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The attitudes of senior emergency medical care students and early career emergency care practitioners to paediatric pain management.

By

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Declaration

I, Suzan-Lynn Smit, hereby declare that the work on which this thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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Name: Suzan-Lynn Smit Date: 01.08.2025

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Dedication

For:

Mia Elizabeth Smit

Acknowledgement

To everyone who supported me during this challenging, eventful and educational journey; I would not have been able to complete this without the encouraging words, advice, and loving support. Mia Elizabeth Smit, my daughter, thank you for being not only a source of inspiration and encouragement, but for allowing me to take time that was meant for us and spending it on this achievement. May this master's degree prove to you that you can achieve anything you want if you put your mind to it, no matter what your circumstances or what people say.

My family, Colleen, Ignes, Marge, Elizabeth, Ani Marge, when I was at my lowest you picked me up and put me back together. When I wanted to give up you would remind me why I'm doing this and that I am capable. This achievement is not only mine, but also a reflection of how this family rallies around one another.

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Last but definitely not least, to every participant that gave their time to this research, this would not be possible without every one of you. Your participation created the foundation of this research, and I trust you will be satisfied with the result and will be proud of your part in it.

Personal Statement

I am a post-graduate student studying the attitudes of undergraduate and newly qualified Emergency Care Practitioners (ECP) to paediatric pain management. I graduated from the Bachelor of Emergency Medical Care program (BEMC) in 2017 and worked as an operational ECP in both the public and private sector for 4 years after which I worked in the education field for one and a half years. My interest in this topic stemmed from my experiences as an operational practitioner, my time in the academic field and experience as a mother. These experiences collectively developed a much-individualised understanding and belief regarding the significance and importance of the paediatric pain experience and management.

I worked as a clinical coordinator and lecturer in the BEMC program at exit level and had firsthand experience with curriculum and experiential learning. During my time in the education sector, I witnessed the significant influence the undergraduate program has on the practitioners that are created. This influence is one that, in my opinion, is undervalued and under-utilised and has potential to be a part of the development of truly holistic practitioners.

I am currently working operationally as an ECP in the government sector. I myself have been in scenarios in my early career where I was fearful and hesitant to manage paediatric pain. When faced with these patients, I too experienced the challenges and spent time reflecting on the potential causes or roots of these challenges. I have witnessed this as a practitioner and in my days as a student. In my journey as a practitioner, I encountered challenges addressing this fear. Accessing effective continuous professional development programs focused on paediatric pain management and related support has proven challenging. I also have a maternal instinct born from my motherhood that drives me to want to protect children and alleviate pain as far as possible. In my personal life I have the privilege of being a mother to a 5-year-old little girl. In the capacity as a mother, I have been through the experiences of my child being unwell, hospitalised and in pain. These experiences have further developed my strong advocacy and value in effective paediatric pain management and the manner in which we interact with these

vulnerable patients. As a practitioner and mother, I am aware that my personal and professional experiences inform how I interpret data and interact with participants.

Abstract

Paediatric pain is poorly managed, due to a combination of practitioner factors, patient factors and environmental factors. This study focused on the practitioners 'factors related to paediatric pain management in the prehospital field. Specifically including attitudes, perceived readiness and confidence, beliefs and perceptions, and self-reported barriers and enablers. The aim is to explore the attitudes of senior undergraduate students and early career emergency medical care practitioners toward paediatric pain management and their self-reported readiness to manage paediatrics for pain.

Data collection was done in two phases: phase one consisted of face-to-face, one-on-one, semi-structured interviews with exit level undergraduate participants. A total of 10 interviews were recorded and transcribed until saturation was reached. Phase two consisted of an online survey disseminated using social media networks to early career emergency care practitioners. The survey consisted of open-ended questions that were developed from themes emerging from phase one. Saturation was reached after twelve submissions.

The phase one findings highlighted the perceived insufficiencies of the undergraduate program. This included curriculum theory, simulation and work integrated learning placement. The lack of exposure and experience and perceived poor preparation resulted in poor attitudes, a perceived lack of readiness and low levels of confidence. Despite these insufficiencies identified in the undergraduate participants, there was a strong theoretical understanding of the importance of paediatric pain management, although this understanding seemed to be limited to a theoretical level and had yet to be internalised. The phase two participants appreciated the significance and importance of the paediatric pain experience. Phase two data echoed some sentiments found in the phase one data. Initial readiness was found to be lacking in phase two data, similarly, attributed to the shortcomings in the undergraduate program as well as limited experience and exposure. Mechanisms found to supplement these perceived gaps in knowledge and readiness led to the development of collegial networks and search for further teaching and learning programs. Informal collegial networks emergedamongst new

practitionersthat allowed for support, sharing knowledge as well as consulting. A lack of teaching and learning programs regarding paediatric patients, and specifically paediatric pain management programs were also identified.

In conclusion, exit level undergraduate participants felt insufficiently prepared, and weren't ready or confident to manage paediatric patients in pain. Similarly, findings were obtained in the early career practitioner participants, where the perceived poor sense of readiness was also found and led to different ways of supplementing were informally developed. The attitudes of participants, in both phase one and two, were found to be missing the potential development and fortification that could be gained from the undergraduate program as well as appropriate experience and exposure.

Recommendations include the analysis and development of the undergraduate program regarding paediatric pain management. Continuous professional development programs focusing on paediatric pain management should be created to allow for the growth of graduated practitioners. Creating collegial networks available for all Emergency Care Practitioners is also recommended as it was found to be a significant enabler.

Table of Figures

Definition of Terms and Abbreviations

Attitudes.

A set of emotions, beliefs, and behaviours toward a particular object, person, thing, or event. Attitudes are often the result of experience or upbringing, and they can have a powerful influence over behaviour. While attitudes are enduring, they can also change (Stangor, 2014)

Pain.

"*An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage*" (Raja et al., 2020)

Paediatric.

Patients aged from 28 days old year old up to 14 years old (Dept. of Health, RSA)

Perception.

A belief or opinion, often held by many people and based on how things seem (Stangor, 2014)

Oligoanalgesia.

Under-treatment of pain (van Zanden et al., 2018)

Nociception.

"*The neural process of encoding noxious stimuli*" (Raja et al., 2020)

Noxious stimulus.

"*A stimulus that is damaging or threatens damage to normal tissues*" (Raja et al., 2020)

Analgesia.

"Absence of pain in response to stimulation which would normally be painful" (Raja et al., 2020)

Subjective Norms.

"A perception that an individual has regarding whether people important to that individual believe that he or she should or should not perform a particular behaviour" (Ajzen, 1991).

Perceived Behavioural Control.

The extent to which a person believes behaviour is under his or her active control (Stangor, 2014).

Behavioural Intention.

A prior conscious decision/The perceived likelihood to perform a behaviour (Stangor, 2014).

Emergency Care Practitioner.

An individual registered as such in terms of the Act (Health Professions Act, 1974) (PBEC).

Abbreviations

ALS:	Advanced Life Support
ASAP:	As soon as possible
BEMC:	Bachelor of Emergency Medical Care
CHEOPS:	Children's Hospital of Eastern Ontario Pain Scale
DALYs:	Disability Adjusted Life Years
ECP:	Emergency Care Practitioner
EMS:	Emergency Medical Services
FLACC scale:	Face, Legs, Activity, Cry, Consolability scale
HPCSA:	Health Profession Council of South Africa
IASP:	International Association for the Study of Pain
ICU:	Intensive Care Unit
IV:	Intravenous
OPD:	Outpatients Department
PBEC:	Professional Board for Emergency Care Practitioners
PMEP:	Pain management education programs
PNKAS:	Paediatric Nurse Knowledge Attitude and Practice
QD:	Qualitative Design
UK:	United Kingdom
WC:	Western Cape
WHO:	World Health Organisation
WIL:	Work Integrated Learning

1. Chapter One: Introduction

1.1 Introduction

Pain is one of the most common occurrences in Emergency Care (Lourens et al., 2019). Pain features strongly amongst the top10 causes of Disability Adjusted Life Years (DALYs) in children 10-24 years old in South Africa and globally, according to a study conducted in 2019 (Vos et al., 2020).

As the understanding of pain has developed, so has recognition of the importance of pain assessment and management. The definition of pain, as recently revised by the International Association for the study of Pain (IASP) has been defined as *"an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage*" (Raja et al., 2020). The definition recognises that while tissue injury often precedes pain, pain itself is a personal experience, and may be present without tissue injury (Raja et al.,2020). Pain is a multifaceted and complex experience by nature, a combination of memories, emotions, pathologies, and cognitive factors. The summations of these factors are specific to individuals and cannot be measured in a linear fashion and cannot always be directly related to the nociceptive input. Pain is a unique experience that is subjective to the interpretation of the individual and involves multiple areas of the brain, working together in functional networks (Saba, 2017).

Pain management in the prehospital setting has been found to be sub-optimal in all patient populations and is even less often assessed and treated in the paediatric population (Seers et al., 2018). Pain that is under-managed, or not addressed at all, heightens anxiety and fear, which complicates the provision emergency care and has potential long term physiological effects (Burkey & Carns, 2020).

The paediatric population is recognised as a vulnerable group due to several factors; their developing physical and psychological status, dependence on caregivers, limited autonomy, and

susceptibility to harm or exploitation (Lambert & McVeigh, 2024). These factors are interrelated, and it is difficult to address them in isolation. The cognitive and emotional development is limited to age-appropriate abilities and influences their ability to fully comprehend the risks and benefits of medical interventions or make informed decisions regarding their health (Bagattini, 2019). This is further compounded by their reliance on parents or legal guardians for decision-making, possibly creating ethical concerns, as parents/legal guardians may not always act in the child's best interest or may be influenced by external factors, such as personal beliefs or cultural values (Faldet & Nes, 2024). The dependency on parents/legal guardians can be related back to the physical and psychological status that could limit their ability to communicate. Often parents/legal guardians are relied on to verbalise signs and symptoms, and to consent or deny procedures or assessments.

Pain assessment in the paediatric population has been found to be lacking and could become a reason for practitioners to not utilise analgesia guidelines (Downs et al., 2022). A study conducted in Pietermaritzburg (Freund & Bolick, 2019), South Africa, found that not only is the prevalence of paediatric pain significant, but that many of the participants experienced moderate to severe pain during their stay in the hospital. Whilst pain was prevalent and significant in this hospital context, pain assessments and pain assessment scores were not routinely documented, despite validated pain assessment tools being available for most age groups (Freund & Bolick, 2019). This may indicate a knowledge translation gap in the paediatric pain management practice (Velazquez Cardona et al., 2019b).

The direct correlation between pain assessment and analgesia administration demonstrates the importance of pain assessment (Handyside et al., 2021), yet the pain assessment in the paediatric sub-population has been found to have many challenges and is often omitted, leading to oligoanalgesia in paediatric patients. Some challenges are communication barriers, such as the patient being pre-verbal, or being unable to sufficiently put into words their pain experience.

Although there are many certified pain assessment tools available for paediatric pain assessment, these tools cannot be generalised and used on all age groups and/or levels of

development (Zieliński et al., 2020). A paediatric pain assessment tool would have to be selected based on the practitioners' understanding of the patients' cognitive abilities and clinical appropriateness. The first step to effective analgesia is pain assessment; therefore, pain assessment tools and a sufficient understanding and level of comfort with these tools are important (Freund & Bolick, 2019).

This thesis aims to explore practitioner factor: the attitudes of senior undergraduate students and early career emergency medical care graduates' practitioners toward paediatric pain management. The results of this exploration may inform potential changes in undergraduate education, and continuous professional development of emergency care practitioners. A secondary intention is to inform clinical management of prehospital paediatric pain.

1.2 Background to the Problem

In the vulnerable population of paediatrics, data on the burden of paediatric pain is limited and 'rigorous' research is needed (Matula et al., 2018). In 2019, Lourens et al. (Lourens, 2020) found only six publications addressing prehospital acute pain management practices in Africa, highlighting the research and knowledge gap in paediatric pain management and more specifically, paediatric pain management in South Africa (Lourens, 2020). Despite the high prevalence of paediatric pain, amongst the top 10 causes of Disability Adjusted Life Years (DALYs) in children (Vos et al., 2020), the operational level practice does not align to the importance of management described in the research (Velazquez Cardona et al., 2019).

Significant barriers exert undue influence on pain management in paediatrics. These include misaligned beliefs and attitudes that may result in inaction or poor management of paediatric pain (Whitley et al., 2022). Factors that influence paediatric pain management are often categorised (Downs et al., 2022; Handyside et al., 2021; Whitley et al., 2021a). Categorisation allows for more focused and coherent research that encompasses all relevant data. These categories are environmental factors, practitioner factors and patient factors (environmental factors being referred to as organisational factors by some authors)(Downs et al., 2022). For example, practitioner-based factors are related to the practitioner's thoughts, attitudes, education or any other factor, which pertain to the preparation, competence or willingness of the practitioner, and how these factors influence paediatric pain management. Environmental factors possibly influencing practice and practitioners can include the presence or absence of parents/legal guardians. Patient factors include potential preverbal nature, emotional responses and possibly uncooperative behaviour. Although not all paediatric patients present with as such, the fact that our paediatric population is a vulnerable population is consistent.

Patient factors included the age of the patients, sex and ethnicity. Barriers to pain management have been found to be a determinant of whether analgesia agents are administered. Clinician factors found were fear of error and limited experience and education. The fear of errors was based on fear of dosage errors, and fear of adverse events from analgesic drugs. Limited

experience and exposure have an influence on the confidence of the practitioners, who demonstrated a poor sense of familiarity with the paediatric sub-population (Downs et al., 2022). Both Cushman et al., (2010) and Whiney et al., (2017) have documented that a range of factors contribute to inadequate management of paediatric pain, including lack of training, limited experience, fear, and anxiety on the part of the provider of aggravating or causing pain and knowledge deficits.

Among the primary clinician factors that have been identified are incorrect or hindering attitudes of health care practitioners to paediatric pain management. Although attitudes are not often assessed or reported, qualitative research has found a significant, and alarming, problem related to the inappropriate attitudes of health care practitioners to paediatric pain management. Studies regarding attitudes lack descriptive context regarding attitude findings, despite stating that attitudes are 'poor' or have found to have gaps, meaning solutions are not immediately clear. In the Western Cape, South Africa, the attitudes of practitioners in the prehospital field were found to have gaps, implying the attitudes were unfavourable to prehospital pain management (Lourens et al., 2020).

These attitudes could be linked to many clinician factors, such as, the historical, and erroneous, belief that paediatric patients do not need analgesia, a lack of training support, and the under-estimation of paediatric pain experiences (Kusi Amponsah et al., 2020). All factors potentially culminate in poor attitudes.

Due to the paediatric population's limited life experience, and limited ability to articulate and express themselves, a scenario may arise where the pain experience is more generalised and more intense (Hainsworth &Jastrowski Mano, 2021). Considering the highly subjective factors that create an individual pain experience, it is challenging to assess, investigate and manage pain in an objective manner. The potential non-verbal nature or limited verbal capacity of paediatric patients are just one of the many challenges of this sub-population. The revised definition of Pain from the IASP was premised on the fact that pain should be '*defined whenever possible from the perspective of the one experiencing the pain*, *rather than an external observer*' further stressing the value of a verbal description from a patient, adult or

paediatric (Raja et al., 2020, p.1977). The non-verbal nature of a patient, whether in paediatric patients who have yet to reach that developmental milestone, or adults with pathology, will create a scenario where the individual who has a unique pain experience is unable to communicate this with the practitioner. It is important to keep at the forefront that patients who do not have the skill or capacity to verbalise their pain experience are no less capable of experiencing pain and should be treated as such (Raja S et al., 2021). Without verbalisation of the experience by patients, and expression of intensity through a validated pain score, the practitioner is left to imagine what the pain experience is like, from their experiences and influenced by their own biases. In fact, in this there is an assumption that the practitioners believe the paediatric pain experience is important, and significant.

Validated pain assessment tools which assess patient behaviour and accommodate non-verbal patients (such as paediatric patients) are qualitative and require interpretation. As such they are influenced by practitioner's perceptions (Chan et al., 2022). Tools such as Face, Legs, Activity, Cry, Consolability (FLACC) scale and the Children's Hospital of Eastern Ontario Pain Scale (CHEOPS) can be considered as validated pain assessment tools (Freund & Bolick, 2019), but may still be susceptible to bias and skewed perceptions. The use of these behavioural pain scales becomes the only option of pain assessment in pre-verbal paediatric patients, as well as patients unable to verbalise for other reasons. This potentially creates scenarios where the practitioner is solely responsible for not only quantifying the pain of the patient, but also whether a pain assessment is even done. If the practitioner has a poor attitude to paediatric pain and does not fully appreciate the importance of paediatric pain assessment and management, it may lead to oligoanalgesia.

Attitudes influence the action or inaction of a topic, acting as an enabler or barrier and influences the way information, such as research, is processed and received. Therefore, if one has a poor or inappropriate attitude to a topic, research consumed regarding the topic will be skewed to match the existing attitudes. Strong negative attitudes are also harder to change (Ajzen, 2014). Knowledge, attitudes and practice are directly related, and changes in one of the factors will result in changes in another. This demonstrates that attitudes are an important part

of the practice, and necessary for development and improvement of clinical pain practice (Afzal et al., 2021).

1.3 Statement of the Problem

The intention to perform behaviour is a combination of knowledge, skills, and attitudes. Although knowledge and skills play an important role in the development of behaviours, attitudes dictate action, or inaction (Ajzen, 1991). Existing evidence has raised the possibility that the attitudes to paediatric pain management held by practitioners are a barrier to effective care (Kusi Amponsah et al., 2019). Attitudes may develop in response to several factors influencing the practitioner (Lulie et al., 2022). One of these factors is the initial education which practitioners are exposed to. Confidence too has been found be related to education. Poor confidence has also been recognised as being poor with regards to paediatric pain management (Fowler et al., 2018). Just as attitudes is a determinant of action or inaction, so is confidence (Dequech, 2000). While knowledge and skills are easily observed and measured, attitudes are inferred, and observation is indirect. Thus, enabling attitudes may be difficult to observe, and assess, in practice. Development of attitudes may not be as effective as teaching of knowledge or skills (Parvizy et al., 2020). This creates a risk that education does not, indeed, develop enabling attitudes(Murinson et al., 2011). Without a description of the prevailing attitudes amongst people who have been proximally exposed to undergraduate education, whether a gap in the development of attitudes exists, remains unknown (Walsh et al., 2013).

1.4 Aim of the Study

The aim of the research is to explore the attitudes of senior undergraduate students and early career emergency medical care practitioners toward paediatric pain management and their self-reported readiness and confidence to manage paediatric patients for pain.

1.5 Objectives

1. To explore the beliefs and perceptions of senior undergraduate students and early career practitioners towards paediatric pain management when delivering emergency medical care.
2. To explore self-reported barriers and enablers to paediatric pain management by senior undergraduate students and early career practitioners
3. To explore self-reported confidence and readiness to perform paediatric pain management by senior undergraduate students and early career practitioners.

1.6 Research Questions

1. What are the attitudes of senior undergraduate emergency care students and early career emergency medical care practitioners towards paediatric pain management?

2. What is the self-reported readiness of senior undergraduate emergency care students and early career emergency medical care practitioners towards paediatric pain management?

3. What is the self-reported confidence of senior undergraduate emergency care students and early career emergency medical care practitioners towards paediatric pain management?

1.7 Significance of the Study

Exploring the attitudes to paediatric pain management of senior students (those about to graduate) and early career practitioners (those who have recently graduated), allows the influence of undergraduate education on attitudes to be explored. Shortcomings in the existing undergraduate curriculum may be encountered, with opportunities to develop attitudes that have been missed. This may contribute to curriculum renewal, enhancement of design, refinement of content and improvements in teaching, learning and assessment. Cultivation of enabling attitudes and their integration into practice by new graduates' may improve paediatric pain management, potentially improving outcomes. Exposure and experience, both in the undergraduate curriculum and in operational practice, is also to be explored with relation to attitudes. The study does not write new curriculum, nor develop techniques for cultivating enabling attitudes. It is an exploration of attitudes as a baseline, and an exploration of an assumed problem to explore whether it exists, and the underlying contributory elements. The value of the study is thus one of problem exploration, an essential first step in curriculum development (Khamis et al., 2016).

