



A scoping review of qualitative studies on pre-hospital analgesia administration and practice

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ABSTRACT

Background: Pain is an exceedingly common complaint in the pre-hospital setting. Despite advancements in organizational protocols and guidelines, many emergency medical services (EMS) systems still fail to provide optimal pain management. This scoping review thus aimed to map the body of qualitative literature pertaining to factors influencing pre-hospital analgesia administration and practice in order to clarify concepts and understanding as well as to identify any knowledge gaps.

Methods: The review protocol was guided by the framework outlined by Arksey and O'Malley and ensuing recommendations made by Levac and colleagues. Five databases were searched from inception till October 26, 2021, namely MEDLINE, EMBASE, CINAHL, The Cochrane Library, and Scopus. The search strategy was developed in consultation with a medical information specialist. A total of 5848 records were screened by abstract and title by four independent researchers. 199 records were included for full text review. From these, 15 articles were eligible for thematic analysis based on pre-defined inclusion criteria.

Results: Included studies found that practitioner, patient, and environmental factors influenced the administration and practice of pre-hospital analgesia. Key barriers included the difficulty in assessing pain, poor inter-professional relationship, knowledge deficits, stress and anxiety, and miscellaneous factors, such as concerns over drug-seeking behaviours. Some possible solutions were proposed, and pre-hospital EMS systems and healthcare institutions could consider bridging some of these gaps. There was a notable paucity of Asian studies, and a variety of EMS settings with different protocols and workflows were examined, hence systemic factors including guidelines and legislations cannot and should not be generalized across every healthcare system.

Conclusion: The factors influencing pre-hospital analgesia administration and practice remain incompletely understood. Existing tools and practice guidelines were also inadequate. This scoping review provided an overarching perspective of the extant literature, highlighting some of the significant barriers, enablers, and areas for further research.

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1. Introduction

The concept of pain has been defined as an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage [1]. Pain is an exceedingly

common complaint in the pre-hospital setting, whether it arises from physical trauma or medical causes [2]. A register-based study found that at least 27% of patients reported moderate to severe pain during ambulance transport [3]. Failing to adequately manage pain can negatively impact patients' physiological parameters, potentially worsen prognosis, as well as lead to subsequent development of psychological disorders and reduced quality of life [4,5]. Proper treatment of pre-hospital pain is thought to improve survival rates, reduce patient distress, and enable seamless patient transfer to the hospital [4,6].

Several studies have shown that pre-hospital providers fail to adequately recognize and treat pain [7–10]. The response to such shortcomings in pre-hospital analgesia administration has catalyzed the

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exploration and implementation of new organizational protocols and guidelines [11–14]. These guidelines suggest different treatment options, ranging from intravenous opioid administration to intranasal non-opioid treatments. Despite these advancements, many emergency medical services (EMS) systems still fall short in providing optimal pain management for adults, the elderly, and children alike [15,16].

Pre-hospital analgesia has long been identified as a priority in EMS research [17]. Current literature has shown that individual, cultural, and systemic factors may influence the practice and administration of pre-hospital analgesia, resulting in its highly variable nature [15,16,18]. Although several qualitative studies have attempted to highlight potentially modifiable attitudinal issues and training deficits [19–21], these problems have still persisted.

Despite being a fundamental pillar of pre-hospital emergency care, the suboptimal quality of pain assessment and management for any aetiology in the pre-hospital setting remains a global concern [2,22]. Therefore, given this context, our scoping review aimed to (1) map the findings of qualitative studies on this topic and (2) identify factors influencing pre-hospital analgesia administration in order to inform future research as well as paramedicine education and practice in the field.

2. Methods

Owing to the heterogeneous body of evidence on the administration and practice of pre-hospital analgesia, a scoping review was considered suitable to provide conceptual clarity and an overarching perspective of the barriers and enablers pertaining to this topic. This scoping review protocol was guided by the framework outlined by Arksey and O'Malley [23] and ensuing recommendations made by Levac and colleagues [24].

2.1. Search strategy

Our search strategy was developed in consultation with a medical information specialist (Medical Library, National University of Singapore), employing various combinations of the following keywords: [paramedic* OR prehospital OR pre-hospital OR emergency medicine technician OR EMT] AND [analgesia OR pain]. The search was systematically performed in five major electronic databases, namely MEDLINE, EMBASE, CINAHL, The Cochrane Library, and Scopus, from inception till October 26, 2021. No restrictions on date, language, or subject were implemented on the database search. The detailed search strategy can be found in Appendix I of the Supplemental Material. Abstracts were imported into Covidence (Melbourne, Victoria, Australia) and screened by four independent researchers (S.E.T., C.Y.L.L., C.Y.Y.L., and R.I.H.C.). Full texts were obtained for all abstracts of relevance and their respective reference lists were hand-searched to identify additional relevant articles. Forward searching of prospective citations of the relevant full texts was also performed and authors of the respective articles were contacted if necessary to provide additional data.

2.2. Study selection and eligibility criteria

A full text sieve was independently conducted by four authors (S.E.T., C.Y.L.L., C.Y.Y.L., and R.I.H.C.) and all conflicts that surfaced through the screening stages were resolved by discussion and consensus with the senior author (J.C.H.N. or Q.X.N.). Full texts were considered eligible for inclusion if they met the following inclusion criteria: 1) original studies with qualitative or mixed methods methodology, 2) studies examining perceptions, attitudes, or perspectives of pre-hospital providers towards pre-hospital analgesia usage, and 3) studies that were written in or translated into the English language. Commentaries, consensus-based guidelines, case reports, case series, review articles, and conference abstracts were excluded.

