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Title page:

Title: Systematic mixed studies review and thematic synthesis of Emergency Department staff' perceptions of enablers and barriers to pain management.

Short running title: ED pain management review

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Introduction

Pain is the most common presenting feature within the Emergency Department (ED), yet under-treatment of pain in the ED is a well-documented problem worldwide. Despite the development of interventions to address this problem, there is still limited understanding of how pain management can be improved within the ED. This systematic mixed studies review aims to identify and critically synthesise research exploring staff views of barriers and enablers to pain management to understand why pain continues to be under-treated in the ED.

Methods

We systematically searched five databases for qualitative, quantitative and mixed methods studies reporting ED staff views of barriers and enablers to pain management in the ED. Studies were quality assessed using the Mixed Methods Appraisal Tool. Data were extracted and qualitative themes were generated by deconstructing data then developing interpretative themes. Data was analysed using convergent qualitative synthesis design.

Results

We identified 15,297 articles for title/abstract review, reviewed 138 and included 24 in the results. Studies were not excluded due to low quality, although lower scoring studies contributed less data to the analysis. Quantitative surveys focused more on environmental factors (e.g. high workload and bureaucratic restrictions) while qualitative studies revealed more insight about attitudes. We developed five interpretative themes from the thematic synthesis: 1) Pain management is seen as important but not a clinical priority 2) Staff do not recognise the need to improve pain management 3) The ED environment makes it difficult to improve pain management 4) Pain management is based upon experience, not knowledge 5) Staff lack trust in the patient's ability to judge pain or manage it appropriately.

Conclusions

Overly focussing on environmental barriers as principal barriers to pain management may mask underlying beliefs that hinder improvements. Improving feedback on performance and addressing these beliefs may enable staff to understand how to prioritise pain management.

Keywords: pain management, systematic mixed studies review, qualitative synthesis

What is already known on this subject

- Pain management within the ED is poorly managed. Reasons for this are complex and under-researched.
- Studies of staff views of barriers to pain management suggest a wide range of factors that influence how pain is managed, with quantitative surveys focusing on pre-conceived, non-modifiable barriers such as time and workload pressures.

What this study adds

- This synthesis of quantitative and qualitative studies found that whilst quantitative studies focus on non-modifiable barriers to pain management (e.g. organisational barriers) , qualitative studies indicated other modifiable barriers to pain management such as motivation to change, prioritization and knowledge and training.

How this study might affect research, practice or policy

- A clearer understanding of the range of barriers to pain management may help EDs address barriers to inadequate pain management by focusing on modifiable factors.
- Research exploring staff views needs to incorporate qualitative measures in order not to limit understanding of issues explored.

Why is pain management so difficult in the Emergency Department? A systematic mixed studies review and thematic synthesis of staff perceptions of enablers and barriers to pain management within the Emergency Department.

Introduction

Pain is the most common presenting feature within the Emergency Department (ED) yet under-treatment of pain is a well-documented problem worldwide (1-5). Comprehensive guidelines to assist with the management of acute pain in the ED exist, along with various effective pharmacological and non-pharmacological treatment to reduce pain that can be administered within EDs (6-10). However, evidence continues to show under-prescribing and delays to analgesia for patients with painful conditions. Recent empirical research, editorials and opinion pieces have suggested various underlying reasons for poor pain management, including poor alignment of pain management with ED processes and structures, high workload, difficulties in assessing and reassessing pain, reluctance to prescribe opioids, poor staff knowledge and unrealistic patient expectations (11-17). Pain management guidelines reference a need for further research in this area (6).

Whilst barriers to pain management are well known within other settings, the ED setting has a unique combination of organisational characteristics, which means that context-specific research into this area is essential (18). Understanding staff perceptions can reveal why interventions aimed at improving pain management appear to have limited success (19) and enable more effective interventions to pain management to be developed.

This systematic review aims to identify literature reporting staff perceptions of barriers and enablers to pain management in the ED and to synthesize the evidence to improve our understanding of modifiable and non-modifiable barriers and enablers to pain management.

Methods

We undertook a systematic mixed studies review and thematic synthesis of the published literature to identify staff perceptions of barriers and enablers to pain management in the ED. We followed the PRISMA checklist where applicable.

Search strategy.

