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TITLE PAGE

How can pain management in the Emergency Department be improved? Findings from multiple case study analysis of pain management in three UK Emergency Departments.

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ABSTRACT

Introduction

Inadequate pain management in Emergency Departments (EDs) is a worldwide problem, yet there has been little progress in understanding how pain management can be improved. There is only weak evidence and limited rationale to support interventions to improve pain management. We used naturalistic, qualitative methods to understand the factors that influence how pain is managed within the adult ED.

Methods

We used a multiple case study design incorporating 143 hours non-participant observation, documentary analysis and semi-structured interviews with 37 staff and 19 patients at three EDs in the North of England between 2014 -2016. We analysed data using thematic analysis.

Results

Our analysis demonstrated that pain management was not well aligned with the core priorities of the ED and was overlooked when other work took priority. We identified: 1) Pain management was not perceived to be a key organisational priority for which staff were held accountable and staff had limited awareness of their performance, 2) Pain management was not a core component of ED education and training, 3) ED processes and structures were not aligned to pain management and pain reassessment was overlooked unless staff escalated pain management outside of normal processes, 4) Staff held embedded beliefs that conceptualised pain management as distinct from core priorities and limited their capacity to improve. However, EDs were able to improve pain management by aligning processes of pain management with other core work, particularly patient flow (e.g. nurse initiated analgesia at triage).

Implications

EDs may be able to improve pain management by ensuring pain management processes align with key ED priorities. Undertaking multifaceted changes to structures and processes may enable staff to improve pain management and develop a culture in which pain management can be prioritised more easily. Future interventions need to be compatible with the wider work of the ED and enable patient flow in order to be adopted and maintained.

Key words

Pain management, Emergency Department, Qualitative Research, Quality Improvement

What is already known on this subject

- There has been little progress in understanding how pain management can be improved within the ED and insufficient evidence to support implementation of any particular intervention.
- Limited improvements may stem from a lack of understanding of the barriers to pain management that interventions need to overcome.

What this study adds

- Pain management is not well aligned with the core priorities of the ED and is not a key organisational priority for which staff are held accountable.
- Multifaceted changes to structures and processes may help staff deliver improved pain management and develop a culture in which pain management can be prioritised.
- This exploratory multiple case study of 3 EDs in England used multiple data sources to add to our understanding of how pain management can be improved, by identifying how interventions to improve pain management need to be compatible with the wider work of the ED and enable patient flow, such as nurse-initiated analgesia at triage.

Introduction

Pain is a common presenting complaint for patients attending the emergency department (ED), with prevalence of severe pain reported at between 20 and 40% worldwide (1). However, inadequate management of pain is widely reported, with 'oligoanalgesia' characterised by long waits to analgesia, limited provision of analgesia and a high proportion of patients still being in significant pain upon discharge from the ED (2, 3). Despite two decades of reporting of inadequate pain management, and significant literature reporting high prevalence of pain, there has been little progress in understanding how pain management can be improved in the ED.

A systematic review of interventions to improve pain management identified a range of interventions that had been developed to improve pain management in the ED, including pain scoring, education and training and nurse-initiated analgesia, but insufficient evidence to support implementation of any particular intervention (4). In particular, studies revealed limited understanding or reporting of the theoretical underpinnings of the interventions, and authors were not explicit about how the interventions might work to improve pain management. Improved understanding of the barriers to pain management and explicit statement of the mechanisms of action of interventions to overcome these barriers may help to produce successful interventions in this field. (5) (6)

Despite significant literature reporting prevalence of oligoanalgesia, or factors associated with analgesia, there is currently limited research exploring the barriers and enablers to pain management that may explain why pain management is inadequate. Current debate around barriers to pain management centres on a number of reviews, opinion pieces and editorials, principally from the perspective of the ED clinician or surveys reporting the prevalence of pre-determined factors affecting pain management, based upon factors derived from other settings (7) (8) (9). More recently, some qualitative studies exploring staff views of barriers and enablers to pain management have been published (10) (11). These identified that staff perceived barriers to include difficulties in assessment, knowledge deficits, with most significant barriers relating to the environment of the ED and difficulties relating to high workload and competing pressures. These studies offered valuable insights into staff perceptions, but offered limited insight into how pain management could be improved within the current climate of high demand within EDs worldwide.

We aimed to undertake a more in-depth exploration of pain management in the ED, using multiple case study design and multiple data sources to understand the contextual factors affecting pain management, and barriers and enablers to improving pain management.. Within this paper we aim to explore the wider factors that influence how pain is managed and understand how interventions may help EDs to change practices to improve pain management.

Methods

Study design and setting

We used an inductive, naturalistic methodology, using an exploratory multiple case study design (12) (13). We chose multiple case study design to enable in-depth exploration of contextual factors influencing pain management and understanding of why there may be variation in performance at different EDs. We selected three cases because this was considered practical to maximise diversity and increase the strength of analytic generalisation. (Yin 2003) Case studies incorporated different data sources, including direct elicitation methods (semi-structured and informal interviews), unobtrusive data collection methods (documentary

analysis) and non-participant observation in order to incorporate different perspectives of factors that influenced how pain was managed.

We undertook case studies within three EDs in England with different levels of pain management, chosen to enable a range of barriers and enablers to be explored. Cases 1 and 2 represented EDs with 'good' and 'poor' pain management respectively. Case 3 was used initially as a pilot, then expanded to explore the impact of recent attempts to improve pain management within the ED, and allow emerging theories to be tested. Case selection was based upon results of CQC national ED survey data, using the patient reported outcome measure "do you feel that staff did everything they could to manage your pain?", alongside national audit data of proportions of patients with fracture neck of femur receiving analgesia within 60 minutes, both from 2012 (14) (15). The study was approved by NRES Committee Yorkshire & The Humber – South Yorkshire NHS research ethics committee. A Patient and Public Involvement (PPI) user group was set up to support the study. The group advised on documents related to ethical approval, discussions of emerging themes within analysis and discussions of early drafts of results.

Selection of participants

We invited cases (EDs) to participate by email and identified a key informant at each case to help to gain access to the field. To ensure representation of different perspectives, we sampled staff purposively to incorporate different roles, gender and seniority and sampled patients purposively for gender, age and condition. We undertook semi-structured interviews with 20 emergency physicians, 16 nurses and 19 patients. Staff interviews were undertaken either by telephone (n=9) or face-to-face within private areas of the department (n=27). For patient interviews, staff identified patients who had attended with painful conditions and approached them to ask whether they would be willing to speak to a researcher (FS). Patients were recruited whilst in the department and interviews were undertaken by telephone at a later date, except for one interview which was face-to-face. Details of participants are included within the supplementary file.