2.3. Data extraction from included studies

Data were extracted and recorded in a spreadsheet by four authors (S.E.T., C.Y.L.L., Y.M., and D.J.L.), and validated by a third author (J.C.H.N. or Q.X.N.) to ensure accuracy. We extracted the following data items: general data (first author's name, year of publication, and country of origin), methodological data (research design and methodology, setting, sample size, and participant characteristics [e.g. type of pre-hospital provider]), and primary findings from the included articles (barriers and enablers to pre-hospital analgesia administration). Data extraction was carried out verbatim only for quotes from pre-hospital providers to illustrate their personal experiences in the setting of pre-hospital analgesia administration.

2.4. Study quality appraisal

Quality appraisal of included studies was conducted by using the Critical Appraisal Skills Programme (CASP) [25]. The CASP Checklist consists of 10 items developed to evaluate the trustworthiness, relevance, and results of published papers (Supplemental Table 1). Quality assessment was independently conducted by two authors (S.E.T. and C.Y.L.L.). When needed, a third opinion from the senior author (J.C.H.N. or Q.X.N.) was consulted.

2.5. Collating, summarizing, and reporting the results

Our findings were analysed and organized through a thematic analysis approach, which involved careful scrutinization and discussion amongst the study team with regard to the meanings of the findings in relation to the emerging themes. A narrative account as well as tables and graphs were generated to present patterns and interlinking concepts of the barriers and enablers of pre-hospital analgesia administration and practice. The results of our primary outcomes were categorized into three main categories, namely environmental factors, patient factors, and practitioner factors. The Preferred Reporting Items for Systematic Reviews and Meta-Analysis extension for Scoping Reviews (PRISMA-ScR) reporting guidelines were followed for this review [26].

3. Results

3.1. Literature search

The database search yielded 5848 records, with 11 additional records obtained from secondary sources. A total of 1468 records were removed as duplicates and a further 4178 were excluded on the basis of their titles and abstracts. A further 185 records were removed after the review of full texts. Ultimately, 15 articles were eligible for thematic analysis in this scoping review [19,20,27–38,40]. The detailed selection process and reasons for excluding articles were illustrated in the PRISMA 2020 Flow Diagram (Fig. 1).

3.2. Characteristics of included studies

As seen in Table 1, the 15 included studies originated from eight countries, namely Canada, Ireland, the Republic of South Africa, Rwanda, Sweden, the Netherlands, the United Kingdom (UK), and the United States of America (USA). Four (26.7%) of the studies were published in Sweden [28,30,32,37], four (26.7%) in the UK [29,31,33,40], two (13.3%) in the USA [19,20], one (6.7%) in Canada [38], one (6.7%) in Ireland [35], one (6.7%) in Rwanda [36], one (6.7%) in the Netherlands [27], and one (6.7%) in the Republic of South Africa [34].

A collective sample size of 302 healthcare providers (both from pre-hospital and ED settings) was included in this scoping review. There were two studies, namely Berben et al. [27] and Iqbal et al. [31], which included additional ED staff in their sample sizes. However, only

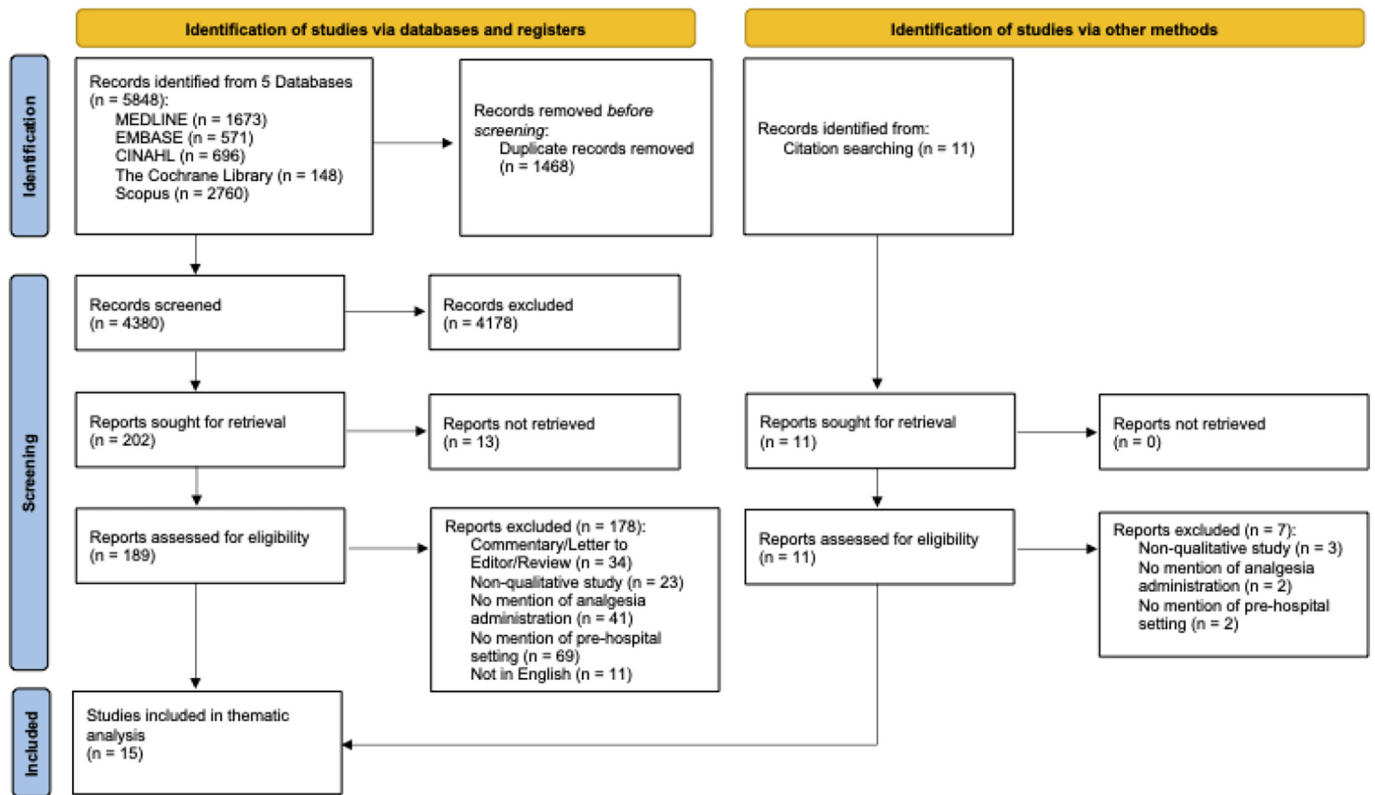


Fig. 1. PRISMA flowchart showing the abstraction process.