We carried out a comprehensive two-stage literature search. Firstly, a broad and sensitive literature search was conducted with one reviewer (FS) initially screening articles by title and abstract to identify articles that potentially related to barriers or enablers to pain management in the ED. The broad search strategy was developed from a previous systematic review (19). Both authors reviewed this list against the selection criteria to select relevant articles and resolved disagreements about inclusion by discussion. (See appendix).

We searched the following databases in May 2016 (updated in October 2022): Medline (via Ovid), Embase (via Ovid), Cinahl (EBSCO), Web of Science, Cochrane central register of controlled trials. We also searched Opengrey (previously SIGLE) and Health Management Information Consortium for grey literature to identify peer-reviewed articles by authors of MSc or PhD dissertations that may have been missed within the database searches. No limits were placed on year of publication or

language. We also searched reference lists of reviews of pain management in EDs and reference lists of all included studies.

Study selection and inclusion criteria

We included any original research that reported data on staff perceptions of enablers or barriers to pain management within the ED. Studies were categorized as those that used naturalistic methods (qualitative studies using observation or open or semi-structured questions to elicit opinions from staff) and those that used a pre-defined set of questions to obtain staff or patient opinions about enablers and barriers to pain management in the ED (quantitative studies). Studies were excluded if they were based solely outside the ED (e.g. prehospital only, post-discharge) or if they related solely to procedural pain. We included research from any country and also included any ED pain population (e.g. paediatric, trauma etc.).

Quality assessment.

Assessment of risk of bias and quality of studies was undertaken by both authors using the 2011 McGill Mixed Methods Appraisal Tool (MMAT), which allows for critical appraisal of qualitative, quantitative and mixed methods studies (20).

Data extraction

Data from the results and discussion sections of qualitative studies were extracted independently by both authors and charted in MS Excel. Whilst all data (original participants' quotes and author's analysis) was used in the analysis, we report only original quotations to illustrate our findings. Data from qualitative studies were deconstructed into descriptive themes and reconstructed into interpretative themes, as described by Harden et al. (21).

Quantitative data came exclusively from observational data (surveys). Studies reporting Tanabe & Buschmann's questions (22) were tabulated. For other studies, the top 5 barriers and enablers were documented and the researcher's interpretations and conclusions about the results were summarised.

(See table 1 in supplementary material)

Research team and reflexivity

FS is a Health Services Researcher, with 20 years' experience of pragmatic health services research. MJ is a qualified Oncology nurse and was working in Public Health research at the time of the review. Neither have worked in the ED, so preconceptions around barriers and enablers were minimised, although FS was undertaking fieldwork into barriers and enablers to pain management concurrently in three UK EDs concurrently when undertaking the review. Articles written by either author were excluded from the evidence synthesis.

Patient and Public Involvement (PPI)

We did not consult with our PPI group due to this being a secondary review.

Data synthesis

Data was analysed using a convergent qualitative synthesis design described by Pluye et al (23). As there were no a priori theories of barriers and enablers developed, inductive coding was developed and thematic synthesis was used. FS and MJ read and re-read the qualitative data to understand the analytic meanings behind the data and developed themes which were then discussed and refined. Due to significant heterogeneity in the questions asked, narrative summaries of data from cross-sectional studies were developed (qualitizing the data), and the narratives were used to develop the themes. Qualitizing data involves finding an underlying qualitative representation of the quantitative data items. In this instance, the results of the different questions were interpreted and mapped alongside the qualitative findings. For example, high levels of agreement that 'lack of time to adequately assess and control pain' was a barrier was mapped onto the theme 'culture/context', subtheme 'Busy, noisy, pressurised environment with heavy workload, surges in demand and wide range of tasks that take up staff time'). The descriptive themes were analysed and discussed and the authors developed analytic themes, or inferred barriers which emerged as important in considering future intervention development (24, 25).

Results

The broad literature search identified 15,297 articles, once duplicates were removed. From these, 151 articles were identified as potentially including data on ED staff views regarding pain management and double-screened (by FS and MJ). Literature results are detailed in the Prisma flow diagram (Figure 1).