1.8 Assumptions

The research assumption is that attitudinal barriers contribute to poor pain management in paediatrics. Inappropriate attitudes acting as barriers align with Reason's theoretical constructs, specifically the Swiss Cheese Model and the Safety Culture Framework (Reason, 2000). The literature shows these attitudinal barriers to include fear of pain management, diminished value of the paediatric pain experience and several knowledge deficits (Franklin & Lovell, 2024; Fisher et al., 2023; Pérez-Fernández, Salaberria& Ruiz de Ocenda, 2022). The "Swiss Cheese Model" conceptualises systems as multiple layers of defence, each with weak points, or "holes". Inappropriate attitudes to paediatric pain management represent one such layer, and gaps in knowledge or misconceptions about the topic allow errors to pass through. The "Safety Culture Framework emphasises organisational values and behaviours and prioritises safety. If

an organisational, or professional, culture overlooks inappropriate attitudes it creates conditions where these errors persist, ultimately causing harm.

Another assumption is that attitudes start developing during undergraduate training, where structured academic learning, clinical placements, and early exposure to professional environments begin shaping students' perceptions and beliefs. Devenish (2014) reinforces this perspective, highlighting that attitude development is a continuous process, influences by formal training and experience. As practitioners start their independent practice, continuous reflection, peer support, and effective mentorship become important in cultivating attitudes and personal beliefs (Devenish, 2014). To explore these assumptions, it is appropriate to explore the undergraduate program and the personal beliefs of senior undergraduate practitioners and newly graduated practitioners.

2. Chapter Two: Literature Review

2.1 Introduction

This chapter provides a literature review regarding attitudes to paediatric pain of both practitioners and undergraduate students, factors influencing attitudes, effects of attitudes and the role of education. The review will follow a framework which describe the factors influencing pain management: practitioner factors, patient factors and environmental factors (Downs et al., 2022). Barriers to prehospital paediatric pain management have been discussed in most medical disciplines (Jagamaya Georgena Small &Montayre, 2021), and are similar, allowing findings to be extrapolated (Handyside et al., 2021).

The prehospital field has unique challenges, such as limited equipment and resources, limited space and practitioner working to the limits of their knowledge. Pre-hospital care is distinguished by its urgency and the need to move patients elsewhere, potentially impacting pain management. There is a limited amount of research data exploring the prehospital environment and its unique challenges (Abebe et al., 2021). Even more so when focused on South Africa and the Western Cape (Lourens et al., 2019). The study by Abdullah, Majiet&Sobuwa (2024) on prehospital paediatric burden in the Western Cape was conducted over a two-year period and found the total paediatric cases under five years to be 87,457, demonstrating the significance of this vulnerable population (Abdullah, Majiet&Sobuwa, 2024).

In-hospital data can't be extrapolated to the prehospital setting entirely yet unfortunately will have to be since there is limited data speaking to prehospital care. In-hospital settings, while better equipped, also have barriers like parental/legal guardian's anxieties and assessment challenges. Recognising the differences between in-hospital and prehospital environments is needed for adapting effective paediatric pain management approaches. Whilst research from in-hospital medical practitioners is abundant and will often be used to in the supporting evidence for this research, it is important to note the difference in the under-graduate training as well as in the transition period from under-graduate to graduated practitioner. In-hospital

medical practitioners work in structured clinical environments, often in conjunction with other medical practitioners, and have clear protocols. The transition to practice of in hospital medical practitioners includes graduate programs, internships and formal support structures (Munro, 2016). This transition to practice support is not present within Emergency Medical Services (EMS). Medical care in-hospital versus pre-hospital might not vary in theory, but the environment and non-technical skills required are significant. Prehospital practitioners practice in high-pressure, unpredictable settings, requiring rapid decision-making and clinical autonomy. The lack of formal and standardised transition to practice support can lead to variability in confidence and competence (Devenish et al., 2014; Phillips, 2024).

International prehospital research and research from other medical disciplines will be reviewed to demonstrate the gap.

2.2 Factors Influencing Paediatric Pain Management

Several factors have been shown to influence pain management in children, categorised as environmental factors, patient factors and practitioner factors (Downs et al., 2022).While these factors may overlap, and more than one category of factor may be present at any one scene, these categories will be discussed separately below.

2.2.1 Environmental Factors

Environmental factors play a crucial role in the administration of prehospital analgesia. An environmental factor that is associated with the prehospital setting is the potentially chaotic and uncontrolled environment. While busy emergency centres may be chaotic at times, the uncontrolled prehospital emergency scene is unique and does not exist within in-hospital data.

The reality of having to work in an ambulance with limited space and potentially emotive patients and parents/legal guardians adds to the cognitive load of the practitioners. The presence and potential negative reactions from parents were found to be a factor adding to

stress and anxiety (Handy side et al., 2021). The presence of parents was found to have the potential to have either a positive or negative effect on the practitioner, with some being able to utilise the parents as an assessment tool and form of non-pharmacological analgesia, whereas other practitioners experienced their presence as a stressor and were overwhelmed by the further emotional mental load. As demonstrated below, the presence of parents has an impact on the pain experience of the paediatric patient and can either aggravate or alleviate the scenario. Scenarios where parents were allowed to be with paediatric patients showed the benefit of having parents present as psychological support, and that they are the child's '*main source of coping'* (Handayani & Daulima, 2020). Although prehospital scenarios are different, they can be a lot more uncertain, dynamic and chaotic than in-hospital scenarios; one can argue that the support of a parental figure is even more valuable.

Working with senior colleagues may have a positive or negative effect on confidence. Whitley et al. (2020) found that the nature of the influence of colleagues varied from practitioner to practitioner, either positive or negative effects, but the influences were present and potentially significant environmental factor. Working with senior nurses and having their input and guidance were valuable to junior nurse practitioners. The presence of a senior practitioner can provide a sense of comfort and confidence, if the relationship between the practitioner and senior practitioner/ colleague is one of mentorship and respect (Susanto et al., 2022). The benefit of having colleagues to discuss patient care with was also found as an enabler, along with collaborating with physicians regarding pain management plans for the paediatric patients (Rababa et al., 2021). The influence of the presence and/or input of senior practitioners is often addressed as a secondary or tangential finding and not researched directly. The willingness of practitioners to learn from senior and/or more experienced practitioners (Kusi Amponsah, Kyei-Dompim, et al., 2020) can be an element utilised for the development of attitudes or serve as a supportive measure to enable this.

2.2.2 Patient Factors

Paediatric pain assessment can be challenging and be a barrier to effective pain management, partially due to the patient's inability to self-report pain (Trottier et al., 2022: p.430). Practitioners need to use their own observations and clinical reasoning to assess pain (Freund & Bolick, 2024: p.2). Practitioner biases may thus affect pain assessments. The lack of a clear pain score and/or difficulty in pain assessment adds to the practitioner's hesitancy to provide analgesia as it does not provide a clear numerical indication for chemical intervention as other vital signs do (Susanto et al., 2022; Teoh et al., 2022). Research revealed that 61.1% of registered nurses had good knowledge and enabling attitudes in respect of paediatric pain, self-reported inadequate knowledge was a barrier identified in 76.1%of participants. This included inadequate knowledge regarding paediatric pain assessment tools (Wuni et al., 2020). These statistics show that unfamiliarity with the application of pain assessment tools is a barrier to safe, quality patient care.

Due to the subjective nature of the pain experience, and the difficulty to place a uniform numerical value to it, it can be particularly challenging for practitioners to assess pain in an un-biased manner that does not under or overestimate pain (Freund & Bolick, 2019). The lack of a standardised guidelines and/or protocols regarding paediatric pain assessment has been found to be a barrier (Deldar et al., 2018), yet the nature of the pain experience limits standardisation of pain assessment and management (Rababa et al., 2021). Accredited health care organisations have standards of care and best practice guidelines for practitioners that are to be upheld, so too health care practitioners are regulated, by the Health Professional Counsel of South Africa, to maintain legal and ethical standards for safe practice. Although research regarding the emotive display of the paediatric pain experience is limited, it is a real factor to consider when managing a paediatric pain scenario. The emotive display of the paediatric pain experience has been described as '*a powerful communication medium* 'and is important when assessing pain (Craig 2020:44), yet it can add to the cognitive load of the practitioner and can be a perceived barrier. As previously stated, the emotive aspect of the paediatric pain experience can be a useful tool when doing a pain assessment on a paediatric patient,

especially in scenarios where the patient is non-verbal; despite the usefulness of this emotive display, it can add to the cognitive load due to its sensory overload properties in a potentially already stressful scenario.

2.2.3 Practitioner Factors

Many practitioner factors were fear based and reflected perceived insufficient experience, feeling unprepared by education for paediatric pain management scenarios (Whitley et al., 2021). Knowledge and familiarity were a factor influencing analgesia administration in the prehospital setting, with knowledge and familiarity being an enabler and the converse being a barrier (Whitley et al., 2021). Handyside et al. (2021) found practitioner factors could be related back to the limited exposure to paediatric patients in operations, resulting in fear and uncertainty regarding drug dosages and IV access.

The fear of error or fear of making a mistake in judgement has a psychological impact on the practitioner's internal narrative and decision-making process regarding paediatric pain management. Practitioners often feel personally responsible for the wellbeing of their patients, and any failure, or potential failure, to maintain this can cause intense feelings of fear and uncertainty that can have lasting effects (Helo & Moulton, 2017). Risk aversion can occur when the fear of error is present, leading to possible cases of oligoanalgesia or hesitancy to consider analgesia.

Fear, uncertainty and anxiety that practitioners may experience when faced with paediatric patients can result in poor confidence (Fowler et al., 2018). Poor confidence may lead to hesitancy to administer analgesia or clinical interventions. Poor confidence has often been linked to insufficient education, as well as experience and exposure to paediatric patients. Undergraduate medical students too were found to be uncomfortable and have poor confidence in paediatric pain management (Tran et al., 2018).

The top factor identified in this study was insufficient training. As well as insufficient training, factors such as interpreting the paediatric pain expression and unfamiliarity with pain assessment tools culminate in poor confidence and hinder paediatric pain management (Carter et al., 2016). Poor confidence to administer analgesia has been identified as a barrier to paediatric pain management (Ciornei et al., 2023), and is often closely associated with attitudes.

An evaluation of the knowledge, practices and barriers across ten wards toward paediatric pain management found the knowledge of the participants to be 'good' in more than half of participants (Wuni et al., 2020). Practice also reflected that the nurses who worked in paediatric specialised wards scored higher in their knowledge and practice than nurses in wards did not specialise to paediatric patients. This was concluded to be because of increased exposure and practice with paediatrics, demonstrating the significance of exposure and practice. Attitudes of nurses to paediatric pain acted as a barrier to effective analgesia, with concepts such pain assessment often not being seen as important (Rababa et al., 2021). A negative attitude has been found as a barrier to paediatric pain management and often is a predictor of paediatric pain management interventions being done. This lack of knowledge and unfavourable attitudes to pain has a negative effect on patient management (Jemebere et al., 2020). As previously discussed, oligoanalgesia has potential long-term effects, with lack of knowledge and poor attitudes being a recognised cause of mismanagement of patients (Institute of Medicine, 2000; World Health Organization, 2023). A medical college in China did a study on attitude and intention, based on the theory of planned behaviour, with one of the focuses being belief-based attitudes. It was found that negative attitudes significantly influence behavioural intentions, which can result in oligoanalgesia (Fang et al., 2017). Attitudes, behavioural intentions and confidence are facets of clinical decision making that influence the clinical practice, and the importance and development of these require further time vested and research (Achaliwie et al., 2023; McCabe et al., 2023). The following section will further explore attitudes, education and exposure to paediatrics as influencing factors in pain management.

2.3 Attitudes, Education and Exposure

A positive relationship exists between education and attitude, showing that an increase in knowledge results in a more favourable attitude. This is significant since knowledge and attitude predict behaviour (Ajzen, 2014). Attitudes improve with exposure to patients in pain during education and further educational programs (Alshehri et al., 2024).

Exploration of nurse's attitudes to paediatric pain management found factors such as training, experience and knowledge to have significant influences on attitudes. In-service training improved attitudes to paediatric pain management, strengthening the positive association between knowledge and attitudes. Nurse practitioners with more years of experience and good knowledge had more favourable attitudes to paediatric pain management (Lulie et al., 2022). Experience and exposure being a factor demonstrates that theoretical knowledge, while being an important factor, is not sufficient in and of itself, and that experience and exposure is required to improve attitudes, solidify the acquired knowledge and improve confidence. For experience and exposure to have a positive influence on attitudes, they need to be specific to the area of concern, as in this case, paediatric patients. Consistent exposure and experience to paediatric patients cultivates confidence and a level of comfort with interacting with and managing paediatric patients, positively influencing attitudes. Nurse practitioners working in the Outpatients Department (OPD) were 52% less likely to have sufficient knowledge regarding paediatric pain management, potentially due to limited exposure to the management of paediatric patients (Lulie et al., 2022).

The knowledge and attitudes of undergraduate nurses were studied and found that 88% of participants had poor knowledge regarding paediatric pain management and nearly 50% of the nursing students had poor attitudes to paediatric pain management (Gadallah et al., 2017; Li et al., 2022). Knowledge deficits regarding effective and safe paediatric pain management often results in poor attitudes, despite practitioners being aware of the importance of pain management. The authors proposed that the findings were influenced by insufficient undergraduate education as well as limited time spent managing and interacting with

paediatric patients. These problems identified by the researchers were linked to the lack of available standards for paediatric pain management education in undergraduate programs in Indonesia. A study conducted on nursing students in the Western Cape found factors in the undergraduate program that negatively affected attitudes to paediatric pain were lack of focused training, insufficient time spent on the subjects, as well as the volume of clinical exposure being too little (Karikurubu, 2022).

Nursing students have been found to have negative attitudes to pain and pain management (Karaman et al., 2019), demonstrating a need for further and more focused education for pain in the undergraduate context (Agyemang et al., 2020; Gadallah et al., 2017). Nurse practitioners, typically trained at master's level also associated with more positive attitudes, were found to have more favourable attitudes to pain management after a pain management specific training event when compared to nurse practitioners who had not attended such a learning event (Kim et al., 2020).

A good understanding of the objective nature of the pain experience and the benefits of early and pre-emptive assessment and pain management was identified in more than half of the students participating in a PNKAS (Paediatric Nurse Knowledge Attitude and Practice) study, yet the knowledge and attitudes were found to be insufficient. This was reflected with an average score of less than 50%, demonstrating the inadequate nature of undergraduate training in paediatric pain management. The strengths identified need to be considered when reassessing the undergraduate education. The areas where students scored low were pain assessment, useful analgesia drugs, drug administration, specifically opioid drugs, pain physiology, non-pharmacological pain management techniques, and pain perceptions (Amponsah et al., 2020). These findings echo a larger trend of medical professionals displaying inappropriate attitudes and beliefs regarding paediatric pain, and all facets thereof. Pain management education programs (PMEP) were found to improve critical thinking and patient management on a larger scale, amongst other non-technical skills (Chatchumni et al., 2020). The subsequent improvement in patient pain management is significant. Knowledge provided by education can eradicate fear, uncertainty and doubts, resulting in better attitudes and a higher likelihood of

pain management administration. This education can be in the form of undergraduate programs or continuous professional development. Undergraduate students have demonstrated the desire to improve their knowledge and attitudes in respect of paediatric care, and have identified the need for more focused time, and contextually relevant content (Kusi Amponsah, Kyei-Dompim, et al., 2020). This desire and acknowledgement of need for improvement in undergraduate education was echoed by undergraduate doctors, who expressed a discrepancy between expectations and teaching and learning. This was specific to pain management of vulnerable populations that they identified, which included paediatric patients (Lechowicz et al., 2019).

Unfavourable attitudes and knowledge in Emergency Medical Services (EMS), both in under-graduate and operational practitioners, have been identified as in other health care fields, with similar factors influencing this. Saudi Arabian EMS students were found that attitudes and knowledge were unfavourable may hinder the provision of appropriate and evidence-based pain management (AlRazeeni, 2021). Factors such as focused time and exposure regarding pain management were once again identified, along with the potential need for pain specialised EMS educators. The need for better undergraduate education regarding pain management is known, yet resources to do so is limited regarding facilitators with pain management training and a lack of pain dedicated content (Hurley-Wallace et al., 2019). This relationship that was identified between the lack of standards for pain education and poor knowledge and attitudes highlights an important gap in education and research related to paediatric pain management. To maximise the development of knowledge and attitudes of undergraduate practitioners, the content taught, and amount of relevant experience and exposure needs to be appropriate.

Focused educational interventions can improve attitudes, beliefs and self-perceived confidence, and can be utilised as continued professional development after graduation. A study done before and after an educational seminar was conducted and found an increase in self-perceived knowledge and confidence. This anonymous cross-sectional survey was aimed at professionals that care for cancer patients yet demonstrated the positive influence of well-structured educational events on confidence and knowledge (Arthur et al., 2021). Educational

interventions, as seen in the above study, are significantly beneficial to both attitudes and knowledge of practitioners regarding paediatric pain management. Four hours of training in the form of a workshop found an increase in knowledge and attitudes from 14.47 to 53.09 (Parvizy et al., 2020).

Further research regarding undergraduate education of paediatric pain management and attitude development is required to develop supportive frameworks to mitigate for barriers and to better describe possible enabling factors to improve the undergraduate development of favourable attitudes. Such supportive steps should include curricula review, continuous professional development of facilitators as well as access to suitable resources (Uwimana et al., 2021). The section above explored educational and attitudinal factors influencing management. The following sections explore management itself.

2.4 Paediatric Pain Management Practice

Pain management consists of recurrent pain assessments, pharmacological analgesia selection and administration. Analgesic selection is individualised to achieve pain management and manage adverse pharmacological effects (Di Sarno et al., 2023).

The prevalence of pain amongst ambulance patients is high, however only a small portion of patients in severe pain receive analgesia (Pilbery et al., 2019). In this service evaluation, it was discovered that 17% of reviewed cases had no pain score recorded, with a portion of these patients receiving analgesia as per the patient records. Although nearly 86% of patients had a pain score recorded, only 14.4% received analgesia. Despite such a small portion of patients receiving analgesia, and only paracetamol being administered, in cases where more than one pain score was recorded, the pain score improved. This improvement was hypothesised as a possible result of non-pharmacological analgesia (Pilbery et al., 2019). Lord and Parsell (2003) identified paediatric patients, and cognitively impaired patients are particularly at risk for oligoanalgesia, with half of the patients in the study not receiving analgesia. This lack of analgesia was despite moderate to severe pain being reported. Validated pain assessment tools

such as Visual Analogue Scale (VAS) and Numerical Rating Scale (NRS)are available but is found not be consistently used (Lord & Parsell, 2003). Certain factors such as, age, gender and cognitive status, influence whether analgesia is administered. A retrospective observational study done in Italy found that pain, particularly in paediatric patients, is "*under recognized*, *underestimated*, *and undertreated*" (Ferri et al., 2022:2). This study was done in the prehospital setting, with the difference that the ambulances are staffed by nurses and found that nearly 80% of patients that reported pain did not receive analgesia. In cases where analgesia was administered, the analgesic drugs administered were Paracetamol, Ketorolac, Fentanyl and Morphine. Similar, a retrospective review done in Western Cape, South Africa found that only about 8% of patients that reported mild to moderate pain received analgesia, and only about 3% of all trauma cases (Lourens et al., 2020).

One of the benefits of the prehospital field developing and growing is the addition of more analgesic options. Recommendations for clinical guidelines were made for prehospital paediatric pain management, discussing benefit and risk relationships with different analgesic drugs and different administration methods (Lindbeck et al., 2023). Lindbeck et al. (2023) developed clinical guidelines in the United States of America (USA) to improve paediatric pain management in the prehospital field. The recommendations support the use of intranasal fentanyl for its rapid and non-invasive delivery, especially in paediatric patients. The guidelines also speak to the importance of the use of validated pain assessment tools, practitioner education, and routine audits to ensure effective pain relief.

These evidence-based guidelines were developed in a high-income country (HIC), and might not be entirely applicable to our setting, but discuss options readily available and the risks versus benefits. Although HIC guidelines might not be directly applicable for our setting, the WHO focused suggested guidelines on access to care and addressing disparities in pain management, by emphasising the use of validated pain assessment tools and adaptable care models that would be more appropriate. Analgesic options such as ketoprofen, ibuprofen and metamizole have been found to be effective, has limited side effects and more frequently used is often discussed in first world country research (Holak et al., 2021).

Paediatric pain management poses many challenges, and unfamiliarity and uncertainty might contribute to these challenges, yet there are guidelines that can be used to manage these paediatric pain scenarios. These guidelines were categorised by severity of pain as mild, moderate and severe, providing suggested analgesic drugs for each severity of pain and different methods of administration (Yousefifard et al., 2019). Clinical guidelines provide practitioners with evidence based best practice models to adapt and apply in their patient care. These guidelines are dependent on effective pain assessment tools being used to establish the patient's entry point into these guidelines. Guidelines act as cognitive aids in high pressure scenarios as well as the standardising of care within organisations. Clinical governance and having clear expectations of patient management standards with organisations are vital for safe practice.

