NURSES KNOWLEDGE, ATTITUDES AND PRACTICES TOWARDS PAIN ASSESSMENT AND MANAGEMENT IN INTENSIVE CARE UNITS AT KASAMA GENERAL HOSPITAL, ZAMBIA

BY

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A DISSERTATION SUBMITTED TO THE UNIVERSITY OF ZAMBIA IN FULFILLMENT OF THE REQUIREMENTS OF A DEGREE OF MASTER IN CRITICAL CARE NURSING

THE UNIVERSITY OF ZAMBIA

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MAY, 2025

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DECLARATION

I Chibochi Kaminsa do hereby declare that this research paper on Nurses knowledge, attitudes and practices towards pain assessment and management in ICUs at Kasama General Hospital, Zambia is my original work. It has not been previously submitted in its entirety or in part for a degree, diploma or any other qualification or any other University. All sources used in this research have been cited and acknowledged by means of complete references.

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ABSTRACT

Critically ill patients, have challenges reporting pain given their physical state. The complex nature of critical illness and diverse needs of patients may impact on the effectiveness of pain assessment and management in the intensive care units (ICU). Effective pain assessment culminates in effective pain management and nurses play an important role in ensuring effective pain management. Existing literature has shown a gap in the practice of pain assessment and management and efforts have been made to try to mitigate the inefficiencies among nurses, yet their knowledge, attitudes, and practices (KAP) in this domain remain variable and impact patient outcomes. This study assessed the nurses' knowledge, attitudes and practices towards pain assessment and management of patients in ICUs at Kasama General Hospital. The study employed a quantitative cross sectional analytical study design. A population of 53 Participants was selected using census sampling method. A self-administered questionnaire was used following approval of the study by the local Ethics Committee. Written consents were obtained before commencement of the study. Data was analyzed using SPSS version 26 employing Binary Logistic regression and chi square. The results revealed significant associations ($P \leq 0.05$) between gender ($P = 0.014$), years of experience ($P = 0.046$), and attitude ($P = 0.002$) to practice of pain assessment and management. Binary regression also revealed that females (AOR: 6.247, 95% CI: 1.19-32.70, $p = 0.030$), nurses with more than 10 years of experience (AOR: 3.962, 95% CI: 1.26-23.5, $p = 0.002$) and nurses working in the Pediatric Intensive Care Unit (AOR: 3.504, 95% CI: 0.001-11.51, $p = 0.019$) and Neonatal Intensive Care Unit (AOR: 6.098, 95% CI: 2.85-5.82, $p = 0.002$) had significantly increased odds of good practice. In addition, having positive attitude (Attitude: AOR: 2.007, 95% CI: 2.33-23.3, $p = 0.016$) and possessing knowledge (AOR: 3.267, 95% CI: 0.99-2.47, $p = 0.004$) about pain assessment and management was significantly associated with higher odds of good practice. This study revealed that pain assessment and management practices among nurses at Kasama General Hospital are influenced by their knowledge levels and type of attitudes. Therefore, it is recommended that professional development programs be intensified and educational opportunities on pain management and assessment increased for nurses working in the ICUs.

Key words*: Pain management, pain assessment, Intensive care units, Nurse's Knowledge, Nurses attitudes and practice*

ACKNOWLEDGEMENT

I would like to thank God almighty for his grace and faithfulness towards me during the development of this research.

My greatest appreciation goes to my supervisor and mentor in research Dr. Priscar Sakala Mukonka, my co- supervisor Phadaless Phiri Sinkamba (Mrs) and the University of Zambia school of Nursing sciences staff for their timely and untiring guidance in supervising and developing of this research.

In addition, I would like to acknowledge funding from Fogarty International Center of the National Institutes of Health, U.S. Department of State's Office of the U.S. Global AIDS Coordinator and Health Diplomacy (S/GAC) and the President's Emergency Plan for AIDS Relief (PEPFAR) under the Award Number R25 TW011219 under the project title: Strengthening Health Professional Workforce Education Programs for Improved Quality Health Care in Zambia (SHEPIZ) Project.

Finally, I would like to thank the nurses at Kasama general hospital for consenting to participate in this study and my Husband Mr. Muyunda and family for the unwavering support rendered throughout the development of this dissertation.

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ABBREVIATIONS

ICU	Intensive care unit
KAP	Knowledge, Attitudes and Practices
NRS	Numerator rating scale
VAS	Visual analogue scale
CPOT	Critical care pain observation tool
BPS	Behavioural pain scale
GCS	Glasgow coma scale
NSAIDS	Non-steroidal anti-inflammatory drugs
FPS	Face pain scale
HRV	Heart rate Variability
SCA	Skin conductance algesimeter
PABP	Pain assessment, behavior and physiology test
KGH	Kasama General Hospital

CHAPTER ONE

INTRODUCTION AND BACKGROUND INFORMATION

1.1 Introduction

Pain is a major issue among critically ill patients that it is considered a fifth vital sign in patients that are severely ill. The consideration of pain as a fifth vital sign makes it an important marker in the patients' condition and is an indicator of the patient's rate of recovery (Kutluturkan and Aydan, 2019). Pain assessment therefore, should be conducted correctly by skilled health providers that can provide the best care and make appropriate choices for patient safety. Effective pain assessment however may rely on the level of consciousness of the patient and the severity of the patients' condition. It is important to note that pain assessment and management is a dynamic process that changes as the patients' condition changes (Curseen, Taj aand Grant, 2020). The severe the patients' illness, the more likely strong analgesics like opioids can be considered in the management of pain. The practice of pain assessment and management is highly reliant on the nurses' ability to correctly assess pain; practice hence can be influenced by the nurses' knowledge levels and attitudes. This study therefore aimed at establishing the nurses' knowledge, attitudes and practice in the assessment and management of pain among critical care patients in the intensive care units at Kasama General Hospital. The study findings are significant as they provide benefits such as improving patients' outcomes, reducing health care costs and fostering standardization of pain assessment and management (Mweene et al., 2017. Mwamba et al, 2019).

1.2 Background

The ICU is a hospital unit that admits critically ill patients with life threatening conditions that have to undergo invasive monitoring procedures which may cause severe tissue damage resulting in pain. According to the Critical Care Society (2021), in the United States of America it is estimated that over 5 million people are admitted into the ICU annually with patients in need of but not limited to: cardiac monitoring, respiratory support and acute pain management. In Germany, 80-90% of patients admitted in the ICU experience moderate to severe pain (Shahnaz, 2018) while in Canada, the incidence rate of pain in critically ill patients was 50% and the percentage increased to about 80% during nursing procedures such as suctioning, turning and

insertion of tubes (Skrobik, 2014). The altered physiologic state that patients are admitted with into the critical care setting makes most patients experience some form of pain on admission and during hospital stay.

In Africa, pain assessment and management inadequacies continues despite efforts to improve the practice and assessment capacities among ICU nurses. According to recent data, South Africa a country with improved infrastructure faces challenges in pain assessment and management due to lack of trained nurses (Randa and Phale, 2023). In addition, Nigeria with a population of over 200 million with only about 30 public ICUs and is economically lacking has in addition, challenges with resources that are supposed to be used in the ICU for pain assessment and management (Tobi and Ogunbiyi, 2024). The reduced number of ICUs in the country like Zambia, has contributed to majority of critically ill patients being managed in the general wards by nurses that may lack adequate knowledge, have inefficient practice and negative attitudes regarding pain assessment and management.

In Zambia, pain is a common issue among admitted patients in the ICUs with over 52.9% of patients having experienced severe pain during hospital stay which is consistent with global trends (Simate et al, 2019). Health care factors such as limited availability of pain assessment tools, inadequate training on pain management, insufficient supply of medicine and negative attitude towards pain management have been challenges that have a huge impact on pain assessment and management. Pain assessment is cardinal throughout the management of critically ill patients exclusively before, during and after nursing procedures to ensure effective treatment (Mwape et al, 2017. Kachimba et al, 2019. Soko et al, 2018).

