

**Knowledge, attitudes and practices regarding paediatric pain management among
undergraduate nursing students at a university in the Western Cape**

Amrani Karikurubu

Student number: 3917249

A mini-thesis submitted in partial fulfilment of the requirements for the Degree of Master's in
Nursing (Education) at the School of Nursing, Faculty of Community and Health Sciences,
University of the Western Cape

Supervisor: Prof. Talitha Crowley



November 2022

<https://etd.uwc.ac.za/>

ABBREVIATIONS

EMLA:	Eutectic mixture of local anaesthetics
FLACC:	Face, Legs, Activity, Cry, Consolability
IASP:	International Association for the Study of Pain
KAP:	Knowledge, attitudes and practices
KR-20:	Kuder-Richardson Formula 20
NSAIDs:	Non-steroidal anti-inflammatory drugs
PICU:	Paediatric Intensive Care Unit
PNKAS:	Paediatric Nurses' Knowledge and Attitudes Survey
SANC:	South African Nursing Council
SD:	Standard Deviation
SPSS:	Statistical Package for the Social Sciences
WHO:	World Health Organization



ABSTRACT

Background: Despite the availability of analgesics for pain relief, children experience moderate to severe pain during hospitalisation. A student nurse placed in a paediatric setting is part of the healthcare team who can support children in pain. However, studies have documented a gap in the knowledge, attitudes, and practices (KAP) of nursing students regarding paediatric pain management.

Aim: The study aimed to describe the KAP of undergraduate nursing students regarding paediatric pain management at a university in the Western Cape. The research objectives were to describe a) the knowledge of undergraduate nursing students regarding paediatric pain management, b) the attitudes of undergraduate nursing students regarding paediatric pain management, and c) the practices of undergraduate nursing students regarding paediatric pain management.

Methodology: A quantitative descriptive design was employed. An all-inclusive sampling technique involving 205 nursing students in their fourth year of training who have completed clinical placement in paediatric units was used. Data were collected using an electronic survey with validated questions to measure KAP. Of the 205 potential participants, 87 (42.4%) completed the questionnaire. Data were analysed descriptively using the Statistical Package for the Social Sciences (SPSS) version 26.

Ethics: Ethics approval was obtained from the Humanities and Social Sciences Research Ethics Committee of the University of the Western Cape. Ethical principles of autonomy, beneficence, and justice including informed consent from research participants were upheld throughout the study.

Results: The study revealed gaps in nursing students' KAP. The average scores for KAP were knowledge – 2.2 (SD=1.2) or 55% out of a maximum of 4; attitude – 9 (SD=3) or 52.9% out of a maximum of 17; practices of pain alleviation – 2.18 (SD=1.2) or 36.6% out of a maximum of 6; practices of pain assessment – 2.7 (SD=1.2) or 54% out of a maximum of 5;

practices of nonpharmacological measures – 4.6 (SD=2.6) or 41.8% out of a maximum of 11. The majority of participants (69.0%; n=60) reported insufficient training on pain management for infants and children. A significant positive relationship between attitudes and practices was observed ($p<0.01$).

Conclusion: Nursing students were found to have deficits in the area of KAP regarding paediatric pain management. Lack of training that focuses on pain management for infants and children and the short time spent in the clinical field with paediatric patients were found to be barriers that might contribute to the inadequate management of pain in paediatric patients. Therefore, sufficient training and proper support in the clinical field should be given to undergraduate nursing students in order to keep them informed of the best practices for the assessment and management of paediatric pain.



KEYWORDS

Attitude

Knowledge

Nursing student

Paediatric patient

Pain

Pain management

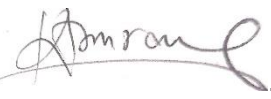
Practices



DECLARATION

I, Amrani Karikurubu hereby declare that 'Knowledge, attitudes and practices regarding paediatric pain management among undergraduate nursing students at a university in the Western Cape' is my own work. All resources that have been used or quoted have been indicated and acknowledged by means of a complete references list. This thesis has not been submitted before for any other degree at any institution.

Amrani Karikurubu

Signed: ...

November 2022



DEDICATION

This mini-thesis is dedicated to God the Almighty, who has strengthened me so far from the beginning of this beautiful work.

To my lovely daughter Basma Tiana Muhoza, who was born when I was absent following my studies and who was patient throughout this period of my research studies.



ACKNOWLEDGEMENTS

It has been challenging to complete this thesis due to the public health crisis that the country has been going through as a result of the Covid-19 pandemic; however, I am happy to have reached this point. I have a number of individuals to thank for their support in getting me this far.

First and foremost, my special thanks of gratitude go to God the Almighty; He was always there to keep me going, despite many challenges and struggles. Without Him, none of this would have been possible.

To my father Moussa Karikurubu, my mother Adidja Ntezimana, and the rest of the family members at large, thanks for your patience and understanding when I could not travel to visit you. Your prayers and moral support were of great importance to my dreams.

To my supervisor, Professor Talitha Crowley, you have put a lot of effort into getting this work done and your commitment, encouragement and positive criticism have helped me produce excellent academic work.

To my previous supervisor, Professor Margaret Williams, I sincerely appreciate your positive engagement and criticism.

To Nicolette Johannes, the postgraduate administrator, I am extremely grateful for the help you have given me from the admission process to the end of my studies. You've been so helpful, God bless you.

To my lovely daughter Basma Tiana Muhoza, it's been so many years since you were born and now, I'm finishing my studies. You never got my attention and support as you should have because it's been a long journey to come to this end. Thank you for your patience and understanding when I could not travel to see you. This achievement will be an inspiration for you to aspire to greater achievements.

To the family of Ali Ndayishimiye, your eternal love and moral support supported me to produce this work so promptly; I am grateful.

To Alice Nihoreho, I am extremely grateful for your moral and financial support. I pray that God the Almighty can bless you and your family.

To my colleagues at the University of the Western Cape in nursing education, for their collaboration and loving encouragement. I pray that God Almighty will bless you all. Thank you.

To the fourth-year nursing students who participated in this study, I am extremely grateful for your time and willingness to produce answers that have allowed me to continue my research. Thank you very much, and I pray that God the Almighty can bless you.

To my friends and all those who contributed to the success of this research study, thank you and God bless you.



TABLE OF CONTENTS

ABSTRACT	iii
KEYWORDS.....	v
DEDICATION.....	vii
ACKNOWLEDGEMENTS.....	viii
CHAPTER ONE.....	1
ORIENTATION TO THE STUDY	1
1.1 Introduction	1
1.2 BACKGROUND	3
1.3 PROBLEM STATEMENT.....	5
1.4 STUDY QUESTION AND AIM.....	7
1.5 STUDY OBJECTIVES	7
1.6 SIGNIFICANCE OF THE STUDY.....	7
1.7 OPERATIONAL DEFINITIONS	8
1.8 OUTLINE OF THE THESIS.....	10
1.9 CONCLUSION	10
CHAPTER TWO	11
LITERATURE REVIEW	11
2.1 INTRODUCTION.....	11
2.2 PAIN IN CHILDREN.....	11
2.3 PAIN MANAGEMENT IN PAEDIATRIC NURSING	12
2.4 KNOWLEDGE OF PAEDIATRIC PAIN MANAGEMENT	16
2.5 KNOWLEDGE OF PAIN ASSESSMENT IN CHILDREN.....	17
2.6 KNOWLEDGE OF PHARMACOLOGICAL AND NON-PHARMACOLOGICAL APPROACHES.....	18



2.7 BARRIERS TO OPTIMAL PAIN MANAGEMENT	20
2.7.1 Patient factors	20
2.7.2 Personnel factors	21
2.7.3 Institutional and healthcare system factors	22
2. 8 ATTITUDES AND PRACTICES TOWARDS PAIN MANAGEMENT.....	24
2.9 CONCLUSION	25
CHAPTER THREE	26
RESEARCH DESIGN AND METHODOLOGY	26
3.1 INTRODUCTION.....	26
3. 2 RESEARCH APPROACH	26
3.3 RESEARCH DESIGN.....	26
3.4 RESEARCH SETTING	27
3.5 POPULATION	27
3.6 SAMPLING AND SAMPLING STRATEGY	28
3.7 INSTRUMENT	29
3.8 PILOT TEST	30
3.9 RESEARCH RIGOUR	31
3.9.1 Validity	31
3.9.2 Reliability	32
3.9.3 Data collection	33
3.10. DATA ANALYSIS PROCESS	34
3.11 ETHICAL CONSIDERATIONS	35
CHAPTER FOUR	38
RESULTS	38
4.1 INTRODUCTION.....	38



4.2 RESPONSE RATE	38
4.3 SECTION A: DEMOGRAPHIC CHARACTERISTICS AND TRAINING	39
4.3.1 Age (n=87)	39
4.3.2 Gender (n = 87)	39
4.3.3 Duration of placement (n=87)	40
4.3.4 Training (n=87)	40
4.4 SECTION B: KNOWLEDGE AND ATTITUDE QUESTIONS	41
4.4.1 Knowledge about paediatric pain management	41
4.4.2 Attitude regarding paediatric pain management	42
4.5 SECTION C: PRACTICE QUESTIONS.....	43
4.5.1 Practices of pain alleviation	43
4.5.2 Practices of pain assessment	44
4.5.3 Practices of non-pharmacological measures	44
4.6 KNOWLEDGE, ATTITUDES AND PRACTICES SCORES	45
4.7 INFERENCE STATISTICS	45
4.7.1 Correlations	45
4.7.2 Non-parametric tests	47
4.8 SUMMARY	48
CHAPTER FIVE	49
DISCUSSION, RECOMMENDATIONS AND LIMITATIONS	49
5.1 INTRODUCTION	49
5.2 DISCUSSION.....	49
5.2.1 Response rate	49
5.2.2 Age and gender	50
5.2.3 Duration of placement	50
5.2.4 Training	51



5.2.5 Student nurses' knowledge of paediatric pain management	52
5.2.6 Student nurses' attitudes of paediatric pain management in children	54
5.2.7 Practices of pain alleviation	56
5.2.8 Practices of pain assessment	57
5.2.9 Practices of non-pharmacological measures	58
5.3 SUMMARY OF KEY FINDINGS	60
5.3.1. Objective 1: nursing students' knowledge regarding paediatric pain management	60
5.3.2. Objective 2: Nursing students' attitudes regarding paediatric pain management	61
5.3.3. Objective 3: Nursing students' practices regarding paediatric pain management	61
5.4 RECOMMENDATIONS	62
5.4.1 Recommendations for nursing education	62
5.4.2. Recommendations for nursing practice	63
5.4.3 Recommendations for further research	64
5.5 LIMITATIONS OF THE STUDY	64
5.6 CONCLUSION	65
REFERENCES	66
ANNEXURES	78
ANNEXURE A: QUESTIONNAIRE	78
ANNEXURE B: DISTRIBUTION OF SCORES TABLES	81
ANNEXURE C: PERMISSION TO USE THE SURVEY	88
ANNEXURE D: Consent form	91
ANNEXURE E: ETHICS APPROVAL	93
ANNEXURE F: PERMISSION TO CONDUCT RESEARCH	94
ANNEXURE G: Editor's letter	95



LIST OF TABLES

TABLE 1: QUESTIONNAIRE DOMAINS	30
TABLE 2: RELIABILITY OF QUESTIONNAIRE SCALES.....	33
TABLE 3: GENDER	40
TABLE 4: TRAINING OF PARTICIPANTS (N=87).....	41
TABLE 5: KNOWLEDGE OF PARTICIPANTS ABOUT PAEDIATRIC PAIN MANAGEMENT (N=87)	42
TABLE 6: ATTITUDE OF PARTICIPANTS ABOUT PAEDIATRIC PAIN MANAGEMENT (N=87)	42
TABLE 7: PRACTICES OF PAIN ALLEVIATION (N=87).....	43
TABLE 8: PRACTICES OF PAIN ASSESSMENT	44
TABLE 9: PRACTICES OF NON-PHARMACOLOGICAL MEASURES (N=87).....	44
TABLE 10: KNOWLEDGE, ATTITUDES AND PRACTICES SCORES	45
TABLE 11: CORRELATIONS BETWEEN KNOWLEDGE, ATTITUDES AND PRACTICES	46



LISTS OF FIGURES

FIGURE 1. THE AGE OF PARTICIPANTS 39

FIGURE 2. DURATION OF PLACEMENT IN PAEDIATRIC WARDS 40

FIGURE 3. BOX AND WHISKER PLOT OF KNOWLEDGE SCORE ACCORDING TO SUFFICIENT INSTRUCTION 48



CHAPTER ONE

ORIENTATION TO THE STUDY

1.1 Introduction

Pain is one of the main sources of distress for children during hospitalisation and can result from medical or surgical intervention inducing pain, trauma, and acute and chronic diseases. Pain is still a widespread problem worldwide, as statistical data shows that 77% of hospitalised children worldwide suffer from pain (Aziznejadroshan et al., 2020). This shows that inadequate management of pain in children is a global concern. Pain that is not adequately treated will severely affect children's development by leading to, among others, emotional and psychological disorders, learning disabilities, lower levels of participation in daily life or therapy, poor attendance at school, and problems in their social functioning and development (Mediani et al., 2020). Preventing such adverse effects requires effective pain management by healthcare providers such as nurses, nursing students and doctors (Mediani et al., 2020).

Pain management of paediatric patients is one of the competencies that nursing students should demonstrate during training, and it is a competency that should continue after training to allow them to provide quality nursing care (Kusi Amponsah et al., 2019). In principle, pain management in children utilises pharmacological and non-pharmacological methods. Proper and optimal pain management in children requires regular and constant assessment and appropriate intervention to prevent failure and help improve the paediatric patient's comfort (Waisundara et al., 2021).

A nurse takes up the role and function of a nursing caregiver to minimise the impact of paediatric pain. Moreover, nurses spend more time with children dealing with their pain than other healthcare professionals. These points demonstrate that nurses play an essential part in handling paediatric pain (Gadallah et al., 2017).

It is unprofessional to let children suffer from their pain without any interventions to alleviate it or provide appropriate treatment. The ability of nurses to take care of a child's pain is informed by their knowledge and attitudes. Nurses' lack of knowledge about assessing and managing paediatric pain will hinder their practice of appropriate pain management (Gadallah et al., 2017).

Therefore, future registered nurses should be able to provide better pain management in children, and most importantly be able to carry out assessment, planning, implementation and evaluation of nursing care for individuals of all ages and groups all the time.

During clinical placement, student nurses are expected to work and improve their nursing skills in different clinical settings, including paediatric services (Kusi Amponsah et al., 2019). In addition, during their training, they will be in contact with children suffering from pain and will have to use their knowledge and positive attitudes to provide the necessary support to paediatric patients (Kusi Amponsah et al., 2019).

The experience gained from working with children helps students to understand what nursing is, gives them the opportunity to apply classroom theories to the real world of clinical nursing, and provides opportunities to gain confidence through which they are introduced to the practices, expectations, and real-world work environment of the nursing profession (Al Sebaee et al., 2017).

Fourth-year student nurses are future professional nurses, and they will be expected to work independently with children suffering from pain in paediatric settings (Abbasi et al., 2014). The caring attitude and responsibility which they need as professional nurses when it comes to pain management in children need to be developed while they are still nursing students (Abbasi et al., 2014). Nursing students' knowledge, attitudes and practices (KAP) about pain management in children will help them improve the quality of their care and their caring attitudes towards paediatric patients (Kobe et al., 2020). It is therefore necessary that nursing

students be exposed to the clinical practices of caring for children with pain during their placements in order to be effective and caring practitioners in the future (Abbasi et al., 2014). The objective of the present study was to describe the KAP of undergraduate nursing students at a university in the Western Cape regarding paediatric pain management. The findings provide baseline information that could assist nurse educators, clinical educators and other stakeholders to optimise teaching and learning practices to guide nursing students when they are working with children in pain.

1.2 Background

In many clinical conditions, pain is one of the major symptoms and it is the commonest reason for people seeking treatment (Aziznejadroshan et al., 2020). Pain is defined as a conscious experience that is caused by brain activity in response to a harmful stimulus, and engages the sensory, emotional and cognitive processes of the brain (Stanley & Pollard, 2013).

In general, poorly managed pain is a problem that affects individuals, entire health systems and societies around the world (Hroch, 2017). The experience of paediatric pain can be caused by different conditions such as medical treatment, invasive procedures, physical injuries and unknown factors (Kusi Amponsah et al., 2020).

Failure to provide appropriate nursing care for pain in children has been shown to affect patient outcomes by potentially increasing the expected time of hospitalisation, increasing the amount of analgesia needed and delaying recovery (Patnaik et al., 2017). Nursing students' KAP can affect their ability to provide adequate management of paediatric pain (Selvi et al., 2022).

Previous research has found that when nursing students are knowledgeable about pain management, it results in effective pain control. The most common misconceptions among nursing students that contribute to poor pain management are that they underestimate

paediatric patient's pain, do not believe paediatric patients are in pain, and do not administer the prescribed dosage of analgesics due to fear of addiction (Laprise, 2016). A study conducted on the knowledge and attitudes of nursing students from the University of Texas at Tyler College of Nursing and Health Sciences indicated that nursing lecturers are in a unique position to meaningfully address the issue of paediatric pain management, by facilitating the acquisition and use of knowledge by the next generation of nurses (Gadallah et al., 2017). The same study by Gadallah et al. (2017) also emphasised that nursing students should be familiar with the management of pain in children.

Meanwhile, as part of their academic preparation, nursing students work in paediatric units as part of their work-integrated learning activities and can work as professionals after obtaining their degree (Park et al., 2018). Compared to other health professionals, nurses and nursing students spend more contact hours interacting with patients at their bedside, and therefore play a great role in the assessment and management of paediatric pain (Park et al., 2018). This is the reason why nursing students need to become the main agents of change for better management of pain outcomes among paediatric patients (Gadallah et al., 2017). If nursing students are not sufficiently educated and are poorly prepared to alleviate pain adequately, the patient ends up suffering (Ortiz et al., 2015).

Pain management in children is unique and complex because children are often not capable to describe their pain, thus leading to inadequate interventions (Ortiz et al., 2015). The problem of inadequate management of paediatric pain is exacerbated due to insufficient knowledge and formal training in paediatric pain management (Wuni et al., 2020). Nursing students' training and clinical experience contribute to the KAP necessary for paediatric pain management competence (Wuni et al., 2020). However, a study of Mexican nurses and nursing students conducted on knowledge and attitudes towards pain management in children found that on a

scale of 30 items distributed, over half of the respondents had poor knowledge and inappropriate attitudes (Ortiz et al., 2015). From the results of the studies mentioned, it is therefore likely that paediatric nurses have deficiencies in knowledge and attitudes that could be attributed to poor educational preparation. Hence, it is necessary that student nurses are well equipped with KAP necessary to put theory into practice effectively to ensure optimal and effective pain management in children.

1.3 Problem statement

For many years, increasing efforts have been made to promote better pain management in children. Unfortunately, it is still estimated that inadequate pain management is a global problem that affects more than 150 countries and 80% of the world's population (Vittinghoff et al., 2018).

Better management of pain in children relies on good knowledge of pharmacology, an understanding of physiology, psychology and showing positive attitudes as well as the ability to translate this knowledge into practice to meet the needs of children with pain (Imtiaz et al., 2019). In low- and middle-income countries, inappropriate management of paediatric pain is often attributed to insufficient resources and knowledge, poor assessment of pain and low priority given to pain (Lourens et al., 2020).

Research conducted in and out of South Africa showed that paediatric pain management is not addressed and that a significant number of children are excluded from palliative care services and their pain management is generally neglected (Cardona et al., 2019).