2.5 Knowledge, Attitude and Practice Surveys

The use of KAP surveys is used in healthcare often and provide a useful structure and framework to get information (Andrade et al., 2020). The survey is also a good tool to identify barriers and issues related to the topic. KAP surveys were prominent in the literature on paediatric pain management, although largely focused on in-hospital medical disciplines. KAP surveys are largely quantitative, using pre-determined descriptive answer options to collect data. Of the KAP surveys used to look at paediatric pain management, the overall findings were that knowledge, attitudes and practices of healthcare providers were lacking(Jairoun et al., 2022). The KAP survey tool was useful in that the findings were able to support the need for educational interventions and guidelines (Negash et al., 2022).

Poor or lacking attitudes is a common finding in the KAP surveys, but do not describe the ‘poor’ attitudes adequately. The questions asked to explore the attitudes in KAP surveys vary in nature and often focus on different aspects in order to better align with the topic or vantage point of the research. For example, a KAP survey on palliative care in paediatric patients asked

questions regarding benefits of palliative care with contrasting questions being asked in tandem (Lu & Jin, 2024), whereas a KAP survey on critically ill patients asked yes, no questions focused on practitioners' beliefs about when they do or do not believe analgesia is necessary (Sweity et al., 2022). Despite the different approach and context of questions used to explore attitudes, both studies found poor or lacking attitudes and did not provide further descriptions(Sweity et al., 2022). Although the research findings are valuable in that it demonstrates a need for improvement, it lacks the richness of qualitative and more descriptive data. Due to the structured nature of the KAP survey framework, there is a less likelihood that collateral data will be identified.

2.6 Summary

The importance of paediatric pain management and its establishment as a fifth vital sign and human right have created awareness and demonstrated the need for research (Brennan, Lohman & Gwyther, 2019). Research regarding paediatric pain management in the prehospital setting, even more so in the Western Cape, South Africa is sparse and lacking. Current paediatric pain management practice is insufficient, with oligoanalgesia being common due to the barriers to paediatric pain management.

Barriers to paediatric pain management have been categorised as practitioner factors, patient factors and environmental factors. These factors influence paediatric pain management and need to be addressed where they appear as barriers to improve pain management practice.

Of these barriers, attitudes are significant due to it being a concept and not a quantifiable or educational outcome, but rather a combination of beliefs and perceptions. Attitudes are a determining factor in paediatric pain management practice. The importance of education, exposure and experience in the development of attitudes has been highlighted and research on

this matter is required to further develop our undergraduate programs as well as creating continuous professional development programs.

This study will examine the progression—or developmental limitations—of attitudes toward paediatric pain management from the undergraduate exit level to the early stages of professional practice. New practitioners may enter the clinical environment feeling underprepared and, in some cases, holding inappropriate attitudes toward pain assessment and analgesia. By describing these attitudes and exploring potential influencing factors, including educational experiences, personal beliefs, and prehospital culture, the study seeks to provide insights into why such attitudes develop and how they shape clinical decision-making. These insights may inform the development of supplementary educational strategies and interventions aimed at better preparing graduates for safe and effective paediatric pain management.

3. Chapter Three: Methods and Methodology

The following section will describe the methods and methodology used to conduct the study to create transparency.

3.1 Research Design

The research followed a Qualitative Descriptive (QD) design (Sandelowski, 2010), using a constructivist paradigm. Using the qualitative approach and Thematic Analysis (Braun & Clarke, 2006a) allowed for patterns and themes to emerge from the internal perceptions and thought processes of the participants. Qualitative Description was chosen for its beneficial characteristics that compliment and enable the research topic. Characteristics such as allowing for rich data, and accurate descriptions of the perceptions and experiences of the participants that allows the researcher to be immersed in the data. It is regarded as a pragmatic and accessible approach that is suitable for novice researchers due to its straightforward design and emphasis on rich participant centred insights. It is less interpretive than methodologies such as Phenomenology or Grounded Theory, but no less rigorous or valuable. It explores phenomena in adaptable, clear, and practically relevant terms (Hall & Liebenberg, 2024).

The design allows for rich and comprehensive data about the experiences and perceptions of the participants regarding paediatric pain management. Interviews and open-ended survey questions allow full expression of experiences, perceptions and beliefs and align with the research design. The development of codes, categories and themes that describe the content of data allows for potential insight for further research and practical policy development (Doyle et al., 2020). This study is exploratory in nature, searching for rich data that reflects the true perspectives and experiences of participants to illuminate future policy development and research, aligning with the advantages of the QD design.

3.1.1 The Research Paradigm

The researcher appreciates that there is no single objective truth to be found in the data, but rather that meaning is constructed by the research and participants together. The participant's individual experiences and perspectives are sought out and valued in the development of the data as this is where the desired information lies. Participants lived experiences and truth was the relativist data the researcher aimed to gain. Data analysis was done with the acknowledgement of assumptions and biases, and transparency was maintained by clearly documenting data development and having independent revision done by supervisor and co-supervisor.

The constructivist paradigm takes the ontological stance that multiple realities exist. Individuals construct their own meaning when their consciousness engages with objects and relate that to meanings which already exist. This paradigm accepts the researcher's bias and is used with qualitative and interpretative approaches, such as QD. Constructivism and positivism have opposing views on research. Positivism is objective, and utilises quantitative and structured methods, assuming a single reality exists independent of human perceptions (Habib, 2020). With the goal of predicting and explaining data, it does not align with the aim and objectives of this research topic.

The ontology (nature of reality) accepted by the researcher in this project is "relativist". The research aimed to explore the relative meaning participants made of managing paediatric pain, or the potential to manage paediatric pain, and the internal beliefs and perceptions they formed of their preparation (education) for this performance. Relativism holds that reality cannot exist independently from individual experiences and perspectives, and that there is no one objective or single truth (Scotland, 2012). Conversely, realist ontology (Realism) believes that reality exists separately from human thoughts and perceptions, with the aim of reflecting on this reality as accurately as possible.

Epistemology is concerned with the nature of knowledge, and how it is acquired (Scotland, 2021), as this knowledge was derived from meanings constructed by the participants, and

interpreted by the researcher, its nature was subjective. The epistemological stance of the project and researcher is subjectivism (Burns et al., 2022). Aligning with the use of relativism, constructivism and the aims and objectives of this research, subjectivism values the personal interpretation of individuals. Objectivism, in contrast, posits that truth and knowledge exist independently of human perception and that objective truths exist.

3.1.2 Method

Reflexive Thematic Analysis is a qualitative method for identifying, analysing, and reporting themes within data, as introduced by Braun and Clarke (2006). It offers a structured yet flexible framework, making it adaptable to different research paradigms and methodologies. Unlike some other qualitative approaches, thematic analysis is not tied to any specific theoretical perspective, allowing researchers to adapt its use to the requirements of their study. Braun and Clarke emphasise that thematic analysis is an interpretive process, allowing the researcher's perspective, personal experiences, and the context of the study play a big role in developing the themes that emerge from the data (Braun & Clarke, 2006). This can be done in two main ways: working from the data itself (inductive) or starting with a specific idea or theory in mind (deductive), giving it flexibility to suit different research goals. Inductive methods were used for this research.

This approach is adopted because it is clear, user- friendly, and allows comprehensive analysis, making it a good choice for both beginners and experienced researchers. By following Braun and Clarke's structured steps, researchers can create meaningful and trustworthy analyses that help make sense of complex information (Braun & Clarke, 2006).

3.1.3 Research procedure

The data analysis of the interviews and open survey used Thematic Analysis (Braun and Clarke, 2006), with qualitative open-ended questionnaires and semi-structured interviews as data collection methods. Research proceeded in two sequential phases: Phase one consisted of semi-structured interviews with senior undergraduate students. Phase two was an electronic questionnaire distributed to newly graduate emergency care practitioners consisting of open-ended questions. Phase two occurred after the analysis of phase one data.

Semi-structured interviews are commonly used as qualitative research methods explore individuals' experiences, perspectives, and insights in rich detail. They involve direct, one-on-one engagement between the researcher and the participant, allowing for a deep understanding of topics with complex layers. This method is particularly useful for examining personal experiences, exploring sensitive issues, or uncovering insights that cannot be easily obtained through other methods (Gill et al., 2008).

Open-ended questionnaires are an effective and adaptable method for collecting information in qualitative research. This method allows participants to share their thoughts, experiences, and opinions in their own words, offering personal insights (Reja et al., 2003). Although very useful, this method was limited in richness since there was no opportunity for follow up, or probing questions. Unlike closed-ended questions with fixed answers, open-ended questions encourage honesty and creativity, helping researchers uncover ideas and themes. Although analysing responses can be more time-consuming than structured data, open-ended questionnaires provide valuable depth and understanding of the topic. By including the use of open-ended online questionnaires, it allowed more participants from different geographical areas to participate in the study. The format created opportunity for participants to take part when they had enough time available to complete the survey to their fullest expression, with no time pressures. There were also more privacy and confidentiality for participants to express themselves while still reducing social desirability bias and interviewer influence.

The use of two different data collection methods allowed for a larger sample population to be reached, but also to broaden the data. The use of interviews allowed the researcher to probe, interpret and investigate the beliefs, perceptions and attitudes of participants. This led to rich data. But the survey tool allowed for independent expression of beliefs, perceptions and attitudes to the extent that the participant felt satisfied with. Although the survey data might not have the riches as the interview data, the survey data had the benefit of not having geographical constraints, allowing for triangulation and broadening of data. The two-method data collection approach aligns with the principles of reflexive thematic analysis and supports the pragmatic ethos of qualitative description, which values clarity, accessibility, and relevance over theoretical complexity.

3.2 Data collection methods

Data collection methods congruent with Constructivism were used to collect data: methods such as semi structured interviews and questionnaires with open ended questions. The use of semi structured interviews allowed for rich data to be extracted by allowing the participants the opportunity to fully express their experiences, perceptions and beliefs (Coleman 2021; Weller et al. 2018). In the semi structured interviews, an interview guide (Appendix Three) was used to ensure that all objectives were met, and all participants were asked about the same content (Karatsareas, 2022). The constructivist paradigm posits that there is value in individuals' reality and experiences, aligning with the method used to obtain this rich data. Open-ended questions were used in the questionnaire, enabling participants to express as much detail as possible regarding the questions. Although there is the limitation of follow up or probing questions not being possible, it is better than closed ended questions that would limit participants to predetermined answers. The semi-structured interviews were in depth, one on one and with open ended questions. This allowed the participants to divulge as much information as they felt comfortable with and allowed the researcher the opportunity to follow up with probing questions (DeJonckheere& Vaughn 2019).

The data from phase one formed a basis for the open-ended questions in phase two. Themes that emerged from the analysed phase one data as well as the research questions and objectives provided the questions developed for the phase two data collection tools. This second phase consisted of an electronic questionnaire (Appendix Four) survey distributed to Emergency Care Practitioners (ECPs) who were within two years of graduation. The electronic survey consisted of open-ended questions, with the goal of allowing participants to go into as much detail and depth as they saw fit.

3.2.1 Sampling

In order to reach the two specific populations for the research, two methods of sampling were used. Sampling was guided by Lincoln and Guba's (1985) criteria, upholding trustworthiness and furthered triangulation. By utilising targeted and purposive sampling, it ensured rich and relevant data. Targeted sampling was used with phase two online open-ended survey, aimed at a specific subgroup with 12-24 months, and purposive sampling used with phase one one-on-one interviews with exit-level undergraduate students. Qualitative data focuses on context-sensitive sampling rather than aiming to achieve statistical generalisability (Sandelowski, 2000). To obtain rich data, individuals that have knowledge and experience regarding the topic were sought out and selected (Palinkas et al., 2015). This is in contrast with convenience sampling, that could have the challenges of not being generalisable or representative enough of the population relevant to the topic (Sullivan, 2012).

The sample population that would best satisfy the research question is a small population group within specific ranges of under-graduate program progress and post-graduate operational experience. In order to reach this sample population, purposive sampling was used and served the researcher well. The sample size of phase one should not present as a challenge, as this is mitigated for by triangulation, as previously discussed, trustworthiness, elaborated on later in this chapter, and the methodological rigour. As supported by Sandelowski (2000), QD is

not reliant on large sample populations, as its value is found in the richness and relevance of data.

As data collection proceeded, data saturation was achieved without the sample population being exhausted. The sample size was determined by data saturation. Once saturation was reached, further participants were no longer sought out. Saturation can be found in four ways in qualitative research and is context-dependent; theoretical saturation, data saturation, code or thematic saturation, and meaning saturation. Data saturation was reached in this research, in the manner that codes and themes that arose out of the data became repetitive, and no new codes or themes were found (Rahimi & khatooni, 2024). The RTA method focuses on depth and richness of data rather than aiming for a fixed endpoint, as per Braun and Clarke (2021, 2022), this is demonstrated by no new data codes being identified and codes and themes becoming repetitive. Saturation was achieved reflexively, as themes were developed iteratively and analysed until themes were well-developed.

3.2.1.1 Inclusion Criteria

The study had two participant groups or populations, senior undergraduate (Group 1) and new emergency medical care graduates (Group 2). Both Group 1 and 2 had to be currently living and studying/working within South Africa and have registration with the HPCSA as either an Emergency Care Practitioner (ECP) Student (Group 1) or an Emergency Care Practitioner (ECP) (Group 2). Group 1 was drawn from an exit-level group of the Bachelor of Emergency Medical Care (BEMC) Program. Group 2 was comprised of BEMC graduates, currently working in either the public or private South African Emergency Medical Services (EMS). Participants in Group 2 had to have between 1 and 2 years of experience as an operational ECP. Students in the BEMC program only work in sites where specifically paediatric patients are seen, (paediatric emergency room and paediatric ICU) in their exit level year, as part of their Paediatric Study Block. The two groups of participants were either still in undergraduate education, or in a window of time close to their undergraduate education; this allowed the researcher to assess

the development and change of attitudes relative to their undergraduate education and experience/exposure to paediatric patients in pain as both practitioners and as students.

In order to explore attitudes to paediatric pain management in the prehospital field, exit level BEMC under-graduates and newly graduated ECP's were selected as the sample population. This allowed for a unique view of the development of attitudes and in an opportunity to potentially explore the causes for development and influencing factors.

3.2.2 Instrumentation

Phase 1: Semi-structured interviews; senior undergraduate students.

The semi-structured interview guide and questionnaire were developed by the researcher and the supervisors, based on the objectives, aim and research questions. The questions posed were developed to be contextually appropriate to the prehospital field and exit level under-graduate BEMC students. The interview guide consisted of eleven questions, as well as possible follow up questions, concluding questions and clarifications on certain words used in the questions.

The questionnaire questions for the phase two data collection tool were developed based on the themes developed from phase one data, and by considering the potential experiences and challenges expected to be encountered by operational practitioners. These considerations were informed by the themes to emerge from phase one data, the experiences and expertise of the researcher and the supervisors, as well as pertinent literature on the topic.

The researcher conducted interviews to allow all nuances and themes to be analysed along with responses to the open-ended questions. These were recorded in field notes and were utilised in the development of further probing questions and the development of data codes. The one-on-one interview let participants feel comfortable and express thoughts and beliefs without fear of judgment of peers and allowed for anonymity. The interviews, conducted by the researcher

alone, were recorded on a password protected cell phone and transcribed using Microsoft 365 Dictation. The researcher read and re-read to immerse herself in the data.

Phase 2: Online questionnaire Survey; new graduates

Data from the new graduates' participants and was collected using an online survey, the survey platform that was Google Forms (Google, Mountain View, CA). The survey's questions were open-ended and informed using the trends and identified similarities that derived from the interview data collected from the senior undergraduate phase of the research.

No identifying information was requested from these participants. Three responses were excluded automatically based on their years of experience; two responses were from individuals with years of experience that exceeded the inclusion criteria and one response with less experience than the inclusion criteria.

3.2.3 Data collection Procedure

Data was derived from the senior undergraduate exit level participants in the form of interviews. The interviews were done with the researcher and a single participant present. The questions were based on an interview guide, allowing the participant to divulge as much and as in-depth answers as he/she/they are comfortable with, without the limitations of yes/no questions. Interviews were conducted until saturation was reached. This saturation, described as data and inductive thematic saturation (Saunders et al., 2018), was identified once new data repeated data already collected as well as codes and themes derived from said data became repetitive.

The first contact with the participants was a presentation regarding the nature of the research, the details of participation as well as all potential risks and benefits. At the end of the presentation, consent and information packs (Appendix Five) with all relevant contact

information, were handed out and individuals wanting to participate were requested to give the researcher their contact information. The contact information was sent to the primary researcher via a message after the primary researchers contact details were shared with everyone. Participants contact information was not shared with anyone. Prior to contacting the phase one participants, permission was granted by the University through the official gatekeeper portal (Appendix Six).

The individuals that indicated their desire to participate were contacted in their preferred method, either via mobile phone or email, to arrange a meeting time that suits both the participant and the researcher. The meetings were held in an environment familiar to the participants, some participants requested online meetings for convenience.

The tone of the interviews was informal and relaxed. The room was spacious and comfortable. The researcher was in a seat that allowed the participant to choose a seat either next to or opposite to the researcher. The procedure was explained to the participants before starting and they were allowed to ask any questions.

Any lulls in conversations were filled by asking questions about previous comments or probing questions regarding points were the participant seemed particularly uncertain about. Participants were allowed the time to fully express their sentiments. If needed common point with the data was used redirect the line of questioning or following up on the point if relevant in a manner that made the participant feel empowered and respected.

The online questionnaire was distributed via the social media platform Facebook and WhatsApp. The groups that were utilised were “Evidence based pre-hospital Emergency Medicine “on Facebook. WhatsApp groups “WC EMS ALS Database” and “CEM Group”, both of which are invitation only groups comprised of practitioners from across the Western Cape, South Africa. These groups were chosen as it is largely comprised of practitioners that are within the Western Cape, South Africa and are currently practicing as emergency care practitioners and it would be the most direct and succinct manner to reach the target audience. The survey was released on29th September 2023 and was closed for submissions on 1st December 2023.

The data collection process, for both phase one and two, each posed unique challenges. The tools developed were done with the potential limitations in mind, with geographical limitations as well as time constraints of the researcher. Interacting with the phase one participants and conducting the one-on-one interviews was a learning experience, as being able to set participants at ease, asking the appropriate probing questions and trying to keep on the relevant topics are new skills. With the use of a digital recording device, the interview guide and reviewing and learning from each interview, the interviews were successful and the data was rich. Phase two data collection with an online survey, although appropriate and useful in the context of this research, limited the ability to further probe or explore participants responses and lost some of its richness in that sense. Despite the limitations, data saturation was reached, and insightful data was found.

3.3 Data Analysis

Inductive open coding was used to make observations and come to conclusions in the manner of themes; the themes found using inductive methods are closely tied to the data. Using thematic analysis and open coding, data was coded into descriptive codes. The descriptive codes were then grouped together into categories, and the categories were then ordered into themes. Inductive open coding was chosen to allow themes to naturally emerge from data, without limitations of pre-existing assumptions, aligning with exploratory research. An inductive approach was used so that themes emerged directly from the data, allowing participants' response to guide the findings rather than fitting responses into a predetermined framework.

All interviews were digitally audio recorded. These recordings were then transcribed using the Word365 (Microsoft, 2024) dictation tool. The transcribed data was re-read to familiarise the researcher with the data, taking notes of initial generalised ideas as they emerged. This process

aligns with Braun and Clarke's (2006, 2021) reflexive thematic analysis framework by being an immersive, iterative and flexible data analysis process. The initial coding was done in a systematic manner to include all relevant data to each individual code, capturing particularly interesting features. Combining codes into likely themes in the initial theme search was done, with the use of constant comparative methods all these themes were checked to ensure they relate to the relevant codes and data set in its entirety. The tool FreeMind (FreeMind, 2024) was used to enable visualising the thematic map, making coding and constant comparison easier. The data was mapped from the descriptive code phase all the way through to the eventual development of themes. Each theme was generated and re-assessed compared to the codes and clearly defined and named. The process was overseen and revised by the supervisor and co-supervisor to ensure clear development of themes, as well as ensuring the accurate representation of data set. The thematic analysis followed Braun and Clarke's six-phase reflexive framework. The primary researcher independently conducted familiarisation and initial coding. The codes were then reviewed and discussed with supervisors. Theme development and refinement involved constant comparison to ensure the golden thread is present across the dataset. Supervisors provided independent feedback during this process. Themes were then clearly defined and named. The principal researcher was the first reviewer and analyst of the data, the second reviewer was the supervisor (Ryan Matthews), and the third reviewer was the co-supervisor (Dr. Dirk Bester). These reviews were done independently to improve independence and validity of codes.

3.4 Ethical Considerations

The ethical considerations were assessed and managed separately, as there were two separate participant groups with different factors that influenced ethics.