The International association for the study of pain (2020) defines pain as “An unpleasant sensory and emotional experiences associated with, or resembling that associated with, actual or potential tissue damage”. The actual or potential tissue damage can be caused by various factors which can vary in intensity and extent, these factors may include: stress, anxiety, disease and trauma. Pain is understood to be caused by nociceptors release of neurochemical mediators such as bradykinin, increased hydrogen ions, serotonin and histamine (Dussor, 2015, Slukka and Gregory, 2015). Therefore, pain perception may be increased when there is an increase in the release of neurochemical mediators (Rosa and Fantozzi, 2013). Critically ill patients who have

an alteration in the physiological function of the body and are subject to insertion of equipment during their management are prone to tissue damage which may increase the release of neurochemical mediators thus increasing their perception of pain. Regardless of the extent and severity of pain, it may cause physical, emotional and psychological distress hence the need to be managed either pharmacologically or non-pharmacologically.

Management of pain in critically ill patients requires that nurses who are the primary health care providers conduct a thorough assessment to enable adequate treatment of pain experienced in the patients' state of vulnerability. Pain assessment is important as it allows for: proper diagnosis of pain, identification of the underlining causes and monitoring and evaluating if the underlying cause is deteriorating or not (Nursing Times, 2015). Filligim et al (2016) states that pain assessment serves several functions, including documenting the severity of pain, tracking the course of pain, and providing mechanistic information. Therefore, pain assessment must be holistic in nature and should include assessment of sensory, affective qualities, location, distribution, and intensity of pain and any loss of motor function. Pain is subjective in nature and the patients' pain intensity and threshold differs according to their level of pain modulation allowing effective pain management (Benzon, et al, 2018). Patients can be assessed for pain using a verbal pain scale which is qualified for patients who are able to self-report, which critically ill patients may be unable to do. In a study by Alnajar et al (2021) showed that nurses assessed for pain in 60% of all patients that were self-reporting using the numerical rating scale (NRS), Visual analog scale (VAS) and face pain scale (FPS) and 50% in those that were not able to self-report. The average values in this study shows that not enough patients were being assessed for pain during their management hence, increasing the risk of ineffective treatment. Patients with lowered consciousness may need to be assessed for presence of pain by using other pain assessment methods such as the critical care pain observation tool (CPOT) and the Behavioural pain scale (BPS) (Urden, et al, 2014). It is a common practice to combine pain assessment methods in the ICU in order to increase chances of correctly assessing pain, the behavioral methods such as the CPOT and BPS can be combined with physiological methods such as Heart rate variability (HRV) and Skin conductance algesimeter (SCA) tools or multimodal methods such use of the pain assessment, behavior and physiology (PABP) tool (Clarke, 2018). In addition, pain assessment can be done effectively in critically ill patients by

assessing the non-verbal cues that the patient may show such as variability in heart rate of facial expressions which can aid in proper pain scoring. In a study done in Zambia by Wahila et al (2018), revealed that assessment of facial expressions in patients is of cardinal importance as well as monitoring and assessing the vital signs in the management of pain emphasizing that physiological changes such as vital signs increase due to increased stimulation of nociceptors.

The process of pain management was introduced especially in the management of critically ill patients in order to try to correctly diagnose the pain and establish a correct amount of treatment. Effective management of pain in ICU patients involves use of both opioid and non-opioid analgesics as first line treatment (Pota et al, 2022) leading to positive patient outcomes of critical patients. Use of analgesia should be according to individual needs of patients to avoid under treatment and over treatment. This however is reliant on effective use of pain assessment methods which may be somewhat challenging for patients on ventilation (Choi, 2021). In as much as opioids remain the main treatment of pain in the ICU, the patients may develop adverse effects such as delirium, withdrawal and dependence, over sedation and constipation, which may lead to increased morbidity, prolonged hospital stay and increased use of hospital resources (Motes, 2022) hence, patients should be monitored for development of any of the adverse effects.

In the ICU, health care factors may act as barriers to pain management, were nurses providing health services may be incompetent in pain management. Nurses may have inadequate knowledge due to lack of training on pain management, lack of resources such as limited availability of analgesia, lack of pain assessment tools, limited autonomy in decision making and lack of structured pain management guidelines (Samarkandi, 2021., Ayenew, 2021., Subramanian, 2014., Rabbaba, 2021) negatively affecting the rates of pain management. In addition, challenges such as forgotten priorities in which all the nursing care given to the patients is routine, organizational barriers in which nurses have increased workload, pain assessment is not a priority and nurses attitude problems can lead to failure to recognize that patients that are critically ill may be in pain (Deldar et al, 2018). Several other factors do play a major role in inhibiting good pain treatment such as: overly restrictive controlled medicines' laws, inaccurate actual opioid consumption estimation practices; knowledge gaps in the prescription of opioids; critical shortage of prescribers; and high out-of-pocket financial expenditures for both the hospitals and patients against a backdrop of high levels of poverty (Namisango et al, 2018).

These factors combined may have an extreme impact on pain management in critically ill patients.

In the Zambian context, nurses trained in Zambian Nursing colleges are trained to manage pain as the nursing curriculum includes pain management (NMCZ, 2021). This is with the sole purpose of increasing the knowledge, correcting attitudes and increasing effectiveness of practices regarding pain assessment and management. Therefore, pain in critically ill patients at Kasama General Hospital ICUs is managed using the information acquired during training (KGH, 2023). In addition, efforts have been made to increase the knowledge levels, practice and attitudes towards pain management and assessment among nurses that work in the ICUs through workshops and online training sessions (CCNA, 2024). None the less, pain among ICUs patients in Zambia is a continuous issue that needs constant attention in that assessment of pain at Kasama General Hospital ICUs is conducted by nurses with physiological methods such as heart rate variability (HRV) and self-reporting method (KGH statistics, 2023). However, these methods used to assess pain are not in combination and not ideal for use if used individually in patients that are unable to self-report (Devlin et al, 2018).

Inspite of the efforts made by different stake holders, the rate of pain assessment is below par as patients are managed for pain with insufficient use of pain assessment tools which may result in significant physiological consequences such as chronic pain and disability and psychological consequences including: depression, anxiety and post-traumatic stress. Hence, there is need of assessing the knowledge levels, attitudes of nurses and their practices of pain assessment and management. The study is expected to provide valuable insights to guide the development of targeted interventions, training programs, and quality improvement initiatives to enhance pain assessment and management of patients in ICU.

1.3 Statement of the problem

Globally, it is projected that over 51% of all ICU admissions have an experience of moderate or severe pain (Changues et al, 2014), hence, critically ill patients depend on the nurses' ability to correctly assess, diagnose and manage pain. (Rose et al 2014). Adequate treatment of pain in ICU patients consequently leads to reduced complications and improved patient outcomes. (Harriet et al, 2019). Despite implementation of various strategies to improve the nurses'

knowledge, attitudes and practices (KAP) on pain assessment and management at Kasama General Hospital, there are inefficiencies and inadequacies in their practices. Table 1 shows the percentages of admissions, assessments and pain management percentages among ICU patients from the year 2019 to 2022.

Table 1: Admissions, pain assessment and management among ICU patients at Kasama General Hospital

Year	**No. of Admitted patients**	**No. of patients assessed for pain**	**No. and percentages of patients treated for pain**
2022	205	69 (33.7%)	205 (100%)
2021	149	23 (15.4%)	149 (100%)
2020	118	48 (40.7%)	118(100%)
2019	163	35 (21.5%)	163 (100%)
Total	**635**	**175 (27.5%)**	**635**

The statistics in the Table 1 above show that in the year 2019, 21.5% of admitted patients were assessed for pain. In the year 2020, the percentage increased to 40.7%. In 2021, the percentage reduced to 15.4% and increased to 33.7% in 2022. However, all the patients in the past four years have been treated for some pain regardless of them being assessed or not.

From the statistics above, pain assessment is being conducted by nurses in patients admitted in ICU. However, the rates are low for reasons not known. The percentages above indicate that the highest assessment rate was in 2020 with 40.7% (KGH, 2023) highlighting under practice among nurses as all patients should be assessed for pain regardless of whether they are able to self-report or not. The low pain assessment levels could be attributed to the nurses having inadequate levels of knowledge, poor practice and attitudes towards pain management. The statistics further show that nurses managed pain in all admitted patients. While this was being conducted; it was without consideration of patients pain score as inadequate pain assessment was performed showing a discrepancy in the practice of pain assessment and management by nurses than what is ideal.

