






SYSTEMATIC REVIEW-META-ANALYSIS

Pain Management and Sedation

Patient, family member, and ambulance staff experiences of prehospital acute pain management in adults: A systematic review and meta-synthesis

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Abstract

Background: We aimed to synthesize the qualitative experiences of patients, their family members, and ambulance staff involved in the prehospital management of acute pain in adults and generate recommendations to improve the quality of care.

Methods: A systematic review was conducted following the enhancing transparency in reporting the synthesis of qualitative research (ENTREQ) guidelines. We searched from inception to June 2021: MEDLINE, CINAHL Complete, PsycINFO and Web of Science (search alerts were screened up to December 2021). Articles were eligible for inclusion if they reported qualitative data and were published in the English language. The Critical Appraisal Skills Program for qualitative studies checklist was used to assess risk of bias, thematic synthesis was performed on included studies and recommendations for clinical practice improvement were generated.

Results: Twenty-five articles were included in the review, representing over 464 patients, family members, and ambulance staff from 8 countries. Six analytical themes and several recommendations to improve clinical practice were generated. Strengthening the patient-clinician relationship by building trust, promoting patient empowerment, addressing patient needs and expectations, and providing a holistic approach to pain treatment is key to improving prehospital pain management in adults. Shared pain management guidelines and training across the prehospital and emergency department intersection should improve the patient journey.

Conclusion: Interventions and guidelines that strengthen the patient-clinician relationship and span the prehospital and emergency department phase of care are likely to improve the quality of care for adults suffering acute pain in the prehospital setting.

KEYWORDS

Acute Pain, Emergency Medical Services, Paramedics

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1 | INTRODUCTION

1.1 | Background

Pain is “an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage.”¹ Access to pain management is considered a fundamental human right² and effective pain management has recently been identified as a key quality outcome measure for ambulance services.³

In England during 2019–2020, 4.3 million adults were transported to emergency departments by ambulance.⁴ Pain is a frequent presenting complaint experienced by up to two-thirds of patients who require an ambulance.^{5–8} Prehospital pain management in adults is considered poor, with only 36.7%–40.7% of patients achieving meaningful reductions in pain (pain score reduction of 2 or more out of 10).^{6,9}

A recent qualitative scoping review explored factors influencing analgesic administration in the prehospital setting among adults and children.¹⁰ Practitioner, patient, and environmental factors were identified, and the study noted the difficulty in assessing pain, knowledge deficits, and stress and anxiety as barriers to analgesic administration. Considering that pain is a personal experience influenced by biopsychosocial factors,¹ it is important to explore the literature beyond analgesic administration, because nonpharmacological interventions and psychological and social factors are important components of the pain management process.¹¹ It is also important to understand the experiences of pain management from the perspective of all key stakeholders, including patients, family members, and ambulance staff because this will enable the development of patient-centered recommendations to inform future service delivery, policy, and interventions.

1.2 | Importance

Poor acute pain management can prevent or disrupt sleep¹² and reduce the quality of life,¹³ and patients who do not receive adequate acute pain management are at increased risk of developing chronic pain.^{14,15} Chronic pain is an increasing global burden,¹⁶ and therefore, improving acute pain management may reduce the overall burden of chronic pain. Several economic consequences of poor pain management have been identified, including the increased costs associated with readmission or seeking further health care¹⁷ and the increased likelihood of occupational sickness absence and unemployment in those suffering pain.¹⁸ Given that there are physical, psychological, social, and economic consequences of poor pain management,^{1,14} a more in-depth understanding of this complex phenomenon is needed to help drive improvements in care.

1.3 | Goals of this investigation

This review aimed to synthesize the qualitative experiences of patients, their family members, and ambulance staff involved in the prehospital management of acute pain in adults and generate recommendations to improve the quality of care.

The Bottom Line

Prehospital acute pain management in adults requires a holistic approach that promotes patient empowerment, develops trust and addresses patient needs and expectations. Stronger collaboration across the prehospital-emergency department intersection is needed to improve the emergency care pathway.

2 | METHODS

2.1 | Study design and registration

This systematic review and meta-synthesis adhered to the ENTREQ (enhancing transparency in reporting the synthesis of qualitative research)¹⁹ and PRISMA (preferred reporting items for systematic reviews and meta-analyses) reporting guidelines.²⁰ The protocol was registered on the international prospective register of systematic reviews PROSPERO (registration: CRD42021248514).

2.2 | Search strategy

The following databases were searched:

- MEDLINE via EBSCOhost (inception to June 17, 2021)
- CINAHL Complete via EBSCOhost (inception to June 18, 2021)
- PsycINFO via EBSCOhost (inception to June 18, 2021)
- Web of Science—all databases (inception to June 16, 2021, with citation alert screening until December 31, 2021).

An academic librarian (M.O.) assisted with search strategy development and full-text acquisition. Reference lists of included articles were screened for additional articles. The qualitative search filter, produced by University of Texas Health Science Center at Houston: School of Public Health was adapted and used.²¹ See Appendix S1 for the final search strategy for each database.

Primary studies that included qualitative data in the context of prehospital pain management in adults reported in English were included. Reviews (although their reference lists were screened) along with battlefield, Helicopter Emergency Medical Service, and police service studies were excluded due to the limited number and the significant difference in context.

2.3 | Selection of studies

Covidence software was used to remove duplicates and perform title and abstract screening. Screening was performed in duplicate and led by two reviewers (N.W. and G.A.W.). For those references not

excluded by title and abstract review, full text articles were retrieved and screened for eligibility with disagreements resolved through discussion.

2.4 | Data extraction and quality assessment

Data extraction was performed within Covidence for study characteristics by one reviewer and verified by another, all reviewers were involved in this process. Extracted data were transferred to NVivo (QSR International) software version 12 to facilitate thematic synthesis. Two reviewers extracted qualitative data (both raw participant data and the author's analysis of data) from the abstract results, main results, and discussion section where appropriate, initially from two pilot articles to allow comparison between reviewers and benchmark the technique. Reviewers then continued to extract qualitative data for the remaining articles.

The Critical Appraisal Skills Program checklist for qualitative studies²² and the Joanna Briggs Institute checklist for analytical cross-sectional studies²³ were used for qualitative and survey studies, respectively. Critical appraisal was performed independently and in duplicate with discrepancies resolved through discussion. Studies were not excluded based on their quality.