Participants in phase one gave informed consent first, with the understanding that all data was anonymised. A face-to-face explanation of the purpose of the study, as well as possible risks and mitigation plans, was provided to the participants. Individuals willing to participate in the study voluntarily provided the researcher with contact details to provide copies of the consent forms and to arrange meeting times. Permission to conduct study at the university was granted through the official gatekeeper portal, and a site approval letter is available upon request to maintain anonymity. Participants were provided with an information pamphlet and consent form. Risks that were identified for the participants were fear of negative repercussions from the honest review of program and university attended. Emotional and mental distress from discussing potentially difficult patient care scenarios, and personal and professional practices and opinions being shared were also risks. To mitigate these risks, all participants were informed and made aware of the student counselling facilities available, any and all identifying information, including names of people, services and universities were redacted and access to interview recordings and transcripts were limited to the researcher and, by request, supervisors. Phase one participants were given a code/number, and all data from interviews were labelled as such and did not contain any identifying factors. Transcripts and recordings were saved on the researcher's computer which is password protected and is used solely by the researcher. The data management plan (DMP) is attached as Appendix seven. The interviews were preceded by an opening discussion where the above was reiterated, and participants were made comfortable and rapport was built with researcher.

Phase two data was retrieved from the survey tool without recording any identifying factors. All data retrieved was screened for identifying information, and if found, was deleted. The consent form was embedded in the questionnaire, and to continue with the survey consent needed to be provided. People who were not consenting were directed out of the questionnaire using

skip-logic. Contact details of the primary researcher were attached to allow for participants to make contact in any event that they might feel necessary.

Participation in the study was voluntary, and no remuneration was offered to any participants. Participation could be terminated at any point in the research, and all relevant data would be erased if and where possible. As phase two data had no identifying information and data could not be traced back to any one individual, and so data could not be removed once submitted

The study was approved by the research ethics committee of the Faculty of Health and Wellness Sciences, Cape Peninsula University of Technology (authorisation nr: CPUT/HWS-REC 2022/H21). The ethics approval letter is attached as Appendix eight.

3.5 Trustworthiness

Lincoln and Guba put forth that trustworthiness is important in determining a research study's worth (Lincoln and Guba, 1994). Trustworthiness in qualitative research can be challenging. In order to prove and demonstrate the trustworthiness of the research, the criteria framework from Lincoln and Guba were utilised.

Credibility asks the question 'How *congruent are the findings with reality?*' (Stahl & King, 2020). Sampling methods were specific to participants that could provide data relevant to the problem statement, and question formats allowed the participants to provide answers that were true to their own realities. The researcher was fully immersed in data by utilising face to face interviews for phase one, as well as transcribing data, and utilising the constant comparative method of data analysis. In order to establish that the themes that were put forth were credible, well-established methods were used. Thematic analysis with inductive coding was used, both have been widely used and have been appraised as credible (Braun & Clarke, 2006a).

Dependability was shown with the research design, data collection plan and the external reviews done in the proposal approval process. The external audits assess the research design, methods as well as data analysis and coding process. Data sets were reviewed by the supervisor as well as co-supervisor to receive confirmation of dependability, and lending to transferability.

Transferability in this qualitative data can be challenging but by providing clear data collection plans, data collection methods and data analysis and development one can demonstrate as much transferability as possible. Transferability would be applicable only in the population of undergraduate and newly graduated emergency care practitioners.

Confirmability was demonstrated by triangulation, reflexivity and transparency Nowell et al. (2017). The presence of these three factors is clearly demonstrated throughout the data collection and data analysis processes. A clear audit trail, demonstration of theme development and iterative processes ensure the findings were grounded in the data and not personal biases.

4. Chapter Four: Results

4.1 Introduction

The study explored attitudes of senior undergraduate students and early career ECPs towards paediatric pain management. This was done by exploring beliefs and perceptions, self-reported barriers and enablers, as well as self-reported confidence and readiness. The data collected speaks to several factors that contribute to attitudes, some of which were identified prior to data collection as well as factors that were revealed as data collection was done. The purpose of the study was to explore the attitudes of senior undergraduate students and early career emergency medical care practitioners toward paediatric pain management and their self-reported readiness and confidence to manage paediatrics for pain. This might be used to inform potential changes in undergraduate education, continuous professional development and management of prehospital paediatric pain.

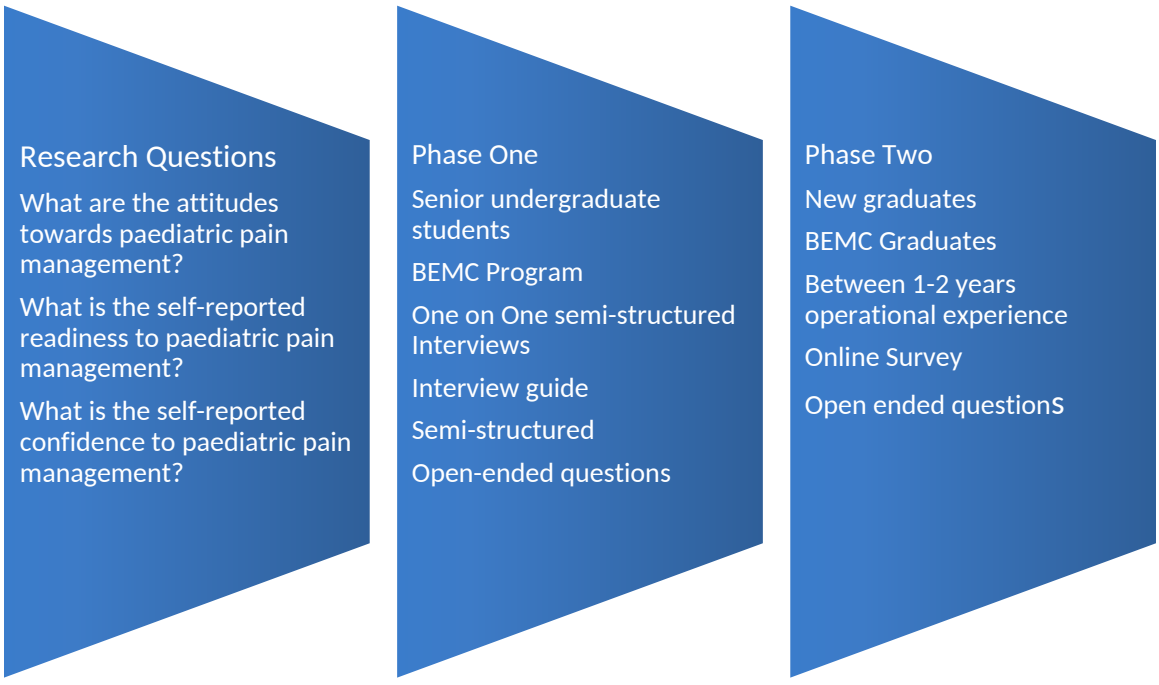

Figure 1 Description of research methods: Figure demonstrates research questions and data collection phases

4.2 Phase One Interviews

Interviews were conducted between the 1st of October 2022 and the 1st of April 2023 and lasted between 23 minutes and 45 minutes. All participants who volunteered attended their interviews at their selected time and date. The last interviews were shorter due to two likely reasons. Some participants provided shorter or more concise responses, even though all main questions were addressed. Secondly, after reviewing the initial interviews, the interview guide was reviewed and refined, requiring less exploratory questions. This is not uncommon in qualitative research, where initial interviews are often broader and later ones become streamlined as data saturation approaches (Braun & Clarke, 2013).

Table 1: Description of Interviews: Table depicting the number of interviews done as well as the duration of each interview.

Participant Code:	**Length of Interview:**	**Gender:**
01	44:40	Male
02	31:22	Female
03	25:59	Female
04	42:03	Male
05	31:13	Female
06	34:06	Male
07	30:41	Female
08	20:26	Female
09	23:16	Male
10	26:00	Male

Three themes emerged from the phase one data collection and analysis. Interview transcripts were analysed using reflexive thematic analysis (Braun & Clarke 2021) and inductive coding using the FreeMind application.

1. Theme One: Misalignment between paediatric pain theory and paediatric pain praxis.
2. Theme Two: Undergraduate education does not adequately prepare senior undergraduate participants for clinical encounters and real stressors of managing pain in paediatrics.
3. Theme Three: Attitudes, confidence and perceived readiness of undergraduate participants are not conducive for effective paediatric pain management.

These themes are unpacked in the section below.

4.2.1 Theme One

Misalignment between paediatric pain theory and paediatric pain praxis.

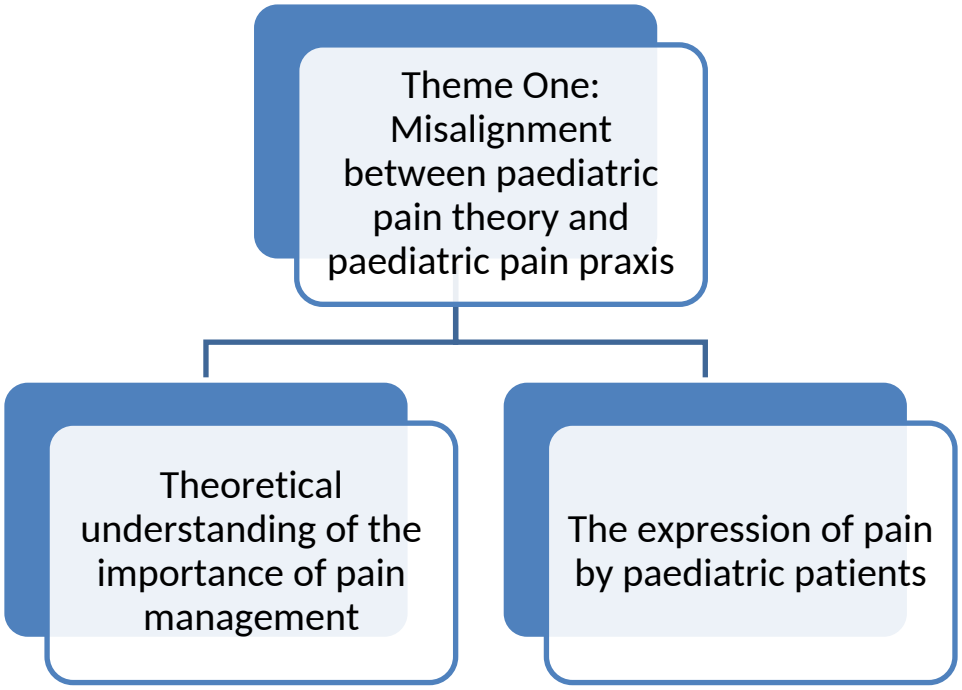

Figure 2: Schematic representation of Theme One: Misalignment between paediatric pain theory and paediatric pain praxis.

This theme suggests that although there is a theoretical understanding of the importance of early paediatric pain management, this sentiment does not necessarily translate into behaviours during clinical practice. Despite having emphatically positive theoretical beliefs on the importance of managing pain in paediatrics, participants' perceptions and beliefs on the accuracy of paediatrics pain presentations conflict with this. The dissonance arose in how participants interpreted the way children expressed their pain, and the value the participants assigned to these expressions. This dissonance is explored below.

3.2.1.1 Theoretical understanding of the importance of pain management

Participants expressed a theoretical position that paediatric pain management is essential and has potentially long-term negative effects when not addressed or under-managed. Strong and emphatic words such as '*important*'[4] '*ethical*'[7] '*detrimental effects*'[1]was used to describe paediatric pain management. Participants defined the theoretical positions based on the ethical, physiological and psychological aspects related to early and effective pain management. The importance of patients being comfortable was acknowledged; comfort enabled easier physical assessments and facilitated their recovery to normal physiological vital signs. Recognition of the potential psychological and physiological effects of oligoanalgesia was commonly expressed, and the general poor management of prehospital pain. Several participants acknowledge the prevalence of oligoanalgesia, and went as far as stressing that they strive to not be a part of this problem so commonly found in the prehospital field.

"*I think the paediatric pain experience is very important and proper management is important because of the possible detrimental effects of unmanaged pain. I think early pain management is very important.* "[3]

The above quote reflects the sentiment of all participants regarding paediatric pain management. This category, although unanimously answered in an emphatic, positive manner, cannot be taken as a standalone theme; it requires a level of internalisation that should be reflected in the acknowledgment and consideration of paediatric pain and all aspects of it. It is easy and comfortable to accept theoretical teachings and facts, but the ability to integrate

these into the clinical decision-making process and clinical practice requires internalisation of these theoretical teachings and facts, and the acceptance of the theory in practice. When describing their experiences of managing paediatrics in pain, participants did not act on the theory. Specifically, belief in the outcomes of pain assessment was contradictory with their description of the importance of pain management. This is explored in the next category.

3.2.1.2 The expression of pain by paediatrics

The paediatric pain expression, crying and/or being inconsolable, was regarded as exaggerated and distracting rather than indicative of the potential for pain. Pain expression, the first indication or interaction with paediatric pain, was not valued or interpreted as a valid aspect of patient management. Words such as '*exaggerated*'[2], '*dramatic*'[8], '*pretend*'[4] and '*does not translate*'[4] were used to describe the paediatric pain expressions. Although these are powerful words, and might reflect the personalities of participants, it is indicative of the strong emotions related to the expression of pain in paediatric patients. There is precedent for this in the literature; The paediatric pain experience is larger than the nociceptive response, and the emotive/physical expression is an aspect that merits acknowledgment (Di Sarno et al., 2023).

This is a display of misalignment between the stated belief of the importance of paediatric pain management and the beliefs related to the paediatric pain experience held by the participants. Participants hadn't seemed to internalise their cognitive understanding of the significance and subjectivity of pain and its management. The theoretical understanding of the nature of pain had not been linked with their own assessment and management practices. This misalignment could be a combination of a lack of knowledge, skill and the confidence to execute the skill.

"*A child's dramatic pain expression doesn't really translate to a pain score to me because I believe children cry quite easily so I will use my personal opinion and distraction methods to try to get a pain score.*"[4]

The quote is one that reflects numerous others, with many participants alluding to the fact that they do not place value in the emotive expressions and prefer to use their own opinions based on their own internal narratives to determine pain assessments. By disregarding or minimising

this aspect of the pain experience, it creates potential for skewed pain score and ultimately oligoanalgesia. Relying solely on own opinions or judgements can further skew pain scores due to personal biases and/or internal narratives (Trottier et al., 2022).

Participants did not integrate the developmental levels of the child's life stage to the way pain may be expressed. This disregard for, or inability to acknowledge the child's experience from their point of view, and to interact with children appropriately during the experience may show a lack of development of empathy, or suppression of empathy in favour of completing the biomedical tasks of providing analgesia. When the expression of pain by the child, and the child's behaviour complicates these biomedical tasks, the participants experienced frustration, and the behaviour of the child as a hindrance to emergency care.

Ultimately, the participants did not link the multidimensional nature of pain to paediatric expression of pain (Jaaniste et al., 2019). There appeared to be a disconnect between the process of nociception and the personalised concept of the pain experience. There is a clear misalignment, demonstrated in the contrasting beliefs, perceptions and theoretical understandings of the importance of paediatric pain management. This coexists with an inability, or unwillingness, to understand the paediatric experience and how it shaped the expression of pain.

The category of the theoretical understanding of the importance of paediatric pain management and the category of expression of pain by paediatric were so starkly different and so significant in value, that the development of the theme was one of importance. This theme demonstrates a level of disconnect from the patients as humans, with very real pain experiences, and could be a possible coping mechanism of participants to create distance between the emotive response of the patient and potential emotional distress of the participants.

Keeping in mind that the participants are still under-graduate students, and the majority of them still being young with limited experience of or exposure to children in their personal lives, the ability to manage the emotional and cognitive stimulation in these scenarios may be limited. Participants also demonstrated an inability to marry the theoretical knowledge with

their practice, or to apply this with their practice in a transformative way. The theory and knowledge expressed in the first category needs to inform the subsequent practice, which should be embodied with critical reflection. The ability to identify this misalignment between theory and praxis was also not present; participants were prompted to link or identify the expressed theoretical understandings, and later dismissive attitude to pain expression, and were unable to make this connection on their own. This further demonstrates dissonance between the value placed in theoretical understandings and the human aspects of their patients. The dismissive attitude towards the pain expression, namely external emotive expressions, seems to display a lack of empathy. Empathy towards patients encountered is a part of the human aspect of our patient care that is missing.

4.2.2 Theme Two

Undergraduate education does not adequately prepare senior undergraduate participants for the clinical encounters and real stressors of managing pain in paediatrics.

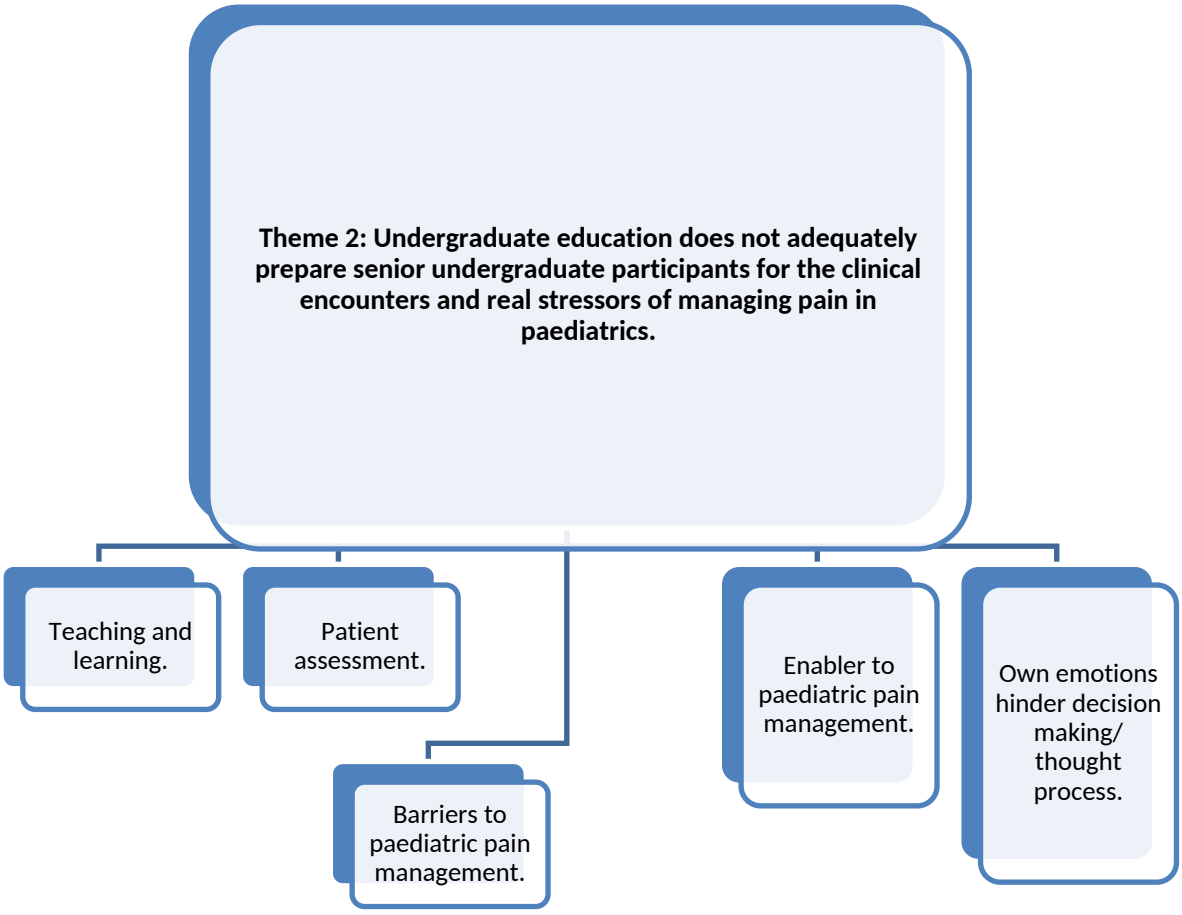

Figure 3 Schematic representation of theme 2: Undergraduate education does not adequately prepare senior undergraduate participants for the clinical encounters and real stressors of managing pain in paediatrics.

In the process of investigating perceived readiness and perceived barriers and enablers, the undergraduate program preparation continuously arose as being insufficient and a perceived barrier. Participants strongly expressed the perceived insufficiencies as barriers.

4.2.2.1 Teaching and Learning

The undergraduate education for prehospital paediatric pain management was described as insufficient by participants in general. Words such as '*definitely too little*'[1], '*way too short*'[2], and '*a straight no*'[5] were used when asked if the undergraduate program preparation was sufficient in preparing undergraduates for prehospital paediatric pain management. This suggested the time spent on content regarding paediatric patients being much too short, including the exposure to paediatric patients.