It is imperative that thorough pain assessment is performed in order to allow for effective pain management as pain assessment levels that are below par could lead to ineffective treatment (Fry et al, 2017) and pose a negative impact on the patients quality of life causing an increase in poor patient outcomes such as depression, anxiety, post-traumatic stress that can become a source of distress to the patient and family members and in turn lead to increase in health care costs and morbidity rates (Griggs, 2017). With this, it is of withstanding importance to consider the immediate and long term effects on the health care system emphasizing the need to assess the ICU nurses' knowledge, attitudes and practices regarding pain assessment and management

1.4 Justification

KAP study on pain assessment and management among nurses plays a critical role in identifying knowledge gaps and behavioral patterns among nurses in order to implement effective pain management interventions through establishment of targeted strategies to promote improved patient outcomes and patient wellbeing (Papagiannis, 2020). Globally, there is ongoing need for improvement in regards to knowledge, attitudes and practices of nurses towards pain assessment and management (Critical care society, 2020). Inspite of researches conducted in other countries, Zambia, in the context of Kasama General Hospital revels significant gaps with existing literature showing research focused on pain management of patients in medical and surgical wards (Shamambo, 2016). Therefore, leaving a gap on pain assessment and management that should be assessed in the ICU.

This research aimed to bridge the gap by assessing the KAP of nurses on pain assessment and management in the ICU instead of a general research that can evaluate pain assessment in all admitted patients in the hospital. The results of this research paper endeavors to inform evidence based practice, improve health care provider education, understand nurses' practices, improve patient outcomes and enhance patient care in the ICU.

1.5 Theoretical framework

A theoretical framework is an important aspect in research as it delves to provide understanding and explain concepts in a study underpinning the outline of the entire research methodology and interpretation of results. A theoretical model such as the knowledge, attitude and practice (KAP)

model provides insights into the factors knowledge, attitudes and practices of nurses towards pain assessment in critical care units.

1.5.1 Description of the model

The KAP model was adapted in this study. The model was formulated by the Carl Rogers who developed the model in his broader theory on behaviour change (Rogers, 1951). This model has been used in various fields of study including public health and social sciences to study behaviour change and health promotion. This model amplifies the importance and effects of the three concepts of study including knowledge, attitudes and practices

Knowledge: In this model knowledge refers to the understanding and awareness of a particular issue or behaviour. Reiterating the need to provide adequate, accurate and relevant information to individuals or communities to create awareness and change in behaviour.

Attitudes: This model further elaborates on the concept of attitudes which refers to the perceptions, feelings, and opinions of individuals towards a particular issue or behaviour. This concept emphasizes the need to influence the motivation and willingness of a particular individual or community to change their behaviour or view of a particular issue.

Practices: Practices is a concept of the KAP model that refers to actual behaviour or actions individuals take in response to their knowledge and attitudes. It underscores the idea of adopting and maintaining new behaviours and practices.

Utilization of the KAP model is important as it assists in identifying the knowledge gaps, assessing attitudes and beliefs and evaluating current practices as knowledge, attitudes and practices are interrelated as the two: knowledge and attitudes can influence the practices of nurses (Launiala, 2009, Bashar, 2015). Therefore, KAP model is ideal for this study as the aim was to assess the knowledge, attitudes and practices of nurse regarding pain assessment and management, giving insight on how the knowledge levels and attitudes may influence the nurses' practices in regards to pain management.

1.5.2 Assumptions of the KAP model

The assumptions of the study are summarized below

i. The KAP model assumes that knowledge is a pre-requisite for behaviour
ii. Knowledge can be acquired through communication and education
iii. Attitudes can influence behaviour though it can be improved through influence and education.
iv. The model also assumes that behaviour is a direct result of attitude and knowledge levels.
v. Lastly, practice can be influenced by environmental factors such as availability of resources

1.5.3 Application of the KAP model to the study

Knowledge is what nurses know, the knowledge of nurses is based on scientific facts and universal truth about biomedical information. Nurses acquire this knowledge through ideas such as perceptions, imagination, memory, judgement and reasoning. Nurses working in the ICU should have high levels of knowledge in regard to: causes, types, levels, indicators, adverse effects, assessment and management of pain in order to improve patient outcomes and patient satisfaction (Jarrett A et al, 2013).

In acute care settings, most patients are in critical conditions or physiological states hence are unable to manage the pain by themselves, emphasizing the need for nurses to monitor the patients' verbal, non-verbal and physiological signs that could be indicative of presence of pain. This model requires nurses' application of their knowledge to influence positive practices which would thus lead to improved pain assessment and management and improved pain experiences in patients. Knowledge is a vital requirement though it can be affected by social demographic factors such as gender and level of education. Limited knowledge on pain, the importance of assessing it and how it should be managed has a direct influence on the practices of nurses (Bashar, 2016).

Attitudes of nurses in regards to pain assessment and management can develop due to situations they encounter while managing patients with pain and can be influenced by environmental factors such as resource availability, communication with other health care professionals, work

culture, severity and prognosis of ICU patients and nurses' personal culture and beliefs. In addition, nurses' personal values, levels of knowledge and opinions can also affect how nurses behave. Attitudes may be beneficial as they can influence positive work ethic to pain assessment and management if positive while negative attitudes caused by other factors may pose as barriers to effectively assessing and managing pain (Badr, et al, 2015). In this view, it is imperative that knowledge and attitudes in this study are assessed separately in order to get clear and accurate results as they are two distinct factors.

Nurse practice in this study entails nurses having the skill to assess and manage pain and take actions as required to help with pain management that includes: performing care actions such as assessing pain levels, relaxation techniques, guiding patients on proper positioning to relieve pain, providing physical and psychological aid by administering medications and assuring the patient of a positive outcome, ensuring a positive environment and teaching the patient on the causes of pain (Sweity et al, 2022). This model is justified as it illustrates that practice is not an independent entity as it can be influenced by knowledge and perception of nurses. Therefore, nurses' practice of pain assessment and management can be largely influenced by how Nurses' perceive situations and their levels of knowledge.

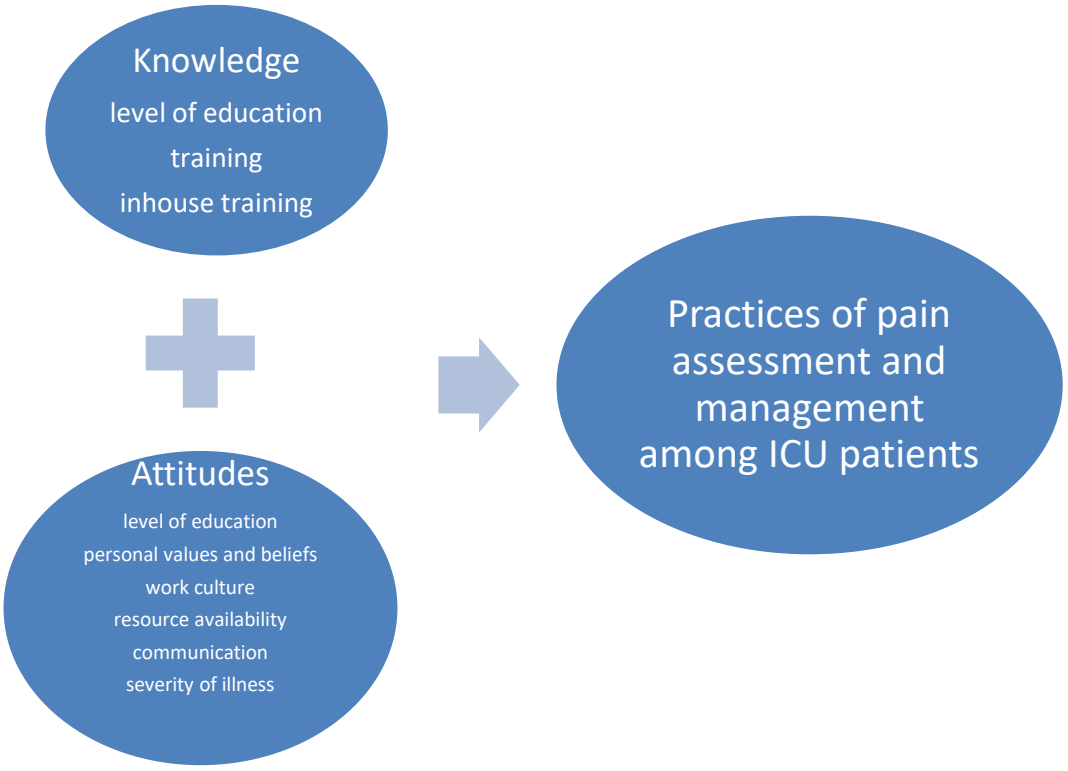

Figure 1. Conceptual framework of the relationship between knowledge, attitudes and practices of nurses in the ICU on pain assessment and management.