Data collection and management

One researcher (FS) undertook the non-participant observation. Data collection took place between September 2014 and July 2016. Observation took place within all areas of the ED where adults were managed, although focused around initial assessment areas (triage rooms and ambulance handover), and staff bases within the major and minor areas, and resuscitation rooms. One of the cases was an adult only ED and in the other two, fieldwork took place only in the adult areas of the ED. When undertaking non-participant observation, FS looked at processes for pain management, communication of pain management and focused on staff-staff and patient-staff interactions relating to how pain management was negotiated and delivered. Informal conversations with staff were used to clarify understanding of observations, and to enable more open answers than more formal interviews provide. Extensive notes were made and written up at regular intervals during and after observation. Reflexive notes were kept alongside the observation notes and a reflexive journal kept to incorporate initial thoughts and developing findings.

Semi-structured interviews with both staff and patients were undertaken by FS. Interviews were based on a topic guide but discussions evolved naturally and included unscripted questions to allow exploration of emerging concepts. Data collection continued until we felt that saturation of themes had occurred; i.e. new data was no longer contributing to the analysis and emerging concepts had been fully explored. All semi-structured interviews were audio-recorded and transcribed verbatim by a third party. Interview transcripts were read and checked for accuracy against the original recording.

Documentary analysis included anonymised patient notes, audits, guidelines or protocols, patient information leaflets and any other documentation relating to pain management visible within the department or referenced by staff.

Analysis

Data were analysed using thematic analysis, following the principles of Braun & Clarke (16). We used an inductive approach in which coding and theme development were directed by the content of the data. Transcripts, documentation documents and fieldnotes were coded in NVIVO (QSR International, Warrington, UK). FS led the analysis and read and re-read the entire data corpus. Subsets of interview transcripts and observation notes were discussed and themes were identified by the team (AOC and SG) and discussed with two members of the PPI team.

Reflexivity was important throughout the process. The principal researcher who undertook the fieldwork (FS) was a social scientist with no experience of working within the ED. This enabled a naive stance, which was not overly influenced by prior conceptions of the setting. Reflexivity was practiced throughout to understand the influence of changing perspectives towards the research to be considered. We developed a descriptive overview and reflective case summaries of each of the 3 cases, and developed a number of cross-cutting themes around barriers and enablers to pain management from the data.

The data corpus included all observation notes, interviews, documentation and reflective notes, and were analysed together. Although all of the data contributed to the analysis, this paper draws largely on the staff interviews, non-participant observation and documentary analysis due to the focus on the organisational context of how pain is managed.

Results

The descriptive overview and reflective case summaries revealed significant differences between the structures and processes of pain management, as well as the profile of pain management within each of the 3 EDs. The following table provides a descriptive overview of the 3 cases, summarising the processes and structures that were identified as influencing pain management during the course of fieldwork.

Table 1: Processes and structures relating to pain management

	Case 1	Case 2	Case 3
ED	Trauma unit, co-located primary care serving urban population of @200,000	Trauma unit, co-located primary care serving urban population of @330,000	Trauma centre with primary care collaborative on same site, but not co-located. Serving urban population of @550,000
Population	Mixed adult and paediatric population (@60-65k attendances p.a.). 93% White British, 20% patients >70	Mixed adult and paediatric population (@80-85k attendances p.a.). 97% White British, 24% >70	Adult only ED (@140- 140k attendances p.a.). 91% White British, 22% >70.
Significant organisational changes during course of fieldwork	The ED moved location during the fieldwork, into a new purpose-built emergency care centre with co-located emergency admissions unit.	Changes made to improve flow, including introduction of ambulatory pathways and introduction of medics from Medical Assessment Unit assessing patients within the ED.	The Trust became 'paper-free' and the electronic patient record was introduced throughout the organisation during the fieldwork.

<p>Changes made to improve pain management prior to fieldwork</p>	<p>Introduction of PGDs for analgesia at triage in 2004, in response to nurse-led review of pain management.</p> <p>Changes to documentation to make pain assessment central for both initial assessment and reassessment. Time of prescription and time of administration added to notes as mandatory fields</p> <p>Introduction of management plans for patients who attended regularly for analgesia</p>	<p>During the previous year, staff had been asked to complete the pain score on the observation chart. Analgesia had been placed in a small cupboard in triage.</p> <p>Other changes had been introduced but not followed through, including the introduction of pain scoring within the triage assessment which was removed as it was felt not to add any value.</p> <p>Some work had been undertaken to develop management plans for patients who regularly attended for analgesia, but not completed as was time-consuming.</p>	<p>Introduction of PGDs for paracetamol, co-codamol and ibuprofen. More senior nursing staff encouraged to undertake nurse prescribing courses.</p> <p>Analgesia cupboards had been introduced in the corridor by triage/ambulance co-ordinator station alongside a water fountain so that patients could take analgesia at ambulance triage.</p>
<p>Layout</p>	<p>Physically small layout, with majors and minors centred around a central staff base which enabled communication between staff, and enabled requests for analgesia. After the move, the layout was in a grid system with separate areas linked by wide corridors. The physical space made communication more difficult but staff contacted each other using personal wifi-enabled communication devices.</p>	<p>Cramped and unwieldy layout, which made movement of patients round the department difficult, and made it difficult to locate staff. Staff relied on face-to-face communication, except for when communicating with staff in the observation unit, who were contactable via the telephone.</p>	<p>Physically large space with long corridors and large distances between different areas of the department.</p> <p>In particular, the distance between the triage areas and majors areas made it difficult to hand over different components of pain management. Staff used a tannoy system to contact staff within other areas of the department.</p>
<p>Triage procedures</p>	<p>Walk-in patients triaged by triage nurses who all had PGDs for paracetamol, ibuprofen and codeine (8mg, 30mg).</p> <p>Patients brought in by ambulance triaged by senior nurse co-ordinator.</p> <p>Walk-in patients always asked about pain (whether or not they were presenting with a painful condition) and offered analgesia. Ambulance patients not always asked unless prompted by paramedic.</p>	<p>Both walk-in and ambulance patients assessed by triage nurses, some of whom had PGDs or paracetamol and/or ibuprofen. Patients often not asked about pain and rarely given analgesia at triage.</p> <p>New system of senior doctor triage was introduced during fieldwork, to support triage nurses 9-5 during weekdays, but was intermittently in operation during fieldwork.</p>	<p>Walk-in patients triaged by triage nurses who all had PGDs for paracetamol, ibuprofen and co-codamol (though not codeine separately).</p> <p>Walk-in patients were routinely asked about pain and offered analgesia.</p> <p>Patients brought in by ambulance were triaged by senior doctors from 8am-8pm (triage nurses outside these hours). Patients were routinely asked about pain and may have been prescribed analgesia, but rarely had it administered at ambulance triage.</p>
<p>Documentation of pain</p>	<p>0-10 pain score mandated within computer triage and on triage</p>	<p>Optional scoring of mild/moderate/severe pain within</p>	<p>Optional scoring of mild/moderate/severe pain within</p>