"*Although the content taught to us may be sufficient, the time spent on the topic is not enough to make us feel prepared and confident. Especially when compared to adult patients. I don't think we're ready when we* [will] *graduate*. "[7]

There appears to be a focus on the management of adult patients. Participants expressed that the omission of paediatric patients from earlier years of teaching and learning creates a scenario where they have not been trained to prepare for paediatric patients in very many scenarios. The teaching and learning of paediatric patients were said to be focused into a single period that was limited to a few weeks, and the content covered not nearly as vast and inclusive as it was with adults. Adult patients were incorporated in all years of teaching and learning, and the abrupt introduction of paediatric patients on a level where evidence based critical thinking is expected, left participants feeling unable to process content in a comprehensive and reflective manner. They were left with insufficient time to internalise the new content organise it into their everyday practice. Consequently, behaviour change on respect of paediatric pain management was compromised. Participants expressed that they felt forced to base this advanced level of paediatric knowledge on the foundation of an adult patient-based knowledge. This perceived gap in knowledge led to participants feeling

unprepared and scared, saying they do not feel prepared or confident to manage paediatric patients.

Workplace learning, a facet of the training in the undergraduate program that starts from early in first year, is not inclusive of paediatric specific wards such as paediatric emergency wards until the specified paediatric block is completed in fourth year. Participants only being allowed in paediatric specific training areas in their fourth year limits the exposure to paediatric patients. Workplace learning was experienced as a stimulating and significant learning aspect in the undergraduate program. Negative and positive experiences were reported to stimulate the development in participants' understanding of prehospital paediatric pain management. The benefit and developmental importance of workplace learning, the exposure and experience that it provided for the participants was expressed as significant. Based on the responses of the undergraduate participants, the time and exposure in workplace learning was also limited and not sufficient.

"*My time spent working with senior practitioners has influenced my attitude and practice. It is where I learnt most of my skills and inspired me to educate myself even further*. "[10]

Participants expressed that experience and exposure in workplace learning have inspired and motivated them to educate themselves further. This demonstrates that a gap in knowledge is identified or experienced more acutely due to exposure to paediatric patients; this motivates participants to self-educate using research and senior practitioners as sources. Participants do not rely on the undergraduate program to prepare them for paediatric patients and are forced to search for supplemental knowledge elsewhere. Experience and exposure, although limited, was found to be significantly influential on the attitudes, confidence and perceived readiness. The role of senior practitioners is also highlighted by participants as beneficial. Participants described this as "intellectual stimulation"[4] and "increased confidence"[7] ,watching senior practitioners interact with patients and being exposed to paediatric specific skills increased confidence and preparedness by creating opportunity to learn in a space that feels safe for the participants.

4.2.2.2 Patient Assessment

The limited exposure to real life experiences added with the limited time spent with the paediatric content, resulted in participants feeling uncertain and insecure when faced with emotive paediatric patients in pain that requires interaction, assessment and management. Communication challenges limited the ability to deescalate a paediatric in pain, and result in participants feeling overwhelmed and over-stimulated by the potentially hysterical and/or loud pain expressions. Words used to describe these interactions included '*I don't like it*, *I hate it*, *I hate it so much.*'[3], *'More stressed'*[1], *'emotionally charged'*[1]and '*Less comfortable'*[7].

"It's really intimidating because it's difficult to assess the severity of the patient's condition." [8]

The vast difference between adult self-reported pain assessment and paediatric pain assessment that requires behavioural pain assessment tools and often include the practitioner's clinical judgement, is one that is only fully appreciated once faced with the scenario. Paediatric pain expression cannot be simulated, and therefore the cognitive and affective loads that come with those scenarios cannot be considered when teaching and learning is taking place, which further leaves undergraduate students feeling unprepared and overwhelmed when faced with it.

Certain aspects of patient management cannot be taught in a classroom setting and cannot accurately be simulated, limiting learning opportunities to workplace learning, which was already found lacking. Participants felt over stimulated, overwhelmed, scared and intimidated when faced with paediatric pain assessment, this could be due to the lack of exposure and experience or insufficient teaching and learning, or a combination of both.

4.2.2.3 Barriers to Paediatric Pain Management

Additional barriers identified by participants were IV access, pain assessment, and drug choice and drug dosages. These barriers require time, practice and experience to be removed as barriers. Barriers found in this study aligns with barriers often found in other professions, and are common in paediatric patients, especially when limited experience is also a factor (de Souza et al., 2024).The fear of causing further harm or discomfort with IV access or adverse events of drugs can be significant barriers. This aligns with the previously stated perceptions that the time and experience in the undergraduate program is insufficient. In order for practitioners to be confident and ready, these skills need to be developed as they cannot all be taught in a theoretical setting only.

"I think minimal experience is my biggest obstacle" [9]

Experience and exposure in workplace learning, also found to be insufficient in terms of time spent, can be one of the first steps to remedy their barriers. The integration of theoretical knowledge with practical application is vital for confidence and preparedness.

4.2.2.4 Enablers to Paediatric Pain Management

Participants chose to focus on technical aspects of patient care, rather than engage with non-technical aspects. This could be a way of reassuring themselves by falling back into biomedical management of patients. These advanced monitoring devices were not described or spoken of in context of operational practice or the use of these monitors in practice. When discussing enablers, only advanced monitoring was identified as a recurrent enabler. Other enablers that were identified by individual participants were *"practitioners that are willing to pick up the phone"* [1] as well as *"a large variety of drugs"* [9]. The positive influence of more senior practitioners or just fellow colleagues being available for informal consults and debriefs is something that emerged from the data and was similarly found in the phase two data. This seemed to give participants a sense of camaraderie in the experience of feeling unprepared and allowed a sense of confidence in moments of uncertainty. A larger variety of analgesic drugs,

from drugs appropriate for severe pain to analgesia for mild to moderate pain now being available, gave participants a sense of comfort knowing that there are analgesic drugs available that have less adverse reactions and requires less 'risk'.

4.2.2.5 Own emotions hinder decision making/ thought process

Paediatric patients in pain pose many unique challenges; some already emerged in above data, whereas this finding was so rich in data, and so significant that a category of its own was warranted. For participants, a good portion of who have limited exposure to children in their personal capacity, or have children of their own, being faced with a paediatric patient can be an emotionally charged for the practitioner as well.

"It's an emotional situation for me because I feel like I can't give what I want to give which I feel more prepared and ready to give to an adult" [5]

"Concerned and sort of more panic than one would experience with an adult" [6]

When faced with paediatric scenarios where the patient is in pain and potentially very emotive, participants expressed experiencing thoughts and emotions that hinder their thought process and/or decision-making process. When describing their initial thoughts and emotion, words such as *"exceptionally stressed"* [1] ,*"anxiety"* [2] , *"apprehension"* [3], were used. These strong emotional responses and uncertain thoughts can limit the behavioural intentions of participants, especially when coupled with the barriers mentioned above where participants fear causing more harm. In the exit level phase of the undergraduate program, there might also be an aspect of professional immaturity that plays a role, where the limited time in the field, limited exposure and experience, could lead to more intense emotional reactions to certain scenarios, or an inability to distance their own emotions for the sake of patient management yet to be developed.

The inadequacies with undergraduate education, and the described barriers, contributed to a lack of confidence and a feeling of unpreparedness, which will be explored in the next theme.

4.2.3 Theme Three

Attitudes, confidence and perceived readiness of undergraduate's participants are not conducive for effective paediatric pain management.

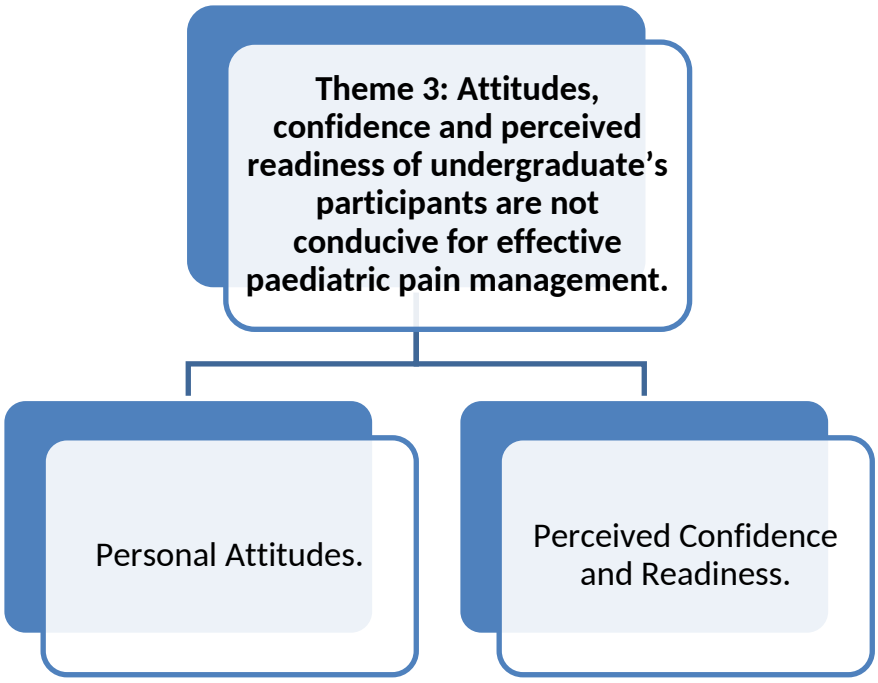

Figure 4 Schematic representation of theme 3: Attitudes, confidence and perceived readiness of undergraduate's participants are not conducive for effective paediatric pain management.

When analysing the data, there was an apparent lack of perceived confidence and readiness, paired with poor attitudes to paediatric pain management. This data is tied together by the participant's perceptions of not only their capabilities and preparedness but also implied willingness to administer analgesia.

4.2.3.1 Perceived confidence and readiness

Although the theoretical knowledge of paediatric pain management might be present, the willingness to initiate and effectively carry out the administration of analgesia appeared to be hindered by the participant's poor confidence and readiness. Participants identified the relationship between their lack of confidence and readiness with limited exposure and experience being directly related. Describing it as *exceptionally low*'[3], *very uncomfortable*'[7] and '*very poor*, *very*, *very poor*'[5].

"*My level of readiness is quite low*, *despite all of my theoretical knowledge I believe only further time and experience will remedy that. Theoretical knowledge can only allow so much confidence and readiness*. "[10]

Confidence and readiness can be a dictator of action or inaction, even more so when the scenario is overwhelming, and the basic interaction and assessment of the patient is already hindered. The increase in cognitive load from the over-stimulating scenario, the emotive child, and the potential presence of own emotions can lead to analgesia being neglected.

Participants often posed their theoretical knowledge as being somewhat sufficient, but then would say despite this, they still felt incredibly poorly prepared and not at all confident. This creates a potential argument that they might be under the impression that the theoretical knowledge is sufficient but could be insufficient in ways that they have yet to identify. As previously discussed, data demonstrated, the participants felt the undergraduate program was insufficient in theoretical content, allocated time, as well as exposure and experience to

paediatric patients. For participants to identify gaps in theoretical knowledge, experience and exposure is requires, and the limit in this regard is also often voiced as a further barrier and contributor to poor confidence and preparedness. Experience and exposure are brought up as the 'solution' to many of the challenges and barriers by participants and was limited to a few months towards the end of their final year.

This lack of confidence and perceived preparedness at an exit level also needs to be questioned, as the participants were in the end stage of their undergraduate program with very little to no time left to remedy this issue.

4.2.3.2 Personal attitudes

Attitudes were appreciated as a factor that influences the management of paediatric pain patients, with the development of these attitudes being reported to be personal influences as well as knowledge and experiences specific to paediatric patients. Current attitudes reflect fear and hesitancy leading to fear-based practice and potentially limiting pain management. Words such as '*hesitant'*[8], *fearful'*[8], *'cautious'*[1], and '*conservative'*[5]were used to describe attitudes to practice.

'*I think my attitude affects my paediatric pain management practice. I tend to get stuck in a loop of wanting to make the pain stop for the pt ASAP and being scared to give the drugs, both regarding the dosage and the drug choice.'*[3]

The role of attitudes in paediatric pain management was found to be significant amongst the participants, with many of them saying their attitudes having a negative effect, since it is often based of fear and uncertainty. This negative effect was expressed to be present in a way that participants feel unable to safely manage the paediatric patient's pain, fearing that the drug dosages will be incorrect, or the adverse events will be more that they can manage. The quotes reflected here encapsulate what was often expressed by participants.

"I do think my attitudes have a negative effect on my pain management practice. I am hesitant and fearful of administering analgesia and it is something I need to get over."[8]

The attitudes that were expressed were largely negative, with fear and hesitancy being significantly found; this can be again linked back to the previously expressed insufficient undergraduate program, and lack of experience and exposure.

4.3 Phase Two Survey

The online survey was posted on the Facebook Groups and the WhatsApp groups. These sites are specific to Emergency Care Practitioners (ECP). Below the development of the themes from data codes and categories are demonstrated. No demographic information is available as survey was anonymised. 12 responses were captured.

Two themes emerged from the data collected and analysed from phase two data.

1. Theme One: A perceived lack of initial readiness to manage paediatric pain.
2. Theme Two: The importance of collegial networks for mentoring and peer-to-peer discussions.

4.3.1 Theme One:

A perceived lack of initial readiness to manage paediatric patients

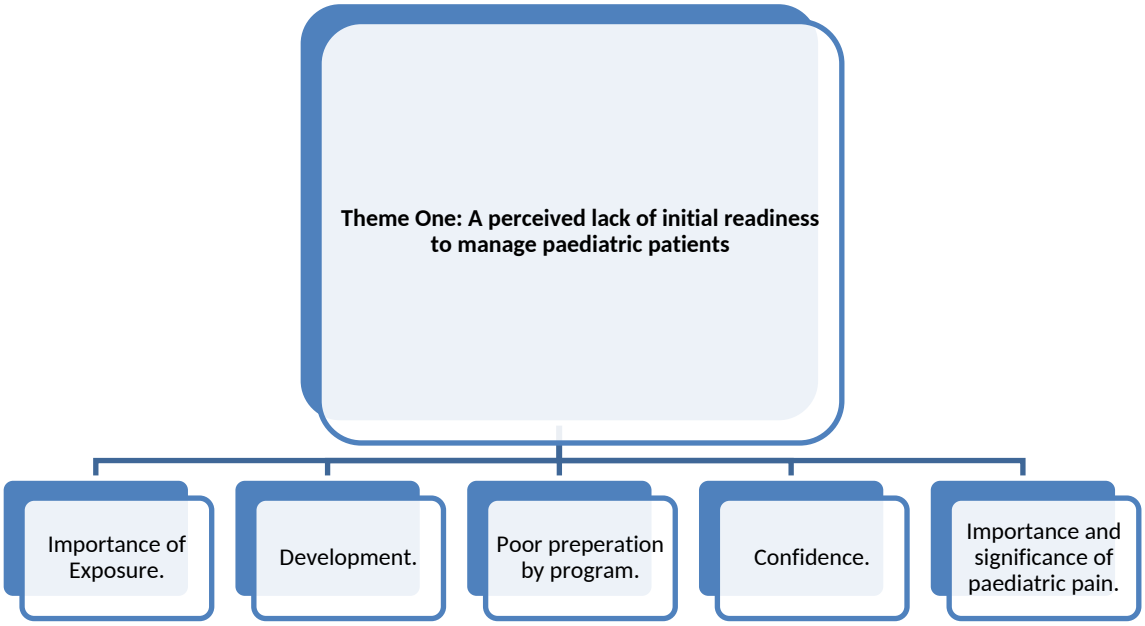

Figure 5 Schematic representation of theme 1: A perceived lack of initial readiness to manage paediatric patients

The participants of Phase Two have between 12-24 months of operational experience working in the prehospital setting, yet unfortunately they too expressed lack of perceived initial readiness. This is significant as they have the operational requirements to compare their readiness with and echoed the poor undergraduate preparation.

4.3.1.1 Importance and Significance of Paediatric Pain

There was a unanimous expression of the importance and significance of paediatric pain management. This significance acted as a golden thread between the two themes and was considered an imperative by the group of participants. The participants were acutely aware of the value of the importance of paediatric pain management. This awareness was coupled to feelings of unpreparedness, and a lack of readiness.

'*Pain management is one of the most important aspects of prehospital care*'[3]

While the awareness of the importance of pain management was clear, participants did neither elaborate on this awareness, nor displayed nuanced understanding. There was no mention of the ethical or psychological aspects of its pain, or how these were influenced by pain management. Participants were asked about the paediatric pain experience, and gave answers that were non-specific, such as "*the paediatric pain experience is influenced by many factors*"[10] [11] and "*paed pain may differ from adults*"[11] [3]. Some participants said that it could be due to their smaller anatomies, and that it could be due to emotional factors and potentially from the influence of the parent/legal guardians. The paediatric pain experience was poorly described or understood by these participants, yet all maintained the belief that analgesia is of utmost importance. This may indicate a biomedical view of pain, and pain management, downplaying or deemphasising bio-psychosocial aspects.

4.3.1.2 Confidence and Readiness

Confidence and readiness were explored separately and had a divergent response. The responses regarding confidence were positive, being described as '*fairly confident*'[8],'*competent enough*'[2], and '*confident but not overly confident*'[12].

"*I am confident that I can manage any paediatric pain patients effectively and efficiently*. "[10]

Although these statements are not excessively positive or confident, they express a sense of confidence that is not like that of their sense of readiness. When asked about sense of readiness, participants reported not feeling ready, describing it as '*not ready at all*'[6],'*unsure*'[8],'*uncomfortable*'[6] and '*feeling under-qualified*'[5].

'*My perceived readiness is not as good as it should be*'[1]

This discordance reported between the perceived confidence and readiness is significant in that it is not fully understood. The definition of confidence is feeling sure of your personal abilities, and the definition of readiness is a state of preparation. Although the definitions are nuanced and inter-linked, there is a difference in the aspect that although they feel they personally are capable, they do not feel prepared or that they have the required skills. This discordance could be a misunderstanding of the question on the part of the participants, yet all participants answered in a similar manner, which makes a misinterpretation of the question unlikely. This finding is unusual but cannot be discounted and opens another branch of potential research.

4.3.1.3 Importance of Exposure

Confidence and readiness to assess and manage paediatric patients was notably related to experience and exposure to paediatric pain patients. This was clear with the emphasis that was placed on the benefits of experience and exposure, as well as the proposed benefits of further and more focused teaching and learning. This lack of exposure and experience came to light in comments such as '*limits recognition*'[1], '*hard to feel ready*'[5] and '*start to doubt competency*'[2].Conversely, opportunities to gain exposure and experience had positive effects as seen in the quote below.

"*The more time spent on managing paeds, the greater the comfort of qualifying paramedics.*"[7]

The participants had the benefit of 1-2yrs of post graduate clinical experience and exposure, although not as much compared to adult patients, to refine the non-technical skills required to interact with, assess and manage paediatric patients. Despite this amount of time spent working operationally in the prehospital setting, participants still expressed feeling their experience and exposure was too little to enable them to feel confident or prepared.

4.3.1.4 Poor Preparation by Program

The issue of limited experience and exposure is one emphasised by the undergraduate program too, as was the program was described as insufficiently preparing practitioners for paediatric pain management.

'*I learnt the majority of things after graduation*'[12]

One participant did not recall addressing paediatric pain management during their education, stating '*I don't remember learning about paed pain management*'[3], and describing their preparation as '*very poor*'[8,9,4]. Participants graduated from the program with identified insufficiencies, and were expected to discover ways to supplement these gaps themselves in a profession where there are no internship programs available.

4.3.1.5 Further Development

Undergraduate education did not meet the preparation needs of the participants. Once these participants started independently practicing, the gap in knowledge was evident and many sought out ways to supplement their knowledge. Further teaching and learning in the form of short courses and research was used as a way to remedy this identified gap in knowledge.

"My practice and understanding improved from courses and lectures" [9]

The use of short courses and self-directed learning was undertaken, with a subsequent increase in attitudes as well as confidence. Although continued professional development is a requirement, and a form of responsible practice, it became an initial form of education on the topic of paediatric patients for participants.