relevant data specifically from pre-hospital providers were extracted from these studies; Berben et al.'s study contained eight paramedics while Iqbal et al.'s study contained 25 paramedics and EMTs.

Six studies [20,28,32,33,37,38] utilized solely individual interviews in their methodologies, three studies [29,34,35] utilized solely focus group discussions in their methodologies, and four studies [19,27,30,31] utilized both individual interviews and focus group discussions in their methodologies. An overview of the characteristics of the included qualitative studies was further described in Table 1. Broadly, the factors influencing pre-hospital analgesia administration and practice could be classified as practitioner, patient, and environmental factors.

3.3. Practitioner factors influencing pre-hospital analgesia administration and practice

Practitioner factors influencing pre-hospital analgesia administration and practice were divided into accuracy of pain assessment, ease of communication with patients, knowledge and familiarity, technical difficulties in administration, stress and anxiety levels, and feedback from healthcare professionals.

3.3.1. Accuracy of pain assessment

Pain is a subjective parameter. Assessment of pain, despite the advent of pain assessment tools, remains a challenging task for practitioners because of its subjective nature. Factors influencing the patient's reporting and the paramedic's assessment included the individual's personality, age, gender, and culture. Some patients may exaggerate pain while others under-reported pain [33,34]. It was suggested in three papers [19,31,33] that the variation in pain threshold and perception, as well as the exaggeration and under-reporting of pain, created a discrepancy between the pain score and the constellation of non-verbal and clinical features. This discrepancy could have ultimately contributed to making paramedics question the veracity of patient symptoms and

hence the subsequent need for analgesia. Given the variability of pain expression, paramedics reflected that they tended to then look for other indicators of pain such as facial expression and body language, as well as for obvious signs of injury, in order to ascertain the severity of pain [31]. In situations where there was a clear association with abnormal vitals, traumatic injuries, and physical expression of pain, paramedics reflected that they were more willing to administer analgesia.

Given the uncertainty that the subjectivity of pain posed to paramedics, paramedics may tend to err on the side of caution and avoid giving too much analgesia, rather than the converse. This is especially so in circumstances when the pathology causing pain was not life-threatening. Paramedics might only give analgesia if they are convinced that the patient was in moderate to severe pain [33].

Pain assessment tools were thought to be helpful for paramedics to determine pain and ease the process of determining the need for analgesia administration. However, existing tools were noted to be inadequate. Despite the tools granting some degree of objectivity, the assessment of pain using these tools still remains highly variable between patients [34]. For instance, some patients reported a high pain score despite being visibly comfortable [33]. Consequently, paramedics felt that pain scales could only be used as adjuncts together with assessment of the patient's mechanism of injury and vitals. Occasionally, they might incorporate their intuition in the overall pain assessment.

In the assessment of pain, paramedics often referenced other physiological indicators of pain in order to adequately assess the severity of pain to prescribe analgesics. Thus, paramedics may be hesitant to administer analgesia when vitals were normal [36] or when other signs of pain (e.g. diaphoresis, tachycardia, hypertension, and tachypnoea) were absent [19]. The absence of a reliable pain assessment tool resulted in paramedics finding it challenging to assess pain accurately. Amidst this uncertainty however, paramedics have reported that experience in practice did help with refining the process of pain assessment and recognition [34].

Table 1
Characteristics of included studies (in alphabetical order)

Author, Year	Country of Origin	Methodology	Setting	Study Population	N
Berben, 2012 [27]	The Netherlands	Focus group discussions and individual interviews	Gelderland-Midden EMS, Gelderland-Zuid EMS, Radboud University Nijmegen Medical Centre, Canisius Wilhelmina hospital, and Hospital Bernhoven	Paramedics who: a. are qualified as level 4 EMT, b. received preparatory training as registered nurses EMS and ED staff	33*
Bohm, 2019 [28]	Sweden	Individual interviews	Västernorrland County EMS	Pre-hospital emergency nurses who: a. have been active in the EMS setting for at least 2 years, b. have experience of relieving pain in patients with addiction problems	8
Evans et al., 2019 [29]	UK	Focus group discussions	Ambulance stations in catchment area of one ED in South Wales	Paramedics who: a. are trained in fascia iliaca compartment block	11
Holmström, 2019 [30]	Sweden	Focus group discussions and individual interviews	Three ambulance stations located in the middle of Sweden	Registered nurses who: a. have experience working in pre-hospital care for 2 years, b. have experience of encounters with children in pain (aged 0–18 years)	18
Iqbal, 2013 [31]	UK	Focus group discussions and individual interviews	East Midlands EMS and one ED	Paramedics, EMTs, and ED clinicians	38^
Jakopovic, 2015 [32]	Sweden	Individual interviews	Stockholm EMS	Pre-hospital emergency care nurses and EMTs who: a. have at least 3 years of clinical experience in the pre-hospital context	22
Jones, 2003 [33]	UK	Individual interviews	Urban ambulance service in UK	Paramedics who: a. are willing to talk about their experiences and provide detailed information	6
Lourens, 2021 [34]	The Republic of South Africa	Focus group discussions	Western Cape EMS	Emergency care providers who: a. work in the private or public sector, b. have operational experience	25
Murphy, 2014 [35]	Ireland	Focus group discussions	Cork EMS and Dublin EMS	Advanced paramedics who: a. have at least 3 years of operational experience	16
Rosenberg, 2020 [36]	Rwanda	Not reported	Rwanda EMS (SAMU)	Emergency nurses, non-physician anaesthetists, and ambulance drivers who: a. have SAMU affiliation for at least 1 year	20
Tegelberg, 2020 [37]	Sweden	Individual interviews	Two university hospitals and three county hospitals in four different health care regions in Sweden	Registered nurses and physicians who: a. provide care to patients with acute abdominal pain in the ambulance service, emergency department, and surgical department	19
Vlahaki, 2016 [38]	Canada	Individual interviews	Haldimand County EMS	Active primary care paramedics	43
Walsh, 2013 [19]	USA	Focus group discussions and individual interviews	New England EMS	EMT-paramedics who: a. have at least 1 year of full-time fieldwork	15
Whitley, 2021 [40]	UK	Not reported	East Midlands Ambulance Service National Health Service Trust	Paramedics, EMTs, and emergency care practitioners who: a. were working on active front line duties during 12 months prior to interview	12
Williams, 2012 [20]	USA	Individual interviews	Western New York EMS	Paramedics who: a. did not have extensive outside medical training (e.g. registered nurses) b. were not paramedic educators	16