	documentation. ED notes contain space for pain score and time of assessment and details of prescribing. Also introduced space for reassessment pain score and time during the course of fieldwork.	computer triage. No mention of pain score in computerised ED notes. Analgesia prescribing documented on separate notes from main ED notes.	computer triage at initial visits, then 0-10 pain score mandated within computer triage during course of fieldwork. Analgesia prescribing documented within ED notes.
Pain management roles outside triage	All nurses trained to cannulate Nurses with PGDs able to prescribe repeat analgesia within the ED. All consultants and registrars (plus some junior doctors) trained to undertake nerve blocks for fracture neck of femur.	Some nurses trained to cannulate. Nurses were unable to prescribe repeat analgesia within the ED. Most consultants trained to undertake nerve blocks for fracture neck of femur. No registrars or junior doctors trained. Observation unit often staffed by nurses who were unable to prescribe and relied on calling doctors through to the unit.	Cannulation undertaken by phlebotomist. Some nurses trained to cannulate. Nurses were unable to prescribe repeat analgesia within the ED. Unable to give details of numbers of consultants and registrars trained to undertake nerve blocks for fracture neck of femur, but described as 'patchy'. Clinical decisions unit staffed by nurses who were unable to prescribe analgesia and relied on doctors responding to tannoy announcements.
Access to analgesia in triage	Paracetamol, ibuprofen and codeine available from lockable cupboard in every triage room. Keys held by nurse in triage. Prior to move, all analgesia, including controlled drugs held within a central cupboard between majors and minors, and another cupboard within the resus room. After the move, analgesia was available via biometric controlled cupboards (Omniceil ®) in resus and minors rooms.	Cupboard in triage room reported to hold paracetamol and ibuprofen, but key was lost for 6 month duration of fieldwork. Some triage nurses with PGDs carried paracetamol in their pockets. Otherwise, triage nurses could get paracetamol or ibuprofen from analgesia cupboard in minors department. This was not always well stocked and did not contain co-codamol or codeine, due to concerns about theft. Other analgesia was available further away from the swipecard entry cupboard in majors.	During early fieldwork, a lockable cupboard containing paracetamol, ibuprofen and co-codamol (but not codeine separately) was accessed from the corridor by triage rooms. Keys were kept variably by triage nurse or nurse in charge. During fieldwork, cupboards were placed in each of the triage rooms, with the keys held by the triage nurse and a single key to fit all analgesia cupboards.
Access to controlled drugs	Prior to the move, analgesia was kept in a locked cupboard in resus room. Keys held by nurses in charge of resus. After the move, controlled drugs held in biometric operated cupboard (Omniceil ®) in resus, and Omnicell ® in minors.	Controlled drugs held in Omnicell ® in resus and in a locked cupboard in swipecard entry room in majors (keys held by nurse in charge).	Controlled drugs held in locked cupboard in resus room. Keys held by nurse in charge of resus (different key from other analgesia cupboards).
Staffing	High turnover of staff led to push for nurses to undergo triage	High turnover of nursing staff. 1/5 of consultant posts were vacant.	No permanent consultant vacancies. Used agency staff but

	training. A third of the consultant posts were vacant, and a third of middle grade posts were filled by regular locums. Agency and locum staff have no access to Omnicell ®	Relied heavily on locum and agency staff for middle grade posts. Agency and locum staff have no access to main swipe card entry drugs cupboard or Omnicell ®. Agency nursing staff could not access computerised notes. Teaching sessions introduced towards end of fieldwork as sickness had led to PGDs and training not being up to date.	less reliant on locums than other sites. Agency staff could use the computerised notes using a ghost log-in.
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The reflexive case summaries that were developed have been summarised in table 2 and provide further detail of the context for the overarching themes that are developed below.

Table 2: Reflexive case summaries

	Case 1	Case 2	Case 3
Key personnel / staff engagement	Improvements to pain management appeared to have been made by both nursing and medical staff. Evidence of commitment across the team. No single pain champion. Staff appeared to have more collaborative view of pain management, with less variation in attitude than other cases. All roles identified as important in pain management, with support for (HCAs) in undertaking assessment and identification of pain.	One member of staff who had tried to improve pain management by changing the documentation to include pain scoring, was referenced as the 'go to' person within the ED for any changes or research but was very busy and difficult to access. Staff were observed to advocate for patients when asked for analgesia, but were not proactive and there was less evidence of staff being encouraged to ask about pain than at site 1. Nurses could not cannulate and healthcare assistants did not perceive themselves to have a role in pain management.	There was no single individual identified as responsible for changes. Senior nurse was instrumental in encouraging nurse prescribing and PGDs for morphine in trauma. Both nursing and medical staff had undertaken audits around pain management, and fed back results to the department. Staff appeared engaged in improving pain management and were aware of problems, and the need to improve some of the structural issues such as inability to prescribe codeine at triage, and problems administering morphine for ambulance patients.
Organisational priority	Evidence of support between ED & Trust board regarding development of new ED. No issues regarding organisational support arose during fieldwork. Staff did not appear to be under too much pressure to meet 4 hour targets, despite struggling with exit block.	Evidence of tensions within the relationship between the ED and the wider organisation. Significant talk about flow and ED staff clearly felt under pressure to meet targets. Staff appeared to feel disempowered and perceived a lack of commitment from the organisation in supporting changes aimed at improvements within their department.	No issues regarding organisational support arose during the fieldwork. This may be due to there being fewer interviews and hours of observation undertaken at site 3 than sites 1 and 2,