4.3.2 Theme Two

The importance of collegial networks for mentoring and peer to peer discussions

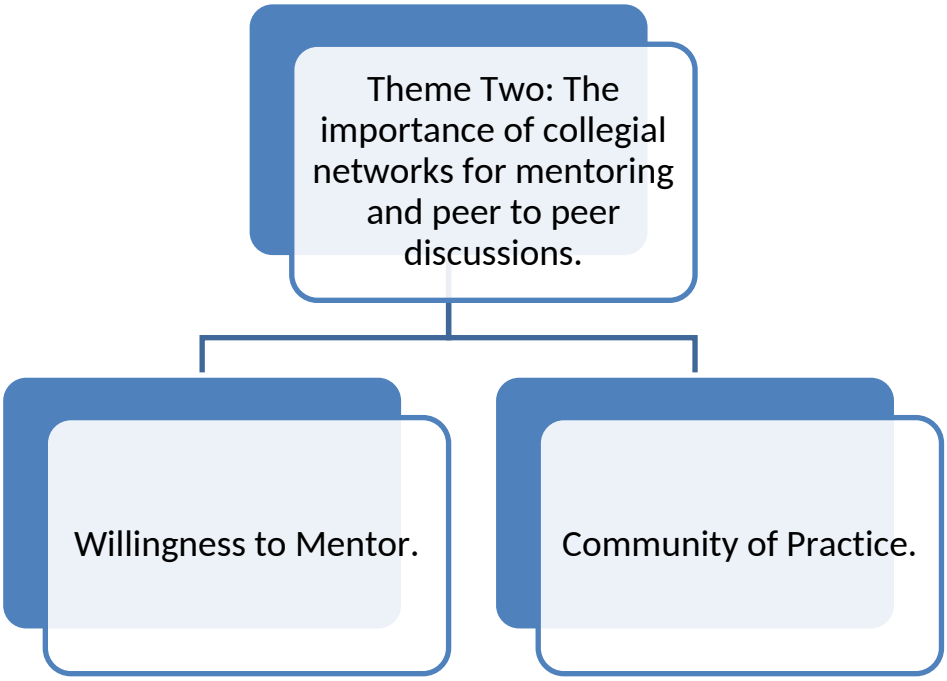

Figure 6 Schematic representation of theme 2: The importance of collegial networks for mentoring and peer to peer discussions.

An interesting data point found was the development of collegial and mentorship networks. This development, albeit informal, was found to be a form of supplementing perceived gaps in knowledge and to bolster confidence and readiness.

4.3.2.1 Community of Practice

To supplement perceived gaps in knowledge and in search of confidence, early career practitioners developed informal and formal groups. These collegial networks, in the form of discussions with peers and consultations with experts, were described as enablers, allowing opportunities for learning from one another as well as guidance.

"Consults with experts have influenced my attitudes" [8]

This demonstrated the desire and need for further continuous learning in ways that accommodate for the practical and realistic management of paediatric pain management scenarios. The development of formal collegial networks as well as improving accessibility can serve as a support network and tool for practitioners to enable effective prehospital paediatric pain management. The benefits of these networks are reflected in the responses from participants

"*An enabler would be discussions with colleagues.*"[3]

"Consults with experts have influenced my attitudes." [8]

These collegial networks are a coping mechanism developed in response to identified knowledge and skill gaps. By reaching out to fellow colleagues, having informal debriefs and discussions and sharing learning experiences, they found a way to support one another.

4.3.2.2 Willingness to Mentor

Along with the above-mentioned networks, was the willingness to offer the same sort of guidance and learning opportunities to newly graduated ECP's.

"*I believe all students should be exposed to specialised ICU vehicles to get more hands on and be around practitioners with actual experience with paeds*."[4]

The sentiment of wanting to include newly graduated practitioners into the networks was positive, but a concern for a lack of framework or appropriate training was raised when speaking of formal mentoring. The desire to participate in mentorship of new practitioners could be because participants remember the gaps in knowledge and challenges, they experienced when graduating and want to prevent new practitioner feeling unsupported during a time that can be intimidating and very challenging.

4.4 Comparison of Phase One and Two Data

When comparing the data analysed from theme one and two, certain similarities and continued themes can be identified. A lack of confidence and readiness as a result of poor undergraduate preparation and limited exposure was identified as a significant theme in both phase one and two participants. The consistent finding gives credence to the notion that the undergraduate program curriculum is insufficient and graduates practitioners that are ill equipped for paediatric patients in the prehospital setting. The phase one participants were yet to experience the real-life stressors of being an independent practitioner responsible for managing a paediatric patient and had not yet had opportunities to develop coping mechanisms. In the phase two participants, the collegial networks were developed as a coping mechanism to supplement the self-identified gaps in their knowledge, experience and confidence and readiness to manage these paediatric patients.

The phase one data demonstrated a clear misalignment between the paediatric pain experience theory and paediatric pain praxis; the phase two participants did not elaborate on the importance or significance of the paediatric pain experience theory much. The narrow description of this importance that was found indicates a potential superficial understanding or internalisation of the paediatric pain experience theory but cannot be confirmed without further investigation. This would align with the poor preparation and experience and exposure echoed by both first and second phase participants.

The overall comparison between phase one and phase two data is demonstrates minimal change in attitude, confidence and readiness. The factors influencing this were described similarly as undergraduate preparation, exposure and experience. Whilst these factors don't significantly change between the two participant groups, the main difference identified was the development of the collegial networks as a form of supplementation.

Viewed through the lens of the Dreyfus model of skills acquisition, participants predominantly occupy the Advanced Beginner and Competent stages, with a notable inability to critically appraise risk–benefit trade-offs in paediatric pain management (Dreyfus & Dreyfus, 1980;

Benner, 1982). The relevance of this framework to health professions is well established in nursing education and clinical practice (Benner, 1984). Consistent with the model's emphasis on experience, the limited experience and exposure reported by participants possibly accounts for their placement at these stages, where performance is rule-governed, context recognition is emerging, and holistic judgment is not yet consolidated.

At the Advanced Beginner/Competent levels, practitioners typically rely on guidelines and protocols, struggle to prioritise when faced with competing demands, and find it challenging to process complex, dynamic scenarios. Paediatric patient care, however, requires holistic assessment, ethically based management, and non-technical skills—including situational awareness, communication, and cognitive flexibility—to conduct fluid risk–benefit reasoning. These capabilities, by definition, are not yet fully established in the categories where participants are located (Dreyfus & Dreyfus, 1980; Benner, 1984). Notably, undergraduate preparation emerged as a strong theme in participants' accounts, with consistently negative experiences and perceptions regarding paediatric pain management, signalling a mismatch between curricular intent and practice needs.

Participants' attitudes, confidence, and readiness were frequently described as not conducive to effective prehospital paediatric pain management, with many stating they did not feel ready to manage paediatric pain. Their dependence on guidelines and constrained ability to formulate context-responsive plans is characteristic of the Advanced Beginner/Competent stages, where prior experiences (positive or negative) strongly influence present decision-making and where intuition is limited by a lack of deep, holistic understanding of paediatric pain (Dreyfus & Dreyfus, 1980; Benner, 1984). Reflective practice at these levels tends to focus on pattern identification rather than critical appraisal, serving as the foundation for eventual confidence as independent practitioners (Benner, 1984). The urgency of this developmental gap is heightened by the local context: Phase I participants were about to graduate into independent practice, yet, in South Africa, there is no formal internship, and—anecdotally—many EMS services do not provide systematic guidance or senior supervision, increasing the risk that novices transition into high-stakes environments without adequate formalised support systems.

This readiness gap manifests in uncertainty and unfamiliarity during high-paced decision-making, where the inability to respond intuitively elevates risk. Lateral thinking—needed to anticipate and mitigate risk—is limited at the Advanced Beginner/Competent levels (Dreyfus & Dreyfus, 1980), and Phase I data indicate that these risks are sometimes "managed" by not executing paediatric pain management at all—suggesting recognition of risk without the capacity for risk calculation and mitigation. This difficulty in adapting to rapid changes or prioritising in complex scenarios can lead to delayed care or errors in clinical reasoning. As one participant noted, "Anxiety is made worse when the child is emotive, which makes drug choice and calculations hard", illustrating how emotional and cognitive load can impede safe, timely analgesia. Moreover, an overreliance on rules can skew attention toward potential adverse drug effects, overshadowing the well-documented harms of oligoanalgesia—an ethical and clinical concern when pain relief is withheld or under delivered.

In sum, the alignment of participants with the Advanced Beginner/Competent stages clarifies why risk–benefit appraisal, holistic reasoning, and non-technical skills are not yet robust. Coupled with insufficient undergraduate preparation and limited early-career supervision in the South African EMS context, these findings persuasively underscore the need to strengthen paediatric pain curricula, embed supervised practice, and cultivate reflective and intuitive capacities to move practitioners toward proficiency and expertise (Dreyfus & Dreyfus, 1980; Benner, 1982, 1984).

This reliance on rules, limited intuition, and lack of confidence at the Advanced Beginner and Competent stages does not only affect technical execution—it directly influences behavioural intention. According to Ajzen's Theory of Planned Behaviour, intention is shaped by attitudes, perceived control, and knowledge, meaning that the developmental gaps identified here have profound implications for whether practitioners choose to act in managing paediatric pain.

According to Ajzen's Theory of Planned Behaviour, the intention to perform a behaviour is shaped by three core determinants: attitude toward the behaviour, subjective norms, and perceived behavioural control (Ajzen, 1991). In the context of prehospital paediatric pain management, these determinants are critical because intention precedes action. While

knowledge and technical skills provide the foundation for competence, they do not guarantee implementation; rather, attitudes dictate whether practitioners choose to act or refrain from acting. Evidence demonstrates a positive relationship between education and attitude, indicating that increased knowledge fosters more favourable attitudes—a significant finding since both knowledge and attitude predict behaviour (Ajzen, 2014). For effective paediatric pain management to occur, practitioners must hold positive attitudes toward analgesia, coupled with confidence in their ability to manage complex scenarios. However, as highlighted in the preceding discussion, participants' limited experience and reliance on rigid protocols undermine perceived control and confidence, thereby weakening behavioural intention. This interplay underscores the need for educational strategies that not only build knowledge and skills but actively shape attitudes and enhance perceived control, ensuring that practitioners are both willing and able to deliver safe, ethical, and timely pain relief.

5. Chapter Five: Discussion and Conclusion

Chapter four outlines result of the data collection phases. In this chapter, the results will be discussed, reflected against the research objectives and compared and contrasted with other existing literature. The research questions posed were: What are the attitudes of senior undergraduate emergency care students and early career practitioners towards paediatric pain management? What is the self-reported readiness of senior undergraduate emergency care students and early career emergency medical care practitioners towards to paediatric pain management? What is the self-reported confidence of senior undergraduate emergency care students and early career emergency medical care practitioners towards to paediatric pain management?

5.1 Phase One Discussion

Pain, as introduced in chapters one and two, is an experience, composed of many factors and cannot be limited to the physiological neuronal response. The terms nociception and pain are often conflated, and might be used interchangeably, yet they have different definitions (Mischkowski et al., 2019). The core differences between nociception and pain are that nociception is the biological response of the nervous system and pain is the cumulative, conscious experience (Baliki & Apkarian, 2015). Although these terms are frequently used interchangeably in non-specialist contexts, they refer to fundamentally different phenomena. According to Baliki and Apkarian (2015), the key difference lies in the biological versus psychological dimensions of these processes. Nociception describes the objective neurophysiological mechanisms by which the nervous system detects, encodes, and transmits noxious stimuli. In contrast, pain is defined as a subjective and conscious experience, the product of sensory information with emotional, cognitive, and contextual influences. This distinction highlights the complexity of pain as more than a solely sensory event, including biopsychosocial factors that affect both its perception and subsequent management. The participants of phase one expressed a theoretical understanding of the importance of paediatric pain management and the detrimental effects of oligoanalgesia, yet viewed the paediatric pain experience negatively, and expressed an aversion to managing the pain. This could be indicative of a conflation between nociception and pain, or a lack of internalisation of the importance of paediatric pain management.

Participants were students, a phase of their development as independent practitioners that allowed them to be a part of the prehospital scenarios as either a participant or a ‘spectator’, with the benefits of interacting with patients and patient care. Although these experiences are crucial in education and training, they are yet to be immersed in patient management in the role of primary and/or senior practitioner on paediatric pain management scenes or be accountable for clinical decisions. This positioning within patient and the attitudes on display will be contrasted in the discussion of the phase two data, where those participants had already been accountable for clinical decisions.

The participants disregarded the pain experience and expression of paediatric patients as '*exagerated*'[2] and '*dramatic*'[8].The inability or unwillingness to appreciate or value the paediatric pain expression, as described by above examples, demonstrates a few possible causes. Undergraduate students having improper understandings or misgivings about paediatric pain has been identified in other medical disciplines as well, and a need for further or more focused education highlighted (Milani et al., 2025). An integrative review of 29 studies showed that across many countries undergraduate nursing practitioners had erroneous beliefs or attitudes to paediatric pain (Alshehri et al., 2024). These beliefs included participants relying heavily on the patients' vital signs as indicators of pain, or the absence thereof, and believing patients should tolerate as much pain as possible before analgesics are administered (Alshehri et al., 2024). As either coping mechanisms, or desensitisation, participants potentially have dehumanised their patients in their minds, resulting in 'symptoms' being treated instead of a complete person. Removing the human factor from patient management creates scenarios where disorders are being 'managed' instead of providing holistic patient treatment where pain experiences are valued and addressed with the appropriate clinical and empathetic response (Alshehri et al., 2024). This approach to paediatric pain management is seen too in data from under-graduate participants that seem more comfortable with technical-skill biomedical patient care, such as managing a vital sign confirmed with monitoring equipment rather than relying on non-technical skills such as assessing pain based off body language and/or facial expressions.

The inclination toward biomedical frameworks among participants highlights a gap that can be addressed by integrating non-technical competencies into the curriculum, aligning training with a holistic biopsychosocial approach to patient care. Pain management requires a comprehensive approach, especially in paediatric patients, and the biomedical focused approach can be limiting. Appreciating the pain experience as a subjective and conscious experience has been acknowledged as a multidimensional approach (Johnson et al., 2024). The disregard for or discounting of the paediatric pain expression rejects the multidimensional approach to pain management, neglecting the human or emotional and existential aspect of pain management that should be present (Russo, 2024).

This disregard of the paediatric pain experience or expression can lead to improper pain assessments as paediatric patients do not necessarily have the ability to accurately verbalise pain scores, and pain assessment is often done using observational assessment tools. These inaccurate pain assessments are yet another factor that leads to oligoanalgesia (Rababa et al., 2021). This potential detrimental effect of oligoanalgesia was theoretically understood by phase one participants, yet they lack the ability to take this into account when critical decision making is required.

When viewed in terms of the Dreyfus (Dreyfus & Dreyfus, 1980) model of skills development, participants appeared to be in the Advanced Beginner and Competent categories with the inability to critically appraise the risk versus benefit calculations regarding paediatric pain management (Benner, 1982). This model is widely used in nursing education and clinical practice (Benner, 1984). The model uses years of experience or level of experience to ascertain which level an individual is at, the lack of experience and exposure locates them in the categories of Advanced Beginner and Competent.

As Advanced Beginner and Competent category, there remains a reliance on guidelines and protocols, and an inability to prioritise or process complex scenarios. Paediatric patient care requires holistic assessments and management plans, the non-technical skills and cognitive ability to fluidly manage the risk versus benefit process as well as treating the patient ethically and safely is not established in the categories the participants fall into. Preparation or lack thereof, in the under-graduate training was a theme that was strongly addressed by the participants, with fairly negative expressions and experiences regarding paediatric pain management.

When discussing teaching and learning, three specific components were often present: 1. content covered, 2. time spent on content, and 3. experience/exposure to relevant scenarios. Although participants occasionally expressed appreciation for the rigour of other components of the undergraduate program, when speaking to the paediatric pain content, some participants were unable to recall any teaching and learning.

The duration of time spent on teaching and learning specific to paediatric patients as a whole category was described as disproportionate when compared to adults, and other categories or components of their teaching and learning.

Paediatric content was expressed as being far less in volume. These findings are similarly found in other medical practices, with undergraduate students expressing insufficient time spent on analgesia (Tran et al., 2018). The undergraduate programme is accredited by the HPCSA to ensure that the curriculum meets national standards and equips graduates with the knowledge, technical skills, and ethical foundations required for safe, competent practice in emergency care. Experience and exposure are an element that emerged multiple times and was brought up to be a factor in many aspects of the attitudes to paediatric pain management. These components, or insufficiencies in these components, resulted in participants emphatically expressing that they do not feel prepared to manage prehospital paediatric pain confidently and safely.

Although South Africa carries a significant burden of paediatric patients, practitioners frequently report limited exposure to critically ill children. Paediatric patients are often taken directly to health care facilities, bypassing EMS and potentially explaining the perception limited exposure. Studies in the Western Cape indicate that paediatric EMS cases are largely interfacility transfers, suggesting that initial access happens at hospitals rather than through EMS (Abdullah, Lahri& Hendrikse, 2024). Student have also reported that hospital staff are reluctant to allow students to perform procedures on paediatric patients, especially in time sensitive or high acuity scenarios (Motsaanaka, Makhene& Ally, 2020).

When referencing the time spent on paediatric patients, participants expressed that after three years of focusing on adult patients, they felt there was an expectation to base the advanced teachings of paediatric patients on the foundation of adult patient knowledge. Adult patient teaching content was done utilizing the spiral curriculum method. The spiral curriculum is often used in higher education, as it requires students to marry theoretical knowledge with practice (Johnson, 2014). As proposed by Bruner (1960), the of key features such as revisiting core concepts, increasing complexity and integrating knowledge allows for the development of

knowledge is done systematically by building on existing concepts. Participants claimed that they were only exposed to paediatric content once, in their final year, and had not been incrementally introduced to paediatric emergency care in the junior study years. Systematic and incremental development of knowledge on the paediatric patient content appeared to have been omitted and left participants with large gaps in their knowledge, resulting in feelings of being unprepared. This finding is significant and could be an indication of a flaw in the current curriculum.

Participants frequently expressed a fear of pain management. When faced with a paediatric patient in pain, participants in phase one expressed feelings of stress, fear and being overwhelmed. These feelings were a culmination of pressure from the desire to make the dramatic pain expression stop, pressure from the parents as well as the internal fear of the management of the patients and side effects from the analgesic drugs. Fear based decision making, such as omitting certain safety procedures, or being unable to be decisive on treatment regimens were another possible outcome of the pressures that's present during the management of paediatric patients. This pressure seems to be largely based on the participant's internalised narratives and their own priorities, which tended to be self-serving rather than being based on the well-being of the patient. Research within the UK ambulance service highlights significant barriers to effective paediatric pain management. Whitley et al. (2020) found that clinicians often experience fear of adverse effects from analgesic drugs, particularly in paediatric patients, due to concerns about dosing accuracy and potential complications. Where the UK based participants expressed concern for potential negative effects on the child's health, participants from this study seemed more motivated on their own negative experience or feelings creating anxiety and fear. Although there were many barriers that were identified in phase one and two data, such as IV access, drug choice and self-doubt, pain assessment was a barrier that was identified but also appeared to be a subject that most participants could elaborate on in terms of which assessment tools would be most appropriate. These barriers are commonly found when faced with paediatric patients (Kusi Amponsah, Kyei, et al., 2020). Difficulty with pain assessment and not being able to determine a clear pain score has resulted in reductions in analgesia administration (Teoh et al., 2022). Although participants

mentioned enablers to paediatric pain management, the only consistently emerging enablers were that there is currently a range of analgesics that allowed for the management of mild to moderate pain as well as severe pain with amnesic and sedating properties. This foregrounding of pharmacology may once again be evidence of a reference for the biomedical model of pain management.

The fear or insecurity regarding gaining IV access and potentially causing further pain to the patient was a common barrier as well as being unsure of whether to align specific classes of analgesic to pain score ranges. Participants also expressed a struggle with balancing the benefits of analgesic administration with the risk of adverse events. These barriers have been noted, by the participants, as results of limited exposure to the paediatric patient population as well as limited time spent on the content of paediatric patients in the undergraduate program. The decreased exposure results in a lack of familiarity, with infrequent exposure resulting in them being uncomfortable with the skills required when interacting and managing a paediatric patient. Fear and uncertainty related to potentially causing pain by attempting IV access as well as drug dosages and side effects have been found to be a barrier for other practitioners as well (Whitley et al., 2022). The barrier regarding the undergraduate preparation was that the time spent on the content was significantly too short, that a large amount of new theory was crammed into mere months and they didn't have time to engage, reflect and internalise the content. There appeared to be a common view that further or more focused teaching and learning regarding paediatric patients would benefit both the operational practice as well as attitudes towards paediatric pain management. A lack of knowledge and exposure is a common barrier to effective paediatric pain management (Kahsay & Pitkäjärvi, 2019). The perceived barriers found in phase one are echoed in the results of the phase two data analysis, with the barriers discussed by the early career practitioners including lack of exposure and experience as well as poor undergraduate preparation.