One study was available in abstract only and excluded due to limited results (26). We also excluded two articles published by one author of this current review prior to assessment for eligibility (one of which would have been eligible) due to concerns that the analysis may be influenced by that author's in-depth understanding of the data within that study and privilege the results of that study (16, 17). A total of 24 articles were analysed. Twelve studies used qualitative methods (14, 15, 27-36) Twelve articles reported quantitative surveys of barriers to pain management, four of which used the same survey questions of ED nurses, or a modified version of the survey questions reported by Tanabe & Buschmann 2000 (22, 37-47). The remaining four articles reported physician responses to a predefined list of potential barriers to pain management. The grey literature search identified 2 dissertations (48, 49) which we did not include within our analysis, although we searched for published articles by the authors.

Due to differences in outcome measures reported (see supplementary table 2) we did not combine responses across surveys. The surveys are discussed narratively, in relation to the themes identified within the qualitative surveys.

Study characteristics and summary of relevant findings are reported in the supplementary material (supplementary table 1). Only 4 of the qualitative studies specifically addressed enablers and barriers to pain management as the primary research question (2 from Australia, 1 Netherlands, 1 USA) with other included studies reporting barriers and enablers as part of broader studies (e.g. nurse perceptions of assessing pain). Qualitative studies incorporated focus groups and interviews (or a mixture), with one including documentary analysis and another including participant observation. Included articles were from North America (8), Australasia (6), Europe (5), Africa (3), Asia (2).

Quality assessment.

Results of the MMAT assessment are shown in Table 1. Quality of studies was lower for the quantitative descriptive studies than the qualitative studies. The lower scoring studies provided fewer details about the study methods and generally provided less data to contribute to the analysis. However, they were not excluded based upon their quality score as they offered some insight into the barriers and enablers to pain management. Study weaknesses are instead discussed within the narrative.

Themes

Data were organised into descriptive themes (table 2) and developed into five interpretive themes.

1) Pain management is seen as important but not a clinical priority.

Staff described an ED culture which prioritises dealing with 'sick' (27) people, with pain management portrayed as a non-essential task that may be more likely to be prioritised if useful in expediting diagnosis, particularly when diagnosis was seen as key to management (14, 15, 35). Staff asserted the need to prioritise 'what kills' first (14), with pain management not defined as a clinical priority, particularly chronic or other non-acute pain (27, 30, 36).

"I don't necessarily see back pain as a priority compared to […] other things that come in." (Emergency Nurse, 36).

Pain management was described as something that can be achieved only when other 'essential' tasks have been performed. Given the focus on moving patients quickly out of the department, the time required to adequately assess patients (particularly those with chronic pain), obtain analgesia and reassess pain was seen as prohibitive (32, 33)

The ED was described as 'saturated' (32) with patients in pain, leading to staff becoming desensitised to pain and normalising rather than prioritising pain, (27) which was seen as 'part of the deal' (14) .

"One of our main barriers has been burnt out staff with lack of empathy for patients, and I think that's universal among both medical and nursing staff, who've seen a lot of it and are working under big pressures, and pain management is just one too many things for them and they don't have enough empathy to see the pain and address it quickly." (Role not reported, 32)

At an organisational level, the ED is driven by targets on waiting times and other key performance indicators that are prioritised over quality indicators such as pain management (15).

"You just have to prioritize. I mean a cardiac red [arrest] comes before pain medication" (Role not reported, 27)

"We are here to find a diagnosis and move them on" (Emergency doctor, 15)

Quantitative survey themes of 'responsibility of caring for other acutely ill patients in addition to a patient with pain' and 'lack of time to adequately assess and control pain' support this theme and were in the top 4 barriers within each study reporting these themes.

2) Staff do not believe there is a need to improve pain management.

Although there was some awareness that patients were not receiving optimal pain management (15, 28, 35) there did not appear to be a strong belief in the need for change. Some interviewees reported that staff, particularly doctors, have a high level of confidence in their own abilities and assumed that current practice was appropriate. Alongside this self-confidence was a lack of protocols and guidance, (or a lack of awareness of existing protocols and guidance) so staff were not aware of the level of best practice that they should be achieving. A need to recognise deficiencies in existing practice through feedback (e.g. audit) was seen as an enabler to change in practice.

