative care needs. Future research should focus on hybrid HPC interventions and developing a core palliative care outcome set for frailty.

Supplementary Data:

Supplementary data is available at *Age and Ageing* online.

Declaration of Conflicts of Interest:

None declared.

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Queries

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Q1	Please check the spelling and accuracy of all author names and affiliations, particularly for any coauthors. Also check that author surnames are correctly highlighted. This is to ensure that forenames and surnames are tagged correctly for online indexing. Incorrect names and affiliations may lead to an author not being credited for their work by funders, institutions, or other third parties. Make any changes directly in the text. Note that changes to your authorship list (adding or removing authors, changing designation of corresponding author) require additional approvals. Email jnls.author.support@oup.com if this is required.	Author	p.sharratt@lancaster.ac.uk	Author	All author names and affiliations checked & correct
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Q3	Please ensure all “conflicts of interest” (or “disclosures”) have been included for you and your coauthors, and that this section is correct. Edit the text directly if changes are required.	Author	p.sharratt@lancaster.ac.uk	Author	No conflicts of interest or disclosures to be included
Q4	Please check that funding is recorded in a separate funding section, if applicable. Use the full official names of any funding bodies and include any grant numbers. Insert any changes to the	Author	p.sharratt@lancaster.ac.uk	Author	Full funding details included

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	funding section directly in the text.				in the relevant section.
Q5	Please check the edits made to the title and make any necessary changes directly in the text. Note that significant changes to the title may be sent to the journal editor for approval.	Author	p.sharratt@lancaster.ac.uk	Author	No changes to be made to the title
Q6	Please provide Department details in the affiliation 2 directly in the text.	Author	p.sharratt@lancaster.ac.uk	Author	department added
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Q21	Please provide the publisher location for reference 12 directly in the reference.	Author	p.sharratt@lancaster.ac.uk	Author	provided
Q22	Please provide the publisher name, publisher location for reference 17 directly in the reference.	Author	p.sharratt@lancaster.ac.uk	Author	provided
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Q26	Please provide the publisher location for reference 31 directly in the reference.	Author	p.sharratt@lancaster.ac.uk	Author	provided
Q27	Please provide the publisher name, publisher location for reference 56 directly in the reference.	Author	p.sharratt@lancaster.ac.uk	Author	provided
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