2.5 | Data analysis

Systematic reviews of qualitative studies allow the generation of new concepts and hypotheses from vast quantities of data using established synthesis techniques such as thematic synthesis.²⁴ The aim of thematic synthesis is to integrate and interpret findings from various similar qualitative studies that are exploring the same phenomena or experience.^{24,25} We synthesized both raw participant data included as quotations and author analyses of data as we felt both provided important perspectives that improved our understanding of the phenomena of interest. Original participant transcripts were not sought, only data extracted from the included articles were synthesized.

Supported by NVivo, we used thematic synthesis to code the extracted data "line-by-line," develop "descriptive themes," and generate "analytical themes."²⁴ Themes were generated inductively, led by A.N.S., and all authors were involved in the iterative refinement of the descriptive and analytical themes. During the synthesis, we were particularly interested to identify areas of perceived importance during the prehospital phase of pain management care and what factors promote or inhibit good pain management. Recommendations for clinical practice improvement and further research were then generated from the thematic synthesis analytical themes, led by G.A.W. and iteratively refined by all authors.

This review was undertaken by a clinical academic paramedic (G.A.W.), a medical physician undertaking postgraduate academic training (N.W.), two academic research fellows (F.C. and D.N.), an academic librarian (M.O.), and a clinical academic general practitioner (A.N.S.). We ensured that all stages of the review involved more than one team

member to minimize the impact of any individual bias and to ensure a mixture of clinical and academic input at each stage. The findings of this review were also assessed externally by a study review group based at the University of Lincoln to ensure congruence between the included data and our interpretation.

3 | RESULTS

From 4290 screened articles, and 4 articles identified through other sources, we included 25 articles in this review. See Figure 1 for the PRISMA flow diagram.

The included studies represented the views of over 464 patients, family members, and ambulance staff from 8 countries including Sweden, the United Kingdom, Australia, Canada, and South Africa. See Table 1 for the summary of included studies.

The critical appraisal results for the included qualitative studies (see Figure 2) illustrate a low risk of bias across the majority of studies included in this review. A large number of studies ($n = 11$) did not adequately discuss the relationship between the researcher and participants (reflexivity). We therefore recommend future qualitative studies follow established reporting guidelines such as the consolidated criteria for reporting qualitative research guidelines⁵¹ or the standards for reporting qualitative research guidelines.⁵² Forslund³⁶ and Lord and Parsell⁴⁴ were assessed using the Joanna Briggs Institute checklist for analytical cross-sectional studies due to their survey design, both of which were assessed as low risk of bias, see Appendix S1.

Thematic synthesis resulted in the generation of 6 analytical themes. See Table 2 for the descriptive and analytical themes. The full codebook has been provided in Appendix S1.

3.1 | Addressing patient needs, expectations, and beliefs is important

Some patients expected immediate pain relief, and some ambulance clinicians anticipated this expectation from patients, particularly for significant injuries.^{31,38} Some patients were more demanding of pain relief and desperate for pain to be relieved. Other patients accepted oligoanalgesia due to perceived time restraints, limited resources, or limited scope of ambulance clinicians.³⁸

Patients felt there were many benefits to effective pain relief, such as facilitating movement to the ambulance.³¹ Some patients felt their pain treatment was meaningful^{26,39} and praised ambulance clinicians stating they were "miracle workers."³¹ Others stated the importance of the "healing touch," with simply hand holding for support or careful manual handling perceived as important.²⁶

As a result of the pain and/or treatment, some patients experienced psychological conditions such as confusion and forgetfulness regarding the event, hallucinations and even near-death experiences.²⁶ Such psychological conditions prompt a unique set of patient needs that require careful navigation and comfort from ambulance clinicians. Some patients questioned whether they fainted or tripped over for