ED: Emergency Department, EMS: Emergency Medical Services, EMT: Emergency Medical Technician, N: Total Sample Size, SAMU: Service d'Aide Médicale d'Urgence,

* Sample size includes additional ED staff and contains 8 paramedics.

^ Sample size includes additional ED clinicians and contains 25 paramedics and EMTs.

In the paediatric population, paramedics felt that it was challenging to use existing pain assessment tools, and they often followed their “general impression” for assessment instead. Paramedics felt less equipped to assess very young children who were unable to comprehend their questions and instructions [35]. The overall difficulty in pain assessment could have made paramedics hesitate in administering analgesia to young children.

3.3.2. Ease of communication with patients

Two papers [31,37] described that communication difficulties with the patient hindered the administration of analgesia. This could have been due to the presence of a language barrier or simply due to the fast-paced and time-sensitive nature of the stressful situation where patients may not be able to adequately describe the degree of pain they were experiencing. The communication difficulties could have led to

reduced recognition of pain and consequently the omission of analgesia administration. On the other hand, good communication skills with patients helped facilitate the administration of analgesia. Paramedics with good professionalism and communication skills were able to alleviate anxiety in patients, improving acceptance of analgesia [29,31]. Additionally, communication with patients increased patient participation and helped facilitate their own pain management [32].

3.3.3. Knowledge and familiarity

Knowledge deficit was cited as a potential barrier to analgesia administration in three papers [27,28,38]. Paramedics' unfamiliarity with analgesia guidelines could lead to uncertainty on how to use the given directives safely and correctly [38,40]. Paramedics in two studies [27,28] expressed that they found it challenging to decide on the type of analgesia to administer, mainly due to potential drug-drug interactions and limited comprehension of different drugs. This was suggested to be likely consequent to a deficit of focus on pain management during EMS training [27]. It was also suggested that limited experience and exposure to certain populations of patients made prompt and apt administration of analgesia challenging.^{38,40} This was more pertinent in three paediatric papers where paramedics expressed that encountering paediatric cases was rare and would require a different routine than the majority of patients who were mainly adults [30,35,40]. The overall unfamiliarity hence was postulated to lead to paramedics' disinclination to administering analgesia, as they felt they lacked the knowledge to be safely administering it.

Conversely, adequate knowledge generally empowered better pain management [27]. In the paediatric population, one study suggested that paramedics' preparedness in advance for paediatric patients reduced internal stress that was significantly higher when dealing with children [30].

3.3.4. Technical difficulties in administration

Technical difficulties encountered in the actual procedure of providing analgesia (i.e. intravenous [IV] or aerosolized) were mentioned in four adult and paediatric papers [29,30,33,38]. Administration difficulties were encountered when emergency patients had to be injected in awkward positions [29], when pills were too big to swallow [38], or when IV access failed [33], especially for young children with small vessels [30]. Another example was when the patient was unable to ingest pills due to a nauseated or vomiting response [38], leading to inability to administer oral formulations of analgesia. Dosage issues such as uncertainty about the child's weight for paediatric dosages could have also culminated to an aversion of analgesia administration in the paediatric population [30,40].

3.3.5. Stress and anxiety levels

Paramedics' stress and anxiety played a crucial role in limiting their analgesia administration. One key stressor cited related to the presence of members of the public or family [29]. This was particularly pertinent in the paediatric population, as managing onlookers or parents, who would occasionally hinder or object to treatment, posed an additional stressor atop the emergency situation [40]. Three papers [20,27,29] mentioned that paramedics' uncertainty and anxiety over a patient's response to analgesia could have posed a significant barrier. They were mainly concerned about the adverse effects of analgesia in children and adults [20,27], how the patient's pain level would reduce, and if they caused harm to the patient [29]. Typical work-related stress such as fear of desensitisation, internal EMS politics and interpersonal relationships, being overworked [34], pressure to work quickly [37], and fear of professional retribution for applying directives incorrectly [38] were other factors causing anxiety for the practitioner. Specifically in paediatric patients, practitioners experienced greater anxiety when dealing with children as they felt the need to be more cautious [40]. The presence of such stressors could have contributed to paramedics' omission of analgesia.