1.6 General objective

To assess nurses knowledge, attitudes and practices of pain assessment and management among patients in intensive care units at Kasama General Hospital, Kasama.

1.6 Specific objectives

1. To assess nurses practices of pain assessment and management of patients in the intensive care units at Kasama general hospital, Kasama, Zambia.

2. To determine nurses knowledge levels on pain assessment and management of patients in intensive care units at Kasama general hospital, Kasama, Zambia

3. To determine nurses attitude towards pain assessment and management in the intensive care units at Kasama general hospital, Kasama, Zambia.

1.7 Research questions

1. What are the practices of nurses towards pain assessment and management of critically ill patients in the intensive care unit?
2. What are the knowledge levels of nurses concerning pain assessment and management among critically ill patients in intensive care unit?
3. What are the attitudes of nurses towards pain assessment and management in the intensive care unit?

1.8 Variables

1.8.1 Dependent variables

- Nurses pain assessment and management practices

1.8.2 Independent variables

- Knowledge levels of ICU nurses about pain assessment and management
- Attitude of ICU nurses towards pain assessment and management
- Practices of ICU nurses with pain assessment and management

Table 2: Variables, Indicators, Cut-off points and Type of measurement

Variables	Conceptual definition of variables	Operational definition of variables	Level of measurement		
			Indicator	**Cut of point**	**Type of measurement**
DEPENDENT VARIABLE S					
Nurses pain assessment and management practices	Pain assessment refers to evaluation of multiple types of pain ranging from nociceptive pain to neuropathic pain and implementation of personalized treatment to reduce pain (Dydyk and Grandhe, 2023).	Pain assessment refers to the various methods that health providers use to determine presence of pain in a patient and utilization of the best treatment modality in order to reduce the pain.	Good pain assessment practices.	Score above 70 % on practices of pain assessment.	Nominal
			Poor pain assessment practices.	Score less than 70% on practices of pain assessment.	

INDEPENDENT VARIABLES					
Knowledge	Knowledge refers to the nurses' familiarity, awareness, or understanding of facts, information, skills of pain assessment and management acquired through experience, education, perceiving or learning. (Hetherington S, 2022).	Knowledgeable will refer to a continuous application of knowledge of pain assessment and management and show of understanding of the effects of undertreated or unmanaged pain.	Adequate Knowledge on pain assessment and management.	Score above 70% on pain assessment and management.	Nominal
			Inadequate Knowledge on pain assessment and management.	Score less than 70% on pain assessment and management.	
Attitude	Attitude is nurses' relatively enduring evaluation of pain of a person admitted in the ICU	Attitude refers to the nurse's view and perceptions of how pain can be managed in critically ill patients.	Positive attitudes towards pain assessment and management.	Score above 60% on pain assessment and management.	Nominal
			Negative attitudes towards pain	Score less than 60% on pain assessment and	

	(Bizer, Barden and Petty, 2006).		assessment and management.	management.	
Practice	Practice is nurses' systematic application of specialized knowledge and skill on individuals who are experiencing pain in the ICU or those that require assistance in maintenance of health or management of illness or injury (Ustun T, 2017).	Practice is the ability of the nurse to properly assess a patient who is in pain who is able to self-report or not and treat the patients' pain and manage the pain efficiently.	Good practice among nurses in the ICU.	Score above 70% on pain assessment and management	Nominal
			Poor practice among nurses in the ICU.	Score less than 70% on pain assessment and management.	

1.10 Conclusion

In conclusion, this chapter has recognized the critical necessity to assess the knowledge, attitudes and practices of nurses towards pain assessment and management at Kasama General Hospital, Kasama, Zambia. The background has drawn the importance of this study in preventing complications such as poor patient outcomes and has additionally introduced the research objectives, justification, and theoretical framework that guided the study, highlighting the importance of nursing knowledge, attitudes, and practices in pain assessment and management. By identifying gaps in current practices, this study aims to contribute valuable awareness to improving ICU nursing care services.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter draws into the review of literature of factors affecting pain assessment and management of critically ill patients in intensive care units particularly, nurses' knowledge, attitudes and practices. Knowledge and attitudes are critical factors that underpin the practice of nurses in the provision of nursing services in the ICU especially on pain assessment and management. The nurses' knowledge level and types of attitudes link to the effectiveness of pain management in the ICUs. A literature search of online platforms such as Pubmed, Medline, Google scholar and library searches was conducted with search terms like "Knowledge and attitudes to pain management, KAP among nurses in ICU, Nursing practice in ICU." The literature comprised primary researches and paper reviews such as narrative reviews, systematic reviews and meta-analysis reviews.

The chapter focused on literature search that gave more information on the sections of the overview of pain assessment and management, the socio-demographic characteristics of ICU nurses, their knowledge, practices and attitudes on pain assessment and management among critically ill patients in the ICU. Each section identified gaps in literature and methods of improving nursing care.

2.2 Socio-demographic characteristics of nurses in the intensive care units

Nurses in the intensive care units possess diverse socio-demographic characteristics that affect pain assessment and management. The ICU is predominantly female influencing team dynamics, communication and the ability to make decisions about patient care and overall impacting the ICU work environment (Pota, Coppolino, and Barbarisi, 2022). Varying educational levels of nurses impact their skills in pain assessment and management. Furthermore, differences in educational levels that are a mainstay in the ICUs give diverse levels of knowledge among nurses revealing the need for continued professional development. It is correspondingly significant to recognize the importance that age and years of experience have, as they bring into the ICUs environment different levels of expertise and different perspectives to the ICUs pain

assessment and management system (Wheeler et al, 2018). In addition, nurses experiences in use of advanced technology and receptivity of new ideas is diverse across different age groups. Examining culture and diversity, they shapes the perceptions, beliefs and outlook of the nurses on pain assessment and management as they influence use of culturally inclined care to the patient by being culture sensitive. It is cardinal to recognize that the wellbeing of nurses can be compromised by influencing factors such as anxiety, stress, increased workload, compassion burnout thus affecting the pain assessment and management practices (Sjoberg et al. (2017). Exploring the socio-demographic factors is fundamental to understanding the disparities in pain assessment and management practices among nurses,' improve patients' outcome, inform healthcare policy, and develop targeted interventions to improve pain management practices.

2.3 Overview of nurses' knowledge, attitudes and practices on pain assessment and management in the intensive care units

Pain is one major symptom that is reported in patients admitted in critical care settings (Fink et al, 2015) who experience different levels of pain due to medical or surgical conditions and differences in the level of actual tissue damage present. Pain is a frequent event among ICU patients with an incidence rate of over 50% in medical and surgical patients (Tsuruta and Fujita, 2018), whose pain levels increase from mild to severe during nursing procedures; therefore, medications can be administered to aid with pain before or after nursing procedures (Puntillo, 2014., Chen and Chen, 2015., Pota and Coppolino et al, (2022)). Intravenous opioids are first line drugs of choice in the treatment of non-neuropathic pain in critical patients. However, non-opioid analgesia can be used to reduce opioid related side effects. (Barr J, et al, 2014). In this regard, nurses ought to understand the administration guidelines of opioids and non-opioid drugs in patients that are experiencing pain and observe the patient for development of any adverse reactions.

An important aspect of nursing services provided in the ICU is pain assessment and management which is reliant on the nurses' level of knowledge, type of attitudes and effectiveness of their practice. In the landscape of health delivery, knowledge is fundamental for nurses to possess and utilize (Olsen et al, 2020). Its applicability stems from nurses ability to understand pain, its physiology, types, assessment tool and management options. However, it is crucial that nurses

furthermore demonstrate compassion and empathy towards critically ill patients and possess beneficial beliefs about the causes, treatment and consequences of pain in patients. Thus, the practice of nurses requires regular use of pain assessment tools necessitating effective pain management through planning and facilitation of patient education and interdisciplinary collaboration.