"*Everyone thought they were doing a good job. And they were very, very surprised to see that they were actually doing so badly." (Role not reported, 32).*

This lack of conviction of a need to change appears to be confounded by a lack of shared aim or 'ownership' of pain management between different staff groups and confusion over key roles (34), with a suggestion that doctors pass the responsibility on to nurses, whilst nurses have to rely on doctors to prescribe (27, 28).

"We [the nurses] are really at the mercy of what the physician wants to do. Sometimes it's easy to get orders and sometimes you can't get orders from them. The nurse is really powerless." (Nurse, 27)

The presence of a champion within the ED to own and drive forward improvement in pain management was seen as an enabler, along with buy-in for change from the whole team (14, 15, 27, 32).

3) The chaotic ED environment and staff role limitations makes it difficult to improve pain management

Staff described a working environment in which change or improvement was difficult, with policies and procedures that ran counter to providing good pain management (27, 35). Staff across all studies reported the ED environment and surges in demand as a significant barrier, with staff working in a busy, noisy pressurised environment with heavy workload, and a wide range of tasks that take up staff time (14, 15, 27, 28, 31, 35).

"Don't have time to get pain scores or analgesia" (Role not reported, 32)

ED overcrowding…it's a problem to do reassessments in triage; the waiting room area is also a challenge because there's usually such a large volume of people you can't reassess as properly as you'd like to (Nurse, 31)

Cross-sectional quantitative studies in particular focussed largely on barriers that were inherently outside the control of staff, such as 'lack of time to adequately assess and control pain' and 'responsibility of caring for other acutely ill patients in addition to a patient with pain' (22, 37-39). Departments were described as working at above capacity and bed-blocking led to nurses having to deal with higher number of patients than they could realistically deal with, leaving them feeling overwhelmed (27). One study highlighted how violent and abusive patients in particular detract from good pain management (34). Respondents describe the environment as prohibitive to achieving 'best practice' and the lack of time available to deal with patients as counter to effecting change.

"When you are battling to keep your head above water it's very hard to aim for excellence" (Emergency Doctor, 15)

Other organisational factors such as opiate protocols requiring physician sign-off and high junior doctor turnaround were seen as barriers to sustaining any attempts to change. A need for improved

teamwork, communication and collaboration between team members (particularly between staff working within the ED and management) emerged as a barrier particularly within the qualitative studies (14, 27, 32, 35). In particular, nurse-initiated analgesia was seen as an enabler to improving pain management as it removed the need to await physician prescription. An increase in nursing responsibilities was seen as beneficial, although this was not always recognised by patients (28, 35).

I know that nurses are now much [more] respected than before but physician dominance of [pain management] is common and [appreciated] by patients! [Smiling]…when the ED patient [steps in] he/she asks for only a physician to assess his/her pain. It is like we know nothing in [pain management]. (Nurse, 34)

"the vast majority of patients that we'd have come through could have the pain treated effectively with the nurse"(Role not reported, 28)

4) Pain management is based upon experience, not knowledge

Pain management in practice was reported to be based more on expert opinion rather than pain protocols, with knowledge and practices passed on from senior to junior staff (14, 15, 32). Despite reporting high levels of confidence in their own pain management practice, knowledge deficits about pain management principles were reported as a barrier (14). Staff revealed a desire for specific knowledge around various aspects of pain management (e.g. physiology of pain, knowledge about consequences of inadequate pain management, knowledge of side-effects and use of pain scales) that would enable them to counter unfounded myths (14, 32).

"The old surgical myth of don't give pain relief to a surgical patient awaiting surgical review in case you hide the symptoms… and also the myth about worrying about whether or not patients will become dependent on opioids" (Role not reported, 32)

Education and training was highlighted as an enabler along with knowledge of research and evidence (11, 32, 38) particularly given the high turnover of staff within the ED. Staff experience was also felt to be an enabler (14, 29), giving staff confidence, but may be a barrier when nursing staff rely on medical staff due to the high turnover of lower grade medical staff.

"I feel fairly confident, but I have been doing this for a while, you can kind of understand. But I feel confident to go up to the doctor and say this isn't working, we need to give some more pain killers – what do you suggest or here are my suggestions. So I feel confident in doing that and treating the patient with pain. Maybe 9/10 but we are all senior nurses and have been on the floor for a while" (*Nurse, 29*)

All of our medical staff have got such a high rotation we have internal residents they're really in the department for 10 weeks all we can really try and do is make them competent (Emergency Doctor, 15)

The lack of clear protocols and guidelines was also felt to reinforce the culture of learning through peer experience rather than evidence-based learning (14). A need to demonstrate 'proof of effectiveness' (26) for interventions was seen as an enabler to changing attitudes towards pain management (15).