On a different note, the self-perceived role of the paramedic was another factor influencing the administration of analgesia, as paramedics felt that they were meant to be focused on treating life-threatening emergencies [27]. They expressed that in most cases, pain did not influence the decision-making process with regard to patient treatment as they felt that there were more pressing issues at hand. This may result in a lower priority of analgesia administration and its omission in stressful, life-threatening situations.

3.3.6. Feedback from healthcare professionals

The lack of sufficient inter- and multi-disciplinary communication on pain could have hindered adequate pain management. This was suggested in six papers [19,27,31,33,34,37]. One main concern of the paramedics was that administering analgesia might 'erase' or 'mask' symptoms and hence hinder patient assessment, diagnosis, and subsequent care in the ED. [19,33] Some paramedics thus preferred not to treat a patient's pain, especially if they considered it to be a crucial element in diagnosis [33]. Additionally, some paramedics also perceived that hospital personnel tended to ignore the handover notes and provided their own regimen of analgesia administration regardless of prior administration in the pre-hospital setting [34]. This may have led to a misconception that ameliorating the severity of pain would not affect subsequent management, which may lead to omission of analgesia administration in the pre-hospital setting. On the other hand, some hospital personnel preferred if EMS staff did not administer pre-hospital analgesia and felt that the analgesia administered by EMS staff was not necessary. Despite the varied opinions, the rationale and context behind such stances were poorly communicated between the pre-hospital and hospital personnel [38]. In that regard, many paramedics felt that shared protocols and training regimes for both ambulance and ED staff would help to improve appropriate administration of pre-hospital analgesia [31].

Additionally, some paramedics also felt that the ED staff, who did not understand the out-of-hospital situation themselves, looked down on EMS staff as lacking the knowledge and ability to handle such situations [34]. This could have led to limited feedback and collaboration between departments in the acute care chain [37]. Minimal information was shared with the paramedics regarding the outcomes of patients, and little feedback was provided on how to fine-tune their triaging and management. The limited feedback and collaboration could potentially lead to suboptimal recognition of inadequate or inappropriate pain management strategies and stagnate progress to enhance analgesia administration in the pre-hospital setting.

Having good support from other professionals and staff facilitated the administration of analgesia through providing reassurance. Having reassurance that support was available made it easier for paramedics to handle and resolve acute events, as they felt that they were supported in decision-making with regard to analgesia administration [28]. Mentorship and advice from senior EMS staff and paediatric doctors facilitated analgesia administration [20].

3.4. Patient factors influencing pre-hospital analgesia administration and practice

Patient factors influencing pre-hospital analgesia administration and practice were divided into case complexity, attitudes towards treatment, patient cooperation, and concordance of patient expectations with treatment goals.

3.4.1. Complexity of case

Paramedics found it challenging to administer analgesia in complex cases. Examples of which include intoxicated patients [34] as well as patients with multiple comorbidities [31]. The complexity of the case likely caused concern for drug-drug interactions amongst attending paramedics, leading to uncertainty as to whether administration of analgesia would be safe in these patients.

3.4.2. Attitudes towards treatment

Patients refused analgesia due to a fear of needles, fear of medication, or pill issues (i.e. too many or too large pills and inability to swallow pills) [36,38]. Patients would also refuse analgesia as they were not interested in taking over-the-counter medications [38]. Two studies [31,38] suggested that patients' misconception that early analgesia administration might affect treatment or prevent the administration of more effective pain relief at the hospital also possibly resulted in patients refusing analgesia treatment.

3.4.3. Patient cooperation

Two papers [27,33] found that input from patients expressing that they were in pain facilitated the administration of analgesia by paramedics. Some patients are able to adequately and accurately convey their level of pain through the use of pain scores and paramedics are then able to evaluate and tailor their treatment based on their input through serial pain scores. Cooperation from the patient likely enabled paramedics to quickly understand the patient's perspective and facilitated administration of analgesia. In paediatric cases, parental assistance supported and eased the administration of analgesia by the paramedic, thus facilitating their work [20].

3.4.4. Concordance of patient expectation with treatment goals

Some paramedics reflected that they found it challenging and conflicting to administer analgesia in certain scenarios where patient's expectations of medical treatment were discordant from their treatment goals. For instance, some patients might expect paramedics to only administer analgesia at their homes without further follow-up, which was contrasted with the paramedics' goal of having the patient seek further medical treatment [28]. This can understandably invoke frustration and conflict for paramedics, potentially resulting in them being unwilling to administer analgesia until the patient agrees to seek further assessment and treatment in the hospital. Therefore, such scenarios may result in withholding of analgesia for these patients.

3.5. Environmental factors influencing pre-hospital analgesia administration and practice

Environmental factors influencing pre-hospital analgesia administration and practice were divided into accessibility, resource, institutional, and miscellaneous factors.

3.5.1. Accessibility factors

Micro-environmental factors included the accessibility to hospitals and home environments. Three studies [29,35,38] reported that the ease of access and proximity to a hospital were identified as possible barriers to provision of analgesia in both the adult and paediatric populations. Delaying transport to the hospital in order to administer analgesia was not justifiable, given the close proximity from the scene to hospital [35,38]. One study found that an unkempt home environment made the clinical assessment and management of paediatric patients more difficult, possibly hampering analgesia administration [40]. Spending a longer time on scene was also thought to lead to more effective pain management and allow more time for the analgesics to take effect [40].

3.5.2. Resource factors

Availability of practitioners, medication, and equipment, as well as financial constraints were some limitations in the pre-hospital setting [34]. In certain settings, there was a limited range of medications available for paramedics to administer [31]. Particularly, emergency medical technicians and practitioners who were not certified for Advanced Life Support might be subject to greater restriction in the types of medication they are able to administer [34,40]. Of note, there was also a significant lack of pharmacological options for treatment of severe pain in paediatric populations [35].