Attitude, confidence and readiness of participants emerged as not conducive to effectively manage prehospital paediatric pain. Participants expressed themselves as not feeling ready to manage paediatric pain. When viewed in terms of the Dreyfus model (Dreyfus & Dreyfus, 1980)

the lack of experience and exposure locates them in the categories of “Advanced Beginner” and “Competent”. The use of guidelines and ability to formulate plans for clinical intervention demonstrates this, with previous experiences, positive or negative influencing this. The lack of a holistic or deep understanding of the concept of the paediatric pain experiences limits the use of intuition, with the mindset of guideline and rule following being more prominent. One would expect students to be in the “Advanced Beginner” and “Competent” categories (Benner, 1984). Reflective practice at the level of Advanced Beginner and Competent is limited, with less focus on critical assessment of practice and focused on identifying patterns and is foundation for developing confidence as an independent practitioner. These phase one participants were shortly graduating into practice as *independent* practitioners. In South Africa there is no formal internship and, anecdotally, many EMS do not provide any kind of guidance or supervision by senior practitioners.

In the South African system, emergency care graduates often become the top tier decision maker during their practice, immediately following graduation, without the benefit of a period of supervised practice or internship. One must pose the question: Is this level of skill and knowledge acceptable at this point in their education? Although expecting an expert level, being able to intuitively and creatively navigate paediatric pain management, might be unrealistic, the current standing of participants leaves a gap that is not appropriate for the graduates of a bachelor’s degree. Internships or supervised practice periods are used in nursing practices and have been found to be vital in the development of practice (Esteves et al., 2019). Interestingly, a comparison of Australian and United Kingdom paramedic preparedness found that more time spent working as a student did not improve preparedness for their internship (Reid et al., 2019). In this comparison, it is explained that the definition of preparedness as a paramedic varies greatly between countries, and also in based on the premise that graduates start their careers in internships, and not directly into independent practice. The benefits of internships and supervised practice periods range from development of competence under supervised guidance (Benner, 1984), the development of behaviours, attitudes and professional identity (Cruess et al., 2014),and the ability to translate theoretical knowledge into practice with critical thinking (Irby, 1994).

The expressed feelings of uncertainty and unfamiliarity in situations, with the limitations of being unable to respond intuitively to the high-paced decision making required can lead to risks. The ability of participants on the Advanced Beginner and Competent (Dreyfus & Dreyfus, 1980) level to think laterally to mitigate for these risks is limited. In phase one it is seen how these risks are mitigated by not executing the skill of paediatric pain management, implying that the risk is identified yet the lateral thinking of risk calculation and mitigation is not yet in place. Difficulty adapting to high-paced changes or prioritising care in complex patient scenarios can lead to delayed care or errors in critical thinking. This is reflected in the data from phase one, such as '*Anxiety is made worse when child is emotive, which makes drug choice and calculations hard*'[2]. In the Advanced Beginner category, there is an overreliance on rules without taking into consideration the more nuanced patient care, such as focusing too much on the potential adverse effects of drugs more than considering the potential negative effects of oligoanalgesia.

Confidence and perceived readiness of participants in the exit level phase of their degree were lacking. Feelings of insecurity, uncertainty, fear and hesitation were the sentiments echoed by the majority of participants. A lack of experience and exposure specific to paediatric patients as well as knowledge was identified as a significant barrier and factor influencing the attitudes of participants. A lack of knowledge, theoretical and practical application thereof, is a direct influence on attitudes, and has been found to be directly linked to attitudes of practitioners (Omotosho et al., 2023). Participants acknowledged the impact their attitudes to paediatric pain management have on their practice and also linked the poor attitudes to the fear and uncertainty born from their perceived lack of readiness. This lack of perceived readiness and confidence was expressed as significant barriers and limited their willingness to administer analgesia to paediatric patients. Education, experience and guidance are three factors that have been put forward as potentially elevating practitioners from beginner to expert (Ozdemir, 2019). Education and experience, as identified in the phase one data collection, is lacking, and with no regulated internship programs for EMS in place, any formal guidance is the prerogative of individual services.

In the following section of the discussion, the progression from exit level student to newly graduated practitioner will be explored and what this progression looks like.

5.2 Phase Two Discussion

Survey participants, independent practitioners with between 12-18 months of operational experience, were found to have a lack of perceived readiness. This is of significance seeing that these participants are the senior, and sometimes sole, health care provider tasked with managing paediatric patients. For an independent practitioner to have these barriers for such an extended period of time, while working without supervision, and in a vulnerable population, should be of concern to all stakeholders in the development and supervision of Emergency Care Practitioners.

As with phase one participants, the lack of exposure to and experience with paediatric patients was found to be a significant barrier to the development of confidence, readiness and positive attitudes. Experience and exposure have been found to be an important facet of building confidence and readiness (Fowler et al., 2018). Despite South Africa's high paediatric burden, EMS providers report limited exposure because many critically ill children bypass prehospital care and are taken directly to hospitals. Evidence from the Western Cape shows EMS involvement is mainly for interfacility transfers rather than initial scene responses, reflecting systemic and caregiver preferences for direct hospital access (Abdullah, Lahri& Hendrikse, 2024; Anest et al., 2016; Mosca et al., 2021).

Although it might be challenging to find opportunities that would allow for exposure to paediatric patients specifically, studies have found that high fidelity simulations can contribute towards gaining experience and exposure (Guerrero et al., 2022). Survey participants expressed that the lack of exposure has been a hindrance and barrier to effective patient management, creating feelings of uncertainty, fear and a lack of readiness. Some participants have prioritised volunteering at paediatric specific facilities and EMS services and found that this experience and exposure was of great benefit to their practice, aligning with the above-mentioned studies.

Evidence suggests that newly qualified healthcare professionals often feel underprepared for the complexities of clinical practice. Lechowicz et al. (2019) identified significant insufficiencies in undergraduate education, particularly in areas requiring advanced decision-making,

communication, and non-technical skills. These gaps can lead to reduced confidence and increased anxiety during the transition to practice, especially in high-pressure environments such as emergency care. As found in the data collected in phase one, survey participants too expressed that the undergraduate program did not sufficiently prepare them for the reality of managing paediatric pain patients. This was expressed by the sentiment that participants said they learned most paediatric management skills and knowledge after graduation, with one participant saying "*I don't remember learning about paediatric pain management*" [3]. The time spent and content covered with regards to paediatric pain management was emphasised, as it was in the interview phase data. This finding, prominent in both phases of data collection, suggests that undergraduate education does not allow for sufficient preparation with regards to paediatric patients including pain management of this vulnerable population. This finding aligns with other medical professions experiencing similar insufficiencies in their undergraduate preparation (Lechowicz et al., 2019). This finding, present in other research and echoed in this research project, could be a sign that curriculum is developing slower than the evidence which shows the importance of analgesia (Fong & Morley-Forster, 2018).

Along with experience and exposure, further and more specific teaching and learning was identified as a potential enabler. Phase two participants pursued further teaching and learning, to supplement perceived gaps in knowledge to improve their readiness. Participants said that further and more paediatric specific teaching and learning had positive influences on their attitudes. This positive influence was experienced in their confidence and readiness too. Teaching and learning in context of theoretical knowledge as well as possible simulations have been found to have a positive effect on confidence and readiness(Vesel & Beveridge, 2018). Cognitive aids, such as applications on their mobile phones and the BroselowPaediatric Emergency Tape™ (Broselow and Luten, 1988) was also of great use and allowed for the participants to have more confidence in their practice.

The importance of early and effective paediatric pain management was acknowledged by all participants of the survey phase, with an appreciation of the significance and unique nature of the paediatric pain experience. Participants indicated that the paediatric pain experience is different than the adult pain experience and seemed aware of the fact that paediatric pain experiences are more nuanced and complex than what may be visible. Unfortunately, the understanding and depth of appreciation for the paediatric pain experience did not go further than the fact that it differs to that of an adult patient. The unanimous expression of the importance of early and effective paediatric pain management coupled with the limited description and understanding of the pain experience could represent a biomedical centred approach to patient care. This would demonstrate little progression from the phase one participants 'data. Pain management has been declared a human right, directly forming part of the ethical patient management approach (Brennan et al., 2007). Despite this fact, only one participant in the phase two participants mentioned the ethical importance and significance of early and effective paediatric pain management. HPCSA regulations outline the ethical obligations and codes of professional conduct that practitioners must adhere to, ensuring accountability, patient safety, and integrity in clinical practice. The importance of pain management was rooted in biomedical aspects of practice, and pride in clinical abilities. Pain management was seen as a technical endeavour, not a moral or humanitarian imperative. This could reflect a lack of altruism and indicate a culture of practice that is based on the biomedical aspects of patient care and a neglecting the human aspect of patient care. A lack of empathy or empathy fatigue leading to a decreased perception of the paediatric pain experience has been identified in nursing practitioners that results in under estimating pain scores (Rybojad et al., 2022).

Data on the confidence and readiness of participants revealed an interesting incongruity. The confidence of participants was positive, and self-reported readiness reported as poor. Although confidence and readiness often have an inter-dependent relationship, they are different constructs (Hayat et al., 2020). Confidence has the potential to act as a powerful motivator to strive for improvement but conversely has the same potential to create a false sense of confidence (Bénabou & Tirole, 2002). The motivating aspect of confidence can be seen in the

data to be discussed further on regarding supplemental coping mechanisms developed by participants. This positive internal belief in themselves and their abilities does not align with their perceived state of preparedness or readiness. This dissonance between confidence and readiness could be a sign of a lack of reflexivity and reflective practice. Reflexivity speaks to the constant reflection and critical self-evaluation regarding a topic, the ability to review your internal narrative and improve oneself systematically (Finlay, 2002). A lack of reflexivity may serve to limit the development and growth of a practitioner within an ever growing and evolving field. As reflexivity seems lacking, so does reflective practice, with retrospective analysis of practices participants are likely to be missing. Schön (1983) introduced the concept as a means for professionals to bridge theory and practice through reflection-in-action and reflection-on-action. Reflexivity and reflective practice in healthcare is essential for competence and professional development (Mann, Gordon & MacLeod, 2009).

Collegial networks appeared to be a significant source of guidance and confidence; these collegial networks were found to be largely informal and consisted of discussions amongst peers, allowing for learning opportunities that were regarded as “psychologically safe” (Hardie et al., 2022). The benefits of collegial networks and mentorship have been identified in many medical professions, and despite further development of these structures being necessary(Lane et al., 2016), the benefits are apparent(Cameron, 2018). Expert consultants provided guidance, and bolstered confidence to practice as independent practitioners. Aligning with the findings of Whitley et al., (2021), who found that the presence of a senior practitioner can have a potentially significant impact as a reassuring factor and improved sense of confidence.

Professional bodies such as, Professional bodies such as the UK College of Paramedics and the Australasian College of Paramedicine (ACP), have formalised support systems such as these. These professional bodies develop and support the practitioners, with structured collegial networks (College of Paramedics, n.d.; Australasian College of Paramedicine, n.d.). Smaller such professional bodies exist in South Africa, with collegial networks being less formalised.

The presence of collegial networks acted as a coping mechanism for new graduates. The development of these networks can be linked to the positive confidence of participants

providing further motivation for improvement. Networks were developed to mitigate for the identified gap in knowledge and lack of perceived readiness by the individuals. These participants identified this gap and took steps, whether knowingly or reflexively, to mitigate for the gaps, by forming collegial networks with colleagues and experts. These collegial networks functioned as impromptu or informal mentorship arrangements. Mentorship was defined by Haggard et al. (2011) as a relationship between an experienced or more senior individual and a less experienced individual. Supporting this, the relevance and importance of mentorship has been found to be critical in the maintenance of clinical competence and the psychological well-being of practitioners (Hodge et al., 2018).

The significance of these collegial networks within EMS is an exciting finding, with many potential positive effects. Collegial networks, elsewhere referred to as Collegial Learning (Woodward & Hall, 2003), have been found to have stimulating effects on professional development and learning, performance, personal well-being and systemic benefits (Woodward & Hall, 2003). These collegial networks stimulate and encourage the development of practice in the Education Profession and lend a sense of support (Thomas et al., 2020). The utilisation, significance and power of these collegial networks can be leveraged within EMS to foster growth and development. This can bolster an argument for the development of internship and mentorship programmes for new graduates.

Internship has no universal definition, and was originally mentioned in the medical profession education, referring to an early period of training in the post graduate phase and has since been adopted and altered to fit into other professional contexts (Stewart, 2021). Stewart 2021., also used the term '*Work-based Learning*' to describe internships and how it is typically designed to have a specific outcome or result. The benefits of internships are apparent in the medical professions that have adopted it, including nursing and medical doctors. Some of these benefits have been described as '*students learn to recognise and respond to the patients' needs, which helps them to understand the value of patient-centred care.'* (Nguyen, 2024). This differs from mentorship as mentorship is based on the mentor, the more senior or experienced individual, guiding or imparting knowledge and valuable information with the mentee, the less

experienced and more junior individual (Henry-Noel et al., 2019). Based on the different definitions, one can see how the two can work in symbiosis to create an environment where a new graduate can learn through guided/supervised work in an operational setting with the added benefit of a mentor. The benefits of mentorship programs and the need to further develop these in order to maximise benefits is present in the literature (Farkas et al., 2019). Internships, mentorships and collegial networks form part of transition to practice support systems.

When discussing the formulation of attitudes to paediatric pain management and the influence it has on their practice, participants of both phase one and two expressed a common view that the influence of their attitudes to paediatric pain management was directly linked to the practice or intention to practice. This is echoed by the findings of another research (Gadallah et al., 2017). The participants spoke of emotional states such as “insecurity", "fear” and “indecisiveness”, which shaped their attitudes and led to hesitancy and/or omission of analgesia.

Similar influences were expressed by the phase two participants, although attitudes to paediatric pain management were linked more directly to their perceived readiness and confidence. This could be as a result of their thought processes regarding paediatric pain management evolving, or due to the inability to further ask probing- or follow up questions as a result of the survey platform, or a combination of the two. The attitudes of phase two participants reflected a more holistic understanding and appreciation of the approach required to manage a paediatric pain patient in the prehospital setting.

5.3 Conclusions

Paediatric patients are a vulnerable population that is often unable to advocate for themselves in a health care system that is largely overburdened. Patients presented to Emergency Centres by EMS often have prolonged waiting times, further prolonging the time paediatric patients spend in discomfort and pain. The potential long-term effects of oligoanalgesia are real, and any time unnecessarily spent in pain and discomfort is too long. Effective pain management is a human right and should be appreciated as such.

The need to manage paediatric pain is a potentially intimidating, fear inducing scenario for many reasons. Attitudes, an identified barrier, have many influencing factors and play a significant role in the practice of paediatric pain management. The attitudes found were based on fear and uncertainty, which resulted in participants feeling unprepared to effectively administer paediatric pain management. Participants linked the insufficient undergraduate preparation and lack of experience and exposure to the lack of confidence and negative attitudes. This study demonstrated that beliefs and perceptions regarding paediatric pain are problematic, with paediatric pain experience and expression being disregarded. This belief and perception, along with the lack of confidence and negative attitudes leads to practitioners that are ill-equipped to manage paediatric pain effectively and ethically. A prominent barrier was a lack of experience and exposure. The converse of this, increased experience and exposure, was also an enabler.

Continuous professional development and collegial networks played critical roles in the development of attitudes and supplementing the experience and attitudinal gaps that were felt by participants. Our study advocates for practitioners to be empowered and enabled to effectively manage paediatric pain. This is a multi-layered issue, as it requires academic, operational and consultation support.

5.4 Recommendations for Further Research

There are many factors that come together to create attitudes, perceptions and beliefs. Recommendations regarding these born from this research are as follows:

Transition to practice

The transition to practice for in-hospital medical professionals typically includes structured graduate programmes, internships, and formal support systems (Munro, 2016). In contrast, such transition support is largely absent within Emergency Medical Services (EMS), despite the unique demands of prehospital care. The lack of standardised transition-to-practice mechanisms in EMS contributes to variability in confidence and competence among new graduates (Devenish et al., 2014; Phillips, 2024). Evidence from other health professions highlights the benefits of structured internships—often referred to as 'work-based learning'—which provide supervised, outcome-driven experiences that foster patient-centred care and enhance readiness for independent practice (Stewart, 2021; Nguyen, 2024). Complementary to internships, mentorship programmes offer sustained guidance from experienced practitioners, creating opportunities for knowledge transfer and professional socialisation (Henry-Noel et al., 2019; Farkas et al., 2019). It is recommended that EMS education and policy stakeholders explore the implementation of structured, supervised work-based learning combined with formal mentorship frameworks to bridge the gap between undergraduate preparation and the realities of autonomous prehospital practice.

Continuous Professional Development

Continuous professional development programs regarding paediatric pain management to improve the practice and attitudes of practitioners already graduated were found to be lacking, and development of such programs would further cultivate attitudes conducive to effective paediatric pain management in the prehospital field. Interventional education, specific to paediatric pain management might be indicated based on regulatory bodies within services. Development of educational content, short courses, and specialised post-graduate education could be long-term goals for EMS as a whole.

Under-graduate Education

Further research into the undergraduate curriculum regarding paediatric patients needs to be conducted, such as curriculum mapping or the development of competency frameworks. Ways to maximise the development of positive attitudes in the program are similarly important to the improvement of paediatric pain management practices, as is research that enables the application of a spiral curriculum. In order to address or supplement this perceived gap in the under-graduate program, an analysis of the current curriculum is advised. This can allow for identification of theoretical gaps, as well as potential opportunities to supplement learning outcomes that reflect the significance and importance of paediatric pain management.

Collegial Networks

Collegial networks are currently informal and not accessible to all practitioners and require research to maximise positive influences as well as creating guidelines to develop more collegial networks.

While high-income countries (HICs) offer valuable literature and data that contribute meaningfully to paediatric pain management—particularly in highlighting the significance of healthcare provider attitudes—their findings cannot be directly extrapolated as a foundation for systemic improvement within the South African context. The burden of disease among paediatric populations in South Africa is shaped by distinct socioeconomic challenges, cultural dynamics, and limited access to healthcare services, requiring a context-specific approach.

Currently, attitudes, perceptions, and beliefs surrounding paediatric pain management in South Africa are not aligned with principles of effective and ethical care. Addressing this misalignment requires a comprehensive, multi-level strategy. This includes revising undergraduate curriculum to incorporate evidence-based paediatric pain education and ensuring the availability of continuous professional development (CPD) resources tailored to local needs. To encourage appropriate clinical attitudes and beliefs, targeted educational interventions must be identified and implemented. Additionally, structured support systems for both novice and experienced

practitioners should be established to reinforce learning and sustain best practices in paediatric pain management.

5.5 Limitations

While this research provides valuable insight into the topic of paediatric pain management, there are limitations present.

The scope of the study was narrowed to the attitudes to paediatric pain to maintain focus and allow the researcher the opportunity to develop and grow experience in the postgraduate research field. The scope of the research being limited to attitudes restricted the results and potential recommendations of the research, though it highlighted areas for future research to complete the overall picture of paediatric pain management.

The use of online questionnaire in phase two data collection was chosen for convenience. Participants did not express themselves as fully as the participants in the interviews, and the researcher could not ask clarifying questions or probe answers and explore beliefs. This limited the “richness” of phase two data.

The research did not investigate and explore the curriculum, nor collect data on practice. These attitudes and perceptions of the participants could thus not be triangulated with objective measures of curriculum and teaching or practice.