In South Africa, a study conducted at Grey's Hospital in KwaZulu-Natal with 505 paediatric patients found that 81% of children suffered from pain in the postoperative period, and in more than half, the unrelieved pain was moderate to severe (Cardona et al., 2019). Poor preparation of paediatric nurses in hospital may or may not change nursing students' KAP about pain

management in children (Ortiz et al., 2015). Based on the aforementioned, it is likely that there is a deficiency in the educational preparation of nurses and a lack of engagement in continuous professional development. It is crucial for nursing students to possess adequate knowledge and positive attitudes regarding the management of pain in children, particularly when they begin practising independently.

Despite the fact that evidence-based guidelines for paediatric pain management are available, undergraduate nursing students exhibit inconsistent knowledge, attitudes and practices, which may negatively impact the quality of care provided to paediatric patients experiencing pain (Kusi Amponsah et al., 2019).

In fact, although the Regulations Relating to the Approval of and the Minimum Requirements for the Education and Training of a Nurse (R425 of 22 February 1985) as well as the scope of practice (R2598 of November 1984) for which nurses are trained, highlight the importance of nurses being skilled in diagnosing health problems and providing therapeutic nursing care to patients at all stages of the life cycle, which may include pain management, it does not specifically mention pain management (Mathe, Downing, & Kearns, 2021). Although pain management is not specifically mentioned, it is an essential component of providing quality care to patients (Esterhuizen, 2016). Not intentionally including paediatric pain management in the nursing curriculum or scope of practice may contribute to a lack of consistent knowledge, attitudes, and practices among undergraduate nursing students in paediatric pain management. This in turn, may negatively impact the quality of care provided to patients experiencing pain, emphasizing the need for comprehensive investigation of the current level of knowledge, attitudes, and practices of undergraduate nursing students regarding paediatric pain management.

The researcher could not find any studies conducted on KAP among undergraduate nursing students regarding paediatric pain management in South Africa. Hence, it is crucial to investigate the current level of knowledge, attitudes, and practices of undergraduate nursing

students regarding paediatric pain management and identify areas for improvement to ensure optimal care for paediatric patients in line with the current scope of practice for professional nurses.

1.4 Study question and aim

The research question was: What are the KAP of undergraduate nursing students regarding pain management in children at a university in the Western Cape?

The study aimed to describe the KAP of undergraduate nursing students regarding pain management in children at a university in the Western Cape.

1.5 Study objectives

The study objectives were to describe:

- The knowledge of undergraduate nursing students regarding paediatric pain management;
- The attitudes of undergraduate nursing students regarding paediatric pain management;
and
- The practices of undergraduate nursing students regarding paediatric pain management.



1.6 Significance of the study

The study significance is a statement of justification in which a researcher demonstrates why it is important to conduct the study; it includes implications for theory or practice (Pandey & Pandey, 2021).

There is a paucity of literature regarding KAP of undergraduate nursing students regarding pain management in clinical paediatric settings (Kusi Amponsah et al., 2019). The researcher considered it important to conduct this study due to this identified gap. The study findings will provide necessary information that could assist nurse educators, clinical educators and other stakeholders to optimise theoretical and experiential learning and teaching of nursing students

in paediatric settings and the translation thereof into practice, to ensure suitable pain management in children.

1.7 Operational definitions

Attitude

Attitudes refer to attributes such as respect, dignity, autonomy, compassion, responsibility and empathy, use of critical thinking and problem-solving skills (Wurjine & Nigussie, 2018). In this study, attitudes refer to the student nurses' behaviour and way of acting towards effective pain management. The attitude of student nurses was measured by asking the students to respond 'Yes' or 'No' to 17 questions regarding their attitude to paediatric pain management.

Knowledge

Knowledge refers to an organised structure of facts, relationships, experience, skills and insights that produce a capacity for action (Shand, 2021). In this study, knowledge is the degree to which nursing students understand aspects of pain in children and pain management procedures. Knowledge of nursing students was measured by asking students to respond 'Yes' or 'No' to four knowledge questions regarding paediatric pain management.

Nursing student

A nursing student refers to a person who is currently enrolled in a nursing program and is in the process of acquiring knowledge and skills to become a registered nurse (Mogale, 2012). A nursing student is expected to possess knowledge and a positive attitude about assessment and management of pain in paediatric patients and apply this knowledge in clinical practice under the supervision of registered nurse ensuring paediatric patients receive optimal pain relief. In this study a nursing student is a fourth-year undergraduate student enrolled in a Bachelor of Nursing degree, in accordance with the South African Council of Nursing (SANC) regulations for nursing education leading to a qualification that confers on the holder the right to register as a nurse (general, psychiatric and community) and a midwife. In South Africa the

Bachelor of Nursing is an undergraduate nursing programme that is governed by Government Notice No. R.425 of 22 February 1985 (Fadana & Vember, 2021).

Paediatric patient

A paediatric patient is a patient who is known to be less than 16 years of age (WHO, 2014). In this study a paediatric patient is a child between the ages of 0 and 12 years who is suffering from pain.

Pain

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage (Laprise, 2016). In this study, pain refers to a condition in which a child experiences and reports severe discomfort or an uncomfortable feeling.

Pain management

Pain management is the use of one or more methods from a range of interventions designed to relieve perceived discomfort and allow patients to function at a level they deem acceptable (Hooten et al., 2017). In this study, pain management consists of the use of the nursing process by a student nurse such as the assessment, planning, implementation and evaluation of pain in children in combination with the use of pharmacological and non-pharmacological approaches.

Practices

Practices have been defined as the continuous exercise of a profession (Kiwanuka & Masaba, 2018). In this study practices reflect all the roles and activities undertaken by nursing students to provide proper pain management in children. Practices of student nurses were measured by asking student nurses to respond to questions measuring their practices in the domains of

pain alleviation (7 questions), pain assessment (6 questions) and non-pharmacological measures (11 questions).

1.8 Outline of the thesis

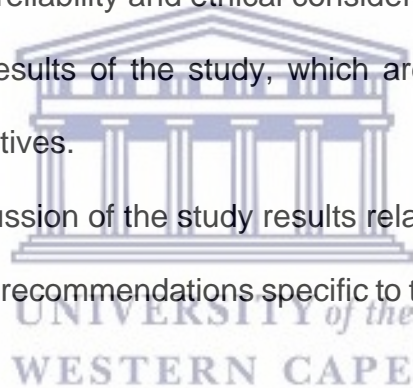
Chapter One: Presents the background to the study, including the problem statement, aim and objectives, the study significance and the operational definition of terms.

Chapter Two: Presents the literature review related to KAP regarding paediatric pain management. It also includes a discussion on knowledge of paediatric pain assessment, nursing management of paediatric pain, and knowledge of pharmacological and non-pharmacological approaches.

Chapter Three: Describes the methodology of the research study. This includes the study design, study setting and the population of the study as well as the sampling and data collection procedures. Validity, reliability and ethical considerations are also discussed.

Chapter Four: Presents the results of the study, which are organised into three sections according to the research objectives.

Chapter Five: Presents a discussion of the study results related to the literature. A summary of the study results, conclusion, recommendations specific to the study and limitations are also presented.



1.9 Conclusion

Effective paediatric pain management is essential to ensure quality and ethical care. Nursing students must therefore be competent when practising independently in paediatric settings to ensure that they provide optimal and effective pain management to children. This study described the KAP of undergraduate student nurses regarding paediatric pain management in order to provide information that could assist nurse educators, clinical educators and other stakeholders to optimise necessary information provided to guide nursing students when they are working with children in pain. In the next chapter, Chapter Two, a literature review on the topic is provided.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a literature review linked with pain in children, pain management in paediatric nursing, nurses' knowledge of paediatric pain management, knowledge of pain assessment in children, knowledge of pharmacological and non-pharmacological approaches, and attitudes and practices towards pain management in children. Finally, barriers to optimal pain management in children are discussed.

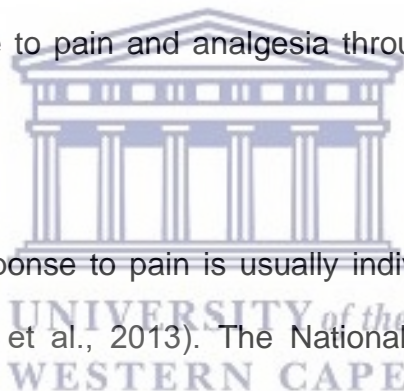
2.2 Pain in children

There are a multitude of definitions of pain, which makes the issue very controversial. The most accepted is that of the International Association for the Study of Pain (IASP): "an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage" (Dezfouli & Khosravi, 2020, p. 292). In human ethics and law, pain is recognised as a serious scourge of humanity; therefore, its management is a fundamental human right (Dezfouli & Khosravi, 2020).

Pain in children has historically been caused by medical treatment, procedures and illnesses. It has generally been under-treated and under-recognised (Aziznejadroshan et al., 2020). Pain in children usually has three broad categories – somatic, visceral and neuropathic (Mazur et al., 2013). Somatic pain is often caused by tissue damage or inflammation, which includes burns, fractures, infections and various inflammatory conditions (Mazur et al., 2013). Visceral pain is always caused by inflammation or damage to the internal organs, usually poorly located or referred to distant locations, and includes appendicitis, a rapid increase in hepatomegaly,

intestinal distension or gastritis (Mazur et al., 2013). Finally, neuropathic pain is usually caused by inflammation, injury, or dysfunction of the peripheral or central nervous systems (Mazur et al., 2013).

Children judge the strength and discomfort of pain in association with the types of pain they have experienced. Their understanding and ability to communicate pain depends on their stage of development, and the nature and diversity of their previous experiences of pain (Waisundara et al., 2021). Infants do not have the ability to say that they are suffering, and especially older children may be reluctant to say that they suffer because they might be afraid of the consequences of such a notion (Waisundara et al., 2021). In these situations, it is recommended by the Association of Paediatric Anaesthesiologists (2008) that pain management be planned considering the age and the stage of development of the child, as well as differences in response to pain and analgesia throughout childhood (Owens et al., 2014).



Pain is subjective and the response to pain is usually individual and modified by different experiences of life (Świeboda et al., 2013). The National Service Framework (NSF) for Children in the United Kingdom emphasises that adequate pain management is central to the quality of care for children and that staff education and training is of paramount importance to ensure best practices (Owens et al., 2014). Therefore, healthcare professionals in paediatric settings as well as in other units have a responsibility to reduce pain and anxiety as much as possible while maintaining the safety of paediatric patients.

2.3 Pain management in paediatric nursing

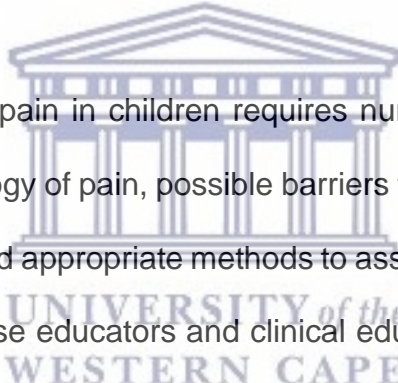
Paediatric pain management is an essential aspect of nursing education that fits in with the theoretical and clinical outcomes of a Bachelor programme in nursing (Aydın & Bektaş, 2021). Theoretical education on pain management provides nursing students with the necessary

knowledge and understanding of the biological, physiological, and social factors that influence pain, as well as the various pharmacological and non-pharmacological interventions available for managing pain (Aydın, & Bektaş, 2021). In clinical settings, nursing students have the opportunity to apply their theoretical knowledge to practice, to develop their assessment and management skills, and work collaboratively with healthcare professionals to provide holistic care to paediatric patients experiencing pain. Through clinical placements, nursing students can also develop their communication skills, including the ability to communicate effectively with children and their families, and to provide education and support on pain management strategies (Aydın, & Bektaş, 2021). Paediatric pain management aligns with the clinical outcomes of a Bachelor programme in nursing, which include developing the ability to assess and manage the physical and psychological needs of patients across the lifespan, as well as providing evidence-based, patient-centered care that is responsive to the needs and preferences of the individual patient (Aydın, & Bektaş, 2021).

Optimal pain management in children is an important aspect of nursing to promote recovery from any disease, relieve suffering, and prevent complications and the development of chronic pain (Ali et al., 2013). The World Federation of Societies of Anesthesiologists and IASP have both identified the reasons why pain in children is poorly managed in all regions of the world, and that special attention needs to be given to pain management in developing countries (Lourens et al., 2020). These reasons include lack of knowledge and awareness of pain management among healthcare professionals including nurses and physicians, inadequate training in paediatric pain management in medical and nursing schools, limited availability of appropriate pain management medications and equipment in many healthcare settings, fear of adverse effects and addiction to pain medications in children, misconception about the nature and perception of pain in children, communication barriers including language and cultural differences, between healthcare providers and patients and their families and also limited resources and financial constraints in many healthcare systems (Lourens et al., 2020).

This fact only demonstrates that nurses or nursing students need to focus on pain management in children, as better pain management becomes a fundamental part of patient quality care (Lourens et al., 2020).

The World Health Organization (WHO), through its normative guidelines on the treatment of pain of all types, is always committed to facilitating the adequate treatment of pain through the legitimate use of opioid analgesics (Stanley & Pollard, 2013). The WHO recommends two stages of analgesic treatment, depending on the level of severity of the child's pain (mild, moderate or severe) (Hauer et al., 2014). The first stage (mild pain) requires the administration of a non-opioid agent together with an adjuvant, and the second stage (moderate to severe pain) requires the administration of an opioid with a non-opioid and an adjuvant agent (Hauer et al., 2014).

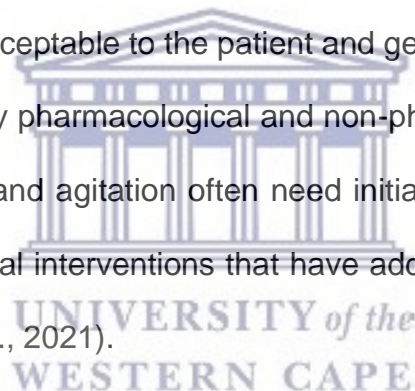
The logo of the University of the Western Cape, featuring a classical building facade with columns and a pediment, with the text 'UNIVERSITY of the WESTERN CAPE' below it.

Better nursing management of pain in children requires nurses to be knowledgeable about pain mechanism, the epidemiology of pain, possible barriers to effective pain relief, commonly encountered pain conditions, and appropriate methods to assess and alleviate pain (Uwimana et al., 2020). In this regard, nurse educators and clinical educators must play a fundamental role while facilitating better acquisition and use of pain management competencies by nursing students as the next generation of nurses (Uwimana et al., 2020).

Pain management in paediatric nursing generally includes the entire nursing process, such as assessment, planning, implementation and evaluation (Cahyani et al., 2018). Best practices for pain management in children include a comprehensive pain assessment and exploration of the child's beliefs and knowledge and stage of understanding about pain and its management (Hroch, 2017). The assessment of pain in children can be done through different measures, such as self-reported, behavioural or psychological (Heale & Twycross, 2015).

However, a contributing factor to unresolved pain in children is the fact that few pain assessment scales are validated specifically for the Paediatric Intensive Care Unit (PICU), and more of them take into account the whole complexity of the pain survey in younger children (Waisundara et al., 2021).

The planning and implementation stage in paediatric pain management is essential, as it allows nurses and nursing students to use their decision-making and problem-solving skills to design an individualised care plan for a child in pain (Heale & Twycross, 2015). During planning, nurses or nursing students must also set priorities based on several assigned nursing diagnoses, including a variety of proposed interventions. In setting priorities, the professional nurse and nursing student must meet the child's most important needs and organise continuous activities (Heale & Twycross, 2015). Pain management in children is a relief of pain to a level that is acceptable to the patient and generally includes two basic types of nursing interventions, namely pharmacological and non-pharmacological (Ali et al., 2013). Patients who experience pain and agitation often need initial drug therapy to manage pain, followed by non-pharmacological interventions that have additional value and can reduce or stop the pain (Waisundara et al., 2021).



Non-pharmacological interventions to relieve pain in children consist of a variety of approaches that do not require the use of medication but make pain more tolerable and give children a sense of control over the situation (Efe et al., 2013). Inadequate treatment with analgesics and non-pharmacological pain relief interventions remains the underlying reason for under-treatment of pain in paediatric patients (Cahyani et al., 2018).

Better pain management has many advantages. It reduces the child's pain and also accelerates recovery, increases mobility, improves sleep, increases parental satisfaction and

reduces the hospital stay as well as the number of hospital readmissions (Cahyani et al., 2018). It is therefore important to describe KAP among nursing students regarding pain and its management in paediatric patients. The findings will help initiate an attitude change to improve pain management in paediatric patients.

2.4 Knowledge of paediatric pain management

The professional nurse's knowledge of pain and its management is always described in terms of an absence or lack of knowledge and serves as an explanation for poor pain management (Lourens et al., 2020). Problems with poor pain management in children can stem from a lack of knowledge or understanding, or a lack of training. However, in many cases the problem is not only that of lack of knowledge, but also of knowledge translation, which refers to the adoption and application of knowledge in practice with an emphasis on overcoming barriers (Lourens et al., 2020).

Most nurses consider physical indicators to be important in pain management, but in this regard, research has revealed a lack of compliance between perceived importance and practice (Heale & Twycross, 2015). In Indonesia, a study conducted by Mediani et al. (2019) demonstrated that effective pain management in children has not been instituted in many Indonesian hospitals for various identified reasons. These include insufficient basic training programmes for nurses, lack of knowledge about pain management, difficulty of healthcare providers in decision making about pain management, and misconceptions about the use of opioid analgesics.

Despite the implementation of educational strategies to increase knowledge among healthcare professionals, other barriers responsible for inadequate pain management in children have been identified and include negative attitudes, lack of interprofessional skills, poor teamwork, inadequate leadership, and lack of resources (Mbugua & Chemoiywa, 2017).

According to a study conducted by Miftah et al. (2017) on nurses working in public hospitals in Northern Ethiopia, pain management in children was not addressed due to a lack of knowledge about opioids, often combined with negative attitudes towards prescribing, and a lack of pain assessment skills and communication.

In addition, 55% to 90% of nurses believed that children exaggerate their pain reports, which is a barrier to paediatric pain relief (Miftah et al., 2017).

Pain management in children was not explicitly addressed in most national responses to the opioid-related crisis, raising concerns that measures to control opioid use in adult pain management may be inappropriately applied to young children (Lourens et al., 2020).

2.5 Knowledge of pain assessment in children

Assessment of pain is essential and is the first step in the process of pain management in children (Mbugua & Chemoiywa, 2017). Failure to assess pain in children results in minimal, if any, pain management (Mbugua & Chemoiywa, 2017). However, to conduct better pain management in children, continuous assessment of the presence and determination of pain severity are necessary (Mbugua & Chemoiywa, 2017).