Effective knowledge, attitudes and practices of nurses can lead to improved patient outcomes, enhanced patient satisfaction and better quality of life (Ayenew and Melaku, 2021). Hence, nurses have cardinal roles in the provision of pain assessment and management services to critically ill patients in the ICU, as the patients are reliant on nurses' ability to assess pain and manage pain effectively. With this, it is with outmost importance that each nurse takes deliberate action to apply and improve their ability to assess and manage pain for the benefit of the patient.

Research underscores the significance of effective pain assessment and management to improve patient outcomes and satisfaction through utilization of evidence-based practice (Puntillo, 2016). Inadequate utilization of standardized pain assessment tools and inability to follow guidelines and protocols on pain management in the diverse conditions of ICU patients may result in poor patient outcomes and lack of satisfaction. Understanding the nurses KAP on pain assessment and management is important to identify potential gaps in practice and enhance patient care.

Within the African context, studies have publicized significant gaps between pain assessment and management practices that revealed the need for KAP studies to be carried out in this aspect to understand why this difference exists (Koftis et al, 2017). In a study conducted by Malek et al, (2021) in Jordan among nurses reports poor pain assessment for patients able to self-report and unable to self-report pain with inadequate pain management. The study highlighted lack of pain assessment and management guidelines as the most common barrier and most common enablers being prescribing analgesia and considering pain a priority. The gaps identified emphasized the significance of effective documentation, discussions on pain assessment and management during ward rounds and good communication in the health care team. Similarly, another study in Jordan indicated that nurses' defective communication, lack of guidelines and patients instability immensely affected pain assessment and management (Mohammad, Shatha and Audai, 2022).

Therefore, revealing the significance of developing universal guidelines and standards to facilitate effective pain assessment and management.

Moreover, more than half of the studied sample in Egypt by Badr., Morsy., and Khalil, (2015) reported that nursing workload and work burn out enables nurses poor pain assessment and management as they easily forget to assess the patient for pain, stressing the need for facilitating realistic workload management, fostering a positive work culture and establishing flexible work arrangements.

In Zambia, a study by Mwango et al (2018) revealed inadequate pain assessment and Siziya et al (2017) highlighted resource constraints as a barrier to effective pain management. The need to promote effective pain assessment should not be of question as nurses must possess adequate knowledge, practices and favorable beliefs on pain assessment in order to facilitate proper management. However, required results to enhance practice would not be yielded if a shortfall in knowledge or attitude is present (Arbour and Choinière et al, 2014).

Furthermore, the current study aims to address the gaps identified and aims to contribute valuable awareness and facilitate development of strategies to improve pain assessment and management practices aligned with best practices, ultimately enhancing patient safety and outcomes. The study also has the potential to serve as a model for improving care practices in similar settings across Africa and globally emphasizing its significance within the broader healthcare system.

2.4 Knowledge of nurses on pain assessment and management

Knowledge is a vital aspect of assessing and managing pain. Nurses are the primary care givers and should have adequate knowledge for effective pain assessment and management. Inadequate pain assessment is due to nurse-related barriers such as knowledge deficits related to pain assessment principles, failure to use pain assessment tools, and communication difficulties between the patient and the healthcare team (Puntilo et al, 2014). Nurses' in the ICUs are anticipated to have the necessary level of knowledge and abilities or skills in pain assessment in order to interpret the findings and give appropriate treatment (Arbour and Choinière et al, 2014).

Application of knowledge allows nurses to effectively utilize the pain assessment tools and improve ICU communication and overall pain management.

Muhammad and Mondol (2018) in Bangladesh explored factors influencing pain assessment, affirming that understanding is of importance when assessing patients in ICUs and during administration of analgesia for pain management. The study attributed adequate knowledge levels to frequent practice of pain assessment as well as by in house training and workshops on pain assessment and management. However, this highlighted the need for global access to resources and adequate information on pain assessment and management. Temesgen et al. (2021) delved into pain management among nurses in Ethiopia. The research reports adequate knowledge levels among nurses assessing pain in critically ill patients. It is imperative to recognize that having adequate knowledge on pain assessment differs substantially from it being put in practice. Therefore, this study revealed a gap that required exploration on the practice of nurses regarding pain assessment.

On the other hand, a review conducted by Alotni et al, (2022), indicated that nurses had poor knowledge and skills to effectively assess a patient in a critical care setting for pain; this was attributed to the nurses' dependency on following the doctor's orders, lack of education, and low numbers of members of staff. The study findings underscore the need for education on the effects of unmanaged pain in critically ill patients and the need to take appropriate actions to manage pain. Similarly, Almutairi et al (2022) reports that ICU nurses' pain management awareness score was 22.5% that showed lack of knowledge and behavioral deficits towards pain management. Thus identifying the need for nurses' knowledge to be continuously monitored and encourage continued professional development.

In another study, Badr et al. (2015) reports significant correlation between education level and working areas among nurses in ICUs and their level of knowledge and practice in Egypt. In addition, the study reported unsatisfactory knowledge level respectively. The disparities are linked to uneven access to educational resources for healthcare professionals, stressing the urgent need for more equitable access to knowledge-building opportunities and resources among healthcare workers to address these expertise gaps effectively

Kachimba et al (2019) conducted a study on knowledge and attitudes towards pain management that identified inadequate knowledge levels among nurses on pain assessment and management. The identified gaps in the study emphasize the need of establishing and sustaining the education and training programs on pain management among healthcare providers in Zambia.

2.5 Nurses attitudes towards pain assessment and management

Pain assessment and management of the patients in the intensive care unit is depended on many factors one of which is the attitude of nurses towards the patients and managing their pain. Manwere et al, (2015) conducted a study on knowledge and attitudes of nurses on pain assessment and management revealing factors that contributed to poor attitude of nurses such as; disbelief of patient's pain, the need to verify the genuineness of the pain and view that patients seek staff attention. Therefore, the gap identified indicates the universal necessity for nurses to recognize that pain is subjective and be able to treat it based on the severity.

In another study conducted by Samarkandi, (2018) in Saudi Arabia focusing on the factors affecting nurses' assessments toward pain management revealed that nurses had negative attitudes towards pain assessment and management. Nurses believed that patients cannot be distracted in the presence of pain, emphasizing the need for educational interventions on how patients respond to pain to improve pain management.

Ahmadi et al (2023) conducted a study in Iran which revealed that nurses with longer work experience and highly educated nurses possessed increasing negative attitudes towards pain assessment and management attributed to: following doctors' orders, low staff and work burn out. The gap identified highlighted the need for development of targeted strategies to continuously mentor and align experienced nursing staff with appropriate attitudes towards assessing and managing pain through increasing their autonomy, reducing workload and managing work burnout.

In the African context, Omotosho et al, (2023) conducted a study to assess the nurses' knowledge, perception and attitudes regarding pain management in Gambia. The findings revealed that nurses had an unfavorable attitude towards pain management. In contrast, a qualitative study conducted in Malawi by Edina et al (2017) revealed that nurses had good

attitudes towards pain management revealing the disparities of nurses' attitudes in different global settings emphasizing the requisite to maintain consistent attitude levels in the health care team.

Chisupa et al, 2023, investigated pain assessment and management in Zambia that revealed varied attitudes among nurses concerning pain management. Skepticism was observed about the trustworthiness of patients' reports of pain, leading to nurses' reservations about the authenticity of reported pain levels emphasizing the importance of nurses practicing advocacy for the patients in pain without any disregard.

2.6 Practice of nurses on pain assessment and management

Assessment of pain in the critical care settings is an important aspect of comprehensive management of patients especially in the ICUs. Practice of pain assessment should be routine and monitored in all admitted patients (Rijkenberg., 2015). However, it can be affected by the ability of the patient to self-report, thus disadvantaging critically ill patients that are unable to do so (Barr et al., 2014, Onwong'a , 2014), highlighting the need for standardization of pain assessment guidelines across different ICU settings.