	Evidence of changes being fine-tuned and altered when difficulties encountered.		
Profile	<p>Pain management appeared to be integrated into the functions of the ED, with multifactorial initiatives having been embedded over past decade. Staff talked about pain management, were aware of processes for improving pain management and evidence of improvements having occurred. Patient information leaflets include reminders to take analgesia. Staff frequently discussed analgesia when discussing patient management plans.</p> <p>Audits of pain management in triage undertaken every 2 years and results fed back to nursing staff.</p>	<p>Pain management was not well integrated into the work of the department, and there was less discussion around pain management than in other sites. Triage staff did not appear to be encouraged to ask about pain and questions regarding pain tended to be framed towards understanding whether analgesia had been taken, rather than asking whether analgesia was needed. Some nursing staff were unaware of the existence of PGDs for pain management, and the PGDs themselves were out of date.</p> <p>Staff did not appear to be aware of their own performance regarding pain management and were unaware of any audits relating to pain management, although they were aware of complaints</p>	<p>Clinical audit of pain management had been undertaken 2 years previously and highlighted the need to improve documentation of pain and provision of analgesia at triage. Staff talked about the audit and were aware of changes that had been put in place to improve pain management.</p> <p>Changes made during the course of the fieldwork appeared to impact upon the profile of pain management, and to make the provision of analgesia easier. Staff appeared to be aware of the need to improve but changes were not yet embedded and there were suggestions that the 'culture' of pain management had not yet improved.</p>

Overarching themes

Within our analysis we identified a number of overarching themes that appeared to be factors in how pain was managed across all three cases. Notably, our findings centred around a core concept that pain management was not aligned with the priorities of the ED, which allowed pain management to be overlooked. This was demonstrated through four themes which explained barriers to pain management: pain management was not prioritised within the organisational systems of accountability, ED education and training, or within the processes and structures of the ED. This was reflected within staff beliefs around pain management which enabled poor pain management to be perpetuated.

Pain management is not perceived to be one of the organisational priorities for which ED staff are held accountable.

Our data demonstrated how pain management was not considered to be an organisational priority and was not prioritised within ED systems of accountability. Whilst staff were keen to emphasise the importance of pain management, the priorities for which they were held accountable (i.e. had their performance measured and monitored), such as waiting times and safety (chest pain, sepsis), were prioritised above pain management.

S2S15: We don't really talk about it [pain] that much. So the maxims that we use and the informal as well as the formal dialogue, heart attacks are up there, strokes are up there, sepsis is there, acute

kidney injury is even there these days, but we don't tend to talk about pain as a, either informally and formally. (Semi-structured interview, Case Study 2, Senior Nurse)

Staff reported prioritising, and were observed to prioritise work that contributed towards the targets for which they were held accountable and enabled patient flow within the department.¹ This included prioritising pain management where it enabled discharge from the department, and not providing analgesia in triage where this was perceived to increase length of stay in triage. This was more evident at case 2, where the department was under pressure to achieve their 4-hour targets.

S2S15: Do I think that's... yeah I think the people under pressure, I think a sister is going to get some embarrassing questions, in a bed meeting, one of you had 3 breaches and you know one of you left the department at 4 hours 10 minutes, couldn't you have got them out, so you know I think decisions are bad around those cases and I think that some of my senior nurse colleagues would quite willingly take a patient that is in pain and could get pain relief to a ward to avoid a breach. (Semi-structured interview, Case Study 2, Senior Nurse)

S2S1: But I suspect when there's a queue at triage because it's busy in the evenings, although we might have 2 or 3 nursing staff at triage, it [pain management] again becomes a low priority because priority is to hit the 15 minute ambulance and walk-in turnaround. (Semi-structured interview, Case Study 2, Consultant)

Because pain was not considered to be a 'talked about' concept within the ED, staff were frequently unaware of how they performed, either as a department or in relation to other EDs and reported receiving limited feedback regarding pain management except for patient complaints. However, pain management had a higher profile at cases 1 and 3, and staff referenced departmental expectations that pain would be managed, with an awareness that inadequate prescribing may be challenged. Some staff were aware of internal audits, where these existed, but few were aware of national audit results, particularly at case 2² where there was no evidence of internal audits.

He (Senior Nurse) asked me what the criteria were for selecting [name] as a research site and I explained how I selected the cases based on CQC survey and RCEM audits. He appeared interested, nodding and said that he had never heard of the ED survey, or of them not performing very well. He appeared perturbed by this: "I should know – I mean I've worked here 3.5 years and I didn't even know that these surveys exist". (Observation, Case Study 2, Visit 3)

When pain management performance was unchallenged, some staff perceived that pain management was being done well, revealing little imperative to improve. Partly due to the fragmented nature of ED care, staff appeared to have limited awareness of the patient journey outside of their own sphere of work and equated seeing patients being given analgesia as pain management being done well. This was noted particularly at case 2 where analgesia was rarely administered at triage and subsequently more visibly administered on the ward.

However, ambiguity over outcomes with which to assess quality of pain management also hindered the ability to hold staff accountable for pain management. Staff used a variety of different outcomes to define quality of pain management (e.g. time to analgesia, patient satisfaction, reduction in pain score), and lacked a shared understanding of the overall goal of pain management (e.g. comfortable, pain-free).

¹ At the time of fieldwork, UK EDs were required to report against targets of 4 hour waiting time from admission to discharge, (Triage targets) and 15 minute ambulance turnaround times.

² All 3 EDs submitted data to the UK Royal College of Emergency Medicine audits on fracture neck of femur and renal colic, which included metrics related to assessment of pain and provision of analgesia.

Int: What would you say was the aim of pain management?

S1S7: It's not always possible to get everyone pain free, but we would aim to get it manageable.

Int: How would you define manageable?

S1S7: Well, say if they're doubled up, we would try to get them relaxed, rather than doubled up. (Semi-structured interview, Case Study 1, Nurse)

Attempts to measure pain management at an organisational (ED) level (i.e. within audit or clinical guidelines) relied heavily on the use of the pain score, which staff did not perceive to be an appropriate objective measure with which to realistically measure pain management. This finding has been reported in further detail elsewhere (17). This limited capacity for accountability, weighed up against concerns around opioid seeking, or the safety implications of overprescribing resulted in a lack of consequences for the under-treatment of pain. As one consultant commented:

"S3S11: It's very easy to do nothing. The downside is a lot of people don't get what they need" (Informal conversation, Case Study 3, Consultant).

Pain management is not prioritised within ED training and education

Exploring how staff understood how to manage pain revealed that pain management did not feature as a core component of ED education and training. Staff reported that pain management training was not incorporated into ED induction packages, or ongoing ED training with the exception of nurse triage training, and some condition-specific training for known painful conditions (e.g. fracture neck of femur). Staff at all case study sites demonstrated limited awareness of either national or local guidance of pain management in the ED and this limited pain management education appeared to lead to variation in practice.