There are three types of pain assessment methods currently in use. These include self-report, behavioural, and physiological measures (Santos et al., 2018). Self-reported measures (what children say) are most effective and valid but require some level of cognitive and language development for the child to describe pain and consists of an assessment using the Wong-Baker Face Scale (Santos et al., 2018). When self-reporting is not possible, especially in children with whom communication is difficult, a behavioural scale (what children do) should be used to assess pain, and consist of an assessment of the Faces, Legs, Activity, Cry, and Consolability Scale (FLACC) (Santos et al., 2018). Although the observed reports of pain and distress provide useful information, especially for young children, they depend on the people who complete the report (Santos et al., 2018). Verbal and non-verbal reporting requires a

certain level of cognitive and language development for the child to understand and give reliable answers (Santos et al., 2018). Physiological measures (how the body reacts) are also useful and include assessment of heart rate, respiratory rate, oxygen saturation, blood pressure, palmar sweating, and sometimes neuro-endocrine responses (Santos et al., 2018). Despite the available literature on pain assessment, pain scales are rarely used and even when they are used nurses sometimes do not know how to interpret them and therefore intervene inappropriately, resulting in insufficient pain relief (Dezfouli & Khosravi, 2020). Several studies were conducted to describe the knowledge of nurses about pain assessment in children. One study revealed that assessing pain in children presents certain difficulties that lead to the creation of many age-specific pain management tools and scores (Dezfouli & Khosravi, 2020). Another study, by Mbugua and Chemoiywa (2017), reported that nurses do not have sufficient knowledge about pain assessment, particularly about the use of pain scales.

While better management of pain can lead to faster recovery and a shorter hospital stay, unrelieved pain can still lead to long-term physiological and psychological effects (Beckett et al., 2016). Therefore, health professionals, especially nurses and nursing students, must have the ability to detect symptoms and signs of pain in different age groups and to determine whether these symptoms are caused by pain or other factors.

2.6 Knowledge of pharmacological and non-pharmacological approaches

Promoting comfort and pain relief in children is essential to nursing practice. In hospital settings, non-pharmacological measures are often used to facilitate the comfort of paediatric patients (Ali et al., 2013). Non-pharmacological interventions play a leading role in the management of pain in children, but pharmacological intervention is recommended if necessary, or a combination of the two (Andersson et al., 2022).

Non-pharmacological interventions for pain relief involve the use of a variety of techniques, and therefore healthcare providers must be able to use them in order to distract children from the procedure (Mbugua & Chemoiywa, 2017).

However, many barriers to the use of non-pharmacological pain treatment in hospitals have been identified, including physician prescriptions, physician approval, patient compliance, and nursing knowledge and acceptance (Ali et al., 2013). Recent techniques in non-pharmacological pain management techniques have been classified into sensory (active and passive distraction in the form of images, computer games, positioning, heat or cold application, massage), psychological, and other interventions including music, belief, and spirituality (Andersson et al., 2022). It has been emphasised that parental involvement in paediatric pain management is also of crucial importance. Parents play an important role in how children deal with pain, as they can act as a coach using behavioural/cognitive techniques to comfort the child (Mbugua & Chemoiywa, 2017).

Drug-based treatment is part of a comprehensive approach, but it is always important to assess and classify pain before making a decision about what type of treatment to adapt to the individual (Bergman et al., 2022). Although there is a limited number of analgesic drugs that can be safely used in children, the WHO recommends in its latest guidelines providing adequate analgesia with two groups of analgesics, depending on the level of severity of the child's pain (Mazur et al., 2013).

Pharmacological interventions in pain involve the use of non-opioid analgesics, including drugs such as paracetamol (acetaminophen), and non-steroidal anti-inflammatory drugs (NSAIDs) such as acetylsalicylic acid (aspirin) and ibuprofen. Opioid analgesics are often opium derivatives and include drugs such as morphine, codeine, and methadone (Waisundara et al., 2021). The dose of opioids that effectively relieves pain varies greatly from child to child and in the same child at different times, and should therefore be based on assessing the severity of the child's pain (Mazur et al., 2013). The WHO supports the inclusion of morphine in the list

of essential medicines to relieve moderate to severe pain in children (Mazur et al., 2013). The administration of analgesics according to the WHO analgesic ladder is one of the recommended methods (Kholowa et al., 2017). According to WHO recommendations, medicines should be given to children by the simplest, most effective and painless route, making oral formulations the most convenient and least expensive route of administration (Kholowa et al., 2017).

The choice of alternative routes of administration, such as intravenous, subcutaneous, rectal or transdermal administration when oral is not available, should be based on clinical judgement, availability and patient preferences; the intramuscular route of administration is painful and should be avoided (Kholowa et al., 2017). Therefore, due to the attention given to the available research, a combination of pharmacological and integrative non-pharmacological treatment is indicated in the management of pain in children (Waisundara et al., 2021).

2.7 Barriers to optimal pain management

Despite the availability and use of pain drugs, several barriers that prevent healthcare professionals from achieving optimal management of pain were identified. These include patient factors, personnel factors, system factors and drug factors (Waisundara et al., 2021). Identifying these barriers and working to resolve them will lead to better management of pain, allowing children to gain trust in healthcare providers.

2.7.1 Patient factors

There are differences in patients' responses to pain and pain management strategies, making it necessary to understand the particularity of each patient suffering from pain. The patient's response to pain is always influenced by their previous experiences of pain, the nature of the injury, and the presence of underlying conditions that cause communication difficulties (Waisundara et al., 2021). The psychosocial development of children and inability to communicate their needs is also a barrier to better pain management. Paediatric patients'

reluctance to communicate their pain is often due to their increased anxiety about how healthcare providers will treat their pain (Elias, 2019). In some cultures, such as Hispanic and Korean, children learn to be tough, which affects their willingness to communicate their pain (Elias, 2019). In addition, it has been found that attitudes and beliefs generally prevent optimal management of pain (Waisundara et al., 2021).

Beliefs and attitudes do not only affect the patient's pain communication and adherence to the analgesic regimen but also negatively impact pain management outcomes. Beliefs and attitudes were found to be factors that hinder better pain management, and they include addiction fear, concerns about analgesics use (side-effects), communication difficulties due to age, language, cultural traditions or other illnesses, inadequate adherence to analgesics, and inadequate adaptation to the ability to control pain in general (Waisundara et al., 2021).

2.7.2 Personnel factors

For nearly 30 years studies have demonstrated the inadequacies in the management of pain in hospitals and pointed the finger at professionals who lack sufficient knowledge and proper attitudes. Specific gaps were identified as due to inadequate knowledge, and lack of assessment, documentation and willingness to prioritise pain. These then become personal obstacles to proper pain management (Wuni et al., 2020).

In Jordan, research on nurses that assessed knowledge and barriers to better pain management found that barriers to better pain management in children include heavy workload, lack of time, the inability of patients to communicate, limited nursing authority, limited nurse-patient relationships, and disruption of pain management interventions (D'emeh et al., 2016). Other barriers were lack of time for health education with the patient, insufficient time to provide non-pharmacological pain relief measures, staff being reluctant to administer opiates, and fear of the side-effects or pain medication addiction (D'emeh et al., 2016).

In a hospital setting the management of pain relies on trained nurses, who often follow the doctor's prescriptions. In this case, good knowledge of the pharmacological agent, its mode of action, the duration of the effect, the recommended dose and adverse side-effects are very important but difficult to achieve (Waisundara et al., 2021).

In Ghana, a cross-sectional study conducted on knowledge, practices and barriers to paediatric pain management among nurses demonstrated that the paediatric population still suffers from unresolved pain, and that factors that prevent healthcare providers from optimising pain management include staff shortage, a huge workload, delays in the availability of analgesics, inappropriate timing of premedication, and low priority given to pain management (Wuni et al., 2020).

The ability to recognise and quantify pain is critical to the success of pain intervention. Pain is often not adequately treated due to barriers such as a lack of recognition and detection, leading to underreporting, especially in patients with communication difficulties (Waisundara et al., 2021). Accurate recognition and quantification of pain in patients with difficulties in communication depends on the expertise of the practitioner or care provider, as in most cases paediatric patients communicate pain using cues such as crying (Waisundara et al., 2021). In addition, an error in pain recognition and quantification could result from the inability of a patient to express pain, even after experiencing a potentially painful episode, or from the patient not showing constant signs of pain (Waisundara et al., 2021).

2.7.3 Institutional and healthcare system factors

Pain management in clinical practice has been problematic for many years. Barriers related to healthcare facilities and systems have been identified and include a lack of clearly defined standards and pain management protocols/guidelines, and limited access to pain specialists and analgesics (Al-Mahrezi, 2017).

In Ghana, research conducted on barriers to better pain management in children has highlighted that several factors such as insufficient orders for medication by doctors, inappropriate timing of pre-medication, low priority given to pain management, and delays in the availability of analgesics are the main barriers that prevent health professionals from optimally managing pain in children (Kusi Amponsah et al., 2019).

Research conducted in countries with limited resources on nurses' knowledge, attitudes and perceived barriers regarding pain management emphasised that several barriers exist that are related to institutional settings that hinder pain management in children, and include overcrowding of the emergency settings, lack of availability of protocols and guidelines for pain management and assessment, nursing workload, and a lack of pain assessment tools (Kahsay & Pitkääjärvi, 2019). It was also found that in cases of overcrowding, paediatric patients may be prioritised based on pain pathology rather than pain severity, further delaying the administration of analgesics (Kahsay & Pitkääjärvi, 2019).

2.7.4 Drug factors

The choice of medications for pain management is influenced by its effectiveness and cost, the patient response and practitioner preference. Different classes of drugs are combined to maximise pain relief (Waisundara et al., 2021).

Better pain management depends on the choice of medication, its effectiveness, dose, delivery technique, adverse effects, time and consistency of intervention (Waisundara et al., 2021). However, pain management is often ineffective because of so many factors, such as underdosing, poor technique of administration, and inconsistency in the timing of administration (Wuni et al., 2020).

In Ghana, a cross-sectional study on paediatric pain management knowledge, practices and barriers among nurses also found that ineffective pain management could result from many shortcomings, such as poor medication prescriptions by doctors, inappropriate timing of

premedication, low priority given to pain, and delays in the availability of analgesics (Wuni et al., 2020).

2. 8 Attitudes and practices towards pain management in children

Attitudes refer to the intention to behave in a certain way in certain situations and determine the motivation to take an action (Kiwanuka & Masaba, 2018). Knowledge and attitudes of nurses towards pain management in children should be assessed, and any gaps identified should be addressed to optimise pain management in children (Ali et al., 2013). Nurses' attitudes towards evidence-based pain management are likely to affect their ability to achieve desired patient outcomes (Ali et al., 2013). For many years nurses' negative attitudes toward the pain experience and pain management in children have been a barrier to better management of pain (Kiwanuka & Masaba, 2018). Children still endure unnecessary pain because of beliefs such as the idea that children do not feel as much pain as adults, or that an active or sleeping child cannot suffer (Kiwanuka & Masaba, 2018).

Heale and Twycross (2015) also emphasised that experiences of pain in children were not recognised because of misconceptions like children could not feel pain at the same level as adults. In addition, some practitioners also express an attitude that pain is not life-threatening, and therefore the management of it is not a priority (Lourens et al., 2020). Underestimation of pain, knowledge translation, practitioner beliefs, and negative attitudes were identified as barriers to better management of pain in children (Lourens et al., 2020).

Pain in children can be poorly managed because of the influence of different cognitive stages of development on a child's perception of pain, and the difficulty of accurately assessing pain in preverbal and nonverbal infants, young children, and children with complex disabilities (Hroch, 2017). Research conducted by Mieronkoski et al. (2020) on the development of a pain-intensity prediction model using facial expression revealed that individual characteristics such as age, education, experience, workplace, and area of expertise did not have an impact

on nursing students' attitudes towards pain. In the same study, Mieronkoski et al. (2020) also stipulated that prior experiences of nursing students with and of pain influence their attitudes toward pain and dealing with it before they attend nursing school.

Research conducted in Taiwan revealed that nursing students possess inadequate knowledge and negative attitudes towards pain management in newborns. The study recommended enhanced training to tackle these deficiencies and promote better pain relief practices in sick children (Patnaik et al., 2017). Furthermore, it has been shown that certain nurses exhibit a poor self-image and negative feelings towards pain medication, resulting in delaying their administration for as long as possible (Mbugua & Chimojywa, 2017). Overall, nurses do not prioritize the measurement and evaluation of pain, leading to medication administration decisions that do not correspond to the level of pain felt by the child (Mbugua & Chemoiywa, 2017).

2.9 Conclusion

This chapter included literature that focused on nurses' KAP related to pain management in children. Consistent with the objectives, the literature indicates that pain management in children continues to be inadequate and that children continue to experience moderate to severe pain. This has been attributed to, among other factors, negative attitudes, lack of knowledge about pain and inadequate pain assessment among nursing staff and students. The overall use of both pharmacological and non-pharmacological methods to relieve pain has also proven inadequate, despite the availability of guidelines and treatments.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

Chapter Three provides a detailed description of the research approach, design and method used to conduct the study. The chapter also provides a detailed description of the research setting, study population, sampling strategy, research tool, pilot testing, methods used to collect data, data analysis, validity and reliability, and ethical considerations applied.

3.2 Research approach

A quantitative research approach was used to conduct the study. Quantitative research is a scientific investigation that includes both experiments and other systematic methods that emphasise control and quantified measures of performance (Hoy & Adams, 2015). The quantitative approach allows the researcher to draw conclusions based on numerical data from the study, which are quantified and analysed using mathematical methods.

A quantitative descriptive research approach was used to describe the KAP of undergraduate nursing students regarding paediatric pain management at a university in the Western Cape. This approach was appropriate for this study because it allows the researcher to collect quantifiable information that is used to describe the characteristics of a population being studied.

3.3 Research design

A research design refers to the strategy we have chosen to integrate the different components of the study in a coherent and logical way, thus ensuring that we will effectively address the research problem. It is the master plan specifying the methods and procedures for data collection, measurement and analysis (Arezina, 2018).

The study used a quantitative descriptive survey design. Descriptive designs are used to collect information about variables without changing the environment or manipulating variables, so the focus is not on cause and effect (Baker, 2017). Descriptive designs can also be employed to develop theory, identify problems with current practices, justify current practice, make judgements or determine what other people are doing in similar situations (Baker, 2017).

Therefore, a quantitative descriptive survey was appropriate for this study, because the survey method attempts to collect quantifiable information for statistical analysis from a larger sample size that is representative of the population of interest in a limited time. The latter also gives participants a sense of anonymity, as the data collection format is independent of the researcher.

3.4 Research setting

The research setting refers to a specific location from which data is collected. This study was conducted at a selected nursing school at a university in the Western Cape province of South Africa. The School of Nursing chosen for this study has the largest undergraduate residential nursing degree course in the country. The researcher became interested in this School of Nursing setting because it offers a four-year Bachelor of Science in nursing qualification that allows nursing students to practice as a general nurse after registration with the SANC.

3.5 Population

Population is also defined as a group to which the researcher would like the results of a study to be generalised; it includes all individuals with certain specified characteristics (Pandey & Pandey, 2021).

The target population is the population to which the researcher, ideally, would like to generalise results (Pandey & Pandey, 2021). Therefore, the target population of interest in this study included all undergraduate nursing students in their fourth year of enrolment in the

Bachelor of Science in Nursing at a university in the Western Cape, and who have completed clinical placement in paediatric units. The students had to be in their fourth year since they would have had multiple opportunities to interact with paediatric patients and their families. In addition, it was expected that they also have gained considerable knowledge and experience in assessing and managing pain in children because are closer to transitioning to professional practice. The total population comprised 205 fourth-year nursing students.

3.6 Sampling and sampling strategy

Sampling is the process of selecting a number of individuals, particularly a sample of a population, so that individuals are representative of the larger group from which they were selected (Pandey & Pandey, 2021).

The study used an all-inclusive sampling technique involving all participants within the population of interest; the researcher included the entire population (N = 205) of fourth-year nursing students. Fourth year undergraduate nursing students are the population of choice for this study because they have already completed clinical placement in paediatric units. The reason why the study used an all-inclusive sampling method is that the survey attempts to collect data from a small population that is easily accessible (Dison, 2019). Therefore, the criterion for inclusion of participants was the entire population, as the researcher expected that not all nursing students would participate in the online survey.

The study inclusion criterion was all fourth-year nursing students who have completed clinical placement in paediatric units. There was no specific exclusion criterion. From the total number of participants (N = 205) that was targeted to be evaluated, only 87 completed the online questionnaire. Therefore, the response rate was 42.4%. This is consistent with average response rates reported in the scientific literature (LoBiondo-Wood & Haber, 2021).

A meta-analysis of 39 studies comparing the response rate to online and postal surveys found that the rate of responses in online surveys was on average 10% lower than the rate of

responses by post. The reason for this is that some respondents may not be familiar with online surveys and others worry that the information provided online will not remain private (LoBiondo-Wood & Haber, 2021). In this study an online survey was the most appropriate method to collect data, as data collection took place during the Covid-19 pandemic.

3.7 Instrument

It is important that the researcher justify the use of the instrument selected in the research study (Ingham-Broomfield, 2014). An instrument is defined as any procedure or device for systematic data collection (Pandey & Pandey, 2021). The instrument that was used in this study is an existing instrument used by Mathew et al. (2011) in a previous study to measure KAP of pain management among paediatric intensive care nurses in a developing country. The instrument was reused in this study after permission was obtained from the original author. The questionnaire is structured according to concepts such as knowledge, attitudes, and practices, and took into consideration the objectives of the study. The existing questionnaire used in this study comprised of three sections consisting of 48 items. A dichotomous measurement scale was used to measure the KAP of undergraduate nursing students regarding pain management in children. A dichotomous response format is where the question asks for a 'Yes' or 'No' response (LoBiondo-Wood & Haber, 2021). To ensure the relevance of the research instrument, a research expert (a Professional nurse academic with a background in epidemiology) and a statistician were also consulted.

Section A included questions associated with the demographic characteristics of the student nurses, such as age, gender, duration of placement in paediatrics, lectures on pain management, lectures on pharmacology, and sufficient instruction in paediatric pain management.

Section B included questions associated with knowledge and attitudes regarding paediatric pain, and section C included questions related to aspects of application of practice while


dealing with the complexities of pain in children (Table 1). With respect to questions related to practices (section C), there were three sub-sections: practices of pain alleviation, practices of pain assessment, and practices of non-pharmacological measures.

For sections A and C, some additional questions were added by the researcher with the assistance of the supervisor, based on the current existing literature on KAP regarding paediatric pain management. This also ensured that the questions were contextualised.

Therefore, for section A, some demographic questions such as age, gender, and year level were added. For section C, questions such as “I do not know how to assess if a child feels pain” for sub-section pain assessment scale and “music” for sub-section non-pharmacological methods were added.

The online survey was in English, as this is a common language for all respondents and the language of instruction at the university.

Table 1: Questionnaire domains



Objective	Item in questionnaire
Demographic characteristics of student nurses: age, gender, year level, duration of placement experience,	Section A, Q1–4
Training in paediatric pain management (3 items): lectures on pain management, lectures in pharmacology, sufficient instructions	Section A, Q5.1–5.3
Knowledge questions (4 items)	Section B, Q6
Attitudes of student nurses regarding pain in children (17 items)	Section B, Q7
Practices of student nurses: practices of pain alleviation (7 items)	Section C, Q8
Practices of pain assessment (6 items)	Section C, Q9
Practices of non-pharmacological measures (11 items)	Section C, Q10

3.8 Pilot test

A pilot test is a small-scale study done before conducting the full study; its purpose is to reveal any imperfections in the research design (Fraser et al., 2018). Pre-data collection pilot testing

determines how long it will take to complete the questionnaire, whether the questions are clear to all respondents, and how respondents would respond. The function of the pilot test is to check if the tool is appropriate and understood in the context of this study (Ingham-Broomfield, 2014).

A pilot study was not conducted in this study because the researcher used an established, validated questionnaire that has been used in the context of a developing country such as South Africa. In addition, the population sample size was small, and the researcher expected not all nursing students to participate in the online survey.