Quantitative studies reported inadequate staff knowledge of pain management principles within the top half of the rankings with one exception (37). The need for education about pain management principles and training on use of guidelines were highlighted as potential enablers (38).

5) Staff lack trust in the patient's ability to judge pain or manage it appropriately

Staff revealed they had more confidence in their own ability to estimate patient pain levels than the patient (14, 28, 31, 32). Staff expressed doubt about the utility of pain scores, undertaking scoring because it was mandated rather than because they believed they were useful (27). Staff reported that patients' pain scores cannot be believed, partly due to a lack of patient understanding of how scoring works, communication difficulties or dementia (31), but also due to a feeling that patients manipulate the scores due to expectations of pain relief or drug seeking behaviour (14, 27).

A patient with a broken wrist gives a pain score of ten. All right, you should not generalise but a pain score of ten gets triage code orange [very urgent]. Naturally that never happens. These patients mostly get the yellow code [urgent]. (Triage nurse, 14)

The more you're there, the more they are being like, what we call dramatic. But when you walk away and no-one's around, they're fine. (Role not reported, 30)

Staff appeared to rely on their own judgement and 'visible signs' of pain (31) than patient reported scores, particularly where the pain score would increase the urgency of the triage category (14). There was a perception that relying on their own nursing or medical experience was a more accurate measure of pain levels than the use of validated patient reported pain scores (28).

…if there's any wincing or they're quiet or they just don't want to move. You can tell when someone is in pain and when someone isn't. (Role not reported, 31)

Texting whilst you walk in! That's a good sign [group laughter] that they are not requiring of morphine (Role not reported, 30)

Staff expressed frustration at patients for not taking analgesia when they considered it was required (14), or for expecting more analgesia than they were prepared or able to give. Patient responsibility for accepting reasonable analgesia was seen as an enabler (27).

Concordance between qualitative and quantitative studies.

All cross-sectional surveys were developed from a list of barriers to pain management developed from the general literature, (i.e. not specific to the ED) though the surveys were carried out in ED contexts. Qualitizing the quantitative data in order to undertake qualitative synthesis of the data was challenging, particularly due to the brief and unclear nature of some of the questions. Due to heterogeneity in the questions reported within the surveys, it was difficult to draw conclusions about the strength or prevalence of particular views, although certain themes were better represented within the different types of studies. The themes of time and workload pressures rated highly across all quantitative surveys. Quantitative surveys also raised questions that did not emerge from the qualitative studies. Interestingly, the barrier of 'inability to medicate unless diagnosis is made' was the top ranking barrier within the quantitative studies of Tanabe (22) and Duignan (37), yet was only mentioned briefly in one of the qualitative studies (28).

Discussion

Statement of principal findings

Despite the different scope, aim and settings of included studies, and considerable heterogeneity in the populations studied, we identified key interpretative themes from the data. The thematic synthesis suggested that staff feel that the environment and context of the ED is a major barrier to pain management with too many 'other priorities' to deal with and high workloads and surges in demand making it difficult to cope and find time for pain management. Barriers around lack of time and the responsibility of caring for other patients ranked highest amongst the surveys overall. However, the qualitative data revealed limited motivation to change, with staff not perceiving that their own pain management practices required improvement and expressing frustration at the patients whose expectations for pain management differ from their own. Pain was not seen as a 'clinical priority' or organisational priority; rather the focus was on diagnosing and moving patients appropriately, while meeting organisational targets. Staff relied on expert opinion and experience rather than knowledge gained from education, training or protocols.

The generation of interpretative themes from the evidence synthesis enabled deeper insight into the barriers and enablers to pain management than those provided by the individual studies themselves. Previous editorials and opinion pieces that reflected upon the barriers to pain management focussed largely on difficulties involved in assessing pain, reassessing pain and a reluctance to prescribe opioids due to fear of drug-seeking behaviour, as well as factors associated with patient expectations and poor staff knowledge. Whilst some of the articles included within this review also reported these factors, the overall analysis suggested that barriers are broader and involve beliefs and motivation regarding pain management. Findings also align with those themes identified by Sampson et al who found that pain management was not perceived to be an organisational priority, education and training on pain management was poor and that staff beliefs limited their capacity to improve pain management (17).