S3S5: We've got far too many different drugs that people just randomly prescribe without any thought as to why they are giving them. We haven't got, as far as I'm aware, any guidelines for managing pain. Even though it's the single commonest symptom I would have thought that we treat in the department

FS: So you don't have a protocol?

S3S5: I don't think we do, no. Erm so because we don't have a protocol people just do whatever they want. So whatever was normal practice wherever they last worked, they just start to do here. (Semi-structured interview, Case Study 3, Consultant)

Staff were observed to rely on personal experience and preferences rather than evidence-based knowledge and explained how they used experience to understand patient pain levels and how pain should be managed. They reported personal preferences for particular drugs, which they passed on to colleagues.

S2S6: [...] I'm not a big fan of tramadol, I don't know why. I don't like tramadol. I think patients sometimes get a bit of a hangover from it. I think morphine's a cleaner drug but I couldn't give you any evidence behind that, it's just from experience, if you like. (Semi-structured interview, Case Study 2, Consultant)

S3S5: Also, the painkillers you choose comes down to what you are happy with as a doctor. You choose what you like, what you feel comfortable with using, what you are used to and what you trust. Like anything else, it is based on your own knowledge and experience. So, for example, if I am sedating patients, I personally prefer fentanyl to morphine, it's shorter acting, I like it better. Other people might use morphine or even ketamine. (Semi-structured interview, Case Study 3, Consultant)

We observed inconsistent knowledge of pain management principles within fieldwork, with staff working within the same department demonstrating different understanding of, for example, peak effect times for morphine, or understanding of how to manage the pain ladder. Staff revealed how they relied on colleagues for support, rather than more formal evidence-based sources, particularly colleagues from specialties where pain management was core, such as anaesthesia or palliative medicine.

S2S6: As I say, there used to be, I think her name was [name], but she was the pain person on the orthopaedic ward, and I learnt so much from her with regards to analgesia. I mean she was the one that taught me 'why are you prescribing co-codamol?' And I go 'well you're getting 60 milligrams of morphine' and she said 'yes but it's no better than 30, and if you give 30 every 3 hours, actually your analgesia profile in your system's much better'. So there's little things like that, little tricks like that, that you learn and you keep, if you see what I mean, and then you pass on. (Semi-structured interview, Case Study 2, Consultant)

Low organisational priority underpinned personal beliefs about the priority of pain management

The low organisational priority of pain management that was demonstrated through education, processes and structures of pain management appeared to underpin a framework of staff beliefs around how pain was managed that enabled poor pain management to be perpetuated. Notably, staff appeared to conceptualise pain as distinct from core clinical priorities, commonly referencing the concept that “you can't die of pain” (S1S2), which enabled them to prioritise other work that aligned with emergency department priorities, notably ‘saving lives’ and ensuring patient safety. Staff revealed low levels of perceived control to improving pain management, considering that pain management could not be improved due to contextual factors such as the volume of workload and staffing shortages, and the need for double sign off for controlled drugs. For example, in the following quotes, the staff justify not providing pain relief due to capacity pressures.

S1S14: We're all very busy. Trying to, (pause)- I don't mean we don't do it, but there are times when you think actually it would be easier if I just let the next person sort this out. It would be the wrong thing, but you can see why it happens. Sometimes, somebody will be in triage and they won't have been given their analgesics at triage. Then you go back to the triage and say 'you've scored them at 7 on the pain score. Why didn't you do anything?', and the answer might come back 'well I've got another half a dozen people in the waiting room to sort out, so I didn't have time'. So sometimes it's capacity pressures I suppose. (Semi-structured interview, Case Study 1, Consultant)

S2S4: I think it's difficult to say. It's difficult to say, I'd say, because we are trying our best. It's not as if we don't want to give pain relief to everyone. I'd say it's all slightly out of our control. (Semi-structured interview, Case Study 2, Junior Doctor)

This justification does however reveal an implicit belief that places pain management as a lower priority than other work. Within the following observation, the nurse demonstrated how pain management was one of a number of competing priorities that needed dealing with, but demonstrated how they placed pain management further down the list than other priorities.

12.00- (On staff bay in Majors, talking to a nurse about the analgesia some of the patients identified as in pain had received). I asked the nurse "what about patient [8]?" He hesitated and then said "he's not had any either, I've not given him any. I need to get up there now and see him as he needs fluids". He gestured towards the patient, waving his forms in his hand. He had notes and treatment forms in his hand. "As you can see, I've got 6 patients. One's in respiratory failure, I've got her in the corridor who's mine too, I've got to do bloods, ECGs, get them cannulated and then (gestures to all the patients) give

them fluids and all that before I can even think about dealing with their pain". (Observation notes, Case Study 2, Visit 3)

Other factors such as concerns around opioid seeking, and the subjective nature of pain, meant that staff were able to justify not providing pain relief due to concerns that it was not needed, or not a high enough priority. Staff had little confidence in patient reported measures of pain, but commonly used their own judgement based upon their clinical and behavioural signs, along with presence of a known painful condition, which they used to support their decision-making around pain management, and justify treatment decisions. This may have been reinforced by limited education, and the focus of education around pain management on known painful conditions.

ED processes and structures enable other ED priorities, but can hinder pain management.

The processes and structures that enabled ED work to be undertaken focused on patient flow, but did not always enable pain management. The 'linear processes' by which patients were managed involved multiple handovers of care which introduced delays and opportunities for pain management to be overlooked, particularly where staff roles did not enable individuals to undertake multiple pain management tasks (e.g. assessment, cannulation, prescription and administration of analgesia).

S3S5: The worst place here is probably in [ward 1] or [ward 2] team just because it takes so long for the process to work its way through.[...] But because it takes, we still have a very old-fashioned, very linear process where the patient will come in , wait to be assessed by a nurse, wait to be assessed by a doctor then the card goes back in a box for some treatments then wait for a nurse again. So you can easily be waiting 2 or 3 hours before you actually get some analgesia. (Semi-structured interview, Case Study 3, Consultant)

During observation and in patient interviews there were multiple observations of patients presenting but having to wait for analgesia due to these delays highlighted. For example, this patient who had been in the ED for over two hours describes how he had been in agony in triage, but not given any pain relief until he had been assessed by a doctor hours later:

[...]FS: Right, yes. And then you got pain relief when you were in the private bay then?