3.9 Research rigour

3.9.1 Validity

Validity is the extent to which an instrument accurately measures what it claims to measure (LoBiondo-Wood & Haber, 2021). It is important to consider the validity of the data collection instrument to obtain useful results. With the data collection instrument of this study, the following two main types of validity needs were maintained: face validity and content validity.

Face validity is a confirmation of whether the constructed questionnaire is appropriate for the study respondents (Binti Daud, 2021). Face validity of the instrument was ensured by handing over the research instrument to a research expert with nursing experience for examination (Muhamad et al., 2017). The instrument was evaluated for face validity when the proposal was submitted to the university school and faculty structures, including the Ethics Committee.

Content validity indicates the extent to which the elements of an instrument are sufficiently representative of the entire domain that the instrument seeks to measure (Binti Daud, 2021). To ensure the validity of the content, the researcher used an established, validated questionnaire. The established, validated questionnaire was also submitted to an expert with experience in the nursing field for evaluation, and the supervisor checked it for any relevant additions or omissions. This confirmed that the instrument was measuring what it intended to

measure and ensuring that all relevant elements for the study were included, according to the research objectives.

3.9.2 Reliability

Reliability refers to the ability of an instrument to give the same results each time it is used, assuming that the measured variables do not change (LoBiondo-Wood & Haber, 2021). An instrument is always considered reliable if it is used to collect data in similar circumstances over time and reveals the same results (Heale & Twycross, 2015).

As mentioned before, the instrument that was used in this study is an existing instrument that has been used by another researcher in a previous study. Cronbach's alpha measurement was used to test instrument reliability and internal consistency. The value of Cronbach's alpha must be at least 0.7 and above for a new and existing instrument. Since the level of measurement for the KAP scales was dichotomous, the Kuder-Richardson Formula 20 (KR-20) was used to measure the internal consistency.

The KR-20 coefficient is the estimate of homogeneity used for instruments that have a dichotomous response format (LoBiondo-Wood & Haber, 2021). The interpretation is the same as for the Cronbach's alpha. The instrument consisted of 48 items in six domains: training and experience (3), knowledge (4), attitude (17), practices of pain assessment (6), practice of pain alleviation (7), and practices of non-pharmacological measures adopted for pain alleviation (11). The items were coded as 'Yes=1' and 'No=0'.

For the knowledge domain, questions 3 and 4 (infants perceive less pain and infants/children forget pain faster) were recoded, and for the attitude domain, the questions related to the following procedures were recoded: application of sticking tapes, squeezing of muscles, application of spirit swab, and convulsions. For the pain assessment scale, the last question related to not knowing how to assess pain was not included in the scale, as this was an additional question that was added.

As seen in Table 2, only the practices of non-pharmacological measures had an internal consistency value of more than 0.7. Other scales did not have acceptable reliability measures. Low reliability values might be due to the dichotomous responses, and Likert scales might have yielded better reliability values.

Table 2: Reliability of questionnaire scales

Scale	Kuder-Richardson Formula
Knowledge (4 items)	0.5
Attitudes (17 items)	0.64
Practices of pain alleviation (7 items)	0.3
Practices of pain assessment (5 items)	0.5
Practices of non-pharmacological measures (11 items)	0.73

3.9.3 Data collection

Data collection is the accurate and systematic collection of information relevant to the specific research objective(s), questions or assumptions of a study (Pandey & Pandey, 2021). Prior to data collection, a letter of ethics approval and authorisation was obtained from the institutional Ethics Committee to conduct the study. At the same time, a permission request was submitted to the School of Nursing to gain access to the participants. Data collection tools included an online questionnaire created in Google Forms. An online questionnaire was chosen as the method of data collection due to the public health crisis that the country was experiencing due to Covid-19 and the fact that there was a moratorium on in-person research at the time.

Potential participants were sent an email that included both an online survey link and a participant information sheet. The information sheet featured within the email outlined the study's objectives and detailed the ethical precautions implemented to protect the dignity, rights, and welfare of the respondents. The survey was loaded onto an online platform and the students were only able to access the survey once they have given their consent. The survey created in Google Forms contained a question at the beginning that asked students if they consented before they completed the questionnaire.

The survey was available in English as it is a common language for all respondents, and it was loaded onto an online platform for completion on 15 June 2021. Students completed it until 5 August 2021. As part of the follow-up to the survey, the students' WhatsApp groups were identified as the most appropriate means of communication. With the help of their class representatives, participants received reminders to complete the questionnaire via these WhatsApp groups.

3.10. Data analysis process

Data includes information obtained from the data collection process, and analysis is the systematic organisation and synthesis of research (LoBiondo-Wood, 2021). Out of 205 possible respondents, 87 completed the questionnaire online. There were no irregularities in the responses provided and, therefore, no completed questionnaire was discarded. The data were classified according to their domains, and each completed online questionnaire was coded. The data file was imported from Google Forms into the Statistical Package for the Social Sciences (SPSS) version 26 program for analysis. Descriptive statistics were used to summarise and present the results.

Descriptive statistics help convert and reduce a large amount of data into an organised whole, allowing readers to understand it (Mishra et al., 2019). The analysis was performed using descriptive measures to generate frequencies and percentages. Frequencies and percentages were used to describe the categorical data. The frequency of a particular response, such as gender, age group, or student nurse responses on KAP was calculated using frequencies and percentages.

For the various KAP (pain alleviation, assessment and non-pharmacological) scales, scores were created by adding the individual response values after recoding the variables, as indicated in section 3.9.2. Since the reliability analysis indicated low-scale reliability, the inferential statistical results need to be interpreted with caution.

Associations between demographic characteristics (age, gender, placement duration, exposure to training) and dependent variables (KAP scores) were explored using non-parametric statistical analysis (independent-samples Kruskal-Wallis test and Mann-Whitney U test). The Kruskal-Wallis test is used when the original dataset consists of a nominal classified variable since the dependent variables were not normally distributed (Pallant, 2020). The Mann-Whitney U-test is used to test the null hypothesis that two samples are from the same population, or alternatively, if observations in one sample tend to be larger than observations in the other (Pallant, 2020). Spearman's r correlation was used to test for associations between knowledge, attitudes and practices. Spearman's r correlation is commonly used when you want to explore the strength of the relationship between two continuous variables (Pallant, 2020).

3.11 Ethical considerations

Ethical authorisation was sought from the Ethics Committee for the Humanities and Social Sciences and Research of the University of the Western Cape (see Annexure D). The researcher conducted the research study by adhering to the principles and processes of health research as prescribed by the guidelines of the Department of Health (South African National Department of Health, 2015).

Autonomy ensures the ability to deliberate about a decision and to act on that decision (South African National Department of Health, 2015). The researcher ensured autonomy by explaining to participants in the information leaflet that they have the freedom to participate or not in the research. In addition, participants were also informed that they could withdraw from the study at any time.

Beneficence is an obligation not to harm and to maximise potential benefits to research while minimising any potential harm to others (LoBiondo-Wood & Haber, 2021). The respondents in this study were treated in an ethical manner since their decisions to participate or not to

participate were respected. The questionnaire was short which allowed respondents not to spend a lot of time on it.

Nonmaleficence holds that there is an obligation not to inflict harm on others, which requires that the researcher minimises any risk of harm to the participants (South African National Department of Health, 2015). During participation, the researcher ensured that no discomfort, harm or exploitation could occur. Minimal risk was anticipated, and respondents were encouraged to complain about harm or discomfort caused by the study. None of the respondents raised any concerns.

Justice refers to the concept of fairness and equity (South African National Department of Health, 2015). Respondents to this study were selected and treated fairly and were asked to participate in the study voluntarily after adequate information was provided and they agreed to complete the questionnaire.

Informed consent means that the researcher must ensure that all participants gave their consent by agreeing to complete the online questionnaire, to provide evidence that the participant was voluntarily chosen to participate in the research project (South African National Department of Health, 2015). Before proceeding to the survey questions, respondents to this study were given an option on the questionnaire where they could choose whether or not to participate in the study, and they could also withdraw from the study at any time by not completing the questionnaire or informing the researcher not to use their data.

Privacy of research participants and confidentiality were strictly observed. The researcher emphasised every person has the right to confidentiality when taking part in the study, and the privacy of the participants was protected by giving consent before they started responding to the questionnaire. It was highlighted that information provided during the filling in of questionnaires is confidential. Participants in this study could choose where and when to complete the survey.

The electronic data is anonymous, and it is being password-protected. A copy is being stored on the secure University of the Western Cape Google Drive. Electronic copies of the data will be destroyed after five years and will be deleted from the computer. When disseminating results through publications and conference presentations, the identity of the university and the School of Nursing will remain anonymous.

3.12 Summary

This chapter outlined the methodology and design applied to describe the KAP regarding paediatric pain management among undergraduate nursing students at a university in the Western Cape. The setting and the population of the study, the research approach, sampling, research instrument, pilot study, data collection and analysis were described. The researcher explained how ethical considerations were applied. Chapter Four includes the results of the study according to the stated objectives.



CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the results of the study associated with the objectives of the research. The results are presented in three sections based on the research questionnaire. Section A included questions associated with the basic characteristics of the nursing student, such as age, gender, length of placement, lectures on pain management, lectures on pharmacology, and whether they received sufficient instruction on the topic of pain management in infants and children. Section B included questions associated with knowledge and attitude regarding pain management in infants and children, and section C included questions related to aspects of the application of practice while dealing with the complexities of pain in infants and children.

The data was imported directly from Google Forms into IBM SPSS version 26 and analysed with the help of the study supervisor. In this chapter, all the results of the study are presented in the form of frequency tables, graphs and bar graphs. Each table is accompanied by a brief description and interpretation of the results. A p value of <0.05 was used as the level of significance as this is considered a statistically significant threshold. All decimal values were rounded to the first decimal. Descriptive statistics (frequency, mean and standard deviation) were used to describe sample characteristics and non-parametric tests (Kruskal-Wallis and Mann-Whitney U) and Spearman's correlation were conducted to determine associations between demographic variables and the KAP of nursing students regarding paediatric pain management.

4.2 Response rate

The response rate refers to the number of people who responded to the questionnaire divided by the number of people in the expected sample size, usually expressed as a percentage (Hiltunen & Suuronen, 2019). The population of the study was all undergraduate nursing

students in their fourth year of training at a university in the Western Cape who had completed clinical placement in paediatric settings. Out of 205 nursing students, 87 completed the online survey. The response rate to the study was therefore 42.4%. The submitted online surveys were checked for completeness and consistency. All completed online surveys were used to conduct the analysis.

4.3 Section A: Demographic characteristics and training

Demographic data provided the socio-demographic characteristics and training of the study sample. The frequencies and percentages of the socio-demographic variables – age, gender, length of placement and education – are presented.

4.3.1 Age (n=87)

Most of the participants were between the ages of 15 and 20 years (n=57, 65.5%), followed by participants aged 20–25 years (n=14, 16.1%) (Figure 1).

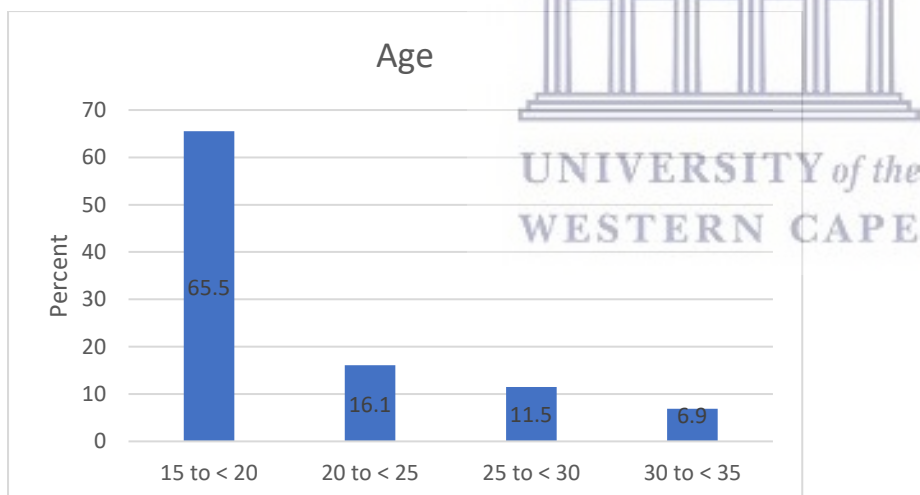


Figure 1. The age of participants

4.3.2 Gender (n = 87)

As indicated in Table 3, the majority of participants were females (n=78, 89.7%).

Table 3: Gender

	Frequency (n)	Percent (%)
Female	78	89.7
Male	8	9.2
Other	1	1.1
Total	87	100.0

4.3.3 Duration of placement (n=87)

As indicated in Figure 2, 26.4% (n=23) of the participants were placed in paediatric wards for 2to 4 weeks, followed by 25.3% (n=22) who were placed for between 4 and 6 weeks. These differences in duration to placement could be due to the limited availability of clinical placements in paediatric wards.

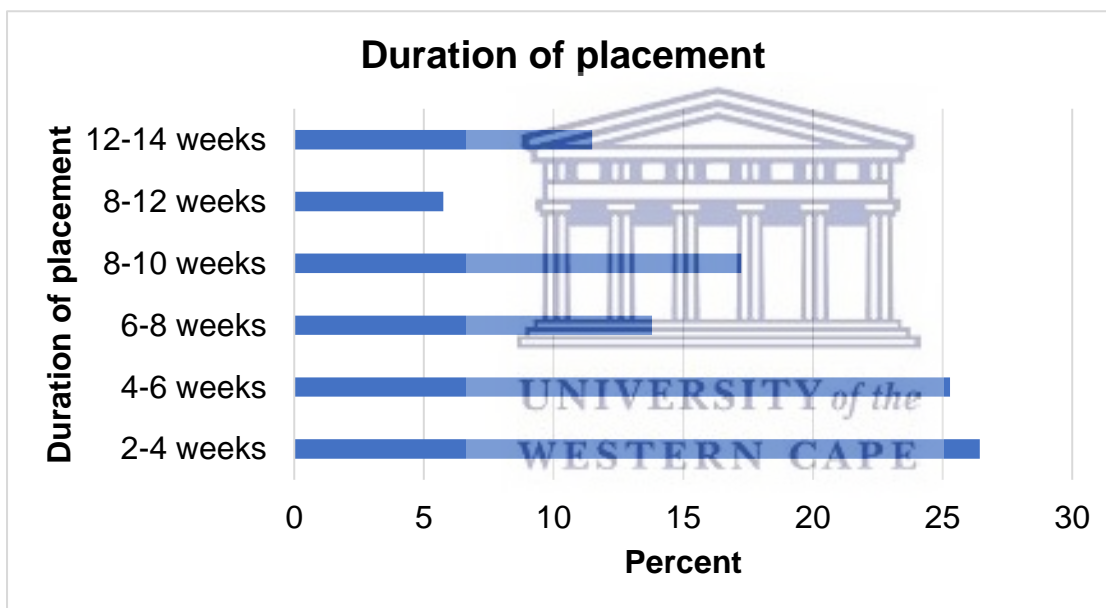


Figure 2. Duration of placement in paediatric wards

4.3.4 Training (n=87)

As indicated in Table 4, it is a concern that the majority of participants reported not having received sufficient instruction on pain management for infants and children (n=60; 69.0%). In addition, 63.2% (n=55) did not attend any lectures in pharmacology focusing on pain management for infants and children. Lastly, more than half of the participants (n=45; 51.7%) did not have any lectures that focused on pain management for infants and children. The

differences observed in this report, which pertains to instructions on pain management for infants and children among fourth-year nursing students from the same institution are concerning. These variations could be attributed to multiple factors, including the absence of certain students from lectures or their failure to fully capitalize on learning opportunities related to pain management for infants and children. Furthermore, it is plausible that not all lecturers accorded priority to pain management for infants and children during their lectures, and students might not have retained the instructions accurately, particularly if the topic was not emphasized in their studies.

Table 4: Training of participants (n=87)

Question	Yes (n, %)	No (n, %)
Have you had lectures which focus on pain management for infants and children?	42, 48.3	45, 51.7
Have you attended lectures in pharmacology which focus on pain management for infants?	32, 36.8	55, 63.2
Have you received sufficient instruction on the topic of pain management in infants and children to assist you when you work with infants and children in healthcare?	27, 31.0	60, 69.0

4.4 Section B: Knowledge and attitude questions

4.4.1 Knowledge about paediatric pain management

The first study objective was to describe the knowledge of student nurses regarding paediatric pain management at a university in the Western Cape. In order to achieve this, questions related to knowledge about paediatric pain management were asked, to which the respondents were requested to answer, 'Yes' or 'No'. Four items were used to assess and describe nursing students' knowledge of paediatric pain management.

As shown in Table 5, the majority of participants responded that infants and children have less perception of pain than adults (72.4%; n=63). Further, only 65.5% (n=57) of participants responded that infants aged less than a year perceive or experience pain. More than half of the participants (52.9%; n=46) believed that infants and children forget pain faster than adults.

Table 5: Knowledge of participants about paediatric pain management (n=87)

Question	Yes (n, %)	No (n, %)
Infants (age <1 year) perceive or experience pain?(correct answer=Yes)	57, 65.5	30, 34.5
Preterm infants perceive pain?(correct answer=Yes)	53, 60.9	34, 39.1
Infant and children have less perception of pain than adults.(correct answer=No)	63, 72.4	24, 27.6
Infants and children forget pain faster than adults.(correct answer=No)	46, 52.9	41, 47.1

4.4.2 Attitude regarding paediatric pain management

In assessing the attitude of student nurses regarding paediatric pain management, students were asked to respond 'Yes' or 'No' to 17 questions that describe the attitudes of student nurses regarding paediatric pain management.

As reported in Table 6, the majority of participants agreed that lumbar puncture is a procedure or event that causes infants and children to experience pain (77.0%; n=67), followed by perforation of the intestine (66.7%; n=58), insertion of a chest tube (64.4%; n=56), pneumothorax (62.1%; n=54), and blood sampling (60.9%; n=53). The lowest frequencies of respondents reported application of spirit swab (16.1%; n=14), and both application of sticking tapes (17.2%; n=15) and chest physiotherapy (17.2%; n=15), as painful.

Table 6: Attitude of participants about paediatric pain management (n=87)

Indicate whether the following procedures/events in infants and children cause them to experience pain	Yes (n, %)	No (n, %)
Endotracheal intubation	51, 58.6	36, 41.4
Endotracheal suctioning	32, 36.8	55, 63.2
Application of sticking tapes	15, 17.2	72, 82.8
Removal of sticking tapes	46, 52.9	41, 47.1
Insertion/removal of infant feeding tube	45, 51.7	42, 48.3
Urinary bladder catheterisation	46, 52.9	41, 47.1
Cystoscopy	35, 40.2	52, 59.8
Lumbar puncture	67, 77.0	20, 23.0
Squeezing of muscles during blood sampling	41, 47.1	46, 52.9
Blood sampling	53, 60.9	34, 39.1
Chest physiotherapy	15, 17.2	72, 82.8
Foreign body nose/ear removal	50, 57.5	37, 42.5
Application of spirit swab	14, 16.1	73, 83.9

Indicate whether the following procedures/events in infants and children cause them to experience pain	Yes (n, %)	No (n, %)
Insertion of chest tube	56, 64.4	31, 35.6
Convulsions	30, 34.5	57, 65.5
Pneumothorax	54, 62.1	33, 37.9
Perforation of intestine	58, 66.7	29, 33.3

4.5 Section C: Practice questions

The questions concerning practice included seven items for practices of pain alleviation, six items for practices of pain assessment and 11 items for non-pharmacological measurement practices, which were used to assess nursing students' practices with respect to paediatric pain management.