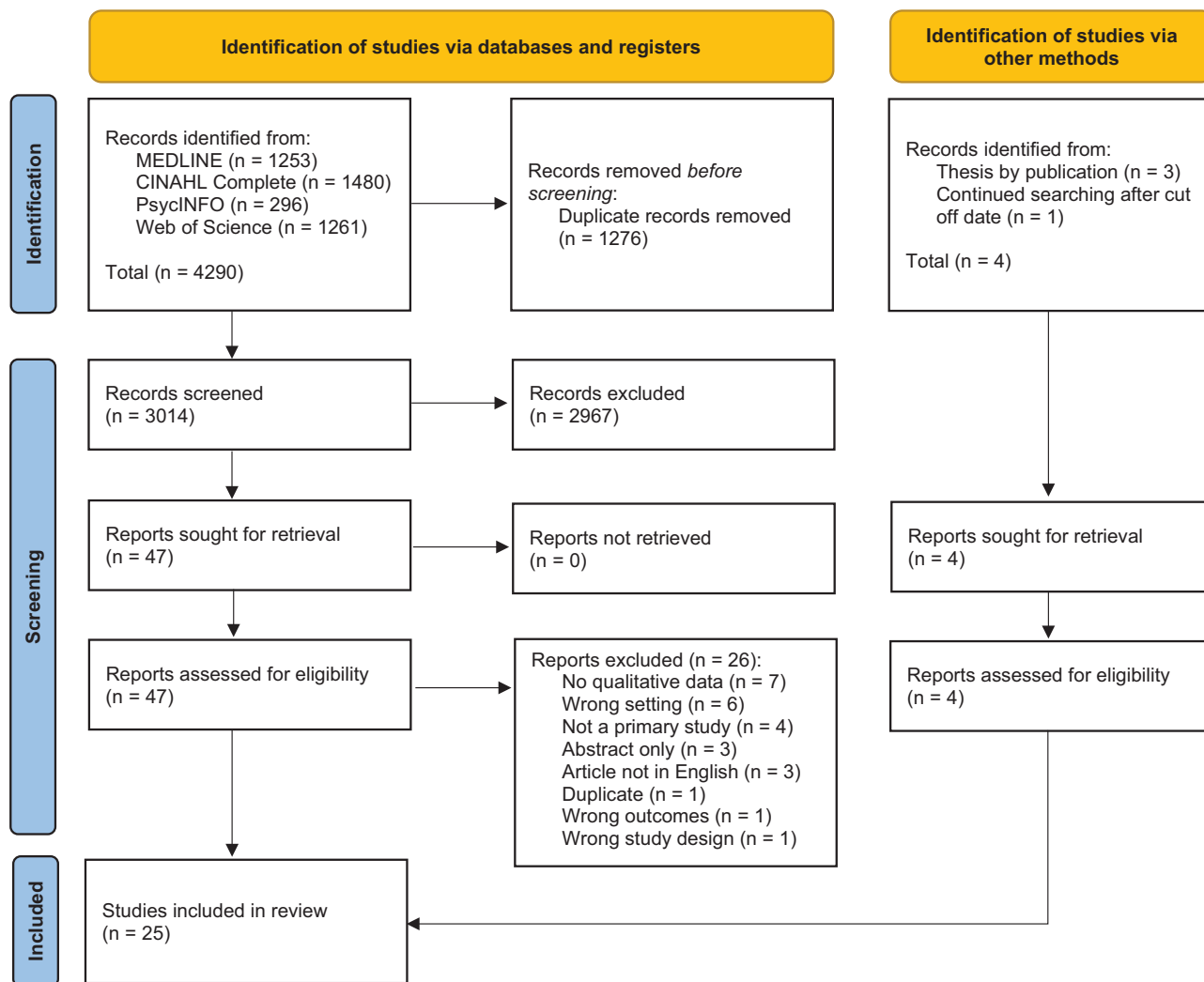


FIGURE 1 PRISMA flow diagram.

example. One patient stated, “I asked where they put the needle, what the hell had I done, what injury did I have?” Aronsson et al²⁶ [participant quotation]. Describing recruitment into a pain treatment study, one patient explained how their memory of the event was somewhat lacking: “I think he asked me if I would go into this scheme and I have a feeling that they asked me that and I know I said yes to something. And he gave me an injection and that was fine. I don’t even remember going into the hospital.” Evans et al³¹ [participant quotation].

3.2 | The clinician–patient relationship is key to enabling good pain management

Ambulance clinicians felt that good clinician–patient communication enabled effective pain management in challenging environments.²⁸ One key element of good communication was clear explanation of the situation and of the expected chain of care.⁴⁰ Regular re-evaluation of pain was deemed important as well as allowing the patient to choose additional analgesic administration where needed.⁴⁰ Good verbal and

nonverbal communication was found to engender well-being, trust, confidence, and reassurance for patients.²⁹ Professional behavior and conduct were also a key aspect of care, as prioritization of the tasks over and above the patient were deemed to have a negative impact on the patient, creating a sense of loneliness.²⁶

Fostering trust, care and patient empowerment were perceived as important by ambulance clinicians when managing adults suffering pain. It was found that “Having a calm approach while encountering patients with chest pain is experienced as a prerequisite in obtaining the patient’s trust.” Carnesten et al²⁹ [researcher quotation]. Creating conditions of participation and adapting to the patient’s needs were methods identified to promote patient empowerment.⁴⁰

It was also noted that there was potential for conflict in the clinician–patient relationship, particularly when drug misuse was suspected: “Some [prehospital emergency nurses] tried to meet patients’ desire for pain relief and gave pain relief medication, while others abstained, which many times complicated their work. This created conflicts in the patient relationship concerning how pain was to be treated.” Bohm et al²⁸ [researcher quotation].

TABLE 1 Summary of included studies..

Author and year	Country	Participants	Sample size	Data collection	Study aim
Aronsson et al ²⁶ 2014	Sweden	Patients	10	Interviews	To describe and explain older patients' lived experiences of prehospital emergency care in cases of suspected hip fractures after falling
Berben et al ²⁷ 2012	Netherlands	Ambulance staff	33 ^a	Focus groups and interviews	To give insight into facilitators and barriers in pain management in trauma patients in the chain of emergency care in the Netherlands
Bohm et al ²⁸ 2019	Sweden	Ambulance staff	8	Interviews	To describe PENs experiences of relieving pain in patients with addiction problems, otherwise called Substance Abuse Syndrome
Carnesten et al ²⁹ 2021	Sweden	Ambulance staff	7	Interviews	To describe the phenomenon of the caring approach while encountering EMS patients with chest pain from RNs lived experiences
Clarke et al ³⁰ 1998	United Kingdom	Ambulance staff	21	Interviews	To document and assess paramedic analgesia management across the 7 ambulance services participating in the Northern and Yorkshire Regional Ambulance Clinical Audit Project
Evans et al ³¹ 2019a	United Kingdom	Patients, family members	7	Interviews	To explore patients' experience of receiving pain relief injection for suspected hip fracture from paramedics at the location of the injury
Evans et al ³² 2019b	United Kingdom	Ambulance staff	11	Focus groups	To explore paramedics' experience of delivering FICB to patients with suspected hip fracture at the scene of injury
Forslund et al ³³ 2004	Sweden	Ambulance control staff	16	Interviews	To analyze the situations that emergency operators experienced as difficult to deal with and their reflections on how they managed them
Forslund et al ³⁴ 2005	Sweden	Patients	13	Interviews	To illuminate how patients with acute chest pain experience the emergency call and their pre-hospital care
Forslund et al ³⁵ 2006	Sweden	Ambulance control staff	19	Interviews	To describe registered nurses' and emergency-operators' experiences of working together at an EMD-center after adding registered nurses to increase medical competence
Forslund ³⁶ 2007	Sweden	Ambulance staff	336 ^b	Survey	To describe ambulance personnel's perceptions regarding the quality of the information received from the EMD-center with acute chest pain alarms
Forslund et al ³⁷ 2008	Sweden	Family members	19	Interviews	To illuminate how spouses to persons with acute chest pain experienced the alarm situation, the emergency call and the prehospital emergency care
Iqbal et al ³⁸ 2013	United Kingdom	Ambulance staff, patients	55 ^a	Focus groups and interviews	To investigate patients' and practitioners' views and experiences of pre-hospital pain management to inform improvements in care and a patient-centered approach to treatment
Ivarsson et al ³⁹ 2018	Sweden	Patients	14	Interviews	To elucidate perceived situations experienced by patients with hip fracture during the pre- and in-hospital phase
Jakopovic et al ⁴⁰ 2015	Sweden	Ambulance staff	22	Interviews	To describe the ambulance personnel's experience of managing the pain of patients with a suspected hip fracture
Jangland et al ⁴¹ 2016	Sweden	Patients	5	Interviews	To explore how patients with acute abdominal pain describe their experiences of fundamental care across the acute care episode