3.5.3. Institutional factors

Guidelines were, in certain institutions, difficult to locate, did not realistically match the patient's needs, or were ambiguous [37]. Conflicting directives, intra- or inter-department, could have led to confusion on the ground on the appropriate use of analgesia and consequently divergent and different practices. Paramedics in a study felt a lack of organization feedback on pain management [27]. Revisions to current protocols and guidelines were found to be few despite the problem of insufficient pharmacological options on the ground [27]. Conversely, directives may also have restricted the scope of administration to certain settings, making it difficult to administer analgesia in situations otherwise not stated [38]. Differences in operations of public and private sectors might also contribute to differences in practice. Financial incentivisation to prescribe analgesia might account for a higher rate of administration in patients in the private sector [34].

3.5.4. Miscellaneous factors

In certain settings, drug-seeking behaviours have emerged as a concerning trend. Drug-seeking behaviours most likely impeded paramedics' willingness to provide pre-hospital analgesia, particularly on-scene analgesia, as shown in three studies [19,28,34]. With regard to drug-seeking behaviour, it was perceived that it may be common for patients to falsify an emergency to obtain drugs [28,34]. Unless obvious deformities and injuries were present, first responders found it difficult to differentiate between true emergencies and falsified ones, and tended to err on the side of caution and refrain from administering analgesia [28]. In settings with higher rates of opioid dependence, paramedics were also hesitant to provide on-scene analgesia, in particular opioids, and did not carry large amounts of analgesia on them or in the ambulance [34]. They did not wish to promote drug habits [19], and feared for their own safety if "the wrong community members" knew what medications they were carrying around [34]. In addition, paramedics were also hesitant to provide analgesia to known drug abusers due to potential drug-drug interactions [28].

4. Discussion

This scoping review synthesized the available research on factors affecting pre-hospital analgesia administration and used a conceptual framework to categorize these according to patient, practitioner, and environmental factors. These factors were further distilled into six key aspects, which are identified as potential areas for intervention. Pre-hospital EMS systems and healthcare institutions could consider bridging the following gaps in the delivery of pre-hospital analgesia for patients. The complex interplay of factors and proposed solutions at the micro-, meso-, and macro-level were illustrated in Figs. 2 and 3 respectively.

Misconceptions amongst patients, such as prejudiced views of over-the-counter medications, perception that receiving analgesia in the pre-hospital setting will deny them "better" options in the hospital, and that analgesia is the definitive treatment for their conditions, are a common theme amongst interviewees. A multi-pronged approach to patient education would be beneficial to correct these misconceptions and improve patients' acceptance of analgesia. This can occur through the daily patient-paramedic encounters and through platforms of broader reach such as social media campaigns [42]. Appropriate counselling could help address the patient's misconceptions and concerns and enhance acceptance. Analgesia provides symptomatic relief of pain but may not be the definitive treatment for many conditions. Proper patient education about the benefits of analgesia would help reduce discordance between patient expectations and the paramedic's goals of treatment and empower patients to seek definitive medical assessment and treatment. Patient education aside, it would be useful for pre-hospital personnel to look into increasing the tolerability of medications. Such measures may include simple equipment to crush pills or equipping pre-hospital

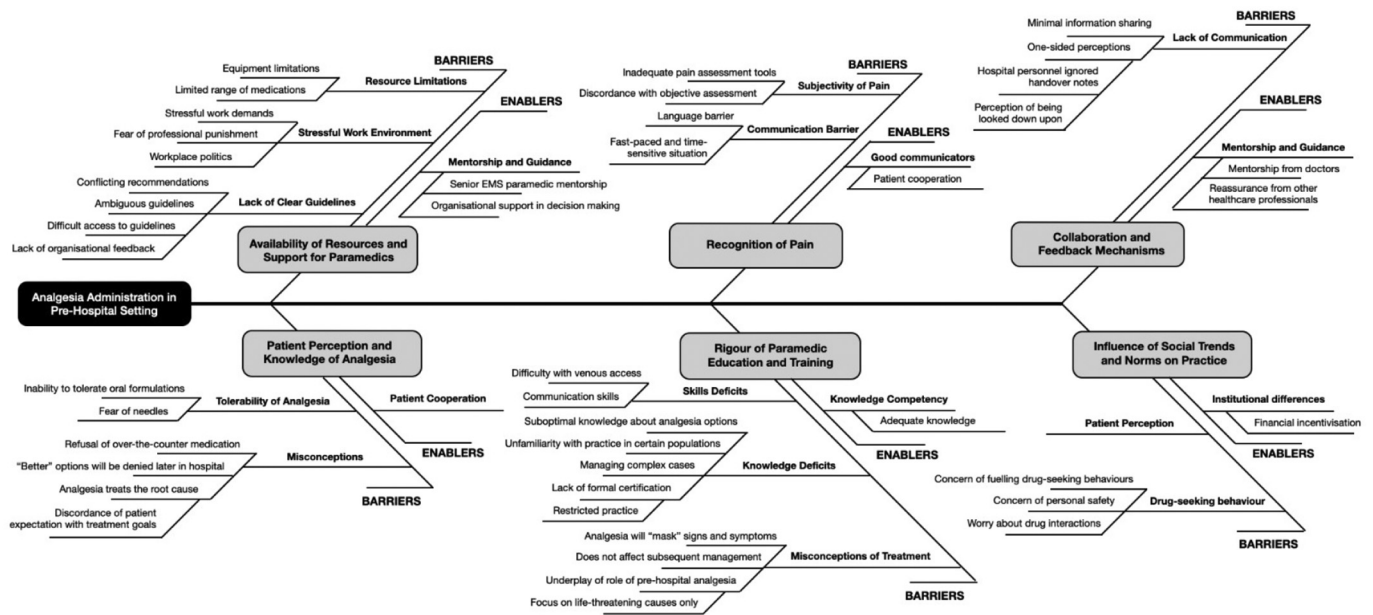


Fig. 2. Fishbone diagram showing analysis of primary and secondary causes to suboptimal analgesia practice in the pre-hospital setting. EMS: Emergency Medical Services.

personnel with a sizeable range of medications so that they may consider alternatives for patients with different needs.