4.5.1 Practices of pain alleviation

As shown in Table 7, distraction was the method that the highest frequency of participants considered appropriate to practice for intravenous (IV) cannulation or blood sampling in a child (69.0%; n=60). The lowest frequencies of respondents indicated that sedation (12.6%; n=11), local anaesthetic infiltration (16.1%; n=14) and eutectic mixture of local anaesthetics (EMLA) application (17.2%; n=15) were appropriate practices.

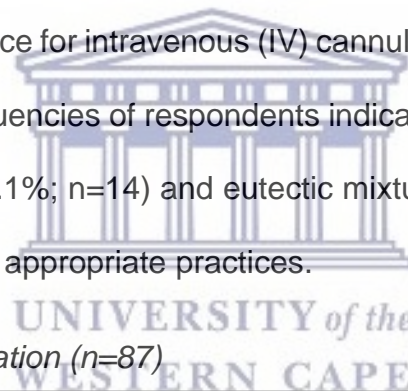


Table 7: Practices of pain alleviation (n=87)

For IV cannulation / blood sampling in a child, which of the following methods do you practice? Or would you consider to be appropriate practice?	Yes (n, %)	No (n, %)
Restraint	26, 29.9	61, 70.1
Distraction	60, 69.0	27, 31.0
Observing the child's face	32, 36.8	55, 63.2
Quick in – quick out	43, 49.4	44, 50.6
EMLA application (patch with local anaesthetic)	15, 17.2	72, 82.8
Local anaesthetic infiltration	14, 16.1	73, 83.9
Sedation	11, 12.6	76, 87.4

4.5.2 Practices of pain assessment

As shown in Table 8, the highest frequency of respondents admitted that observing the child's face would be an appropriate method to assess if a child feels pain (87.4%; n=76), followed by observing the child's posture and body movements (74.7%; n=65). The lowest frequency of respondents (2.3%; n=2) did not know how to assess for pain.

Table 8: Practices of pain assessment

What method(s) do you use to assess if a child is experiencing pain/or do you think would be appropriate?	Yes (n, %)	No (n, %)
Asking the parents	24, 27.6	63, 72.4
Asking the child	24, 27.6	63, 72.4
Observing the child's face	76, 87.4	11, 12.6
Observing the child's posture and body movements	65, 74.7	22, 25.3
Physiological measures	32, 36.8	55, 63.2
I do not know how to assess if a child feels pain	2, 2.3	85, 97.7

4.5.3 Practices of non-pharmacological measures

As shown in Table 9, the majority of participants agreed that touch and reassurance as non-pharmacological measures could be practised to reduce pain in infants and children (67.8%; n=59), followed by distraction (57.5%; n=50), and both positioning and providing company/play game with a child (56.3%; n=49). The lowest frequencies of respondents indicated hypnosis (5.7%; n=5) and preparatory information (11.5%; n=10).

Table 9: Practices of non-pharmacological measures (n=87)

Based on physiological measures such as heart rate or blood pressure, which of the following non-pharmacological measures do you think could be practised to reduce pain in infants and children?	Yes (n, %)	No (n, %)
Massage	46, 52.9	41, 47.1
Heat and cold applications	39, 44.8	48, 55.2
Positioning	49, 56.3	38, 43.7
Rubbing over the painful area	37, 42.5	50, 57.5
Hypnosis	5, 5.7	82, 94.3
Distraction	50, 57.5	37, 42.5
Relaxation and breathing technique	27, 31.0	60, 69.0
Touch and reassurance	59, 67.8	28, 32.2

Preparatory information	10, 11.5	77, 88.5
Music	27, 31.0	60, 69.0
Providing company/play a game with the child	49, 56.3	38, 43.7

4.6 Knowledge, attitudes and practices scores

As described in Chapter Three, the participants' responses were summed to create each of the KAP scores. Overall, mean scores were low (Table 10). The mean knowledge score was 2.2 (SD=1.2) out of a maximum of 4, and the mean attitude score was 9.1 (SD=3.1) out of a maximum of 17.

The practice scores also indicate that few participants practised the range of pain alleviation, assessment and non-pharmacological measures.

Table 10: Knowledge, attitudes and practices scores

	N	Minimum	Maximum	Mean	Std Deviation
Knowledge score	87	0	4	2.2	1.2
Attitudes score	87	3	17	9.1	3.1
Pain alleviation score	87	0	6	2.2	1.2
Pain assessment score	87	0	5	2.7	1.2
Non-pharmacological measures score	87	1	11	4.6	2.6

4.7 Inferential statistics

Although it was not part of the original objectives, some inferential statistics were assessed to explore relationships between variables. As stated before, scores were created for each of the KAP items, to assist with inferential statistics.

4.7.1 Correlations

Bivariate Pearson correlation was performed to assess for an association between the various KAP scores. The correlation coefficient is usually the measure of the association or relationship between two variables, measured on at least one interval scale, to determine

whether they are positively or negatively related or unrelated in any way (Obilor & Amadi, 2018). Two variables are associated if changes in one variable affect or influence changes in the other variable. When measuring the association or relationship between variables, we use correlation coefficients to express the degree of association or relationship. In other words, correlation coefficients measure the strength (direction and magnitude) of the association or relationship between two variables. Attitude had no significant correlation with knowledge ($r=0.1$, $p=0.5$), but had positive correlations of medium to large strength with practices of pain alleviation ($r=0.45$, $p<0.01$), practices of pain assessment ($r=0.5$, $p<0.01$) and practices of non-pharmacological measures ($r=0.6$, $p<0.01$). Knowledge was also not correlated with practices (See Table 11).

Table 11: Correlations between knowledge, attitudes and practices

			Correlations				
			Attitude	Knowledge	Pain alleviation	Pain assessment	Non-pharmacological
Spearman's rho	Attitude	Correlation coefficient	1.000	0.072	0.451**	0.510**	0.586**
		Sig. (2-tailed)	.	0.509	<0.01	<0.01	<0.01
		N	87	87	87	87	87
	Knowledge	Correlation coefficient		1.000	0.083	0.116	0.170
		Sig. (2-tailed)			0.444	0.285	0.116
		N			87	87	87
	Pain alleviation	Correlation coefficient			1.000	0.598**	0.639**
		Sig. (2-tailed)				<0.01	<0.01
		N				87	87
	Pain assessment	Correlation coefficient				1.000	0.698**
		Sig. (2-tailed)					<0.01
		N					87
	Non-pharmacological measures	Correlation coefficient					1.000
		Sig. (2-tailed)					
		N					

** . Correlation is significant at the 0.01 level (2-tailed).

4.7.2 Non-parametric tests

The nominal level variables were used as groupings to look for differences between biographical data groups and the various KAP scores. Non-parametric hypothesis testing was performed (e.g., Mann-Whitney U if there were two groups and Kruskal-Wallis for more than two groups).

The distribution of attitudes, knowledge and practices scores were the same across categories of age (independent-samples Kruskal-Wallis test, $p > 0.05$). Similarly, there was no difference in the distribution of scores across categories of gender (independent-samples Kruskal-Wallis test, $p > 0.05$). The KAP scores also did not differ significantly across categories of duration of placement (independent-samples Kruskal-Wallis test, $p > 0.05$).

Concerning training, no differences were found in the attitudes and practice scores across the categories of whether participants had lectures in pain management and pharmacology or perceived the instruction as sufficient (Mann-Whitney U test, $p > 0.05$). However, the knowledge score differed across categories of whether the participants perceived that they had sufficient instruction on the topic of pain management in infants and children (Mann-Whitney U test, $p = 0.04$).

In Figure 3 it can be seen that the participants who answered 'No' had a higher mean knowledge score (2.30 vs 2.11). This may be an accidental finding with little clinical/educational significance, as the mean scores for both groups were relatively low. In addition, there was more variance in the scores of the group that indicated that they received insufficient instruction, with a range of 0 to 4.

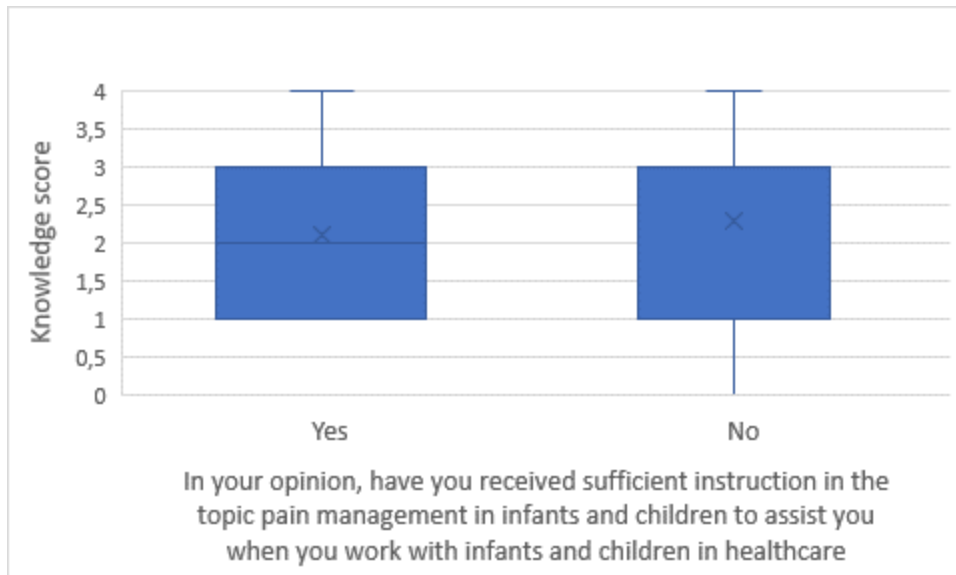
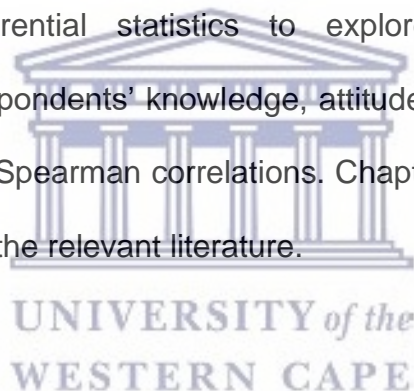


Figure 3. Box and Whisker plot of knowledge score according to sufficient instruction

4.8 Summary

This chapter presented the descriptive statistics of the respondents' demographic characteristics and their knowledge, attitudes and practices regarding paediatric pain management. Secondly, inferential statistics to explore the relationships between demographic variables and respondents' knowledge, attitudes, and practices were provided using nonparametric tests and Spearman correlations. Chapter Five discusses the results of the study in detail in relation to the relevant literature.



CHAPTER FIVE

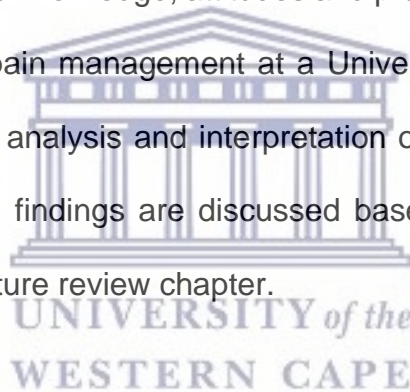
DISCUSSION, RECOMMENDATIONS AND LIMITATIONS

5.1 Introduction

This chapter presents a discussion of the study results in relation to the literature. The conclusion, study-specific recommendations, strengths and limitations are also presented. The discussion will be presented in the same order of sections as the results in Chapter Four. The recommendations will be presented in three sections: recommendations for nursing education, for nursing practices, and further research.

5.2 Discussion

Our study sought to describe the knowledge, attitudes and practices of undergraduate nursing students regarding paediatric pain management at a University in the Western Cape. This discussion section provides an analysis and interpretation of the study findings which were presented in chapter four. The findings are discussed based on the previous studies and literature that covered the literature review chapter.



5.2.1 Response rate

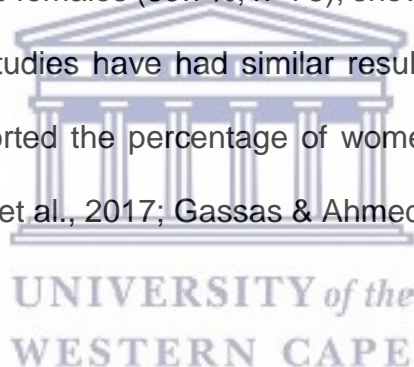
The study response was 42.4%, which is relatively low. The present study findings were in agreement with the results of a literature review comparing response rates of e-mail surveys to paper surveys that noted that most online surveys displayed lower response rates since they can only be completed by participants with access to the internet (Hiltunen & Suuronen, 2019). The present study findings were also similar to the results of an analysis of survey studies in the surgical field that compared response rates for paper, postal and online surveys. In person (paper) surveys had the highest response rate (76%), compared to postal (65%) and online (46%) surveys (Meyer et al., 2022). The standards for an acceptable response rate vary, depending on the type of survey used to collect the data. The average and reasonably

acceptable response rate for online surveys is 60%+/-20, meaning that anything below 40% is not reasonably acceptable and would generate validity issues (Kees et al., 2017). In this study the response rate was 42.4%, which is acceptable. The response rate of the current study resembles response rates in other studies on KAP conducted in Saudi Arabia, which found response rates of 44% (Gassas & Ahmed, 2022; Al-Sayaghi et al., 2022).

5.2.2 Age and gender

In this study the majority of respondents were between the ages of 15 and 20 years (65.5%; n=57). The results of the current study demonstrated that the majority of nursing students were young and probably entered the Bachelor of Science in nursing programme immediately after completing their matric. A Jordanian study by Al Omari (2016) found similar results, with an average age for Jordanian nursing students of 21 years.

The majority of participants were females (89.7%; n=78), showing that nursing is still a female-dominated profession. Other studies have had similar results. Studies in low- and middle-income countries have all reported the percentage of women in nursing to be above 80% (Mediani et al., 2020; Gadallah et al., 2017; Gassas & Ahmed, 2022).



5.2.3 Duration of placement

The results of this study showed that 51.7% (26.4%+25.3%) participants were placed in paediatric wards for less than six weeks. This demonstrated that the period of time given to nursing students during training in paediatric units might have been insufficient, leading to poor knowledge of paediatric pain management practices among nursing students.

A review of the literature indicated that the optimal duration that a nursing student should remain in the different practice settings is approximately seven weeks (González-García et al., 2021). In a study conducted in Spain and Finland titled 'The relationship between clinical placement duration and students' satisfaction with the quality of supervision and learning environment', González-García et al. (2021) found that of the total of 1903 participants, the

majority (n= 1307) were placed in paediatric units for between 2 and 6 weeks. The placement duration of the students in this study was therefore in alignment with global trends.

In addition, according to the SANC, nursing students are expected to complete 4000 practical and clinical hours of training over four years, including 2300 hours assigned to clinical placement while training (Fadana & Vember, 2021). Duration of placement might play a role in acquisition of KAP on paediatric pain management among undergraduate student nurses (Kusi Amponsah et al., 2020). However, the current study shows that nursing students spend a short time in the clinical field with their paediatric patients, and therefore may have limited opportunities to integrate theory into practice.

5.2.4 Training

The results of this study showed that training and exposure to lectures on pain management for infants and children, including pharmacology, were suboptimal. This could be attributed to several factors such as individual study habits where some students may have missed classes or not have taken full advantage of opportunities to learn about pain management for infants and children. In addition, all lecturers may not have prioritized pain management for infants and children in their lectures, and also the difficulty of students to accurately remembering the types of instructions they received especially if it was not emphasized during their studies (Abdelrahman, & Abdelkader, 2017). Other studies have also identified similar results. In Indonesia, a study conducted on undergraduate nursing students' knowledge and attitude regarding children's pain found that 88.8% of them had not attended any paediatric pain management courses or seminars (Mediani et al., 2020).

In Egypt, Gadallah et al.'s (2017) study on undergraduate nursing students' knowledge and attitude regarding pain management in children found that more than half of the students (56.3%) did not attend any pain management courses. Results from Chisupa (2020) in Lusaka on the assessment and management of pain in children also revealed that 87.5% of

respondents said that they had never received formal training on pain in children. These findings show that the component of paediatric pain is not given sufficient attention, and thus nursing students' apparent lack of training regarding pain management of paediatric patients could negatively impact their care for paediatric patients.

5.2.5 Student nurses' knowledge of paediatric pain management

In this study the mean knowledge score of respondents was 2.2 or 55% out of the maximum of 4 (SD=1.2). We did not create a cut-off score for adequate knowledge in this study, as the instrument used did not provide guidance for cut-off scores. The frequency of correct responses varied from 27.6% to 65.5%. The correct answers to the items under knowledge domain are based on responses provided in the data. A majority of respondents (65.5%) answered "yes" for the question 1 indicating that infants(age<year) perceive or experience pain. Similarly, to the question 2, the majority of respondents (60.9%) answered "yes" indicating that preterm infants perceive pain. Questions 3 and 4 were recoded and the correct responses for these recoded questions indicate that a majority of the respondents (72.4% for question 3 and 52.9% for question 4) answered "yes" to question 3 indicating that infants and children have less perception of pain than adults. Similarly, for question 4, a majority (52.9%) answered "yes," indicating that infants and children do not forget pain faster than adults. The present study findings demonstrated a possible lack of knowledge among nursing students regarding paediatric pain management. The expectation was that the knowledge base of nursing students must be good, according to the standard practice they have learned at school and in clinical placement. Unfortunately, that was not the case, as the overall findings were that nursing students were lacking in knowledge regarding paediatric pain management. Possible reasons for this deficiency may be related to the insufficient paediatric pain management training in the nursing curriculum, and the short time spent by students in the clinical field with their patients. Because of this knowledge deficit, pain in children around the

world can remain poorly managed, resulting in unnecessary suffering in this vulnerable population.

The present study findings were in the line with those of a study carried out by Gadallah et al. (2017) in Egypt that revealed that more than half of the nursing students (56%) had an unsatisfactory knowledge level on pain management in children. The same study emphasised that the lack of knowledge of nursing students was attributed to insufficient time spent by students in the clinical field with their patients, and therefore they had limited opportunity to assess or manage pain. The current study found similar results to the study of Al Omari (2016) in Jordan on the knowledge and attitude of nursing students towards pain assessment and management in children. Al Omari's (2016) study revealed that nursing students had poor knowledge about pain management in children, as the average knowledge score was 18.36% (SD=6.30) for the Paediatric Nurses' Knowledge and Attitudes Survey (PNKAS) instrument composed of 40 items. The present study results were also comparable to those of a study by Kusi Amponsah et al. (2019) in Ghana, where student nurses scored poorly on the 42-item PNKAS instrument: the average (SD) correct answer score was 42.1% (8.0%), with a minimum correct score of 21.4% and a maximum of 81.0%. These results demonstrated inadequate knowledge regarding paediatric pain management among nursing students in Ghana. Similarly, Selvi et al. (2022) in New Delhi, India in a study on assessment of KAP towards newborns pain management found that 80% of nursing students had poor knowledge. These low scores found among nursing students imply that they do not appear to have adequate knowledge of pain management, and this could influence the quality of care that they provide to their paediatric patients.

Concerning the relationship between knowledge, age and gender, the results of a Kruskal-Wallis test of independent samples showed that respondents' knowledge did not differ across categories of age and gender ($p>0.05$). The current results were similar to those of the study

conducted by Kusi Amponsah et al. (2019) in Ghana on the knowledge and attitudes of nursing students and nurses regarding children's pain.