(Continues)

TABLE 1 (Continued)

Author and year	Country	Participants	Sample size	Data collection	Study aim
Jones & Machen ⁴² 2003	United Kingdom	Ambulance staff	6	Interviews	To explore paramedics' perceptions of patients in pain and the paramedics' perspective of pre-hospital pain management
Jones et al ⁴³ 2019	United Kingdom	Ambulance staff	11	Focus groups and interviews	We aimed to assess whether a multi-center randomized trial to evaluate FICB was feasible
Lord and Parsell ⁴⁴ 2003	Australia	Ambulance staff	35	Survey	The aim of this study was to use a VAS to measure the adequacy of prehospital pain management
Lourens et al ⁴⁵ 2021	South Africa	Ambulance staff	25	Focus groups	The aim was to gain a deeper understanding, and insight into perceived barriers and facilitators of acute prehospital pain assessment and management
Rosenberg et al ⁴⁶ 2020	Rwanda	Ambulance staff	20	Interviews	To explore the pain experiences and expressions of acutely ill patients on the ambulance in Rwanda from the perspective of those working on the ambulance and investigate emergent pain diagnosis and management on the ambulance in Rwanda
Tegelberg et al ⁴⁷ 2020	Sweden	Ambulance staff	19	Interviews	The aim was to explore, from the perspective of RNs and physicians, how care is provided for patients with acute abdominal pain in the acute care chain, and to identify barriers that they describe in the delivery of care
Togher et al ⁴⁸ 2015	United Kingdom	Patients, family members	30	Interviews	To investigate the aspects of emergency ambulance service care valued by users
Vlahaki ⁴⁹ 2016	Canada	Ambulance staff	43	Interviews	To identify barriers to pre-hospital oral analgesia administration to adult patients, as perceived by paramedics
Walsh et al ⁵⁰ 2013	United States	Ambulance staff	15	Focus groups and interviews	The objective of this study was to identify impediments or deterrents to administering analgesia to EMS patients based on the experiences and perspectives of prehospital medical providers

Note: Ambulance staff—patient facing staff including paramedics, nurses, emergency medical technicians and emergency care assistants; Ambulance control staff—call takers and clinicians who assess and advise patients over the telephone.

Abbreviations: EMD, emergency medical dispatch; EMS, emergency medical service; FCIB, fascia iliaca compartment block; PENs, prehospital emergency nurses; RNs, Registered Nurses; VAS, visual analogue scale.

^aBerben et al²⁷ and Iqbal et al³⁸ included some emergency department staff experiences.

^bNumber of completed surveys (surveys were completed multiple times by approximately 100 ambulance staff).

3.3 | Improved guidelines and protocols informed by more evidence are required

Many of the guidelines and protocols were deemed to lack sufficient evidence, clarity, and scope.⁴⁷ Ambulance clinicians felt there was a lack of monitoring, feedback, and evidence and suggested mechanisms of professional feedback to support and improve pain management.²⁷ A fear of consequences for incorrect use of pain medication was also highlighted by staff.⁴⁹ Having separate prehospital and emergency department pain management guidelines was seen as a barrier to effective care, and that shared guidelines, training, and implementation would help improve the patient journey.^{38,27} It was found that “‘One pain guideline for the chain of emergency care’ was seen as a facilitator of effective pain management.” Berben et al²⁷ [researcher

quotation]. Ambulance clinicians often experience a clash between expertise and protocols, stating that protocols and guidelines were inadequate: “Paramedics brought up that the ‘national EMS [emergency medical service] analgesia protocol was inadequate’: it did not offer sufficient and adequate pharmacological options and gave limited room for the professional expertise of the paramedics.” Berben et al²⁷ [researcher quotation].

3.4 | Improved understanding and compliance of pain assessment is needed

Clinical assessment may complement, conflict or supersede pain scoring or treatment, with one study stating that “While many of the

Author Year	Question Number*									
	1	2	3	4	5	6	7	8	9	10
Aronsson 2014	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Berben 2012	Green	Green	Green	Green	Green	Yellow	Green	Green	Green	Green
Bohm 2019	Green	Green	Green	Green	Green	Yellow	Green	Green	Green	Green
Carnesten 2021	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Clarke 1998	Green	Green	Green	Yellow	Green	Yellow	Yellow	Yellow	Green	Green
Evans 2019a	Green	Green	Green	Green	Green	Yellow	Green	Green	Green	Green
Evans 2019b	Green	Green	Green	Green	Green	Yellow	Yellow	Green	Green	Green
Forslund 2004	Green	Green	Green	Green	Green	Yellow	Yellow	Green	Green	Green
Forslund 2005	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Forslund 2006	Green	Green	Green	Yellow	Green	Yellow	Green	Green	Green	Green
Forslund 2008	Green	Green	Green	Green	Green	Yellow	Green	Green	Green	Green
Iqbal 2013	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Ivarsson 2018	Green	Green	Green	Yellow	Green	Green	Green	Green	Green	Green
Jakopovic 2015	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Jangland 2016	Green	Green	Green	Green	Green	Yellow	Green	Green	Green	Green
Jones 2003	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Jones 2019	Green	Green	Green	Green	Green	Yellow	Green	Green	Green	Green
Lourens 2021	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Rosenberg 2020	Green	Green	Green	Yellow	Green	Yellow	Green	Green	Green	Green
Tegelberg 2020	Green	Green	Green	Green	Green	Yellow	Green	Green	Green	Green
Togher 2015	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
Vlahaki 2016	Green	Green	Green	Green	Green	Yellow	Green	Green	Green	Green
Walsh 2013	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green

Low risk of bias	Green
Unclear risk of bias	Yellow
High risk of bias	Red

*Questions

1	Was there a clear statement of the aims of the research? (Yes, Can't tell, No)
2	Is a qualitative methodology appropriate? (Yes, Can't tell, No)
3	Was the research design appropriate to address the aims of the research? (Yes, Can't tell, No)
4	Was the recruitment strategy appropriate to the aims of the research? (Yes, Can't tell, No)
5	Was the data collected in a way that addressed the research issue? (Yes, Can't tell, No)
6	Has the relationship between researcher and participants been adequately considered? (Yes, Can't tell, No)
7	Have ethical issues been taken into consideration? (Yes, Can't tell, No)
8	Was the data analysis sufficiently rigorous? (Yes, Can't tell, No)
9	Is there a clear statement of findings? (Yes, Can't tell, No)
10	How valuable is the research?