Pain assessment is difficult owing to its subjective nature, and this is further complicated by communication barriers with patients. Good communication skills grant paramedics greater confidence in managing the distressed patient and hence are pivotal in enabling paramedics to assess patients' level of pain. Greater emphasis could be placed on developing this core competency in pre-hospital personnel as part of

their training [43]. Developing enhanced and validated pain assessment tools, which take into context the variability of patients, could help facilitate better communication about pain levels and recognition of pain. The better may be more prominent in patients with difficulty expressing their pain. For instance, the use of technology via a mobile phone application in the UK has been shown to improve accuracy of pain assessment in patients with dementia [44]. This was primarily due to the ability of the application to bridge communication difficulties

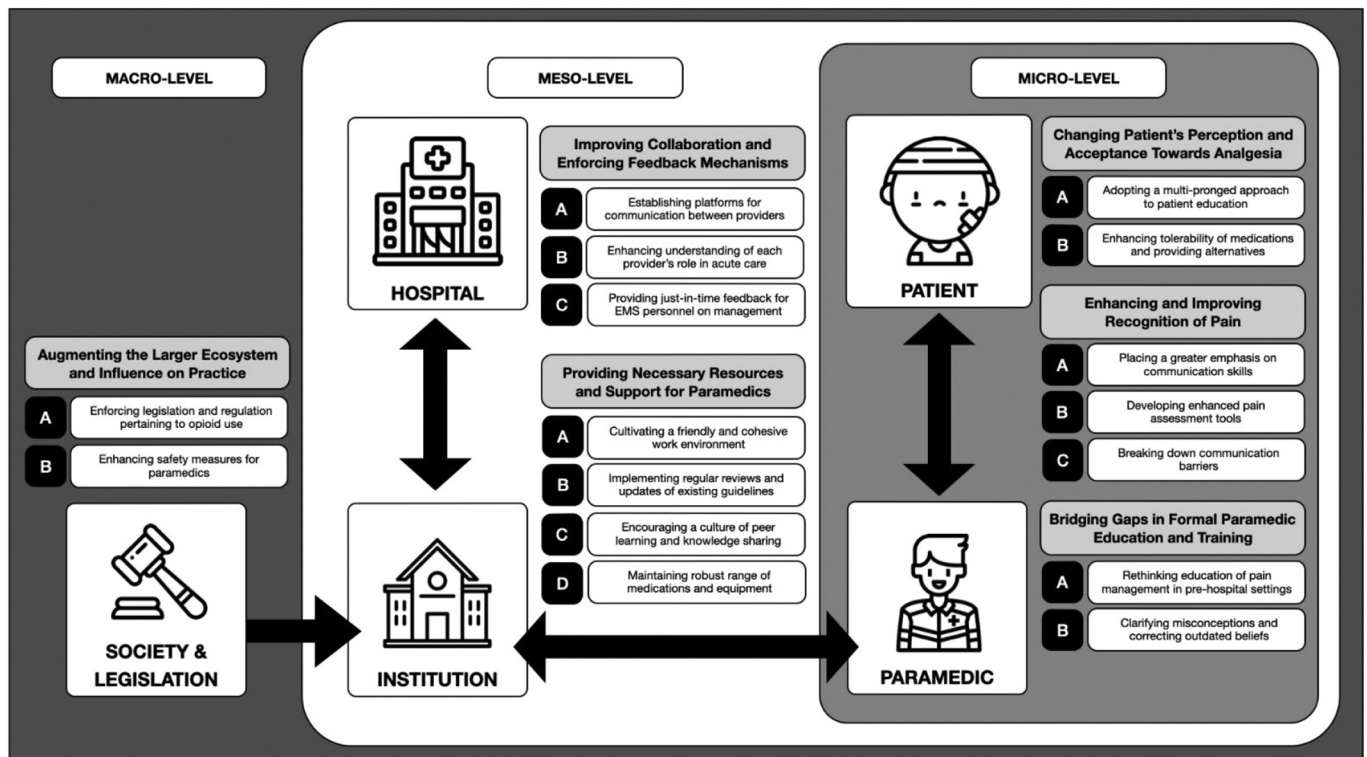


Fig. 3. Proposed solutions to tackle identified issues at the micro-, meso-, and macro-level.

through a user-friendly interface. Language barriers may pose a bigger problem when managing patients who only speak a foreign language or in multi-lingual societies. The advancement in accuracy of language translation software might help alleviate such barriers.

Knowledge and skill deficits should be addressed through evaluation and updates to training curricula. Traditional knowledge transfer through classroom lectures should be supplemented with high fidelity education tools such as skill trainers and manikins. The use of simulated patients in simulation-based training can also help learners better appreciate the complex patient-paramedic dynamic and hone communication skills. The advent of new teaching methodologies can enable learners to apply their knowledge and learn to manage more complex cases. This may in turn give them greater confidence in managing different groups of patients, including paediatric and geriatric patients, patients with comorbidities, and fastidious patients. Misconceptions surrounding patient care such as “masking of signs and symptoms should analgesia be given in the pre-hospital setting” and “pre-hospital care should focus on treating the life-threatening causes only” should be addressed not only in courses for paramedic trainees, but also in continuing education programs for ground paramedics [45]. The latter should not be neglected as medical (and paramedicine) literature will continually evolve.