Strengths and limitations:

This mixed methods review synthesizes findings from both quantitative and qualitative studies on staff views of barriers and enablers to pain management in the ED and draws together perspectives of nurses, physicians, paramedics and other members of staff who have a role in pain management in the ED. Quantitative studies provided limited response sets but were included to provide an estimate of how strongly staff felt particular factors acted as barriers or enablers. The inclusion of qualitative data allowed themes to be developed inductively (i.e. culture, lack of belief in change, over-reliance on experience) which were not reflected in the pre-defined (deductive) research questions in quantitative studies that focused on organisational and environmental barriers.

The inclusion criteria for this review were broad, leading to considerable heterogeneity in the populations studied and focus of the articles. Some studies were over 10 years old. Only two of the qualitative studies had the identification of barriers and enablers to pain management as their primary aim. The total number of studies was low and saturation of data was not reached across all themes. Data quality was variable and even where studies scored reasonably well on the MMAT

criteria, they often lacked important details about data collection and analysis. Studies relied on staff reports and did not use observation or review of documentation, which can provide data that are not subject to social response bias. In interviews or focus groups, staff are more likely to depict the environment (i.e. an external factor) as a barrier rather than shortcomings to their own practice.

Results from these studies may have limited transferability to settings outside the country in which they are based, due to different emergency care systems. Due to the small number of studies, it was not possible to characterize results by country, or healthcare setting, or even by population (e.g. chronic/acute pain, paediatric/adult pain). However, combining heterogeneous populations allowed cross-cutting themes to be developed, and demonstrated that the wider barriers to pain management that relate to ED culture and attitude are not restricted to management of specific populations.

Studies provided a limited amount of data differentiating the perspectives of different staff groups. Identifying differences in views of physicians and nurses would allow better understanding of perceived staff barriers.

The initial title and abstract screening was undertaken by only one author; as no additional articles were identified by reference list searching, we do not feel that this will have significantly affected the results. One author was undertaking qualitative data collection and analysis concurrently and this may have impacted on themes derived, although data was also analysed by a second, independent analyst. Excluding the author's study from the analysis also meant that all potential data was not included.

Implications: possible explanations and implications for clinicians and policymakers

Despite a broad search strategy and inclusion criteria, this systematic review of the literature revealed limited research reporting barriers and enablers to pain management in the ED, with qualitative research emerging only within the past decade. This lack of evidence perhaps reflects the lower priority given to pain management in practice, the lack of belief in the need to change and the acceptance of the status quo we found in existing studies. Whilst research is being undertaken into improved methods of analgesia, there is little attention to how the processes of pain management can be improved in practice.

The rhetoric of time and environment as a barrier suggests that ED staff feel unable to break down or circumvent these barriers to change their practice. The lack of awareness of the need to change results in little impetus to change. However, we found a number of barriers that might be more open to change. Knowledge deficits and a desire for education and training suggest that there is potential to empower staff to understand pain management principles better and remove barriers due to lack of knowledge. Similarly, providing feedback (perhaps by pain champions) on performance may convey the importance of improving pain management. Organisational interventions such as nurse-initiated analgesia, management plans for regular attenders and clear protocols, as well as clarification of roles and responsibilities for who provides pain management, may also help improve practice whilst not increasing workload significantly.

Conclusions

ED staff perceptions of the environment and context of the ED as principal barriers to pain management may mask underlying beliefs that hinder but are amenable to improvements. Addressing these beliefs and providing clearer goals and expectations may enable staff to prioritise pain management.