Their findings revealed knowledge of nursing students on paediatric pain management not to be correlated with age ($p=0.3$) or gender ($p=0.2$). Similarly, Wuni et al. (2020), in their study in Ghana on knowledge, practices, and barriers of paediatric pain management among nurses, also found that knowledge of the respondents was not significantly correlated with age and gender.

The present and previous studies therefore indicate that mainstream nursing education does not prepare nursing students adequately for the field of pain management in children.

5.2.6 Student nurses' attitudes of paediatric pain management in children

In this study, the results from the analysis showed that the mean attitude score of the respondents was 9 or 52.9% out of the maximum of 17 ($SD=3$). The present study findings demonstrated a possible poor attitude of student nurses regarding pain management. This may imply that nursing students hold negative beliefs or misunderstandings about pain management in children or may not consider it as an important aspect of patient care. Consequently, this could result in insufficient pain management. According to the literature, healthcare providers, including nurses, may have unfavourable attitudes and misconceptions about pain management (La prise, 2016). This could be due to different factors such as insufficient training and lack of clinical exposure on pain management in children, fear of addiction, worries about the harmful effects of analgesics, and belief that pain is normal part of the healing process (La prise, 2016).

Other studies had similar findings. For example, Mediani et al. (2020) in Indonesia on undergraduate nursing students' knowledge and attitude regarding management of children's pain found that 52% of respondents had poor attitudes which impeded the ability of nursing students to alleviate children's pain when they are following professional program in the

hospital. The current study results were also similar to those of Gadallah et al. (2017) in Egypt, who studied undergraduate nursing students' knowledge and attitude regarding pain management in children. The findings revealed that more than half of nursing students' attitude about pain management in children was poor. A cross-sectional study by Al Omari (2016) in Jordan on knowledge and attitudes of nursing students towards children's pain assessment and management also revealed that Jordanian nursing students had a poor attitude, as the participants' mean correct score was 18.36% (SD=6.30), with a minimum score of 8 out of the maximum of 40.

In Ghana, a comparative cross-sectional study conducted by Kusi Amponsah et al. (2019) on nursing students' and nurses' knowledge and attitudes regarding children's pain found that according to the 42-item Paediatric Nurses 'Knowledge and Attitudes Survey (PNKAS) instrument, nursing students' average score for correct responses regarding attitudes towards paediatric pain management was 42.1%, indicating that they did not have appropriate attitudes towards paediatric pain management. Similar to the results of the present study, Selvi et al. (2022) in New Delhi, India on the assessment of KAP towards neonatal pain management among nursing students found that 62.7% of participants reported having poor attitudes.

Concerning the relationship between attitude and demographic characteristics such as age and gender, the present study results showed that attitude was not associated with age and gender (independent Kruskal-Wallis test, $p>0.05$). However, attitudes were significantly correlated with practices of pain alleviation, pain assessment and non-pharmacological measures, at $p<0.01$. The present study results were consistent with those of Selvi et al. (2022) in New Delhi, who found that attitudes of nursing students were significantly correlated with their practices ($p<0.01$). Alzghoul and Abdullah (2016) in Jordan also had similar findings that nurses' attitudes towards pain management had a significant and positive relationship with their pain management practices.

Therefore, the present study suggests that although attitudes are generally poor, an improvement in attitude may lead to better paediatric pain management practices.

5.2.7 Practices of pain alleviation

Pain is a major source of distress for children and their families, as well as for healthcare providers. Pain relief practices refer to the activities that nursing students perform in order to reduce patient pain (Alzghoul & Abdullah, 2016). In this study, the results of analysis demonstrated that the mean score for practices of pain alleviation was 2.2 or 36.6% out of the maximum of 6 (SD=1.2). This increases the concern regarding poor practices of pain alleviation among nursing students, since the mean score for 6 survey items was less than 50%. The frequency responses for methods such as restraint, observing the child's face, quick in and quick out, EMLA application, local anaesthetic infiltration and sedation were less than 50%. Distraction was the procedure most commonly used, by over half of respondents (69%; n=60). Owing to the scope of the nursing student, these questions were responded based on what they do in particular situation during placement in paediatric ward, which essentially makes these practice questions.

The present study results were consistent with those of the study of Mathew et al. (2011) on the KAP of paediatric critical care nurses towards pain in a developing country. The authors reported that practices such as restraint (48.2%), positioning (41.1%) and quick-in and quick-out (39.3%) were commonly used by respondents. The rest of the methods, such as EMLA, local anaesthetic and sedation infiltration, were not popular as scores were very low (7.1%, 7.1% and 5.4% respectively).

The current results were also similar to those of a study by Mohamed Bayoumi et al. (2021) in Egypt that revealed that practices of pain alleviation can be utilised without an order from a doctor, and that distraction was the method used by the majority of respondents (68.1%). In addition, Am et al. (2021) in Alberta in Canada on practice patterns and assessment of needs for paediatric pain management revealed that of the 45 respondents from 31 Emergency

Departments representing five geographical zones, the use of topical anaesthesia was employed by only 4 out of 27 respondents (15%), while both comfort positioning and distraction were used by 10 out of 22 respondents (37%).

Overall, current and previous studies show possible gaps in practices of pain alleviation among nursing students. Therefore, the nursing curriculum should focus on training in order to improve nursing students' practices in the field of paediatric pain management.

5.2.8 Practices of pain assessment

The results of the analysis showed that the overall average score for pain assessment practices was 2.7 or 54% out of the maximum of 5 with standard deviation of 1.2. These findings showed possible poor practices of pain assessment among nursing students.

The present study results showed that 72.4% of student nurses devalued asking the parents and asking the child as appropriate methods to assess paediatric pain. According to the literature, parents can and should be encouraged to get involved in recognising and responding to and using non-pharmacological methods of pain relief to help manage their children's pain (Carter & Simons, 2014). It was also pointed out that parents were found to be more accurate in assessing the pain of their infants and children than health professionals (Carter & Simons, 2014). In addition, AL-Sayaghi et al. (2022) in Saudi Arabia revealed that pain cannot be verified, and self-report is the only reliable measure to assess the presence and intensity of pain. Asking children about their pain is therefore important.

Physiological measures were also shown to be given low priority as a method to assess if a child feels pain (32%). This indicated that nursing students had poor practices towards pain assessment, which is a significant barrier to adequate pain management in children. The present study results were also similar to those of Mukandanga (2019) in Rwanda on knowledge and barriers of pain management in children among nurses in two selected referral hospitals.

The results found that of the 102 nurses, over half (51.1%) had poor practices of pain assessment in children. There were also similarities to the findings of Selvi et al. (2022) in New Delhi on assessment of KAP towards neonatal pain management among nursing students. The results found that 53.8% of student nurses had poor perceived practices of pain assessment, and the average for perceived practices was found to be 45.6%.

Poor practices of pain assessment in children might be the result of a lack of attention given to pain-related topics and lack of sufficient time devoted to this topic in nursing school curricula (Selvi et al., 2022).

5.2.9 Practices of non-pharmacological measures

Practices of non-pharmacological measures have been shown to have a positive impact on children's pain. It is recommended to use them whenever possible in conjunction with pharmacological options, to help reduce pain levels in children (Eke & Briggs, 2019). In this study the results of analysis showed the overall mean score of the respondents on practices of non-pharmacological measures was 4.6 or 41.8% out of the maximum of 11 (SD=2.6).

The present study results demonstrated that nursing students do not adequately consider the use of non-pharmacological measures when managing pain in children. The most commonly used non-pharmacological methods were touch and reassurance, distraction, providing company/play a game with the child, and positioning, and massage. This is similar to the findings of Mathew et al. (2011) in a developing country, where massage, positioning, touch and assurance, providing company, heat/cold and distraction were the common methods employed in order to decrease pain in children, and the frequency of these practices was over 50%.

The present study findings also revealed that non-pharmacological measures such as heat and cold application, rubbing over the painful area, hypnosis, relaxation and breathing technique, music and preparatory information proved unpopular, because the frequency of

these methods was less than 50%. These results were similar to those of Mohamed Bayoumi et al. (2021) in Egypt, who described the non-pharmacological pain techniques that may be utilised without a doctor's prescription. The results demonstrated that non-pharmacological practices such as relaxation, breathing technique, massage, heat/cold application and positioning were unpopular, because the frequency was less than 50%. Distraction and positive reinforcement were the methods most often used to decrease pain in children (68.1% and 53.2%).

In contrast, the literature revealed that the use of different non-pharmacological strategies has an important role to play in directing the attention of children away from the procedure. These include techniques such as active and passive distraction in the form of pictures, music, computer games, positioning, heat or cold application, massage, and breathing techniques in managing pain in children (Andersson et al., 2022).

The positive impact of non-pharmacological measures on infants' and children's pain was also emphasised by another review of the literature that stated that the multimodal approach to pain management includes non-pharmacologic options (Gai et al., 2020). These include both physical and psychological strategies that patients may benefit from, such as massage, heat compresses, ice packs, and repositioning (Gai et al., 2020). The same authors also revealed that cognitive behavioural strategies such as relaxation and hypnosis have also been shown to be effective for reducing pain in paediatric patients (Gai et al., 2020). In addition, Mohamed et al. (2022) indicated that non-pharmacological methods for pain management have become increasingly popular and are useful in managing pain in paediatric patients. Mohamed Bayoumi et al. (2021) further emphasised that non-pharmacological interventions are less expensive and more applicable.

The present study findings were similar to those reported by Mohamed et al. (2022) in their study which found that 67.3% of participants had unsatisfactory total practices regarding non-

pharmacological pain management. A study by Yaban (2019) in Turkey on usage of non-pharmacologic methods on postoperative pain management by nurses revealed that they have never used or little used non-pharmacological methods in pain management. The same study findings also emphasised that nurses were found to be reluctant to apply non-pharmacological practices to decrease pain in children, as they mostly prioritised drugs.

Poor non-pharmacological practices may be due to a lack of knowledge of non-pharmacological practices, as indicated in the study by Ortiz et al. (2015) in Mexico, who found that 76% of nurses had a deficit in knowledge about non-pharmacological methods of pain relief.

5.3 Summary of key findings

5.3.1. Objective 1: nursing students' knowledge regarding paediatric pain management

The aim of the study was to describe the knowledge, attitudes and practices regarding paediatric pain management among undergraduate nursing students at a University in the Western Cape. The first study objective was to describe the knowledge of nursing students regarding paediatric pain management. The findings showed that the mean knowledge score was 2.2 (SD=1.2) or 55%, which suggests that there may be a lack of knowledge among nursing students in this area. In other words, the findings indicate that nursing students may not have sufficient understanding of paediatric pain management. Therefore, the findings are directly related to the study objective, as they provide information about the current level of knowledge among nursing students regarding paediatric pain management. The lack of knowledge among nursing students could be linked with inadequate training provided to nursing students during their coursework, as well as their limited exposure to paediatric patients in clinical settings, resulting in fewer opportunities to work with this patient population and gain a comprehensive understanding of pain management in children.

5.3.2. Objective 2: Nursing students' attitudes regarding paediatric pain management

Responding to the second objective which was to describe the attitudes of nursing students regarding paediatric pain management, the findings showed that the mean attitudes score of the respondents was 9 (SD=3) or 52.9% out of the maximum of 17. The findings indicate that nursing students may have negative attitudes towards paediatric pain management. The findings could have been linked with nursing students limited exposure to paediatric patients in their clinical rotations, which may have led to a lack of understanding of the unique aspects of pain management in children. In addition, the nursing education program may have not provided adequate training to nursing students during their coursework on the assessment and management of pain in paediatric patients, which may have led to negative attitudes towards these aspects of nursing care. The findings also indicated that nursing students hold the belief that children do not experience pain to the same extent as adults which influenced their negative attitudes towards paediatric pain management.

5.3.3. Objective 3: Nursing students' practices regarding paediatric pain management

The results of the study indicate potential issues with pain assessment and non-pharmacological interventions in relation to the third objective. The average score for pain assessment practices was 2.7 out of 5 or 54%, with a standard deviation of 1.2. The mean score for nursing students' use of non-pharmacological measures was 4.6 out of 11, or 41.8%, with a standard deviation of 2.6. These findings suggest that nursing students may not be conducting a thorough assessment of pain in paediatric patients, which may have led to inadequate pain management and suboptimal patient outcomes. Additionally, the findings suggests that nursing students may not be effectively using non-pharmacological interventions to manage paediatric pain. This may result in a reliance on pharmacological interventions, which may have potential adverse effects and may not always be the most appropriate or effective approach to pain management.

5.4 Recommendations

Several recommendations specifically for nursing education, nursing practice and further research emerged from the results of the present study.

5.4.1 Recommendations for nursing education

Overall, the present study indicated that undergraduate nursing students' KAP regarding paediatric pain management was poor in most areas, including practices of pain alleviation, assessment, and both pharmacological and non-pharmacological measures. The study results also revealed possible insufficient training on the topic of pain management in children among undergraduate nursing students, which might be the cause of deficits in the KAP. Therefore, the researcher recommends:

- ✓ Further curriculum planning to include a greater focus on pain assessment and management in children is necessary in order to improve adequate knowledge, positive attitudes and good practices among undergraduate nursing students.
- ✓ Ongoing professional development opportunities for nursing faculty to stay up-to-date on the latest research and best practices in paediatric pain management, which they can then incorporate into their teaching.
- ✓ Inclusion of paediatric pain management as a core component in nursing curricula, with a focus on evidence-based practice and interdisciplinary collaboration.
- ✓ Nursing education institutions and educators should focus on teaching and training nursing students in the topic of pain management in children, specifically in terms of pathophysiology, mechanisms, assessment and management with both pharmacological and non-pharmacological methods.
- ✓ Incorporate pain management in children as part of simulation and other teaching and learning strategies to enhance the transfer of learning and integration of theory-practice in undergraduate students.

- ✓ Nursing skills labs for continuous professional development must be adequately equipped with the necessary facilities to enable nursing students to develop clinical skills in the context of pain management in children.
- ✓ Evaluate and assess the effectiveness of nursing education interventions related to paediatric pain management to continually improve and refine the educational approach.
- ✓ Sufficient training should be given to nursing students with theoretical knowledge about pain and its management in clinical practice, with a focus on pharmacological and non-pharmacological interventions, in order to prepare them for the best assessments and management of paediatric pain (Gadallah et al., 2017).

5.4.2. Recommendations for nursing practice

In clinical settings, particularly in paediatric units, nursing students are often expected to demonstrate good practices regarding the management of pain in children. However, the results of the present study demonstrated that nursing students lacked these skills when it comes to pain management in children. Therefore, the study recommends that:

- ✓ Nursing students' clinical practice placement in paediatric units should be of adequate duration in order to give them an opportunity to integrate theory into practice.
- ✓ Hospital management should provide regular training to paediatric nurses to improve paediatric pain management skills, which would allow them to transfer these skills to the nursing students.
- ✓ Nursing continuous professional development training should make the assessment and management of pain in children a part of the practice, in order to increase confidence and skills of nursing students and nurses in practice.
- ✓ There is a need for nursing schools to implement a collaborative system between paediatric nursing staff and supervisors to reinforce service-based professional nurses' responsibility to accompany nursing students and facilitate clinical learning.

5.4.3 Recommendations for further research

It has been shown that little or no research has been conducted on the KAP of undergraduate nursing students regarding pain management in South Africa and in the Western Cape. The present study has raised concerns that pain management in children is still suboptimal, as the results have shown gaps in KAP on this area among undergraduate nursing students. Therefore, the study recommends calling for more research on pain management in children using other research methods and with more participants in order to provide more information that will allow nursing institutions to enrich the curriculum, in order to improve the best learning and teaching strategies to deliver this competency.

5.5 Limitations of the study

Describing the study limitations from the researcher's perspective is intended to highlight possible weaknesses that could have impacted the study. It is therefore recognised that the present study took place in a specific nursing school in the Western Cape. The study focused only on final-year nursing students who worked with children with pain in paediatric settings. The sample size was small, and less than half of the population participated in the study. Failure to pilot test the instrument could have affected the validity and reliability of the instrument. In addition, due to the COVID-19 pandemic and the restrictions on in-person research at the time, data collection was conducted through an online platform. However, this approach had some disadvantages. For instance, not all nursing students may have had access to the internet or necessary devices to participate in the research. Additionally, participants may have experienced technical difficulties while attempting to complete the questionnaire which could have led to frustration and further decrease the response rate. Moreover, participants may have been overwhelmed with numerous surveys and information, leading to survey fatigue and resulting in a lower response rate. The results therefore cannot be generalised to other nursing schools in the Western Cape and the rest of the country, hence

the recommendation for similar studies with a larger sample and a more detailed instrument to assess KAP to be carried out in future.

5.6 Conclusion

The aim of this study was to describe the KAP of undergraduate nursing students regarding paediatric pain management at a university in the Western Cape. The results were discussed with reference to other previous results and literature searches. These findings showed gaps among undergraduate nursing students in all areas, including areas of KAP regarding paediatric pain management. Associations between demographic characteristics and other variables were discussed, with reference to other previous findings and literature. The results revealed that lack of training and limited time spent in the clinical field were perhaps the biggest barriers contributing to KAP deficits among undergraduate nursing students with respect to pain management in children. Therefore, in order to enhance appropriate knowledge, positive attitudes, and good practices in paediatric pain management, it is imperative to offer nursing students more training and increase their time spent in clinical areas, as this would help overcome the limitations arising from inadequate training and limited clinical practice exposure.