S1P1: Yes, yes. As soon as they got me through into a bay. It was quite a while though, I mean I was waiting quite a while. The girl, the young nursing assistant came and did my blood pressure and I just said to her, can you please, obviously she can't, she's got no authority to give me pain relief, but can you please, can you tell somebody. Even if it's just to bring me a bottle of entonox to be breathing on just to get rid of the pain, I just wanted the pain to go away, it was intense.

FS: Yes, and what did she say?

S1P1: Well, her answer was, yes I'll make sure somebody knows but unfortunately it wasn't forthcoming for quite a while, I just laid there, you walked past 2 or 3 times and I'm sure you saw the look on my face. And I mean, because I didn't know who you were, I thought 'ooh, she's a doctor, she's going to come and see me, give me some pain relief'. I mean I'm laughing now but at the time it wasn't at all.

Focus on diagnosis and flow meant that reassessment of analgesia was often overlooked unless staff recognised and escalated pain management outside of normal processes, which disadvantaged patients who were less vocal in their presentation of pain, or whose cause of pain was not evident. This, combined with the lower prioritisation given to pain, meant that patients with pain could get 'lost in the mayhem and chaos' (Semi-structured interview, Case study 2, senior nurse). For example, during observation, a patient had been

brought into majors by a triage nurse who had highlighted that the patient had severe pain, but waited over 2 hours for any pain relief. During an interview she explained her reluctance to ask for pain relief:

S3P33: Erm, I think it's just me, you know I'm quite reserved anyway and I don't like making fuss, you know they are obviously very busy and you could see they were busy and erm you know I just laid there quietly and waited until somebody came to see me

Within the fieldwork, we observed that structural factors such as larger physical distances between sections of the ED and analgesia locations, poor communication systems between staff within different sections of the ED and poor visibility of pain documentation and analgesia within notes also appeared to increase opportunities for pain management to be overlooked (see table 1). Staff mentioned the need for double sign-off and regulatory barriers for controlled drugs as barriers to pain management, but did not always recognise difficulties associated with access.

Staffing shortages appeared to impact negatively on pain management, not just due to the higher workload and attendant lower priority given to pain, but due to the reliance on agency staff who were unfamiliar with the pain management processes and procedures of the department, and whose competencies relating to pain management were unknown. This was compounded by difficulties in locum and agency staff obtaining physical access to computer systems, patient notes and drug cupboard, which put pressure on existing staff to undertake these tasks and made the processes of pain management more difficult.

Co-ordinator: Doctors have been driving me mad today. We've got lots of locums and locums don't know how the triage works, how the system works. (FS: And does this affect pain management?) They don't know what we do about pain scores. It depends on their background, they might not even be A&E doctors. (Informal conversation CS2, visit 2).

Aligning pain management improvements with existing priorities may improve pain management

Staff widely referenced the high-pressured environment and structures of the ED as non-modifiable barriers to analgesia. However, the use of observation and documentary analysis demonstrated that processes differed between EDs (see table 1) and could be used to overcome structural barriers. Within case 1, a number of initiatives had been undertaken to ensure that pain management was better integrated into the work of the ED, including pain assessment being central to all documentation, removing physical barriers to analgesia, enhanced roles for nursing staff to enable cannulation, and administration of analgesia under patient group directives. This meant that, even when the ED was busy and staff were conscious of time pressures, staff faced fewer barriers to provision of analgesia than at case 2, where fewer nursing staff could administer analgesia under patient group directive (PGD) and physical access to analgesia was limited. Importantly, these initiatives did not appear to deflect from other ED work.

At all EDs, nursing staff acted as patient advocates and, where they were unable to prescribe, suggested analgesic medications and doses to medical staff, who often signed prescriptions without 'eyeballing' the patient themselves. Extended nursing competencies, along with more integrated teamworking and 'horizontal hierarchy' in which role boundaries were blurred allowed pain management to be escalated by enabling staff at all grades to take responsibility for highlighting pain and requesting or administering analgesia.

S1S1: I mean it's sort of anecdotal this, and I might be slightly biased because I work here now but they're very proactive compared to nurses in some other trusts that won't do bloods. They see that as a

doctor role. They won't put cannulas in. Ours tend to do that. (Semi-structured interview, Case Study 1, Consultant).

Integrating pain management into the processes of the ED appeared to reduce the time spent on pain management, and reduced the need for patient 'escalation' which involved staff interruptions later in the patient journey. In particular, consistent provision of nurse-initiated analgesia at initial assessment within cases 1 and 3 was observed to reduce the need for further interruptions, and enabled patients to move up the pain ladder if necessary upon initial medical assessment. The following contrasting observations demonstrate how simplified processes and extended role capabilities for nursing staff at cases 1 and 3 impacted upon the provision of analgesia for patients at triage. In the following example, the patient was administered co-codamol under PGD by the triage nurse within 2 minutes of being seen.

21: 17 Walk-in patient. Male, involved in road traffic accident, with chest pain.

Triage nurse S3S8: What can we do for you? (Patient explains he's had the pain since this morning when he was in an accident) S3S8: Have you got pain in your neck, have you had any painkillers? (No) Would you like some whilst you are waiting? (Yes) How bad is your pain out of 10? (7, 6) And you're not allergic to anything? (No). She turns round, takes some tablets out of the cupboard, goes to get him some water, and hands over the painkillers. He asks "paracetamol?" S3S8 says "co-codamol". She then explains that he needs to go back into the waiting room and sends him through. (Observation, Case Study 3, visit 5)

At case 2, the processes for providing pain relief at triage were complex and involved numerous handovers of responsibility. The follow observation illustrates this, with a similar request for co-codamol taking 15 minutes and involving 5 different staff members:

17:45. [Senior Nurse in triage] walks into the ambulatory area and approaches [Registrar] sitting at the computer. She hands him a prescription form and says "Are you happy to prescribe me some co-codamol? She looks like she might have broken her foot".' [Registrar] says "her foot?", leans over and writes out the prescription. She thanks him and hands the prescription form over to [Nursing Assistant], saying "Would you mind asking someone to go and fetch some co-codamol for me? She's gone to x-ray". [Nursing Assistant] hands it over to [Staff nurse] who has just walked in who then heads straight off to get the tablets. She brings them back and places the script and tablets on the staff base desk.