FIGURE 2 Critical appraisal results.

paramedics affirmed that pain is a subjective phenomenon, there was more willingness to treat pain associated with physical signs, such as limb deformity, hypertension, tachycardia, anxiety, or sweating.” Walsh et al⁵⁰ [researcher quotation].

A variety of assessment methods were available to measure pain, with the verbal numeric (0–10) scale often used^{42,46}; however, it was perceived as challenging to understand and interpret as it lacked detail and depth with its accuracy and validity being questioned.^{38,27,42} One study highlighted how a simpler, dichotomous assessment (pain or no pain) might be beneficial.⁴⁹

There were barriers and resistance to the use of validated pain assessment scales, particularly where communication and language

difficulties were present^{38,42,33} or where diffuse, nonspecific symptoms were reported.³³ Resistance to the use of pain assessment scales was identified in the context of trauma, where injury treatment was deemed a greater priority than pain assessment²⁷ and in cases of perceived pain score inaccuracy due to suspected dishonesty or overestimation of pain.⁴⁵ There was also variation in pain score understanding reported by patients, with some finding the verbal numeric scale (0–10) confusing, perhaps due to the nature of the pain scale or its poor delivery by some ambulance clinicians (that may warrant re-training): “The ambulance man, he sort of asked me ‘is it [pain] a two or is it a three’ and I was thinking ‘is this out of what?’” Iqbal et al³⁸ [participant quotation].

TABLE 2 Thematic synthesis: descriptive and analytical themes.

Analytical themes	Descriptive themes
Addressing patient needs, expectations, and beliefs is important	Benefits of effective pain relief Experiences, expectations, or beliefs Psychological effects of condition
The clinician-patient relationship is key to enabling good pain management	Caring, trust, and empowerment Clinician-patient communication Good verbal and nonverbal communication engender well-being, trust, confidence, and reassurance Professional behavior and conduct
Improved guidelines and protocols informed by more evidence are required	Conflict between expertise and protocols Deficient evidence, clarity, and scope Lack of monitoring, feedback, and evidence base
Improved understanding and compliance of pain assessment is needed	Clinical assessment complementing, conflicting, or superseding pain scoring or treatment Different methods of pain assessment Resistance to validated pain assessment Variable understanding of pain scores
A multifactorial approach to pain treatment decision-making is key to enabling good pain management	Contextual factors affecting pain management Resource and financial constraints or incentives Ethical challenges of pain management Nondrug vs analgesic drug options and determinants Understanding and mitigating adverse effects Use and benefits of analgesics Nondrug treatment of pain Patient and clinician influences on pain treatment decisions
Improved pain care continuity within and across organizations is key to enhancing the patient journey	Dispatch information about pain Shared guidelines, training, and implementation Perceived lack of pain care continuity and collaboration across care chain

3.5 | A multifactorial approach to pain treatment decision-making is key to enabling good pain management

Pain treatment decisions included consideration of both pharmacological and nonpharmacological interventions and ambulance clinicians were eager to stress the importance of nonpharmacological techniques.^{38,28,45}

Patient and clinician influences on pain treatment decisions were identified, with disagreements between crewmates identified as a barrier⁴⁹, resolution of patient emotion (such as anxiety) taking precedence over pain relief⁵⁰ and clinician negative attitudes toward weaker analgesics (such as paracetamol and ibuprofen) limiting their administration.⁴⁹

There were ethical challenges to pain management, particularly around consent and patients' memory of consenting to treatments as discussed in the "Addressing patient needs, expectations and beliefs

is important" theme, for example: "*Patients had little or no memory of being offered, consenting to or receiving FICB [fascia iliaca compartment block] from a paramedic to manage pain associated with hip fracture.*" Evans et al³¹ [researcher quotation]. There were also considerations regarding a patient's right to pain medication, particularly for suspected substance misuse and potential litigation for not administering pain medication.^{28,45}

Several contextual factors were identified that influence pain management, such as distance to hospital,^{49,45} potential hospital staff perceptions of pain management,⁴⁵ extrication considerations,⁴⁹ environmental factors,⁴⁷ family, friend and public bystander interactions (calm and relaxed vs. agitated or abusive),⁴⁵ organizational factors,⁴⁵ and pain education and knowledge: "*The participants also identified that one of the principal reasons they administer analgesia is to assist in getting a patient out of a situation and to aid their removal to hospital, as opposed to purely because they are in pain.*" Jones and Machen⁴² [researcher quotation].

3.6 | Improved pain care continuity within and across organizations is key to enhancing the patient journey

The importance of efficient call handling and dispatch was highlighted when dealing with adult patients suffering pain, because many callers were the patient's next-of-kin or a health care professional and so a calm and detailed approach was deemed important.³⁶

The quality of information passed from dispatch to the attending ambulance crew was also deemed important. Ambulance clinicians felt that high quality information included a relevant assessment, sufficient information about the patient's condition, history, and information about the duration of pain.^{36,35} There were challenges identified with acquiring this information: *"The patient's wife who was the caller was rather stressed; it turned out to be abdominal pain not acute chest pain. It must have been difficult to get any medical history at all."* Forslund³⁶ [participant quotation].

There was consideration around pain care continuity and collaboration between the prehospital and emergency department setting, with clear communication at handover being highlighted as key to improving the patient care pathway.^{38,47} Discordance was identified where expectations and management of patients lacked consensus between settings: *"The data suggest a dissociation between prehospital and ED [emergency department] pain care, with hospital staff apparently lacking an understanding of the prehospital environment and scopes of practice... Some hospital staff disapprove or criticise prehospital pain management."* Lourens et al⁴⁵ [researcher quotation].