REFERENCES

- Abbasi, M., Farahani-Nia, M., & Mehrdad, N. (2014). Nursing students' spiritual well-being, spirituality and spiritual care. *Iranian Journal of Nursing and Midwifery Research, 19*(3), 242.
- Abdelrahman, S. M., & Abdelkader, A. M. (2017). The influencing factors of absenteeism among nursing students. *Journal of Nursing Education and Practice, 7*(10), 64-69. <https://doi.org/10.5430/jnep.v7n10p64>
- Al Omari, O. (2016). Knowledge and attitudes of Jordanian nursing students toward children's pain assessment and management: A cross-sectional study. *Journal of Nursing Education and Practice, 6*(3), 51-58. <https://dx.doi.org/10.5430/jnep.v6n3p51>
- Al Sebaee, H. A., Aziz, E. M. A., & Mohamed, N. T. (2017). Relationship between nursing students' clinical placement satisfaction, academic self-efficacy and achievement. *IOSR Journal of Nursing and Health Science, 6*(2), 101-112.
- Ali, H. S., Ibrahim, Y., & Mohamed, E. (2013). Non-pharmacological pain management: nurses' knowledge, attitudes and practices in selected hospitals at Makkah El-Mukarramah. *Life Science Journal, 2*(10), 1327-1335.
- Al-Mahrezi, A. (2017). Towards effective pain management: breaking the barriers. *Oman Medical Journal, 32*(5), 357-358. <https://doi.org/10.5001/omj.2017.69>
- AL-Sayaghi, K. M., Fadlalmola, H. A., Aljohani, W. A., Alenezi, A. M., Aljohani, D. T., Aljohani, T. A., & Alzahrani, N. S. (2022). Nurses' knowledge and attitudes regarding pain assessment and management in Saudi Arabia. *Healthcare, 10*, 528. <https://doi.org/10.3390/healthcare10030528>

- Alzghoul, B. I., & Abdullah, N. A. C. (2016). Pain management practices by nurses: an application of the knowledge, attitude and practices (KAP) model. *Global Journal of Health Science*, 8(6), 154.
- Am, N. B., Thull-Freedman, J., & Ali, S. (2021). Practice patterns and assessment of needs for paediatric pain management in Alberta Emergency Departments. *Emergency Medicine*, 13, 587-594. <https://doi.org/10.2147/OAEM.S337900>
- Andersson, V., Bergman, S., Henoch, I., Simonsson, H., & Ahlberg, K. (2022). Pain and pain management in children and adolescents receiving hospital care: a cross-sectional study from Sweden. *BMC Pediatrics*, 22(1), 1-9. <https://doi.org/10.1186/s12887-022-03319-w>
- Arezina, V. (2018). Research Design in Methodology of Political Science. *Proceedings of ADVED 2018 – 4th International Conference on Advances in Education and Social Sciences(pp.978-605).Istanbul, Turkey.*
- Arzani, A., Valizadeh, S., Poorkaremi, S., Taheri Ezbarami, Z., & Ghojazadeh, M. (2020). Evaluating the impact of a multimedia training versus lecture training on attitudes and practices in paediatric nurses in children pain management: A randomized controlled trial. *Nursing Open*, 7(4), 1032-1038. <https://doi.org/10.1002/nop2.476>
- Aziznejadroshan, P., Alhani, F., Mohammadi, E., & Zabihi, A. (2020). Nurses' strategies for managing pain in paediatric units: A qualitative study in Iran. *Journal of Nursing and Midwifery Sciences*, 7(2), 105-105. <https://doi.org/10.4103/JNMS.JNMS.53-19>
- Aydın, B., & Bektaş, M. (2021). Pediatric pain management knowledge scale for nursing students: Assessment of the psychometric properties. *The Journal of Pediatric Research*, 8(1), 82. <https://doi.org/10.4274/jpr.galenos.2020.38258>

- Baker, C. (2017). Quantitative research designs: Experimental, quasi-experimental, and descriptive. *Evidence-based practice: An integrative approach to research, administration, and practice*,30(1), 155-183.
- Beckett, K., Henderson, E. M., Parry, S., Stoddart, P., & Fletcher, M. (2016). A mixed-method study of pain management practice in a UK children's hospital: identification of barriers and developing strategies to maintain effective in-patient paediatric pain management. *Nursing Open*, 3(1), 19-29.
- Binti Daud, R. (2021). Face and Content Validity for The Special Education Leadership (Integration) Questionnaire in Malaysia. *Turkish Journal of Computer and Mathematics Education*, 12(11), 5172-5178.
- Cahyani, S. L., Yaputra, F., & Widyadharma, I. P. E. (2018). The nurse's role in pain assessment and management of paediatric patient: A Literature Review. *International Journal of Medical Reviews and Case Reports*, 3(3), 104-104.
- Cardona, C. V., Rajah, C., Mzoneli, Y. N., Friedrichsdorf, S. J., Campbell, F., Cairns, C., & Rodseth, R. N. (2019). An audit of paediatric pain prevalence, intensity, and treatment at a South African tertiary hospital. *Pain Reports*, 4(6), e789.
- Carter, B., & Simons, J. (2014). *Stories of children's pain: Linking evidence to practice*. *Stories of Children's Pain*. 1st edition. Sage publications,272(1).
- Chisupa, E. (2020). *Pain assessment and management in children at Lusaka children's Hospital: A mixed methods study*. Unpublished doctoral dissertation, Kamuzu College of Nursing.

- D'emeh, W. M., Yacoub, M. I., Darawad, M. W., Al-Badawi, T. H., & Shahwan, B. (2016). Pain-related knowledge and barriers among Jordanian nurses: a national study. *Health, 8*(6), 548-558. <https://doi.org/10.4236/health.2016.86.056>
- Dezfouli, S. M. M., & Khosravi, S. (2020). Pain in child patients: A review on managements. *European Journal of Translational Myology, 30*(2). 291-294. <https://doi.org/10.4081/ejtm.2019.8712>
- Dison, A. (2019). *Factors influencing first year nursing students' career choice at a University in the Western Cape*. [Unpublished Master's dissertation]. University of the Western Cape. Retrieved from <http://hdl.handle.net/11394/7430>
- Elias, J. M. (2019). Knowledge and Attitude Regarding Children's Pain and Perceived Barriers to Optimal Pain Management among Staff Nurses. *International Journal of Nursing Education, 11*(1), 51-54. <https://doi.org/10.5958/0974-9357.2019.00012.6>
- Efe, E., Dikmen, Ş., Altaş, N., & Boneval, C. (2013). Turkish paediatric surgical nurses' knowledge and attitudes regarding pain assessment and nonpharmacological and environmental methods in newborns' pain relief. *Pain Management Nursing, 14*(4), 343-350. <https://doi.org/10.1016/j.pmn.2011.08.003>
- Esterhuizen, J. (2016). The professional nurse's scope of practice: a historical, South African perspective nursing. *Professional Nursing Today, 20*(1), 12-14. Retrieved from <https://hdl.handle.net/10520/EJC188483>
- Fadana, F. P., & Vember, H. F. (2021). Experiences of undergraduate nursing students during clinical practice at health facilities in Western Cape, South Africa. *Curationis, 44*(1), 1-10. <http://dx.doi.org/10.4102/curationis.v44i1.2127>
- Fraser, J., Fahlman, D. W., Arscott, J., & Guillot, I. (2018). Pilot testing for feasibility in a study of student retention and attrition in online undergraduate programs. *The*

International Review of Research in Open and Distributed Learning, 19(1), 261-273.

<https://doi.org/10.19173/irrodl.v19i1.3326>

Gadallah, M.A., Hassan, A.M., & Shargawy, S.A. (2017). Undergraduate nursing students' knowledge and attitude regarding pain management of children in upper Egypt.

Journal of Nursing Education and Practice, 7(6), 100-

107. <https://doi.org/10.5430/jnep.v7n6p10>

Gai, N., Naser, B., Hanley, J., Peliowski, A., Hayes, J., & Aoyama, K. (2020). A practical guide to acute pain management in children. *Journal of Anaesthesia*, 34(3), 421-433.

Gassas, R. S., & Ahmed, M. E. (2022). Development and psychometric evaluation of nurses' perception towards the gap between knowledge and practice. *Nursing Open*, 9(2), 1497-1505.

González-García, A., Díez-Fernández, A., Leino-Kilpi, H., Martínez-Vizcaíno, V., & Strandell-Laine, C. (2021). The relationship between clinical placement duration and students' satisfaction with the quality of supervision and learning environment: A mediation analysis. *Nursing & Health Sciences*, 23(3), 688-697.

Hauer, J., Duncan, J., & Scullion, B. F. (2014). *Paediatric pain and symptom management guidelines*. Dana Farber Cancer Institute/Boston Children's Hospital Paediatric Advanced Care Team, 27(1).

Heale, R., & Twycross, A. (2015). Validity and reliability in quantitative studies. *Evidence-Based Nursing*, 18(3), 66-67.

Hiltunen, I., & Suuronen, A. (2019). Survey on external interference experienced by Finnish journalists: Prevalence, methods and implications. *Nordicom Review*, 40(1), 3-21.

URL: <https://urn.fi/URN:ISBN:978-952-03-1250-3>

Hooten, M., Thorson, D., Bianco, J., Bonte, B., Clavel Jr, A., Hora, J., ... & Walker, N. (2017). Pain: assessment, non-opioid treatment approaches and opioid management (Updated ed.). *Bloomington, MN: Institute for Clinical Systems Improvement, 17-152.*

Hoy, W. K., & Adams, C. M. (2015). *Quantitative research in education: A primer.* Sage Publications, 1-157.

Hroch, J. (2017). *Nursing students' knowledge and attitudes regarding pain.* [Unpublished doctoral dissertation]. Queen's University, Canada, 1-14.

Imtiaz, M., Banode, S. V., Borkar, A. S., Badwaik, R. T., Moallem, S. A., Hossein Zadeh, H., ... & Ko, Y. K. (2019). Assessing knowledge, perceptions and attitudes to pain management among medical and nursing students: A review of the literature. *Canadian Journal of Pain, 3(1), A73-A189.*

Ingham-Broomfield, R. (2014). A nurses' guide to quantitative research. *Australian Journal of Advanced Nursing, 32(2), 32-38.*

Kahsay, D. T., & Pitkääjärvi, M. (2019). Emergency nurses' knowledge, attitude and perceived barriers regarding pain management in resource-limited settings: cross-sectional study. *BMC Nursing, 18(1), 1-13.*

Kees, J., Berry, C., Burton, S., & Sheehan, K. (2017). An analysis of data quality: Professional panels, student subject pools, and Amazon's Mechanical Turk. *Journal of Advertising, 46(1), 141-155.* <https://doi.org/10.1080/00913367.2016.1269304>

Kholowa, E. T., Chimwaza, A. F., Majamanda, M. D., & Maluwa, A. O. (2017). Nurses' knowledge and attitudes towards pain management in children admitted in the

Paediatric Department of Queen Elizabeth Central Hospital, Blantyre,
Malawi. *Journal of Biosciences and Medicines*, 5(6), 46.

Kiwanuka, F., & Masaba, R. (2018). Nurses' knowledge, attitude and practices regarding pain assessment among patients with cancer at Uganda Cancer Institute. *Journal of Research in Clinical Medicine*, 6(2), 72-79.

Kobe, S. C., Downing, C., & Poggenpoel, M. (2020). Final-year student nurses' experiences of caring for patients. *Curationis*, 43(1), 1-9.

Kusi Amponsah, A. K., Kyei-Dompim, J., Kyei, E. F., Oduro, E., Afaya, R. A., & Ahoto, C. K. (2020). Final year nursing students' knowledge and attitudes regarding children's pain. *Pain research & management*, Volume 2020, 6. Article ID 7283473, <https://doi.org/10.1155/2020/7283473>

Kusi Amponsah, A., Oduro, E., Bam, V., Kyei-Dompim, J., Ahoto, C. K., & Axelin, A. (2019). Nursing students and nurses' knowledge and attitudes regarding children's pain: A comparative cross-sectional study. *PloS one*, 14(10), e0223730. <https://doi.org/10.1371/journal.pone.0223730>

Laprise, J. (2016). *Identification of student nurses' knowledge and attitudes regarding paediatric pain management*. University Scholar Projects, University of Connecticut, 2-12. Retrieved from https://opencommons.uconn.edu/usp_projects/28

LoBiondo-Wood, G., & Haber, J. (2021). *Nursing research e-book: Methods and critical appraisal for evidence-based practice*. Elsevier Health Sciences.

Lourens, A., Hodkinson, P., & Parker, R. (2020). Acute pain assessment and management in the prehospital setting, in the Western Cape, South Africa: a knowledge, attitudes and practices survey. *BMC Emergency Medicine*, 20, 1-12. <https://doi.org/10.1186/s12873-020-00315-0>

- Mathe, T. L., Downing, C., & Kearns, I. (2021). South African student nurses' experiences of professional nurses' role-modelling of caring. *Journal of Professional Nursing*, 37(1), 5-11.
- Mathew, P. J., Mathew, J. L., & Singhi, S. (2011). Knowledge, attitude and practice of paediatric critical care nurses towards pain: Survey in a developing country setting. *Journal of Postgraduate Medicine*, 57(3), 196-200.
- Mazur, A., Radziewicz Winnicki, I., & Szczepański, T. (2013). Pain management in children. *Annals of agricultural and environmental medicine*, 1(1), 28-34.
- Mbugua, B., & Chemoiywa, A. (2017). Nonpharmacological pain management in paediatric nursing: Literature review with a systematic approach, 3(2), 12.
- Mediani, H. S., Nurhidayah, I., Mardhiyah, A., & Hendrawati, S. (2019). Nurses journey of postoperative paediatric pain care: a qualitative study using participation observation in Indonesia. *Global Journal of Health Science*, 11(4), 1-93.
- Mediani, H. S., Windiany, H., & Maryam, N. N. A. (2020). Undergraduate nursing students' knowledge and attitude regarding management of children's pain. *International Medical Journal*, 25(1), 13412051.
- Meyer, V. M., Benjamens, S., El Moumni, M., Lange, J. F., & Pol, R. A. (2022). Global overview of response rates in patient and health care professional surveys in surgery: A systematic review. *Annals of Surgery*, 275(1), e75.
- Mieronkoski, R., Syrjälä, E., Jiang, M., Rahmani, A., Pahikkala, T., Liljeberg, P., & Salanterä, S. (2020). Developing a pain intensity prediction model using facial expression: A feasibility study with electromyography. *PloS one*, 15(7), e0235545.
<https://doi.org/10.1371/journal.pone.0235545>
- Miftah, R., Tilahun, W., Fantahun, A., Adulkadir, S., & Gebrekirstos, K. (2017). Knowledge and factors associated with pain management for hospitalized children among

- nurses working in public hospitals in Mekelle City, North Ethiopia: Cross sectional study. *BMC Research Notes*, 10(1), 1-6.
- Mishra, P., Pandey, C. M., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Annals of Cardiac Anaesthesia*, 22(1), 67.
- Mogale, N. M. (2012). *Problem-based case study to enhance critical thinking in student nurses*. [Unpublished dissertation]. University of Johannesburg (South Africa).
- Mohamed Bayoumi, M. M., Khonji, L. M. A., & Gabr, W. F. M. (2021). Are nurses utilizing the non-pharmacological pain management techniques in surgical wards? 16(10), <https://doi.org/10.1373/journal.pone.0235545>
- Mohamed, R. M., Taha, N. M., & Moghazy, N. A. E. K. (2022). Nursing Practices regarding Non-pharmacological Pain Management for Patients with the Cardiothoracic Surgery at Zagazig University Hospitals. *Zagazig Nursing Journal*, 18(1), 16-28.
- Muhamad, S. H., Nuwairi, N., & Rani, Z. A. (2017). Availability of blended learning options in english literature classes at an Islamic tertiary institution: A pilot study. In *Proceedings of the 4th International Conference on Management and Muamalah (ICoMM 2017)*, 292-299.
- Mukandanga, A. (2019). *Knowledge and barriers of pain management in children among nurses in two selected referral hospitals, Rwanda*. [Unpublished doctoral dissertation]. University of Rwanda. <http://hdl.handle.net/123456789/1011>
- Obilor, E. I., & Amadi, E. C. (2018). Test for significance of Pearson's correlation coefficient. *International Journal of Innovative Mathematics, Statistics & Energy Policies*, 6(1), 11-23.

- Ortiz, M. I., Ponce-Monter, H. A., Rangel-Flores, E., Castro-Gamez, B., Romero-Quezada, L. C., O'Brien, J. P., & Escamilla-Acosta, M. A. (2015). Nurses' and nursing students' knowledge and attitudes regarding paediatric pain. *Nursing Research and Practice*, 2015, Article ID 210860, 8 pages. <http://dx.doi.org/10.1155/2015/210860>
- Owens, D., Smith, J., & Jonas, D. (2014). Evaluating students' knowledge of child pain and its management after attending a bespoke course. *Nursing Children and Young People*, 26(2), 34-40.
- Pallant, J. (2020). *SPSS survival manual: A step by step guide to data analysis using IBM SPSS*. Routledge. <https://doi.org/10.104324/97810>. [Available from: <https://www.routledge.com/SPSS-Survival-Manual-7th-Edition/Pallant/P/BOO/9780367204457>, accessed on: April 29, 2023]
- Pandey, P., & Pandey, M. M. (2021). *Research methodology tools and techniques*. Bridge Center, Romania, 18-74.
- Park, S. N., Im, Y. S., Park, S. N., & Im, Y. S. (2018). Utilizing video vs simulation practice for handoff education of nursing students in pediatric nursing. *Child Health Nursing Research*, 24(1), 27-36.
- Patnaik, S., Swain, N., Behera, C. K., Jain, M. K., & Nayak, M. K. (2017). Evaluation of knowledge, perception, attitudes, and practices of pain management of children among paediatric nursing personnel of a tertiary care hospital. *Indian Journal of Child Health*, 4(1), 75–78. <https://doi.org/10.32677/IJCH.2017.V04.i01.020>
- Santos, A. F., Machado, R. R., Ribeiro, C. J. N., Neto, M., Marden, J., Ribeiro, M. D. C. D. O., & Menezes, M. G. V. (2018). Nursing students' knowledge about pain assessment. *Brazilian Journal of Pain*, 1(4), 325-330.
- Selvi, A. M., Gauba, A., Joshi, P., & Pandey, C. (2022). Assessment of knowledge, attitude and practice towards neonatal pain management among nursing students in selected College of Nursing in New Delhi: A web based online KAP–questionnaire–

based cross-sectional study. *International Journal of Special Education*, 37(3), 15679-15690.

Shand, J. (2021). On never knowing the definition of knowledge. *Dialectic*, 15(3), 33-41.
Retrieved from <https://uoydialecticjournal.wordpress.com>

Stanley, M., & Pollard, D. (2013). Relationship between knowledge, attitudes, and self-efficacy of nurses in the management of paediatric pain. *Paediatric Nursing*, 39(4), 165-171.

Świeboda, P., Filip, R., Prystupa, A., & Drozd, M. (2013). Assessment of pain: Types, mechanism and treatment. *Pain*, 2(7), Special Issue 1, 2–7.

Uwimana, P., Mukamana, D., Adejumo, O., & Babenko-Mould, Y. (2020). Pediatric pain management competencies taught to nursing students in Rwanda: Perspectives of nurse educators, preceptors and nursing students. *J Nurs Educ Pract*, 10(12), 21-29. URL: <https://doi.org/10.5430/jnep.v10n12p21>

Vittinghoff, M., Lönnqvist, P. A., Mossetti, V., Heschl, S., Simic, D., Colovic, V., ... & Morton, N. S. (2018). Postoperative pain management in children: Guidance from the pain committee of the European Society for Paediatric Anaesthesiology (ESPA Pain Management Ladder Initiative). *Paediatric Anaesthesia*, 28(6), 493-506.

Waisundara, V. Y., Banjari, I., & Balkić, J. (Eds.). (2021). *Pain Management: Practices, Novel Therapies and Bioactives*. Books on Demand.
<http://dx.doi.org/10.5772/intechopen.87267>

World Health Organization. (2014). Expert Committee on the Selection, Use of Essential Medicines, & World Health Organization. *The selection and use of essential medicines: Report of the WHO expert committee, 2013 (including the 18th WHO Model List of Essential Medicines and the 4th WHO Model List of Essential Medicines for Children)* (Vol. 985). Available from

<https://www.who.int/medicines/publications/essentialmedicines/en/> Accessed on 29

April 2023

Wuni, A., Salia, S. M., Mohammed Ibrahim, M., Idriss, I., Abena Nyarko, B., Nabila Seini, S., ... & Mohammed, J. (2020). Evaluating knowledge, practices, and barriers of paediatric pain management among nurses in a tertiary health facility in the northern region of Ghana: A descriptive cross-sectional study. *Pain Research and Management*, 2020, article 8846599. <https://doi.org/10.1155/2020/8846599>

Wurjine, T. H., & Nigussie, B. G. (2018). Knowledge, attitudes and practices of nurses regarding to post-operative pain management at hospitals of Arsi zone, Southeast Ethiopia, 2018. *Women's Health*, 7(5), 130-135.

Yaban, Z. S. (2019). Usage of non-pharmacologic methods on postoperative pain management by nurses: Sample of Turkey. *International Journal of Caring Sciences*, 12(1), 529-541. Available from <http://www.internationaljournalofcaringsciences.org/docs/vol12.Issue1-17-Yaban-529-541.pdf>. Accessed on April 29,2023



ANNEXURES

ANNEXURE A: Questionnaire

Dear students

Thank you for responding to the invitation to complete this questionnaire on studying the knowledge, Attitudes and Practices regarding paediatric pain management among undergraduate nursing students in the western Cape. Your answers will allow a better perception and management of pain in children. You need not write your name. Kindly tick the appropriate choice. Participation in this study is voluntary.