According to the findings of Almutairi et al (2022), it was revealed that nurses' performance of pain assessment for ICU patients was below average. This study identified the need for education regarding pain. Hence, healthcare professionals, organizations, nursing schools, and policymakers need to work together to improve the nurses' pain assessment and management practices through policy development.

In a study conducted in Egypt by Badr et al, (2015), showed majority of the studied sample of 95% had unsatisfactory nurse practices in regards to pain assessment and management respectively. Similarly, Kizza, (2013) indicated inadequate utilization of pain assessment tools and poor pain management. Therefore, stressing the need for nurses to develop their practices in regards to pain assessment and management.

Sweity, et al. (2022) investigated knowledge, attitude, practice and perceived barriers of nurses working in intensive care unit on pain management of critically ill patients in Palestine. Their

findings indicated nurses' reluctance to prescribe opioids owing to rigorous controls over opioid use emphasizing the need to revise the opioid guidelines for use in pain management in the ICU.

Furthermore, a study conducted in Zambia by Wahila et al (2020) revealed that nurses assessed patients' pain using several behavioral and physiological responses in varying percentages through patients' expressions, activity levels, changes in vital signs and general behaviour. The findings of this study emphasized the significance of developing a standardized pain assessment tool.

2.7 Conclusion

From the literature review, it is evident that several factors do affect pain assessment and management. The nurses' knowledge levels, attitudes and practices affect the effectiveness of pain assessment and management. The literature review shows that inadequate level of knowledge was attributed to lack of training and nurses with inadequate levels of knowledge were more likely to have ineffective practices of pain assessment and management. The attitude of nurses was likely to be negative among nurses with longer years of experience therefore, inhibiting effective pain assessment and management. The overall practice of nurses towards pain assessment and management was hugely influenced by lack of guidelines, inadequate knowledge levels and constraints in availability of resources. Effective pain management may lead to early recovery of patients and prevent complications such as chronic pain and neurological shock and improve patient outcomes in the ICUs at Kasama General Hospital. Therefore, it is critical to assess the nurses' knowledge, attitudes and practice in the assessment and management of pain among critically ill patients in the ICUs to assist in identifying factors that hinder effective pain assessment and management, provide and develop appropriate solutions that will improve pain assessment and management. This study also aims to provide awareness to facilitate informed decisions and foster evidence-based practices among healthcare professionals, administrators, and policymakers.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The methodology is the outline that underscores the entire research process. Included in the methodology is the study design, study settings, population, sampling method, research instruments and data processing, analysis and interpretation in order to ensure validity and reliability of results.

3.2 Study design

In this study, a cross sectional analytical study design was used in order to quantify and qualify the intended variables: knowledge, attitude and practice of nurses in regards to pain assessment and management. This study design was utilized to identify patterns and trends in data collected in order to provide insights into the factors influencing pain assessment and management practices. Data was collected at a single point in time to allow for efficient data collection in a fast paced and dynamic environment of the ICU without budget constraints.

3.3 Study setting

This study was conducted at Kasama General Hospital situated 2 Km from Kasama town center with an easily usable road. Kasama General Hospital is the largest hospital in Northern Province that provides various services including critical care. The hospital comprises the following main departments: medicine, surgery, pediatrics, and gynecology and auxiliary departments such as radiology, pharmacy and laboratory. The hospital's encompasses three ICUs: neonatal, pediatric, and adult ICU with a total bed capacity of 18. The ICUs health care team includes physicians, nurses, pharmacists, radiologists, physiotherapists and nutritionists. The ICU houses patients with various medical and surgical conditions requiring emergency and lifesaving care that experience mild to moderate pain depending on their condition. This study setting was selected because it aligned with the researchers' interests and was relevant to the research questions.

3.4 Study population

The study population comprised all nurses that work in the ICUs at Kasama General Hospital, Kasama, Zambia during the study period.

3.4.1 Target population

The target population for this study included all nurses working in the ICUs at Kasama General Hospital, Kasama, Zambia who were responsible for providing care to admitted patients.

3.4.2 Accessible population

The accessible population included nurses who were providing care to admitted patients in the ICUs at the time of data collection.

3.5 Inclusion and exclusion criteria

3.5.1 Inclusion criteria

This study included:

- All nurses that work in the ICUs at Kasama General Hospital.
- Nurses that consented to participate in the study.
- Nurses that have worked longer than 6 months.

3.5.2 Exclusion criteria

- The exclusion criteria included all nurses who were not available at the time of data collection such as those who: were on leave, travelled out of the work area at the time of data collection and were sick at the time of data collection.
- The exclusion criteria also included nurses that did not consent to participate in the study.

3.6 Sample size determination

The study utilized a census sampling method as the sample population was less than 200 by including all accessible participants that were available at the time of data collection and were eligible. Census method was considered ideal because it minimizes bias by incorporating the

entire population of interest, ensuring an inclusive representation of the study group. The census population comprised of 60 eligible participants, only 53 nurses participated representing 88.3% of the entire population.

3.7 Sampling technique

This study used a census method in which the population selected had specific characteristics. The population of interest (ICU nurses) was defined and each nurse had an equal opportunity to participate in the study to reduce selection bias. The information generated was comprehensive and represented the views of the entire population.

3.8 Data collection procedures

3.8.1 Data collection tool

A self-administered questionnaire was utilized in this study. The questions in the tool were adapted from the modified Knowledge and Attitude Survey Regarding Pain (KASRP) assessment tool developed by Betty Ferrell in 2014 (Ferrel, 2014). The KASRP was designed to assess nurses' knowledge, attitudes and practices regarding pain. The tool has three sections including knowledge, attitudes and a case study with a total of 34 questions. Two of the sections were adopted in this study. The tool has been validated and widely used in studies across healthcare systems similar to Zambia's, demonstrating its reliability and applicability. The tool was utilized in studies in Kenya on "pain assessment and management of knowledge and attitudes of Kenyan nurses" (2016) and in South African on "pain management knowledge and attitudes of south African nurses and physicians (2018). Content reliability was established by a review of the tool by pain experts by the original authors, it has a confirmed cronbachs alpha of 0.7 and test to test reliability of 0.85. Published under a Creative Commons license, the tool can be used without formal authorization as long as the original authors are cited. For this study, all relevant sections of the tool were adopted, and proper acknowledgment was given to the developers. In addition, the self-administered questionnaire in this study was developed in English language as English is the official language used in Zambia.

3.8.2 Data collection technique

The researcher obtained ethical clearance from the University of Zambia Biomedical Research ethics committee (UNZABREC), Kasama General Hospital and the University of Zambia (UNZA) School of nursing sciences before commencement of the study. All eligible participants were recruited with the laid out edibility criteria. The researcher approached the participants during their intended work shift; they were informed about the research study, its purpose, benefits and risks and informed consent was sought. The use of serial numbers on each questionnaire with no name was included, and participants were permitted to answer the questionnaire at the time that they were free and alone to ensure privacy and confidentiality. The participants signed informed consent forms before participating in the research study. The self-administered questionnaire was given to the participants and collection of the questionnaires was within a week, to give ample time for the participants to answer the questionnaires. Upon collection, the questionnaires were reviewed for completeness and consistency and gratitude was expressed. The questionnaire employed a structured approach ensuring that the data collection was systematic, comprehensive, and efficient.

3.9 Validity and reliability

3.9.1 Validity

Validity of the study was ensured through paying attention to the questions included in the study ensuring that the questions were clear, concise and brief, to make it easy for participants to answer accurately. The questions were formulated with consideration of other health care settings and broader context. In addition, the assessment tool appeared to have good face validity as it seemed to measure pain assessment and management, knowledge, attitudes and practices of nurses making it seem relevant and effective. Furthermore, the assessment tool demonstrated strong correlation with nurses' actual pain assessment and management practices indicating that it accurately measured nurses KAP in this area. The assessment tool was also reviewed by lecturers and supervisors to ensure it covered relevant questions and domains on nurse's knowledge, attitudes and practices regarding pain assessment and management. External validity was attained by selecting an appropriate sample size to ensure that statistics obtained were representative of the broader population.

3.9.2 Reliability

The reliability of the assessment tool was established through internal consistency reliability which strengthened the process of obtaining accurate results that were consistent. The assessment tool was reviewed by the researcher and supervisors before administration to ensure consistent responses and balanced questions to yield reliable data. A pilot study was conducted to ensure stability of the assessment tool. The adapted questionnaire had Cronbachs alpha of 0.7 and test to test reliability of 0.85.