4 | LIMITATIONS

Most studies included in this review were from Sweden (12) and the United Kingdom (7), which is evidence of the extensive research activity on prehospital pain management within these specific geographies. There was a lack of evidence from other high-income settings and low- and middle-income settings. There were only a small number of studies that included family members (n = 3) and ambulance control staff (n = 2); therefore, the views and experiences of these groups were underrepresented in this review. The context for most of the studies included in our review was moderate-to-severe pain, so our findings may not be transferable to those suffering mild pain. Because of the difference in context, these review findings are not transferable to the in-hospital setting. Qualitative data from interviews and surveys provide access to what participants say, rather than what participants do. Analysis of these data is also subjective in nature. Triangulating these findings with quantitative data or participant observation would increase their validity. Two studies^{38,27} included experiences of ED staff. It was not possible to fully exclude the ED staff experiences from our analysis as we chose to include the full results section, including author narrative. Where possible, we ensured our analysis focused primarily on the prehospital experiences when analyzing these 2 studies.

5 | DISCUSSION

Thematic synthesis of 25 studies, representing the views and experiences of over 464 patients, family members and ambulance staff from 8 countries, resulted in the generation of 6 analytical themes. Each of these analytical themes were used to generate a recommendation for clinical practice improvement (see Figure 3) or further research.

5.1 | Address patient needs and expectations

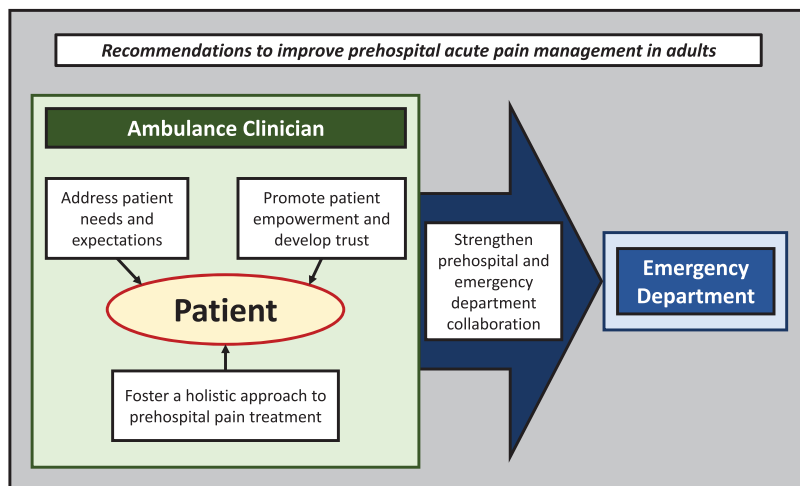
The needs and expectations of patients are an important consideration, especially given that mean reduction in pain score has recently been recommended, by expert, patient and public contributors, as a key outcome measure for ambulance services.³ Patient needs and expectations will vary significantly depending on the patient's prior experience, knowledge and understanding and will necessitate a holistic, highly adaptable approach from the prehospital clinician. Clinical guidelines and future interventions should accommodate the need for a patient specific, adaptable approach to prehospital pain management in adults.

5.2 | Promote patient empowerment and develop trust

Prehospital clinicians should increase patient participation in pain treatment decision-making to empower patients to achieve their pain reduction goals. Promoting patient empowerment will also help to address patient needs and expectations. Developing trust through enabling patient empowerment and providing comfort and reassurance will enhance the patient-clinician relationship; a strong relationship is key to good pain management. The importance of developing trust was reflected in a recent review of prehospital pain management in children, where ambulance clinicians prioritized the development of trust with the child before they could effectively manage pain.⁵³

5.3 | Foster a holistic approach to prehospital pain treatment

Good pain treatment requires an understanding of the contextual factors that influence decision-making, the benefits of analgesic administration, the importance of nonpharmacological interventions and ethical considerations. Clinicians should be encouraged to treat pain more readily to meet patient needs and expectations, making full use of nonpharmacological techniques when appropriate and to use analgesics even when perceived to be weaker, thus harnessing the psychosocial effect of analgesic administration.⁵⁴ This review highlighted a lack of clinician feedback, therefore ambulance clinician feedback systems should be implemented and maintained because previous research suggests clinical feedback may improve quality of care.⁵⁵


FIGURE 3 Recommendations for improvement.

5.4 | Strengthen prehospital and emergency department collaboration

The perceived lack of care continuity across the prehospital and emergency department intersection found in this review was corroborated by a recent review that identified prehospital clinician concerns about what emergency department staff would say regarding their prehospital treatment decisions.⁵³ The development and implementation of shared pain management guidelines and training across the prehospital and emergency department intersection may improve the patient's pain management journey.

5.5 | Recommendations for future research

Future research should focus on the development and validation of pragmatic prehospital pain assessment tools. In a multiple case study exploring emergency department pain scoring and treatment, Sampson et al⁵⁶ identified significant challenges to the pain assessment process, with clinicians placing a heavy reliance on implied understanding of the patient's level of pain and intuitive judgment of pain score, rather than the patient report, to guide treatment decisions. Implicit bias⁵⁷ is a concern, because factors such as patient ethnicity and sex have been shown to influence the pain management and assessment process,^{58,59} therefore the use of clinician judgment to assess and manage pain is not recommended, because clinicians often underestimate patients' pain.⁶⁰ Current pain scales and tools are confusing to patients and clinicians, with concerns over their accuracy and validity, and therefore prehospital pragmatic pain assessment tool development and validation work is urgently needed.

An increase in volume and quality of evidence is required to develop improved clinical guidelines and training. Frustration over clinical guidelines and protocols regarding pain management in the prehospital setting, due to the lack of evidence, ambiguity, and lack of patient focus is well established,^{10,53,61} and thus further research in the field of prehospital pain management is urgently needed.

Ethical considerations were raised in this review, specifically around the validity of informed consent when managing patients suffering acute pain. Prehospital ethics is a challenging topic that raises questions for clinical practice and research⁶² and further research in this field is required. When considering participant consent within future prehospital clinical trials of acute pain management in adults, the model of waived or deferred consent⁶² may be most appropriate, where participants are given the intervention after gaining assent, and later approached to give full consent for ongoing participation and use of data.

Prehospital acute pain management in adult patients is highly complex and challenging. Several recommendations for clinical practice improvement have been made and concerns were raised around mental capacity and the validity of consent in adults suffering acute pain in the prehospital setting. Interventions that foster the patient-clinician relationship and span the prehospital and emergency department phase of care are likely to improve the quality of care for adults suffering acute pain in the prehospital setting.