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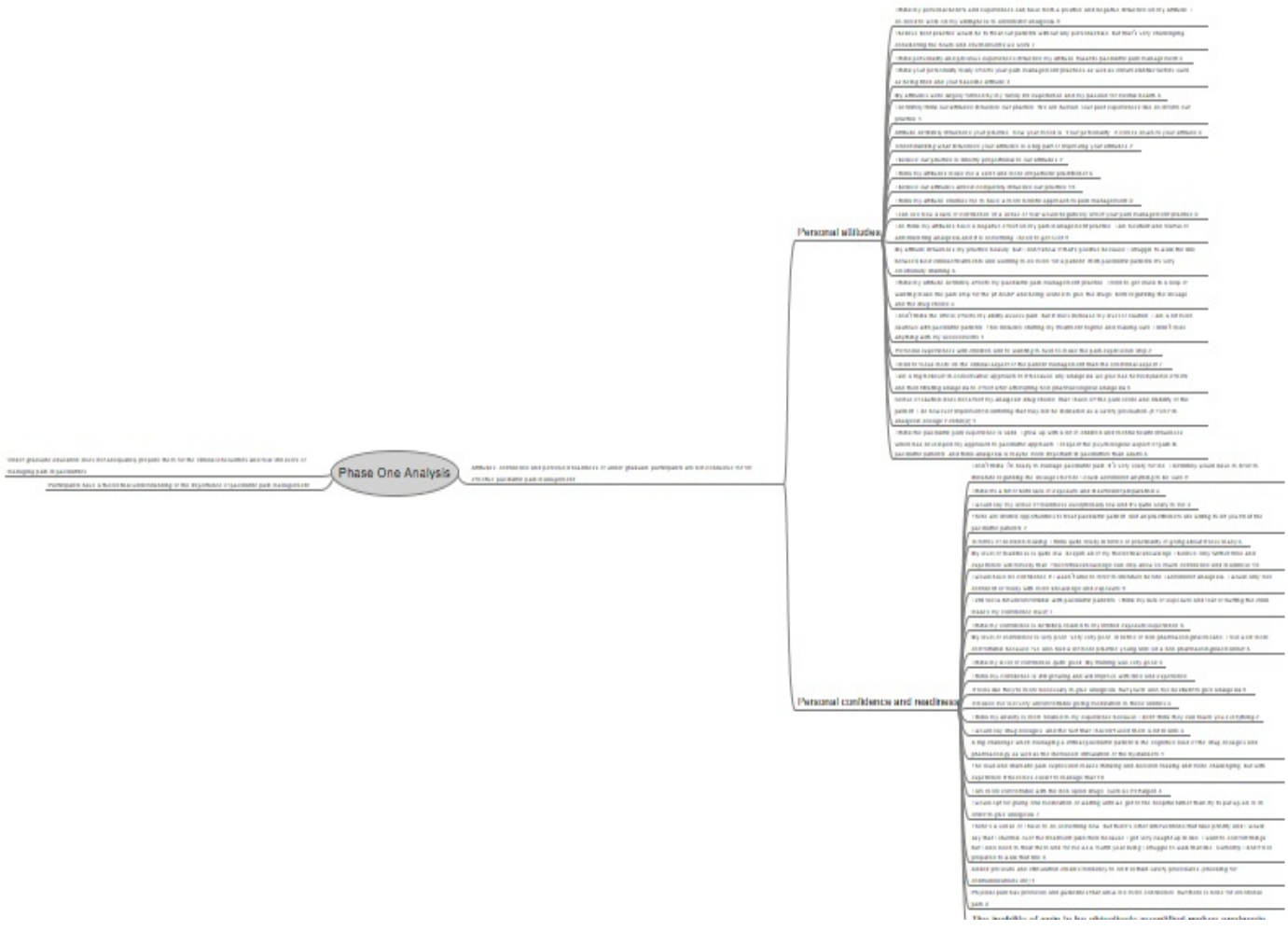
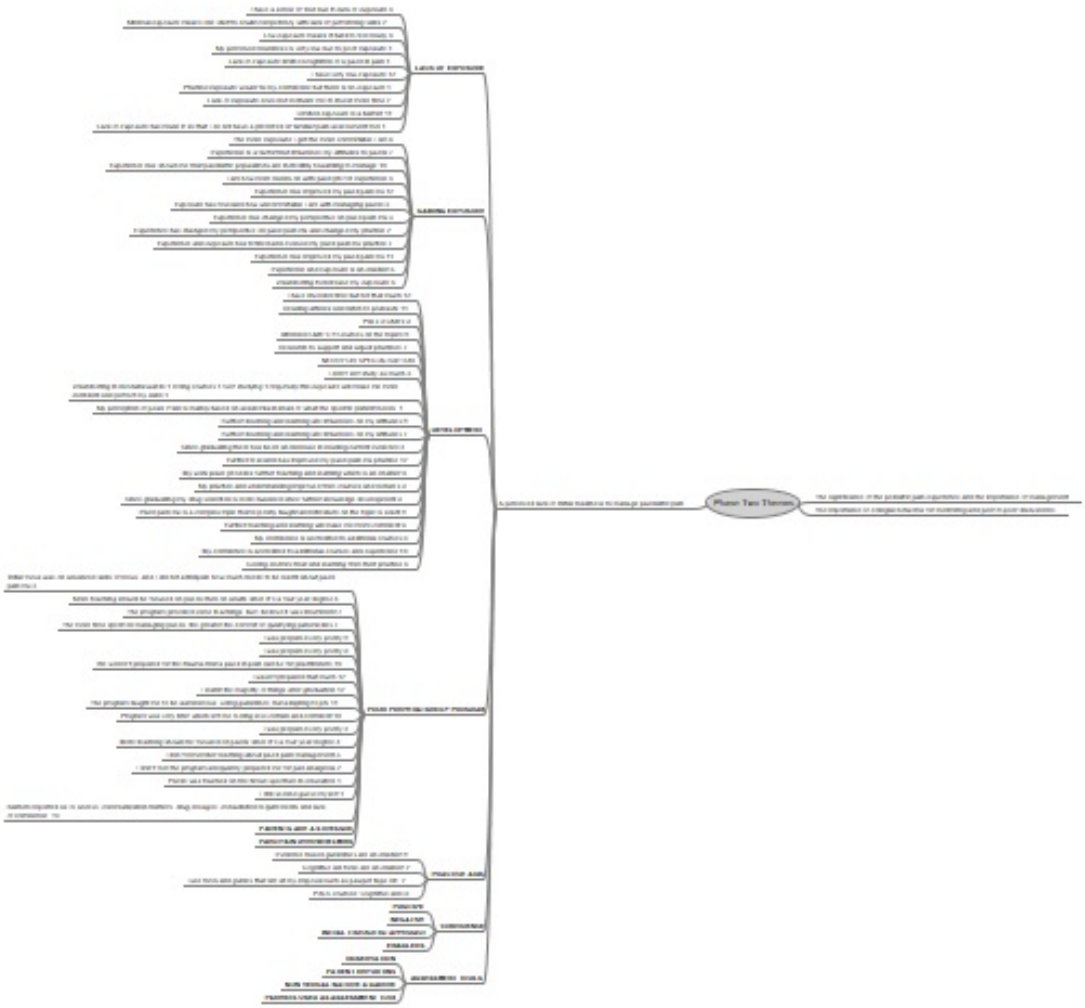
Appendix One: Diagram of data tree of theme development of phase one data



Appendix Two: **Diagram of data tree of theme development of phase two data**



Appendix Three: Phase One: Interview Guide

Aim

The aim of the research is to explore the attitudes of senior undergraduate students and early career emergency medical care practitioners toward paediatric pain management and their self-reported readiness and confidence to manage paediatric patients for pain.

Objectives

1. To explore the beliefs and perceptions of senior undergraduate students and early career practitioners towards paediatric pain management in emergency medical care.

2. To explore self-reported barriers and enablers to paediatric pain management by senior undergraduate students and early career practitioners

3. To explore self-reported confidence and readiness to perform paediatric pain management by senior undergraduate students and early career practitioners.

Questions.

1. How do you think paediatric patients experience pain ?

2. How do you think the most correct way is to assess paediatric pain ?

3. If you were to be faced with a paediatric patient with a significant pain score, what would be your initial thoughts/feelings be?

4. When considering the need or importance for prehospital paediatric pain management, what are the thoughts and feelings that you experience?

5. How would you characterize your level of readiness to manage prehospital paediatric pain?

6. What do you believe would be your top barriers to prehospital paediatric pain management?

7. When reflecting on your own confidence to prehospital paediatric pain management, how would you describe it?

8. What would you perceive to be an enabler to prehospital paediatric pain management?

9. What do you think influences your attitudes to prehospital paediatric pain management?

Possible follow-up Questions to allow for in-depth answers.

1. You mentioned you feel/think/experienced (x), what do you think led to that feeling/thought/experience?

2. Can you elaborate on your answer to (x) question?

Concluding Questions.

1. Do you believe your attitudes to prehospital paediatric pain management influences your practise?

2. Would you say further or more focused learning and teaching would positively influence your attitudes to prehospital paediatric pain management?

Clarifications on words used in questions.

1. Perception: how you personally interpret or understand something

2. Readiness: Do you feel well-equipped or prepared

3. Attitudes: Your personal beliefs, thoughts, and feelings about something

Appendix Four: Survey Questions: Phase Two

Screening Questions

1. Are you currently registered with the HPCSA as an ECP? (yes/no)

2. Are you currently working operationally? (yes/no)

3. Did you complete your Bachelor in Emergency Medical Care? (yes/no)

4. Have you been operational for more than 1 year and less than 2 years? (yes/no)

Survey Questions

1. During your operational time, how often would you say you encounter Paediatric Patients with pain? (pain can be medical, or trauma related and does not have to be the Initial Complaint/Reason for call)

2. What are your thoughts on the paediatric pain experience? How do you think children experience pain?

3. What method do you think is more accurate to assess pain in a paediatric patient? How do you think children in pain should be approached?

4. In your own words and as descriptively as possible, can you explain your initial thoughts and feelings when faced with a paediatric patient with pain?

5. How important do you believe prehospital paediatric pain management is? Please provide reasons for answer(s)

6. When you are faced with a paediatric pain patient, how would describe your level of perceived readiness to manage the patient?

7. In your own experience, what would you say are the barriers to prehospital paediatric pain management?

8. Reflecting on your confidence to manage a paediatric pain patient, how would you characterize your confidence? Please provide reasons for answer(s)

9. What do you perceive to be an enabler to prehospital paediatric pain management? Please provide reasons for answer(s)

10. What do you think influences your management of children in pain?

11. Have you encountered another practitioner who you believe manages pain in children well? How did they go about it?

12. Do you believe your initial education prepared you to manage children in pain? What do you think needs to change in the teaching of paediatric pain management, if anything?

13. Have you invested extra time and effort to learn about managing children in pain, or children in general, over and above what you learned on your initial degree program? Please provide a reason for your answer.

Appendix Five: Consent Forms

Phase One Consent Form

Consent to Participate

Title of Study

The attitudes of senior emergency medical care students and early career emergency care practitioners to paediatric pain management.

Principal Researcher

Suzan-Lynn Smit

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Submitted in partial fulfilment of a thesis

Supervised by

Ryan Matthews

Co-Supervised by

Dirk Bester

Ethics Committee

Health and Wellness Sciences Research Ethics Committee

sethn@cput.ac.za

Purpose of Study

My name is Suzan-Lynn Smit, and I am on a journey to contribute to the body of evidence and development of our Emergency Medical Service system and community. Your participation in

this journey will not only benefit me, as the principal researcher, but the system we all form a part of.

You are being asked to take part in a research study. Before you decide to participate in this study, it is important that you understand why the research is being done and what it will involve. Please read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information.

The purpose of this study is to explore the attitudes of senior undergraduate students and new graduate practitioners to paediatric pain management.

STUDY PROCEDURES

Phase one's data will be derived from the senior undergraduate Exit Level participants in the form of interviews. You will be interviewed with the researcher. The interviews will be done with the Researcher and a single participant present. The questions will be based on an interview guide, allowing you to divulge as much and as in-depth answers as you are comfortable with, without the limitations of yes/no questions.

The Interviews will be recorded using a recording device, as well as the researcher taking notes of subtle nuances and trends. The recordings will be transcribed after all interviews have been completed. Once the interviews have been transcribed in its entirety, the transcriptions will be sent to you to allow you to review and reflect on their responses and an opportunity to add further insight will be given to the participants to allow for member checking.

The interviews will last for approximately 20minutes but can be shortened/lengthened depending on the researcher and participant present.

RISKS

You may decline to answer any or all questions and you may terminate your involvement at any time if you choose with no penalty to yourself. There is no risk involved in the voluntary participation; the data protection plan will ensure anonymity and protection of every participant.

The contact details of counselling services of the higher education institution will be supplied to the participants individually after the interview is complete to ensure the well-being of all participants. BENEFITS

As future independent practitioners', the study, and participation therein, will be beneficial by contributing to the body of evidence that will inform the possible improvement of prehospital paediatric pain management. There will be no direct benefits to individual participants. CONFIDENTIALITY

Your responses will be anonymous. No identifying information will be included in the study, and your comments will not be anonymous. Every effort will be made by the researcher to preserve your confidentiality including the following:

Measures to be taken to ensure confidentiality:

- Assigning code names/numbers for participants that will be used on all research notes and documents

- Keeping notes, interview transcriptions, and any other identifying participant information in a locked file cabinet in the personal possession of the researcher.

Participant data will be kept confidential except in cases where the researcher is legally obligated to report specific incidents. These incidents include, but may not be limited to, incidents of abuse and suicide risk.

VOLUNTARY PARTICIPATION

Your participation in this study is voluntary. It is up to you to decide whether to take part in this study. If you decide to take part in this study, you will be asked to sign a consent form. After you sign the consent form, you are still free to withdraw at any time and without giving a reason. Withdrawing from this study will not affect the relationship you have, if any, with the researcher. If you withdraw from the study before data collection is completed, your data will be destroyed.

CONSENT I have read, and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

Participant's signature _____ Date _____

Witness Signature _____Date_____

Researcher's signature _____ Date _____

Phase Two Consent Form

Consent to Participate

Title of Study

The attitudes of senior emergency medical care students and early career emergency care practitioners to paediatric pain management.

Principle Researcher

Suzan-Lynn Smit

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Submitted in partial fulfilment of a thesis

Supervised by

Ryan Matthews

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Ethics Committee

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The purpose of this study is to explore the attitudes of senior undergraduate students and new graduate practitioners to paediatric pain management

STUDY PROCEDURES

Phase two; New emergency medical care graduates Participants

Phase two will consist of data from the new emergency medical care graduates' participants with between one and two years of operational experience and will be done using an online survey. The survey's questions will be informed using the trends and identified similarities that derived from the interview data collected from the senior undergraduate phase of the research, phase one of data collection. Participants will be required to list their qualification and their number of years' experience; this will determine whether the individual falls within the required inclusion criteria. The questions will be open-ended, allowing the participant to elaborate on their individual thoughts, feelings, perceptions and experiences without the limitations of yes or no questions. The questions are structured this way to allow the researcher to understand, as accurately as possible, each individual practitioner's input. There will be 15 questions and will take roughly between 10 to 15 minutes to complete, depending on the depth and length of the participants individual answers.

The email address of the principal researcher will be provided to all participants, to allow for an opportunity for further insights to be delivered after the survey is complete in the case of a participant having reflected on the topic further.

RISKS

You may decline to answer any or all questions and you may terminate your involvement at any time if you choose and without any penalty to you. There are no risks involved in the voluntary participation; the data protection will ensure anonymity and protection of every participant.

BENEFITS

As future independent practitioners', the study and participation therein, will be beneficial by contributing to the body of evidence that will inform the possible improvement of prehospital paediatric pain management. There will be no direct benefits to individual participants.

CONFIDENTIALITY

Your responses will be anonymous. No identifying information will be included in the study, and your comments will not be anonymous. Every effort will be made by the researcher to preserve your confidentiality including the following:

Measures to be taken to ensure confidentiality:

- Assigning code names/numbers for participants that will be used on all research notes and documents

- Keeping notes, interview transcriptions, and any other identifying participant information in a locked file cabinet in the personal possession of the researcher.

Participant data will be kept confidential except in cases where the researcher is legally obligated to report specific incidents. These incidents include, but may not be limited to, incidents of abuse and suicide risk.

VOLUNTARY PARTICIPATION

Your participation in this study is voluntary. It is up to you to decide whether to take part in this study. If you decide to take part in this study, you will be asked to sign a consent form. After you sign the consent form, you are still free to withdraw at any time and without giving a

reason. Withdrawing from this study will not affect the relationship you have, if any, with the researcher. If you withdraw from the study before data collection is completed, your data will be returned to you or destroyed.

CONSENT I have read, and I understand the provided information and have had the opportunity to ask questions. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and without cost. I understand that I will be given a copy of this consent form. I voluntarily agree to take part in this study.

Participant's signature _____ Date _____

Witness Signature _____Date_____

Researcher's signature _____ Date _____

Appendix Six: Data Management Plan

The attitudes of senior emergency medical care students and early career emergency care practitioners to paediatric pain management.

Data Management Plan

DATA COLLECTION

What data will you collect/create?

For the research there will be two phases of data collection. Phase One will consist of one-on-one interviews with final year undergraduate participants, and phase two will be an online survey tool for the newly qualified post-graduate participants. All data that will be collected will be qualitative and will be analysed using qualitative data analysis software to improve trustworthiness.

How will the data be collected or created?

Phase One will be interviews; these interviews will be transcribed and analysed using the data analysis software. Prior to the data being analysed, the transcriptions will be sent to the individual participants for member checking, allowing the participants to add to their inputs upon reflection. Phase two data will be online surveys, and the data will be directly imported into the data analysis software, all participants will be provided with the contact details of the primary researcher in the case of further comments wanting to be added after the survey has been completed. The interpretative grounded theory will be utilized as it allows the researcher to study a particular individual experience and facilitates the inductive approach which derives themes and trends from data.

DATA DOCUMENTATION AND METADATA

What documentation and metadata will accompany your dataset?

Supporting documents, such as the Interview Guide and Survey Questions will be included in the documents, this will allow for the readers to contextualise the data. The demarcation, inclusion and exclusion criteria will also be included.

ETHICS AND LEGAL COMPLIANCE

How will you manage any ethical issues pertaining to data?

All participants will remain anonymous. Each participant will be assigned a random code. No identifying questions will be asked. All identifying comments will be redacted. All data will be stored on a password protected device. Access to the data will be limited to the primary researcher and the supervisors.

How will you manage copyright and Intellectual Property Rights (IPR) issues?

All data, and products thereof, will remain the property of the University and the funder. Our findings will be published in peer reviewed Open Access Journals. Therefore, there will be no unforeseen copyright and IPR issues.

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DATA STORAGE AND BACKUP

How will you store and back up your data during the research?

All data will be stored on a password protected Laptop and will be backed up on a password protected external hard drive.

How will you manage access and security?

All devices containing data, and products thereof, will be password protected. This password will only be known by the Principal Researcher and the Research Supervisor.

DATA SELECTION AND PRESERVATION

Explain which data should be retained, shared, and /or preserved?

Data will only be kept for as long as the researcher requires it to code and establish the trustworthiness of the data and research.

RESPONSIBILITIES AND RESOURCES

Who will be responsible for data management?

Data management will be done by the Principal Researcher and the Research Supervisor.

What resources will you require to deliver your plan?

A laptop and an external hard drive.

PERSONAL, SENSITIVE AND IDENTIFIABLE HUMAN RESEARCH DATA

Will you be collecting personal information?

No

List all the types of personal/sensitive/identifiable data you will be collecting.

None

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Conduct a benefit/risk analysis to ensure that the benefit of collecting such data outweighs the risk and then motivate why you need to collect such information.

Confidentiality, anonymity, and privacy of human participants.

What happens to the information if a participant withdraws from a study?

If a participant withdraws from the study, all information and/or data related to the participant will be irretrievably destroyed.

After completion of the research, will the information be used for anything else in the future?

No

Will study participants/groups etc. receive feedback before disseminating the results of the research?

Member checking will be done by providing the final year participants with copies of their transcriptions to allow further reflection and feedback, as well as supplying them with the final thesis and/or article. The operational participants will be supplied with the email address of the primary investigator for the option to send further comments and/or thoughts after the survey is complete. Feedback will not be possible since no identifying details or contact details will be provided.

Outline your informed consent process and details of the data management plan.

Informed consent will be achieved using Informed Consent Documents. These documents will be supplied to the prospective participants prior to any contact between them and the researcher, allowing the prospective participants time to review the document to their satisfaction.

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Appendix Seven: Ethics Approval

Cape Peninsula University of Technology

HEALTH AND WELLNESS SCIENCES RESEARCH ETHICS COMMITTEE (HW-REC)
Registration Number NHREC: REC- 230408-014

P.O. Box 1906 • Bellville 7535 South Africa
Symphony Road Bellville 7535
Tel: +27 21 959 6917
Email: sethn@cput.ac.za

17 October 2022
REC Approval Reference No:
CPUT/HWS-REC 2022/H21

Faculty of Health and Wellness Sciences

Dear Ms. Suzan-Lynn Campher - 213014386

Re: APPLICATION TO THE HWS-REC FOR ETHICS CLEARANCE

Approval was granted by the Health and Wellness Sciences-REC to **Ms. S Campher** for ethical clearance. This approval is for research activities related to research for **Ms. S Campher** at Cape Peninsula University of Technology.

TITLE: **The attitudes of senior emergency medical care students and early career emergency care practitioners to paediatric pain management.**

Supervisor: Dr. D Bester and Mr R Matthews

Comment:
Approval will not extend beyond 18 October 2023. An extension should be applied for 6 weeks before this expiry date should data collection and use/analysis of data, information and/or samples for this study continue beyond this date.

The investigator(s) should understand the ethical conditions under which they are authorized to carry out this study and they should be compliant to these conditions. It is required that the investigator(s) complete an **annual progress report** that should be submitted to the HWS-REC in December of that particular year, for the HWS-REC to be kept informed of the progress and of any problems you may have encountered.

Kind Regards

Ms. Carolynn Lackay
Chairperson – Research Ethics Committee
Faculty of Health and Wellness Sciences