17:52. [Nursing Assistant] and [Staff Nurse] are sitting talking when [Nursing Assistant] notices the painkillers sitting on the side and says "Oh, has she not had them?" [Staff nurse] says "I'd told her (Senior Nurse in triage) I'd got them – has she not had them?" [Nursing Assistant] goes to find the Senior Nurse in triage who asked for them. [Nursing Assistant] returns and reports that the patient is outside x-ray. [Staff nurse] asks [Student Nurse] "Can you go and given them to her?" [Student nurse] takes the tablets, goes to find the patient then comes back with them and reports to the [Nursing Assistant] that the patient is now in x-ray.

17:58 [Nursing Assistant] comes in and explains the patient is in x-ray and asks where she will go. She says "Tell you what, I'll tell her to come back in this way when she's done and she can get them then".

18:00 The patient is wheeled through. [Student nurse] checks if she has had any other medications then gives her the co-codamol. (Observation, Case Study 2, visit 2)

Discussion

Our findings demonstrated that pain management was not well aligned with the priorities of the ED, which could result in it being overlooked. Pain management was generally not included within systems of accountability or education or training within the ED and was not prioritised within the processes of the ED, although the profile and processes of pain management varied between the three EDs. Inadequate pain management was upheld by staff conceptualisation that pain management was distinct from core clinical priorities and belief that improvements to pain management were outside their control. Inadequate pain management practices may be reinforced by dependence on colleagues and experiential learning, particularly when staff beliefs were not challenged with evidence of poor performance, and staff were not held accountable for pain management. However, findings do suggest that EDs can improve pain management by aligning processes of pain management with other core work, particularly where this may enable patient flow.

Our study built on existing studies by using more in-depth exploration and multiple data sources to develop the existing knowledge base and provide new insights into how pain management may be improved by aligning how pain management needs to align with, rather than compete with other priorities. Existing studies of barriers to pain management, based on staff interviews and focus groups, identified similar individual barriers. Staff identified lack of experience and knowledge deficits as barriers to pain management (18) (10) (11) and knowledge deficits for nursing and medical staff have been widely reported (19) (20) (9). Education and training were highlighted as important enablers, and many existing interventions to improve pain management incorporate training or education, suggesting this to be a widely recognised barrier (4). High levels of physician confidence in their own ability and lack of belief in the need to change were similarly highlighted in other ED settings, with audit and feedback perceived as an opportunity to alter perceptions and motivate change (11) (21).

Overwhelmingly, previous studies of barriers to pain management describe structural barriers relating to workload volume and unpredictable nature of demand as the most significant barriers to pain management, which was reflected by staff within our fieldwork. However, underlying these stated barriers are implicit beliefs that may explain why pain management is not improving. Staff perceive they do not have time to undertake pain management due to other more pressing priorities which constitute their core work, and enable patient flow. Presenting workload volume and priorities relating to flow as barriers to pain management allows ED staff to legitimise their actions, and reinforce their ideas about identity that prioritise other work over pain management (22).

Strengths and limitations

We are not aware of any other study that specifically aims to understand barriers and enablers to pain management by using qualitative research incorporating multiple data sources. The use of multiple case study design studies combined the use of observation, documentary analysis and semi-structured interviews with both staff and patients to provide a more in-depth analysis of barriers and enablers that would have been possible using direct elicitation methods (e.g. interviews) only. In particular, the combination of interviews and non-participant observation within multiple cases revealed differences in structures and processes that were not evident to staff who did not see outside their own sphere of practice, or understand their own embedded behaviours. This also revealed the differences between what participants reported, and what they practiced.

This study was undertaken within three EDs in the UK and although the case selection criteria ensured some diversity within the EDs studied, there will be limitations to the transferability of findings to other settings. The EDs within this study were urban EDs in the UK, operating within a context of high demand and pressures to maintain patient flow, which may affect transferability of findings to EDs in different settings. However, descriptions of the setting provided within the results section should counter this and enable the reader to

consider transferability to their own setting. However, the degree of concordance in cross-cutting themes between the 3 EDs, and the reflection of many of the stated barriers within the literature suggests that these may not be significant limitations. There were limitations to the numbers of hours of fieldwork which meant that some themes, such as ED culture were not fully explored, and the impact of the wider ED culture on pain management performance would be an important factor to consider in future research in this area. Patient interviews mainly took place within 3 weeks of the ED visit, although there were two that took place between 1 and 2 months after the visit, which may introduce some recall bias.

The fieldwork was undertaken by a single researcher (FS), which may be considered a limitation as multiple fieldworkers can offer different lenses through which the individuals interpret data being collected or observed. However, the collection of the data by a single researcher across all 3 sites reduces the likelihood that differences between sites were due to observer bias which may occur when multiple researchers are used.

Given that staff were aware of the research being undertaken in the department, there is some risk of impact of researcher effects, particularly within the non-participant observation. However, due to the busy nature of the ED, where people are constantly moving around and under significant pressure it is unlikely that the presence of a single researcher would have significant impact upon staff behaviour. Occasions where there was evidence of researcher effects (e.g. staff asking a patient for a pain score in order to demonstrate to the researcher how pain was assessed) were noted within reflexive notes, but were infrequent.

Implications

This study has important implications for EDs wanting to understand how they can improve pain management. These findings challenge the dominant perception that changes to pain management are outside the control of staff within the ED, due to barriers inherent in the nature of ED workload and demand. In practical terms, by undertaking to understand how the processes and structures within their departments create barriers to providing pain management, EDs can start to look at their processes and understand how small changes can help to enable how they manage pain. Pain management may be improved by developing multifaceted interventions that address specific structural and process barriers, enable easier access to analgesia, reduce the linearity of the processes by enabling staff to undertake multiple roles and reduce handovers of care. In particular, our fieldwork supports existing literature advocating the use of nurse-initiated analgesia in triage by demonstrating that nurse-initiated analgesia may reduce the number of handovers and overall work related to pain management, and enable faster escalation of pain management (23). Similarly, difficulties relating to reassessment may be addressed by enabling nursing staff to provide analgesia under PGD within areas where patients await medical assessment or decisions about their care.

Notably, future interventions that are developed need to be integrated into the processes of the department that enable patient flow in order to be adopted and maintained. In particular, intervention developers need to consider the competing priorities of the ED, which mean that pain management may be considered secondary to other priorities when considering how interventions may be implemented. Social science theories of behaviour change suggest that enabling behaviour change will require staff to understand the purpose and mechanisms of the intervention, have a strong understanding of the work they must do to change behaviour, and understand the benefits and importance of this work (24). Staff implicitly appraise the effect of new interventions on other competing tasks and may attribute low value to an intervention that is perceived to add to their workload, particularly if they consider that pain management is outside the core role of the ED (patient flow, diagnosis). Demonstrable organisational support and education and training may help

to address barriers relating to knowledge and beliefs by improving commitment and engagement, and ensuring staff understand the value and legitimacy of providing pain management.