AUTHOR CONTRIBUTIONS

NW and ANS conceived the study. All authors contributed to each stage of the study, but each stage was led by specific reviewers. Protocol development was led by FC and NW, searching was led by NW and MO, screening was led by NW and GAW, data extraction and critical appraisal was led by DN and GAW and data synthesis was led by ANS. GAW drafted the manuscript, and all authors contributed substantially to its revision. GAW takes responsibility for the article as a whole.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflict of interest to disclose.

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REFERENCES

- Raja SN, Carr DB, Cohen M, et al. The revised international association for the study of pain definition of pain: concepts, challenges, and compromises. *Pain*. 2020;161(9):1976-1982.
- Brennan F, Lohman D, Gwyther L. Access to pain management as a human right. *Am J Public Health*. 2019;109(1):61-65.
- Turner J, Siriwardena AN, Coster J, et al. Developing new ways of measuring the quality and impact of ambulance service care: the PhOEBE mixed-methods research programme. *Programme Grants Appl Res*. 2019;7(3):1-90.
- NHS Digital. Hospital Accident & Emergency Activity 2019–20. 2020; Accessed September 24, 2021. <https://digital.nhs.uk/data-and-information/publications/statistical/hospital-accident-emergency-activity/2019-20>
- Friesgaard KD, Riddervold IS, Kirkegaard H, et al. Acute pain in the prehospital setting: a register-based study of 41,241 patients. *Scand J Trauma, Resusc Emerg Med*. 2018;26(1):53-53.
- Jennings PA, Cameron P, Bernard S. Epidemiology of prehospital pain: an opportunity for improvement. *Emerg Med J: EMJ*. 2011;28(6):530-531.
- Galinski M, Ruscev M, Gonzalez G, et al. Prevalence and management of acute pain in prehospital emergency medicine. *Prehosp Emerg Care*. 2010;14(3):334-339.
- Marinangeli F, Narducci C, Ursini ML, et al. Acute pain and availability of analgesia in the prehospital emergency setting in Italy: a problem to be solved. *Pain Pract*. 2009;9(4):282-288.
- Siriwardena AN, Asghar Z, Lord B, et al. Patient and clinician factors associated with prehospital pain treatment and outcomes: cross sectional study. *Am J Emerg Med*. 2019;37(2):266-271.
- Teoh SE, Loh CYL, Chong RIH, et al. A scoping review of qualitative studies on pre-hospital analgesia administration and practice. *Am J Emerg Med*. 2022;57:81-90.
- Pak SC, Micalos PS, Maria SJ, et al. Nonpharmacological interventions for pain management in paramedicine and the emergency setting: a review of the literature. *Evid Based Complement Alternat Med*. 2015;2015:873039.
- Pavlin DJ, Chen C, Penalzo DA, et al. A survey of pain and other symptoms that affect the recovery process after discharge from an ambulatory surgery unit. *J Clin Anesth*. 2004;16(3):200-206.
- Strassels SA, McNicol E, Wagner AK, et al. Persistent postoperative pain, health-related quality of life, and functioning 1 month after hospital discharge. *Acute Pain*. 2004;6(3):95-104.
- Sinatra R. Causes and consequences of inadequate management of acute pain. *Pain Med*. 2010;11(12):1859-1871.
- Mills SEE, Nicolson KP, Smith BH. Chronic pain: a review of its epidemiology and associated factors in population-based studies. *Br J Anaesth*. 2019;123(2):e273-e283.
- Jackson T, Thomas S, Stabile V, et al. A systematic review and meta-analysis of the global burden of chronic pain without clear etiology in low- and middle-income countries: trends in heteroge-
- neous data and a proposal for new assessment methods. *Anesth Analg*. 2016;123(3):739-748.
- Coley KC, Williams BA, DaPos SV, et al. Retrospective evaluation of unanticipated admissions and readmissions after same day surgery and associated costs. *J Clin Anesth*. 2002;14(5):349-353.
- Macfarlane GJ, Beasley M, Smith BH, et al. Can large surveys conducted on highly selected populations provide valid information on the epidemiology of common health conditions? An analysis of UK Biobank data on musculoskeletal pain. *Br J Pain*. 2015;9(4):203-212.
- Tong A, Flemming K, McInnes E, et al. Enhancing transparency in reporting the synthesis of qualitative research: ENTREQ. *BMC Med Res Methodol*. 2012;12(1):181.
- Page MJ, McKenzie JE, Bossuyt PM, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ*. 2021;372:n71.
- University of Texas Health Science Center at Houston: School of Public Health. Search Filters for Various Databases; 2021; Accessed June 2021. https://libguides.sph.uth.tmc.edu/search_filters/ovid_medline_filters
- Critical Appraisal Skills Programme. Critical Appraisal Skills Programme (CASP) Qualitative Research Checklist. 2018; Accessed January 18, 2022. <https://casp-uk.net/casp-tools-checklists/>
- Joanna Briggs Institute. CHECKLIST FOR ANALYTICAL CROSS SECTIONAL STUDIES. 2020; https://jbi.global/sites/default/files/2021-10/Checklist_for_Analytical_Cross_Sectional_Studies.docx
- Thomas J, Harden A. Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Med Res Methodol*. 2008;8:45.
- Ring NA, Ritchie K, Mandava L, et al. A guide to synthesising qualitative research for researchers undertaking health technology assessments and systematic reviews. 2011. NHS Quality Improvement Scotland (NHS QIS). Accessed October 27, 2020. <http://hdl.handle.net/1893/3205>
- Aronsson K, Björkdahl I, Wireklint Sundström B. Prehospital emergency care for patients with suspected hip fractures after falling - older patients' experiences. *J Clin Nurs*. 2014;23(21-22):3115-3123.
- Berben SA, Meijs TH, van Grunsven PM, et al. Facilitators and barriers in pain management for trauma patients in the chain of emergency care. *Injury*. 2012;43(9):1397-1402.
- Bohm K, Lund R, Nordlander J, et al. Ambulance nurse's experience to relieve pain in patients with addiction problems in Sweden. *Int Emerg Nurs*. 2019;46:100779.
- Carnesten H, Asp M, Holmberg M. Caring approach for patients with chest pain - Swedish registered nurses' lived experiences in emergency medical services. *Int J Qual Stud Health Well-being*. 2021;16(1):1901449.
- Clarke T, Ennis B, Joicey P, et al. Paramedic administered analgesia - an appraisal of current practice. *PHEM*. 1998;2(3):123-127.
- Evans BA, Brown A, Fegan G, et al. Is fascia iliaca compartment block administered by paramedics for suspected hip fracture acceptable to patients? A qualitative study. *BMJ Open*. 2019;9(12):e033398.
- Evans BA, Brown A, Bulger J, et al. Paramedics' experiences of administering fascia iliaca compartment block to patients in South Wales with suspected hip fracture at the scene of injury: results of focus groups. *BMJ Open*. 2019;9(2):e026073.
- Forslund K, Kihlgren A, Kihlgren M. Operators' experiences of emergency calls. *J Telemed Telecare*. 2004;10(5):290-297.
- Forslund K, Kihlgren M, Ostman I, et al. Patients with acute chest pain - experiences of emergency calls and pre-hospital care. *J Telemed Telecare*. 2005;11(7):361-367.
- Forslund K, Kihlgren M, Sorlie V. Experiences of adding nurses to increase medical competence at an emergency medical dispatch centre. *Accid Emerg Nurs*. 2006;14(4):230-236.
- Forslund K. *Challenges in prehospital emergency care - patient, spouse and personnel perspectives*. Orebro University; 2007. [Paper V: Acute