3.10 Data management and storage

The data was collected using a self-administered questionnaire. Data entry was conducted using a secure system with double-entry checks to identify and correct discrepancies. Standardized coding schemes were applied to ensure consistency, with categorical variables coded as 1 and 2 to represent good and poor practices. Validation was guaranteed by assessing the questionnaires for completeness, accuracy and consistency. The data was then entered in excel sheet on a computer for easy analysis. The computer had access controls that required access permissions to ensure only authorized personnel could access the data. The data was backed up to prevent any loss in cases of hardware failure. The questionnaires collected were placed in folders and kept under lock and key by the researchers to avoid tempering and losses and were only accessible to the researchers involved in the study or those responsible for this study.

3.11 Data analysis

Data was first checked for completeness and accuracy, entered into Microsoft Excel for cleaning, and exported to SPSS version 26 for statistical analysis. Numerical values were assigned to categorical variables to facilitate interpretation, and appropriate statistical methods were applied based on the research objectives and data type.

Descriptive statistics were used to summarize demographic characteristics such as age, gender, years of experience, and educational background. Standard deviations, frequencies, and percentages were employed to analyze these variables including knowledge, attitudes and practices

To evaluate associations between nurses' pain assessment and management practices (dependent variable) and factors such as knowledge, practices and attitudes (independent variables), chi

square test was applied. Binary logistic regression analysis was conducted to calculate unadjusted and adjusted odds ratios. A significance level of 0.05 and 95% confidence interval were used, with p-values below 0.05 considered statistically significant.

3.12 Pilot Study

A pilot study was conducted at Mbala General Hospital, chosen for its similarities to the Kasama General Hospital in terms of patient demographics, healthcare infrastructure, and staff composition. Both facilities serve diverse patient populations and have specialized ICUs staffed by critical care nurses with comparable qualifications, experience levels, and workloads. This made Kasama General Hospital an ideal setting for testing the data collection tool and procedures for the main study. The participants n=12(23%) who met the inclusion criteria were recruited for the two-week pilot study. Feedback highlighted issues with some questionnaire items, leading to rewording for clarity. For example, "How long have you worked?" was revised to specify ICU practice only “how long have you practiced in the ICU?” Similarly, "Where have you worked?" was clarified to "which ICU are you currently working?" Ambiguous terms and broad questions were refined to ensure specificity and measurability.

Additional questions were added based on participant suggestions to capture critical aspects of nursing care. These included items like "Do you believe giving narcotics on a regular schedule is preferred over whenever necessary (PRN)?" and "How frequently do you use pain assessment tools during patient handovers?" These improvements enhanced the tool’s reliability, ensuring it effectively captured variables central to the main study.

3.13 Ethical consideration

Ethical approval for this study was sought and obtained from the University of Zambia Biomedical Research Ethics Committee (UNZABREC-REF- UNZA-4681/2023) and the National Health Research Authority (NHRA) (Reference No: NHRAR-R-779/15/08/2023. Permission to conduct the study was also granted by the Senior Medical Superintendent of Kasama General Hospital and written informed consent was obtained from participants before the study commenced. The researcher introduced herself and explained the purpose, the benefits, risks and the participants’ right to leave the study at any given time. All participants of the study were kept anonymous by not writing their names on the questionnaires as serial numbers for

each questionnaire were used instead, in order to provide participant safety and maintain their dignity, privacy and confidentiality was ensured.

3.14 Conclusion

The study employed an analytical cross sectional approach to investigate the knowledge, attitudes and practices of nurses related to pain assessment and management in the ICU. The study involved 60 participants selected using a census method. The study utilized a questionnaire which was reliable and validated. Data collection was carried out over one month and data was analyzed using chi square test, binary logistic regression. This study methodology provided a solid foundation for assessing the nurses KAP towards pain assessment and management. The study provides insights into pain assessment and management among nurses in the ICU and informs the development of effective pain management strategies and contributes to the existing knowledge on pain assessment.

CHAPTER FOUR

RESULTS

4.1 Introduction

This chapter presents the research results obtained from the analysis of data collected from 53 nurses working in the ICU at Kasama General Hospital, which comprised a response rate of approximately 88.3% (53 out of 60). The researcher proposed to conduct a census study, capturing data from 53 nurse in the intensive care units of Kasama General Hospital. This chapter encompasses discussions on data processing and analysis techniques, shedding light on various aspects including socio-demographic characteristics, the level of knowledge, attitude, and practices concerning pain assessment and management of critically ill patients in the hospital's intensive care unit in Zambia. Additionally, it examined the association between categorical independent variables and practices through chi-square test. Furthermore, the chapter concluded by presenting the results of binary logistic regression, emphasizing the factors associated with practices regarding pain assessment and management of critically ill patients in the intensive care unit at Kasama General Hospital in Zambia.

4.2 Presentation of results

The study's findings are presented through frequency tables, charts, and contingency tables, organized based on the order of questions and sections in the developed questionnaire.This presentation style aims to provide a clear summary of the results to aid visual clarity and comprehensibility of the data and facilitate easier understanding of the study's findings.

4.1.1 Socio-demographic Characteristics

Table 4.1 illustrates the distribution of socio-demographic characteristics of patients evaluated in the study to assess their influence on pain assessment and management in the intensive care unit. The variables examined encompassed gender, age, years of experience, location of work unit, and level of education and the social demographic characteristics of the respondents showed a statistical significance in influencing practices of pain assessment and management.

Table 3: Socio-demographic Characteristics (n=53)

Variables	Frequency	Percentage (%)
Gender		
Female	34	64.2
Male	19	35.8
Total	**53**	**100**
Age		
<25	27	50.9
25-29	16	30.2
30-34	8	15.1
>35	2	3.8
Total	**53**	**100**
Years of experience		
<2 years	19	35.8
3-5 years	24	45.3
6-9 years	9	17.0
>10	1	1.9
Total	**53**	**100**
Location of work		
Micu	17	32.1
Picu	19	35.8
Nicu	17	32.1
Total	**53**	**100**
Level of education		
Master of science	2	3.8
Bachelor of science	2	3.8
Diploma	49	92.5
Certificate	0	0.0
Total	**53**	**100**

The distribution of socio-demographic characteristics among the 53 participants assessed in the study revealed that 64.3% (34) were female, 50.9% (n=27) were below 25 years old, 45.3% (n=24) had 3-5 years of work experience. In addition, according to work location, participants were relatively evenly distributed among MICU, NICU and PICU 31.2% (n=17) each and 92.5% (n=49) held a Diploma.

4.1.2 Knowledge of nurses regarding pain assessment and management

The level of knowledge was assessed using a variety of questions, then categorized as either not knowledgeable or knowledgeable, with cut-off points of scores ranging above 70% as adequate knowledge (Knowledgeable) and below 70% as inadequate knowledge (Not knowledgeable)

respectively. The responses to each question and the corresponding outcomes are demonstrated in the table below.

Table 4: Participants responses on Knowledge (n=53).