Thank you.

Demographic information

1. Indicate your age.....
2. Indicate your gender.....
3. Indicate your academic year level.....
4. Please give the duration of your placement experience in paediatric unit (weeks)
5. Please tick the statement which best describes your response; in your opinion have you:



	Yes	No
Had lectures which focus on pain management for infants and children?		
Attended lectures in pharmacology which focus on pain management for infants and children?		
Received sufficient instruction in the topic pain management in infants and children to assist you when you work with infants and children in healthcare settings?		

6. Please tick the statement which best describes your response (you may tick more than one response); in your opinion do you think:

	Yes	No
infants (age<one year) perceive or experience pain?		
preterm infants perceive pain?		
infant and children have less perception of pain than adults?		
infants and children forget pain faster than adults?		

7. In your opinion, kindly indicate whether the following procedures/events in infants and children cause(s) them to experience pain:

	Yes	No
Endotracheal intubation		
Endotracheal suctioning		
Application of sticking tapes		
Removal of sticking tapes		
Insertion/removal of infant feeding tube		
Urinary bladder catheterization		
Cystoscopy		
Lumber puncture		
Squeezing of muscles during blood sampling		
Blood sampling		
Chest physiotherapy		
Foreign body nose/ear removal		
Application of spirit swab		
Insertion of chest tube		
Convulsions		
Pneumothorax		
Perforation of intestine		

8. For IV cannulation/blood sampling in a child, which of the following methods do you practice?

Or would you consider to be appropriate practice? [you can base your response on what you have observed in practice] (can tick more than one option):

Restraint	
Distraction	
Quick in-quick out	
EMLA application (patch with local anaesthetic)	
Local anaesthetic infiltration	
Sedation	

9. What method/methods do you use to assess if the child feels pain? Or do you think would be appropriate? (Tick one or more of the following)

Asking the parents	
Asking the child	
Observing the child's face	
Observing the child's posture and body movements	
Physiological measures	
I do not know how to assess if a child feels pain	

10. Based on physiological measurements like heart rate or blood pressure, which of the following non-pharmacological measures do you think could be practiced to reduce pain in infant and children?

Massage	
Heat and cold applications	
Positioning	
Rubbing over the painful area	
Hypnosis	
Distraction	
Relaxation and breathing technique	
Touch and reassurance	
Preparatory information	
Music	
Providing company/play a game with the child	

Thank you for taking time to answer this questionnaire

ANNEXURE B: Distribution of scores tables

Hypothesis Test Summary			
Null Hypothesis	Test	Sig. ^{a,b}	Decision
1 The distribution of Knowledge score is the same across categories of 2. Age.	Independent-Samples Kruskal-Wallis Test	0.236	Retain the null hypothesis.
2 The distribution of Attitude score is the same across categories of 2. Age.	Independent-Samples Kruskal-Wallis Test	0.518	Retain the null hypothesis.
3 The distribution of Practices of pain alleviation score is the same across categories of 2. Age.	Independent-Samples Kruskal-Wallis Test	0.826	Retain the null hypothesis.
4 The distribution of Practices of pain assessment score is the same across categories of 2. Age.	Independent-Samples Kruskal-Wallis Test	0.644	Retain the null hypothesis.
5 The distribution of Practices of non-pharm measures score is the same across categories of 2. Age.	Independent-Samples Kruskal-Wallis Test	0.940	Retain the null hypothesis.

The significance level is .050.

Asymptomatic significance is displayed.

Hypothesis Test Summary			
Null Hypothesis	Test	Sig. ^{a,b}	Decision
1 The distribution of Knowledge score is the same across categories of 3. Gender.	Independent-Samples Kruskal-Wallis Test	0.433	Retain the null hypothesis.
2 The distribution of Attitude score is the same across categories of 3. Gender.	Independent-Samples Kruskal-Wallis Test	0.343	Retain the null hypothesis.

3	The distribution of Practices of pain alleviation score is the same across categories of 3. Gender.	Independent-Samples Kruskal-Wallis Test	0.481	Retain the null hypothesis.
4	The distribution of Practices of pain assessment score is the same across categories of 3. Gender.	Independent-Samples Kruskal-Wallis Test	0.670	Retain the null hypothesis.
5	The distribution of Practices of non-pharm measures score is the same across categories of 3. Gender.	Independent-Samples Kruskal-Wallis Test	0.451	Retain the null hypothesis.

The significance level is .050.

Asymptomatic significance is displayed.

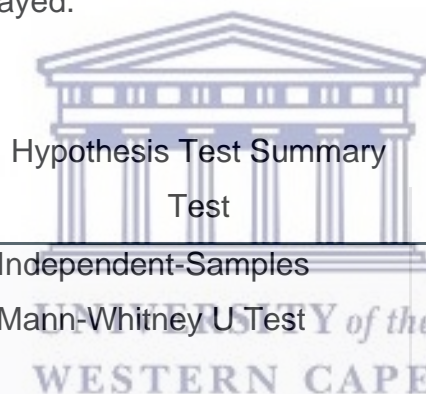


	Null Hypothesis	Test	Sig. ^{a,b}	Decision
1	The distribution of Knowledge score is the same across categories of 4. Duration of placement.	Independent-Samples Kruskal-Wallis Test	0.407	Retain the null hypothesis.
2	The distribution of Attitude score is the same across categories of 4. Duration of placement.	Independent-Samples Kruskal-Wallis Test	0.592	Retain the null hypothesis.
3	The distribution of Practices of pain alleviation score is the same across categories	Independent-Samples Kruskal-Wallis Test	0.290	Retain the null hypothesis.

	of 4. Duration of placement.			
4	The distribution of Practices of pain assessment score is the same across categories of 4. Duration of placement.	Independent-Samples Kruskal-Wallis Test	0.333	Retain the null hypothesis.
5	The distribution of Practices of non-pharm measures score is the same across categories of 4. Duration of placement.	Independent-Samples Kruskal-Wallis Test	0.303	Retain the null hypothesis.

a. The significance level is .050.

b. Asymptotic significance is displayed.



	Null Hypothesis	Test	Sig. ^{a,b}	Decision
1	The distribution of Knowledge score is the same across categories of 4.1 In your opinion, have you had lectures which focus on pain management for infants and children?	Independent-Samples Mann-Whitney U Test	0.445	Retain the null hypothesis.
2	The distribution of Attitude is the same across categories of 4.1 In your opinion, have you had lectures which focus on pain management for infants and children?	Independent-Samples Mann-Whitney U Test	0.678	Retain the null hypothesis.
3	The distribution of Practices of pain alleviation score is the	Independent-Samples Mann-Whitney U Test	0.843	Retain the null hypothesis.

<p>same across categories of 4.1 In your opinion, have you had lectures which focus on pain management for infants and children?</p>			
<p>4 The distribution of Practices of pain assessment score is the same across categories of 4.1 In your opinion, have you had lectures which focus on pain management for infants and children?</p>	<p>Independent-Samples Mann-Whitney U Test</p>	<p>0.389</p>	<p>Retain the null hypothesis.</p>
<p>5 The distribution of Practices of non-pharm measures score is the same across categories of 4.1 In your opinion, have you had lectures which focus on pain management for infants and children?</p>	<p>Independent-Samples Mann-Whitney U Test</p>	<p>0.850</p>	<p>Retain the null hypothesis.</p>



a. The significance level is 0.050.

Asymptotic significance is displayed.

UNIVERSITY of the
WESTERN CAPE

Hypothesis Test Summary

	Null Hypothesis	Test	Sig. ^{a,b}	Decision
1	The distribution of Knowledge score is the same across categories of 4.2 In your opinion, have you attended lectures in pharmacology which focus on pain management for infants?	Independent-Samples Mann-Whitney U Test	0.432	Retain the null hypothesis.
2	The distribution of Attscore_2 is the same across categories of 4.2 In your opinion, have you attended lectures in pharmacology which focus on pain management for infants?	Independent-Samples Mann-Whitney U Test	0.243	Retain the null hypothesis.
3	The distribution of Practices of pain alleviation score is the same across categories of 4.2 In your opinion, have you attended lectures in pharmacology which focus on pain management for infants?	Independent-Samples Mann-Whitney U Test	0.631	Retain the null hypothesis.
4	The distribution of Practices of pain assessment score is the same across categories of 4.2 In your opinion, have you attended lectures in pharmacology which focus on pain management for infants?	Independent-Samples Mann-Whitney U Test	0.453	Retain the null hypothesis.
5	The distribution of Practices of non-pharm measures score is the same across categories of 4.2 In your opinion, have you attended lectures in pharmacology which focus on pain management for infants?	Independent-Samples Mann-Whitney U Test	0.095	Retain the null hypothesis.

The significance level is 0.050.

Asymptomatic significance is displayed.

Hypothesis Test Summary

	Null Hypothesis	Test	Sig. ^{a,b}	Decision
1	The distribution of Knowledge score is the same across categories of 4.3 In your opinion, have you received sufficient instruction in the topic pain management in infants and children to assist you when you work with infants and children in healthcare.	Independent-Samples Mann-Whitney U Test	0.036	Reject the null hypothesis.
2	The distribution of Attscore_2 is the same across categories of 4.3 In your opinion, have you received sufficient instruction in the topic pain management in infants and children to assist you when you work with infants and children in healthcare.	Independent-Samples Mann-Whitney U Test	0.664	Retain the null hypothesis.
3	The distribution of Practices of pain alleviation score is the same across categories of 4.3 In your opinion, have you received sufficient instruction in the topic pain management in infants and children to assist you when you work with infants and children in healthcare.	Independent-Samples Mann-Whitney U Test	0.228	Retain the null hypothesis.
4	The distribution of Practices of pain assessment score is the same across categories of 4.3 In your opinion, have you received sufficient instruction in the topic pain management in infants and children to assist you when you work with infants and children in healthcare.	Independent-Samples Mann-Whitney U Test	0.966	Retain the null hypothesis.



<p>5 The distribution of Practices of non-pharm measures score is the same across categories of 4.3 In your opinion, have you received sufficient instruction in the topic pain management in infants and children to assist you when you work with infants and children in healthcare.</p>	<p>Independent-Samples Mann-Whitney U Test</p>	<p>0.598</p>	<p>Retain the null hypothesis.</p>
---	--	--------------	------------------------------------

The significance level is 0.050.

Asymptomatic significance is displayed.



ANNEXURE C: Permission to use the survey

From: Margaret . WILLIAMS <marwilliams@uwc.ac.za>

Sent: Saturday, May 16, 2020 3:22 PM

To: Health Permissions <healthpermissions@wolterskluwer.com>

Subject: Query from Medknow Site:Permission request

Name: Dr. Margaret . WILLIAMS

Email: marwilliams@uwc.ac.za

Company: University of the Western Cape

Phone: +27-41-3607114

Fax: +27-41-3607114

Subject: Permission request

Message:

I would like to request permission to use the Survey questions from the article: knowledge, attitude and practice of pediatric critical care nurses towards pain: survey in a developing country setting. J Postgrad Med. 2011 Jul-Sep;57(3):196-200. doi: 10.4103/0022-3859.85203

One of my students is busy with this topic, a postgraduate Nursing student studying Nursing Education (Masters Degree), he has chosen the unusual (for SA) topic of pain management in children and the survey in this article is exactly what we require for the study. We will acknowledge the authors

Date and Time: Saturday, May 16, 2020 @ 7:22:13 PM

User IP: 10.232.74.22

Hello Margaret,

Thank you for your email. Is there any form of commercial aspect for the reuse of this material in your survey? This content is published under the Open Access license CC BY NC SA, which allows the material to be reused without permission in purely nonprofit and noncommercial uses. If there will be commercial or profitable use of this content, please explain how.

You can read more about the CC BY NC SA license here: <https://creativecommons.org/licenses/by-nc-sa/4.0/>

Best,
Jenna

Wolters Kluwer Permissions Team

Health Learning, Research & Practice

Wolters Kluwer

healthpermissions@wolterskluwer.com

From: Margaret Williams <marwilliams@uwc.ac.za>

Sent: Monday, May 18, 2020 2:08 PM

To: Health Permissions <healthpermissions@wolterskluwer.com>

Subject: Re: Query from Medknow Site:Permission request



Dear Jenna

Thank you for the reply, and so promptly I am grateful.

No there is absolutely no commercial use involved. My student is a Masters course work student who would like to investigate the knowledge, attitudes and practices of undergrad nursing students at UWC in Cape Town, South Africa and this survey is perfect.

It is only 20% of his degree study so we will not use it for more than 150 students, and it is unlikely that he will publish,

This will assist him so much, I will be so grateful to be able to let him use the survey. Will this be in order?

Best wishes and thank you again

Margaret

Prof Margaret (Maggie) Williams
Associate Professor: School of Nursing
Deputy Director: Head of Clinical Division
Faculty of Community and Health
THE UNIVERSITY OF THE WESTERN CAPE

Rm 625|Level 6|School of Nursing|The University of the Western Cape |
14 Blanckenberg Street | Belville | 7535 | Republic of South Africa

T: +27 21 9591705

E: marwilliams@uwc.ac.za

W: [http://www.uwc.ac.za/Faculties/CHS/Nursing/Pages/Margaret Williams.aspx](http://www.uwc.ac.za/Faculties/CHS/Nursing/Pages/Margaret%20Williams.aspx)

On Mon, 18 May 2020 at 15:41, Health Permissions

<healthpermissions@wolterskluwer.com> wrote:

Hi Margaret,



UNIVERSITY of the
WESTERN CAPE

Thank you for confirming. Since there is no commercial use of the content, the student does not need to obtain permission and is free to use the survey.

Best,

Jenna

Wolters Kluwer Permissions Team

Health Learning, Research & Practice

Wolters Kluwer

healthpermissions@wolterskluwer.com

ANNEXURE D: Consent form

UNIVERSITY OF THE WESTERN CAPE

Private Bag x17, Bellville 7535, South Africa T: +27 21 959 3803/50 F: +27 21 959

3849 www.uwc.ac.za

Consent Form

Research Title: Knowledge, attitudes and practices regarding paediatric pain management among undergraduate nursing students at a university in the Western Cape.

I have read the information presented in the information letter about a study being conducted by Amrani Karikurubu for the Master's Program at the School of Nursing at the University of the Western Cape. This study has been described to me in a language that I understand and I freely and voluntarily agree to participate. My questions about the study have been answered. I have been informed that there are no risks associated with participating in this research study. I have been informed that the research is not designed to benefit the researcher but to provide relevant information about knowledge, attitudes and practices of undergraduate nursing students regarding paediatric pain management at a university in the Western Cape. I understand that my identity will not be disclosed and was informed that I may withdraw my consent and discontinue participation at any time without prejudice. With full knowledge of all foregoing, I agree to participate in this study.

Participant Name : _____ Participant Signature :

_____ Date : _____ Place :

If you have any question about the research study itself, please contact:

Researcher: Amrani Karikurubu; Student Number: 3917249; Mobile Number:
+27626004822; Email: 3917249@myuwc.ac.za

I am accountable to my supervisor: Dr. Talitha Crowley

Email: tcrowley@uwc.ac.za; **Company:** University of the Western Cape

14 Blanckenberg Street, Belleville, 7535

Helpline: 0800 222 333



ANNEXURE E: Ethics approval



UNIVERSITY of the
WESTERN CAPE



18 May 2021

Mr A Karikurubu
School of Nursing
Faculty of Community and Health Sciences

HSSREC Reference Number: HS21/3/13

Project Title: Knowledge, attitudes and practices regarding pediatric pain management among undergraduate student nurses in the Western Cape.

Approval Period: 17 May 2021 – 17 May 2024

I hereby certify that the Humanities and Social Science Research Ethics Committee of the University of the Western Cape approved the methodology and ethics of the above mentioned research project.

Any amendments, extension or other modifications to the protocol must be submitted to the Ethics Committee for approval.

Please remember to submit a progress report by 30 November each year for the duration of the project.

The permission to conduct the study must be submitted to HSSREC for record keeping purposes.

The Committee must be informed of any serious adverse events and/or termination of the study.

Ms Patricia Josias
Research Ethics Committee Officer
University of the Western Cape

NHREC Registration Number: HSSREC-130416-049

Director: Research Development
University of the Western Cape
Private Bag X 17
Bellville 7535
Republic of South Africa
Tel: +27 21 959 4111
Email: research-ethics@uwc.ac.za

FROM HOPE TO ACTION THROUGH KNOWLEDGE.

PERMISSION TO CONDUCT RESEARCH AT THE UNIVERSITY OF THE WESTERN CAPE

Dear **AMRANI KARIKURUBU**

This serves as acknowledgement that you have obtained and presented the necessary ethical clearance and your institutional permission required to proceed with the project referenced below:

Name of Researcher: AMRANI KARIKURUBU

Research topic: Knowledge, Attitudes and Practices Regarding Pediatric Pain Management Among Undergraduate student Nurses at a University in The western Cape

Date permission is valid till: 05-17-2024 (or as determined by the validity of your ethics approval)

Ethics reference: HS21/3/13

Reference code: UWC4973277104705153792

Additional comments: No additional comments

You are required to engage this office in advance if there is a need to continue with research outside of the stipulated period. The manner in which you conduct your research must be guided by the conditions set out in the annexed agreement: Conditions to guide research conducted at the University of the Western Cape.

Please be at liberty to contact this office should you require any assistance to conduct your research or require access to either staff or student contact information.

Regards

Dr Ahmed Shaikjee

Deputy Registrar Academic Administration

ANNEXURE G: Editor's letter

Leverne Gething, M.Phil. *cum laude*
PO Box 1155, Milnerton 7435; cell 072 212 5417
e-mail: leverne@eject.co.za

11 November 2022

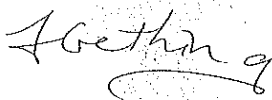
Declaration of editing of a Master's thesis

**Knowledge, attitudes and practices regarding paediatric pain
management among undergraduate nursing students at a university
in the Western Cape**

I hereby declare that I carried out language editing of the above thesis on behalf of Amrani Karikurubu.

I am a professional writer and editor with many years of experience (e.g. 5 years on *SA Medical Journal*, 10 years heading the corporate communication division at the SA Medical Research Council), who specialises in Science and Technology editing – but am adept at editing in many different subject areas. I have edited a great deal of work, including academic papers and theses, for various academic journals, universities and publishers.

I am a full member of the South African Freelancers' Association as well as of the Professional Editors' Association.




Yours sincerely

LEVERNE GETHING leverne@eject.co.za

1

ANNEXURE H: Turnitin report



133 AK

- Overview
- Announcements
- Course Resources
- Lessons
- Self-paced study
- Discussion Forum
- Meetings
- Sign-up
- Assignments**
- Tests & Quizzes


ASSIGNMENTS

Link Help

Thesis submission for Turn it in checks - Submitted Nov 15, 2022 5:25 PM

Assignment has been submitted on Nov 15, 2022 5:25 PM

In progress Submitted Returned

Title	Thesis submission for Turn it in checks
Due	
Number of resubmissions allowed	Unlimited
Accept Resubmission Until	Dec 31, 2022 12:00 AM
Status	Submitted Nov 15, 2022 5:25 PM
Grade Scale	No Grade
Modified by instructor	Sep 27, 2022 1:37 PM
Turnitin Report	 24% - AMRANI K FINAL THESIS 15 NOV 2022(Turnitin).docx
History	Tue, 20 Sep 2022 13:00:23 +0200 AMRANI Karikurubu (3917249) saved draft 