Monitoring outcomes and ensuring accountability may be key to enabling behaviour change, particularly if staff can legitimise outcome measures used. Outcome measures should avoid over-reliance on pain scores due to low perceived validity of the score, and variability in how scores are documented, but incorporate patient-focussed measures such as 'is your pain under control' for staff to understand whether interventions are having a positive impact on patient experience (17) . Audit and feedback have been demonstrated to be effective methods of enabling behaviour change in EDs (25) and the findings of this research indicates that audit and feedback were key tools in challenging embedded beliefs, enabling staff to understand and acknowledge poor current practice and the need for improvement. Auditing and disseminating times of assessment and provision of analgesia may enable staff to understand the impact of interventions, and how interventions may need to be adjusted or reconfigured to enable continued improvements.

Conclusions

In summary, our fieldwork demonstrated how EDs faced common contextual barriers to pain management, yet EDs differed in how they organised and made changes to processes and workforce to overcome these barriers and improve pain management. Multifaceted changes to structures and processes may be required to integrate pain management into the wider work of the ED, increase the priority given to pain management and help engender a culture in which pain management is integral to the work of the ED. Future interventions need to be compatible with the wider work of the ED and enable patient flow in order to be adopted and maintained.

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FS, SG and AOC conceived the study. FS obtained research funding via an NIHR doctoral fellowship and AOC and SG supervised the PhD. FS undertook site and participant recruitment, data collection and management and data analysis. SG and AOC provided advice on study design and management, and made a substantial contribution to data analysis. FS drafted the article and SG and AOC critiqued the paper for important intellectual content. FS takes responsibility for the paper as a whole.

References

1. Chang HY, Daubresse M, Kruszewski SP, Alexander GC. Prevalence and Treatment of Pain in Emergency Departments in the United States, 2000-2010. *Pharmacoepidemiology and Drug Safety*. 2014;23:114-.
2. Cinar O, Blankenship J, Fosnocht D, White J, Rogers L, Carey A, et al. Pain management practices in the emergency department: 10 years of experience in an academic center. *Annals of Emergency Medicine Conference: American College of Emergency Physicians, ACEP 2011 Research Forum San Francisco, CA United States*. 2011;58(4):S227.
3. Todd KH, Ducharme J, Choiniere M, Crandall CS, Fosnocht DE, Homel P, et al. Pain in the emergency department: results of the pain and emergency medicine initiative (PEMI) multicenter study. *Journal of Pain*. 2007;8(6):460-6.
4. Sampson FC, Goodacre SW, O'Cathain A. Interventions to improve the management of pain in emergency departments: systematic review and narrative synthesis. *Emergency Medicine Journal*. 2014;Online first(e1):e9-e18.
5. Pawson R, Tilley N. *Realistic Evaluation*. London: Sage Publications Lrd; 1997 1997.
6. Tavender E, Bosch M, Fiander M, C Knott J, L Gruen R, O'Connor D. Implementation research in emergency medicine: A systematic scoping review. *Emergency medicine journal : EMJ*. 2015;33.
7. Ducharme J. Why is improving pain care so hard? *Emergency Medicine Australasia*. 2013;25(2):110-1.
8. Duignan M, Dunn V. Perceived barriers to pain management. *Emergency Nurse*. 2009;16(9):31-5.
9. Tanabe P, Buschmann M. Emergency nurses' knowledge of pain management principles. *Journal of Emergency Nursing*. 2000;26:299-305.
10. Berben SA, Meijs TH, van Grunsven PM, Schoonhoven L, van AT. Facilitators and barriers in pain management for trauma patients in the chain of emergency care. *Injury*. 2012;43(9):1397-402.
11. Bennetts S, Campbell-Brophy E, Huckson S, Doherty S, Initiative NHaMRCsNifCSNECPM. Pain management in Australian emergency departments: current practice, enablers, barriers and future directions. *Emergency Medicine Australasia*. 2012;24(2):136-43.
12. Eisenhardt KM. Building theories from case study research. *Academy of Management Review*. 1989;14(4):532-50.
13. Yin RK. *Case study research design and methods*. 3rd edition ed. Thousand Oaks, CA: Sage; 2003 2003.
14. Howell E. *Key Findings Report for the 2008 Emergency Department Survey*. Oxford; 2009 2009.
15. Medicine TCoE. *CEM Clinical Audits 2012-13. Fractured Neck of Femur*. 2013 2013.
16. Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative Research in Psychology*. 2006;3(2):77-101.
17. Sampson FC, Goodacre SW, O'Cathain A. The Reality of Pain Scoring in the Emergency Department: Findings From a Multiple Case Study Design. *Annals of Emergency Medicine*. 2019.
18. Fry M, Chenoweth L, MacGregor C, Arendts G. Emergency nurses perceptions of the role of family/carers in caring for cognitively impaired older persons in pain: a descriptive qualitative study. *International Journal of Nursing Studies*. 2015;52(8):1323-31.
19. Mocer JT, Drevdahl DJ. Nurses' knowledge and attitudes toward pain in the emergency department. *Journal of Emergency Nursing*. 2014;40(1):6-12.
20. Tsai FC, Tsai YF, Chien CC, Lin CC. Emergency nurses' knowledge of perceived barriers in pain management in Taiwan. *Journal of Clinical Nursing*. 2007;16(11):2088-95.

21. Shaban RZ, Holzhauser K, Gillespie K, Huckson S, Bennetts S. Characteristics of effective interventions supporting quality pain management in Australian emergency departments: an exploratory study. *Australasian Emergency Nursing Journal*. 2012;15(1):23-30.
22. Checkland K, Harrison S, Marshall M. Is the metaphor of 'barriers to change' useful in understanding implementation? Evidence from general medical practice. *Journal of Health Services Research & Policy*. 2007;12(2):95-100.
23. Varndell W, Fry M, Elliott D. Quality and impact of nurse-initiated analgesia in the emergency department: A systematic review. *International Emergency Nursing*. 2018;40:46-53.
24. May C. Towards a general theory of implementation. *Implementation Science*. 2013;8(1):18.
25. Tavender E, Babl FE, Middleton S. Review article: A primer for clinical researchers in the emergency department: Part VIII. *Implementation science: An introduction*. *Emergency Medicine Australasia*. 2019;31(3):332-8.