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583

584 Table 1: Results of the Mixed Methods Appraisal Tool assessment.

	1.1	1.2	1.3	1.4	4.1	4.2	4.3	4.4	Score
Berben	Y	Y	Y	N					3
Bergman	Y	Y	Y	N					3
Bennetts	Y	Y	Y	N					3
Chafe	Y	Y	Y	N					3
Davidson	Y	Y	Y	N					3
Donnelly	Y	Y	N	N					2
Fry	Y	Y	Y	N					3
Gauntlett-Gilbert	Y	Y	Y	N					3
Gorowara-Bhat	Y	Y	Y	Y					4
Shaban	Y	Y	Y	N					3
Shoqirat	Y	Y	Y	Y					4
Wilsey (b)	Y	Y	N	N					2
Admassie					Y	DK	N	Y	2
Ali					DK	DK	N	Y	1
Duignan					Y	Y	Y	Y	4
Hamalainen					Y	DK	N	N	1
Lea Mortensen					Y	Y	Y	Y	4
Louriz					Y	N	DK	Y	2
Pretorius					Y	DK	Y	Y	3
Rampanjato					Y	Y	N	Y	3
Tanabe					Y	Y	Y	N	3
Thomas					Y	Y	N	Y	3
Tsai					Y	Y	Y	Y	4
Wilsey (a)					DK	DK	Y	Y	2

585 DK = don't know / unable to tell.

586 1.1 Are the sources of qualitative data (archives, documents, informants, observations) relevant to
587 address the research question (objective)?

588 1.2 Is the process for analyzing qualitative data relevant to address the research question
589 (objective)?

590 1.3 Is appropriate consideration given to how findings relate to the context, e.g., the setting in which
591 the data were collected?

592 1.4 Is appropriate consideration given to how findings relate to researchers' influence, e.g., through
593 their interactions with participants?

594 4.1 Is the sampling strategy relevant to address the quantitative research question (quantitative
595 aspect of the mixed methods question)?

596 4.2 Is the sample representative of the population understudy?

597 4.3 Are measurements appropriate (clear origin, or validity known, or standard instrument)?

598 4.4 Is there an acceptable response rate (60% or above)?

599 Table 2: Overview of descriptive themes and barriers and enablers within each theme.

	Barriers	**Source**	**Enablers**
Culture/context	ED is for 'sick' people and pain is not seen as a clinical priority – it doesn't kill or affect treatment decisions. Focus on diagnosis. Chronic pain not seen as our job.	(14, 15, 27, 30, 35, 36, 47)	Presence of pain champion (15)
	Busy, noisy, pressurised environment with heavy workload, surges in demand and wide range of tasks that take up staff time.	(14, 15, 27, 28, 30, 32, 36, 45, 46)	Improved resources
	Pain is a common presentation, potentially leading to a level of desensitisation from staff.	(14, 27, 32)	
	Lack of teamwork and communication about pain management between members of the team	(14, 27, 29, 31, 32)	High quality communication and interprofessional practice (35)
Attitude/Belief	Staff have limited motivation to change due to confidence in own ability and reliance on own judgement. Entrenched practices are passed down from senior to junior staff	(14, 15, 28, 29, 32)	Openness and motivation to change (15)
	Lack of belief in patient level of pain or pain scores. Feeling that patients manipulate score due to expectations of pain relief, drug seeking behaviour or to increase urgency of triage category.	(14, 27, 28, 31,32)	Evidence of effectiveness of interventions / audit to improve practice (15, 32)
	Frustration at patients who won't self-care and don't use the system appropriately, have too high expectations or refuse analgesia.	(14, 15, 27, 34, 36, 46)	
	Belief that need known painful condition prior to giving analgesia / fear that medication may hamper diagnosis	(28)	
Knowledge and confidence	A lack of education, clear protocols and shared aim as to what pain management should be leads to resistance to over-prescribe for fear of adverse events.	(14, 15, 28, 31, 32, 45)	Education, clear protocols and guidelines. (14, 15, 28, 31, 32, 47)
	Reluctance to over-prescribe analgesia for fear of adverse events	(14, 15, 29, 31, 47)	

	Knowledge of how to use pain scores and interpret patient-reported scores.	(14, 27, 28, 32)	
	Inadequate awareness of non-pharmacological methods.	(28)	
Organisational	Legislation and protocols around opioid administration lead to delays in awaiting physician prescription.	(15, 28)	Nurse-initiated analgesia (28, 35)
	ED driven by organisational focus on waiting times and other key performance indicators rather than pain.	(14, 15)	Use of management plans for regulars (30)
	Rapid staff turnover, staff shortages and inappropriate staff skillmix	(14, 15, 34)	

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