- chest pain alarms – ambulance personnel's perceptions of the quality of the information received from the EMD-centre].*
37. Forslund K, Quell R, Sørli V. Acute chest pain emergencies - spouses' prehospital experiences. *Int Emerg Nurs.* 2008;16(4):233-240.
 38. Iqbal M, Spaight PA, Siriwardena AN. Patients' and emergency clinicians' perceptions of improving pre-hospital pain management: a qualitative study. *Emerg Med J: EMJ.* 2013;30(3):e18.
 39. Ivarsson B, Hommel A, Sandberg M, et al. The experiences of pre- and in-hospital care in patients with hip fractures: a study based on critical incidents. *Int J Orthop Trauma Nurs.* 2018;30:8-13.
 40. Jakopovic D, Falk AC, Lindström V. Ambulance personnel's experience of pain management for patients with a suspected hip fracture: a qualitative study. *Int Emerg Nurs.* 2015;23(3):244-249.
 41. Jangland E, Kitson A, Muntlin Athlin A. Patients with acute abdominal pain describe their experiences of fundamental care across the acute care episode: a multi-stage qualitative case study. *J Adv Nurs.* 2016;72(4):791-801.
 42. Jones GE, Machen I. Pre-hospital pain management: the paramedics' perspective. *Accid Emerg Nurs.* 2003;11(3):166-172.
 43. Jones JK, Evans BA, Fegan G, et al. Rapid analgesia for prehospital hip disruption (RAPID): findings from a randomised feasibility study. *Pilot Feasibility Stud.* 2019;5(1):77.
 44. Lord BA, Parsell B. Measurement of pain in the prehospital setting using a visual analogue scale. *Prehosp Disaster.* 2003;18(4):353-358.
 45. Lourens A, Parker R, Hodkinson P. Emergency care providers' perspectives of acute pain assessment and management in the prehospital setting, in the Western Cape, South Africa: a qualitative study. *Int Emerg Nurs.* 2021;58:101042.
 46. Rosenberg A, Uwitonze E, Dworkin M, et al. Pain in the prehospital setting in Rwanda: results of a mixed-methods quality improvement project. *Pain Res Manag.* 2020;2020:3284623.
 47. Tegelberg A, Muntlin A, Juhlin C, et al. Engagement under difficult conditions: caring for patients with acute abdominal pain across the acute-care chain: a qualitative study. *Int Emerg Nurs.* 2020;52:100910.
 48. Togher FJ, O'Cathain A, Phung V-H, et al. Reassurance as a key outcome valued by emergency ambulance service users: a qualitative interview study. *Health Expect.* 2015;18(6):2951-2961.
 49. Vlahaki D. Paramedic perceptions of barriers to prehospital oral analgesia administration. *Australas J Paramedicine.* 2016;13(3):1-8.
 50. Walsh B, Cone DC, Meyer EM, et al. Paramedic attitudes regarding prehospital analgesia. *Prehosp Emerg Care.* 2013;17(1):78-87.
 51. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care.* 2007;19(6):349-357.
 52. O'Brien BC, Harris IB, Beckman TJ, et al. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med.* 2014;89(9):1245-1251.
 53. Whitley GA, Hemingway P, Law GR, et al. The predictors, barriers and facilitators to effective management of acute pain in children by emergency medical services: a systematic mixed studies review. *J Child Health Care.* 2021;25(3):481-503.
 54. Colloca L, Lopiano L, Lanotte M, et al. Overt versus covert treatment for pain, anxiety, and Parkinson's disease. *Lancet Neurol.* 2004;3(11):679-684.
 55. Wilson C, Howell A-M, Janes G, et al. The role of feedback in emergency ambulance services: a qualitative interview study. *BMC Health Serv Res.* 2022;22(1):296.
 56. Sampson FC, Goodacre SW, O'Cathain A. The reality of pain scoring in the emergency department: findings from a multiple case study design. *Ann Emerg Med.* 2019;74(4):538-548.
 57. FitzGerald C, Hurst S. Implicit bias in healthcare professionals: a systematic review. *BMC Med Ethics.* 2017;18(1):19.
 58. Bradford JM, Cardenas TC, Edwards A, et al. Racial and ethnic disparity in prehospital pain management for trauma patients. *J Am Coll Surg.* 2023;236(3):461-467.
 59. Zhang L, Losin EAR, Ashar YK, et al. Gender biases in estimation of others' pain. *J Pain.* 2021;22(9):1048-1059.
 60. Seers T, Derry S, Seers K, et al. Professionals underestimate patients' pain: a comprehensive review. *Pain.* 2018;159(5):811-818.
 61. Murphy A, Barrett M, Cronin J, et al. A qualitative study of the barriers to prehospital management of acute pain in children. *Emerg Med J: EMJ.* 2014;31(6):493-498.
 62. Armstrong S, Langlois A, Siriwardena N, et al. Ethical considerations in prehospital ambulance based research: qualitative interview study of expert informants. *BMC Med Ethics.* 2019;20(1):88.

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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