A friendly and supportive work environment is overall favourable for promoting appropriate analgesia administration in the pre-hospital setting. This includes clear guidance on practice, which requires regular reviews of existing guidelines to maintain currency, consensus regarding conflicting directives, as well as easy access to institution guidelines. It is imperative that guidelines are clear and standardized within an EMS system, to minimize any confusion that paramedics may face at the scene. This is well supported by findings of a study in the Netherlands, where implementation of revised guidelines in pain management led to a significant increase in pain medication administration [46]. While guidelines are useful for most cases, management of complex cases might remain a challenge. To mitigate the overall stress and anxiety paramedics may face as well as to facilitate decision-making, establishing proper support channels for paramedics may be helpful. Ready access to medical support in challenging scenarios, provided by senior EMS staff or doctors, can provide paramedics the reassurance and confidence when dealing with these cases. Besides real-time support, platforms could be established to allow paramedics to share about challenging cases and validate good practices to encourage a culture of peer learning and knowledge sharing. Going beyond knowledge sharing, such platforms could also provide well-being support for paramedics by peers, senior EMS staff, and trained counsellors. A cross-sectional study across eight western industrialized countries observed that the availability of formal peer support systems improved the well-being of pre-hospital providers as they felt more supported by their colleagues [47]. Institutions should also be prepared to provide paramedics with a robust range of medications and equipment in order to empower paramedics to provide analgesia to a wide range of patients of different needs.

More can be done to help improve collaboration between the key players in the acute care chain. Developing platforms for communication between the hospital and the pre-hospital service providers would allow both parties to better understand the rationale and constraints of practice in each setting, and hence facilitate consensus on best practices. Healthcare systems could facilitate mutual transparency and learning to improve cohesion between relevant parties. Ivers et al. concluded that feedback was most effective when provided by colleagues or supervisors on multiple occasions and through more than one medium (e.g. verbally and written down) [48]. Furthermore, some studies also supplemented feedback with educational sessions to enable clinical development [49,50]. “Just-in-time” feedback for EMS personnel could help them critique their own management and enable them to make refinements to their management strategies. Mentorship and reassurance provided by doctors and other healthcare

professionals are valued by paramedics and can be beneficial in their professional growth and development.

In certain countries, drug-seeking behaviours have become an emerging trend, and in some, even an epidemic [51]. This has possibly sparked concern amongst paramedics about fuelling such behaviours and even about their own personal safety. In these settings, it is vital for healthcare systems and governments to examine the measures put in place to regulate drug use and protect frontline workers. In the USA, practitioners are mandated by law to consider non-opioid treatment before opioids [52]. Institutional guidelines should align with national legislation to promote the use of alternative non-opioid agents. The implementation of more robust safety measures such as the use of body-worn cameras can help address the concerns that paramedics have of their own safety [53]. For clients with a known history of substance abuse and violence, this could be flagged up to the paramedic crew, and police or security escorts may also be mobilized to assist them. Raising public awareness and discouraging drug-seeking behaviours warrant a concerted effort by various key stakeholders.

4.1. Limitations

The findings of this scoping review should be interpreted in the context of the following limitations. In our review, there were no Asian studies found and hence, our findings may not be generalizable to the global population. This also highlights a pertinent research gap that needs to be addressed. A variety of EMS settings with different protocols and workflows were analysed, hence systemic factors including guidelines and legislations cannot and should not be generalized across every healthcare system. The lack of consistency in the approach and analysis across studies in this field is a potential limitation of this study, notwithstanding the difficulty in synthesising qualitative and mixed methods research. Our paper attempted to overcome this by following a scoping review protocol published by Arksey and O'Malley. Although relatively new to the field, this scoping review was conducted to enable the identification of nuanced information in order to inform further development of research, which would have been missed if a systematic review had been attempted.

5. Conclusion

Pre-hospital analgesia administration remains a challenge for EMS personnel, with a complex interplay of patient, paramedic, and environmental factors influencing its day-to-day practice on the ground. From our scoping review of qualitative studies in this area, we identified some key areas for improvement, including addressing the patient's perception and acceptance towards analgesia, enhancing and improving paramedics' recognition of pain, bridging gaps in formal paramedic education and training, improving collaboration and feedback between institutions, providing resources and support for paramedics, as well as augmenting the larger ecosystem and systems of practice. These could alleviate some of the identified barriers and ultimately improve patient care. Further research is necessary to develop, implement, and translate interventions into practice in this field.

Author contributions

Study concept and design: S.E.T., C.Y.L.L., J.C.H.N., and Q.X.N.; acquisition of data: S.E.T., C.Y.L.L., R.I.H.C., C.Y.L.Y., and M.X.H.; analysis and interpretation of data: S.E.T., C.Y.L.L., R.I.H.C., C.Y.L.Y., M.X.H., Y.L.L., J.C.H.N., and Q.X.N.; drafting of the manuscript: S.E.T., C.Y.L.L., R.I.H.C., and C.Y.L.Y.; critical revision of the manuscript: S.E.T., C.Y.L.L., Y.L.L., J.C.H.N., and Q.X.N.; all authors have read and agreed to the published version of the manuscript.

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Data availability statement

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

CRediT authorship contribution statement

Seth En Teoh: Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Caitlin Yuen Ling Loh:** Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Ryan Ian Houe Chong:** Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Clyve Yu Leon Yaow:** Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Yoshio Masuda:** Data curation, Formal analysis, Writing – original draft. **Ming Xuan Han:** Data curation, Formal analysis, Methodology, Writing – original draft. **Daryl Jimian Lin:** Data curation, Formal analysis. **Yu Liang Lim:** Conceptualization, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Justin Choon Hwee Ng:** Conceptualization, Formal analysis, Methodology, Supervision, Writing – original draft, Writing – review & editing. **Qin Xiang Ng:** Conceptualization, Formal analysis, Methodology, Supervision, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors declare no conflict of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.ajem.2022.04.038>.

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