Knowledge Variable		Frequency	Percentage (%)
1. Training on pain management	NO	35	66.0
	YES	18	34.0
2. Vital signs an indicator of pain intensity	NO	37	69.8
	YES	16	30.2
3. It is important to assess pain in patients with GCS more than 8	NO	9	17.0
	YES	44	83.0
4. Patients' easy distraction from pain do not have severe pain	NO	20	37.7
	YES	33	62.3
5. NSAIDS are not effective in treating pain in ICU	NO	39	73.6
	YES	14	26.4
6. Analgesia combination has better pain control with few ADRs	NO	25	47.2
	YES	28	52.8
7. Morphine one to two mg lasts for four to 5 hours	NO	16	30.2
	YES	37	69.8
8. Opiods should not be used in patients with substance abuse	NO	24	45.3
	YES	29	54.7
9. Morphine has dose ceiling	NO	27	50.9
	YES	26	49.1
10. Pethidine can be used for chronic pain safely	NO	21	39.6
	YES	32	60.4
11. Assess pain in end of life care	NO	20	37.7
	YES	33	62.3
12. Opioids should not be used in unknown cause of pain	NO	24	45.3
	YES	29	54.7
13. Benzodiazepines are poor pain relievers except in pain by spasms	NO	18	34.0
	YES	35	66.0
14. Route of administration of opioid analgesia in cancer is orally	NO	36	67.9
	YES	17	32.1
15. Route of opioid analgesia in trauma patients is intravenously	NO	18	34.0
	YES	35	66.0
16. Opinion that patients distracted do not have severe pain	NO	21	40.4
	YES	31	59.6
17. Can patients sleep despite pain	NO	34	64.2
	YES	19	35.8

Table 4 shows that among 53 participants, 66.0% (n=35) had no pain management training while 69.8% (n=37) believed vital signs were not an indicator of pain intensity. Moreover, 83.4%

(n=44) recognized the importance of pain assessment in patients with Glasgow Coma Scale (GCS) less than 8 while 62.3% (n=33) stated that patients that are easily distraction from pain do not have severe pain. The results also revealed that 73.6% (n=39) believed that Non-steroidal Anti-inflammatory Drugs (NSAIDS) are effective in managing pain and 60.4% (n=30) agreed that Pethidine can be used for chronic pain safely. This study showed that 66% (n=35) of participants agreed that benzodiazepines are poor pain relievers except for pain caused by spasms while 64.2% (n=34) disagreed to the statement that patients can sleep despite pain. Additionally, participants showed varying levels of understanding regarding opioid administration, with misconceptions about the existence of morphine dose ceiling, 50.9% (n=27) of the participants disagreed. Furthermore, 54.7% (n=29) agreed with the appropriateness of opioid utilization in patients with substance abuse.

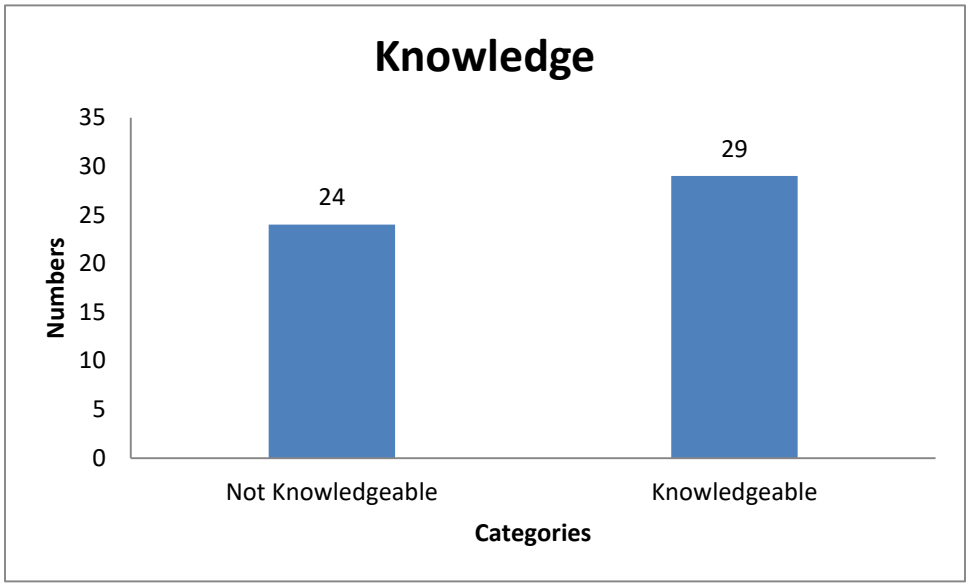

Figure 2: Knowledge regarding pain assessment and management

The figure above, displays the categories of the knowledge variable, 54.7% (n=29) of participants demonstrated having adequate knowledge regarding the assessment and management pain in critically ill patients.

4.1.3. Attitude Regarding Pain Assessment and Management

The attitudes towards pain assessment and management were assessed using questions regarding the perception of pain severity in distracted patients, the ability to sleep despite pain, the threshold for opioid use, reliability of child pain reporting, preference for regular narcotic administration, the utility of placebo interventions, interpretation of pain expression, optimal postoperative analgesia scheduling, the influence of spiritual beliefs on pain perception, and the patient's role as the most accurate judge of their pain intensity. The attitude variable was then categorized into negative and positive attitudes with scores of below 60% representing negative attitude and above 60% representing positive attitude, as demonstrated below.

Table 5: Participants responses on Attitude (n=53)

	Attitude Variable		Frequency	Percentage
1.	Do you think patients who can be distracted by pain usually do not have severe pain?	YES	31	58.5
		NO	22	41.5
2.	Do you think the patient can sleep despite pain?	YES	23	43.4
		NO	30	56.6
3.	Do you think patients should be encouraged to endure as much pain as possible before using opioids?	YES	14	26.4
		NO	39	73.6
4.	Do you think children below 11 cannot reliably report pain so clinicians should rely on parents for assessing the child's intensity of pain?	YES	18	34.0
		NO	34	64.2
5.	Do you believe that giving narcotics on a regular schedule is preferred over PRN schedule for continued pain?	YES	28	52.8
		NO	25	47.2
6.	Do you think that giving patients sterile water (a placebo) is useful in determining if the pain is real?	YES	45	84.9
		NO	8	15.1
7.	Do you think that lack of pain expression does not mean lack of pain?	YES	29	54.7
		NO	24	45.3
8.	Do you think that analgesia for postop pain should initially be administered around the clock on a fixed schedule?	YES	33	62.3
		NO	20	37.7
9.	Do you believe that patients' spiritual beliefs can lead them to think pain and suffering are necessary?	YES	39	73.6
		NO	14	26.4
10.	Do you think that the most accurate judge of the intensity of the patients' pain is the patient?	YES	45	84.9
		NO	8	13.8

Table 5 reveals that 73.6% (n=39) of the participants do not believe that patients should be encouraged to endure as much pain as possible before using opioids while 84.9% (n=45) believe use of a placebo is useful in determining presence of pain indicating concerns about the patients self-reported pain. In addition, 73.6% (n=39) believed patients pain perception can be affected by

their spiritual beliefs affecting the patients tolerance to pain. Furthermore, 84.9% (n=45) of the participants believed that the patient is the accurate judge of the intensity of pain indicating the subjectivity of pain in patients.

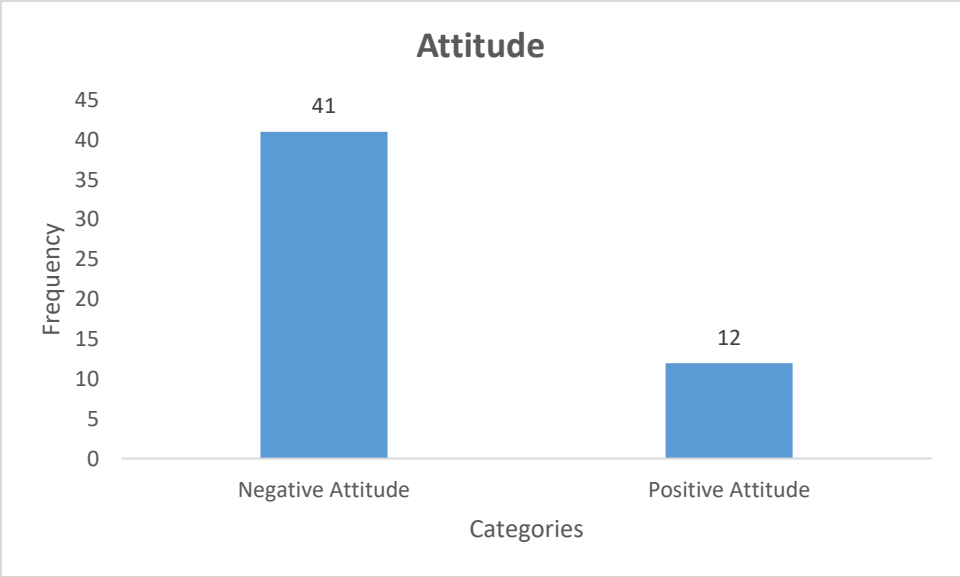

Figure 3: Attitude regarding pain assessment and management

The figure above illustrates that the majority of participants 77.4% (n=41), held a negative attitude towards the assessment and management of pain in critically ill patients.

4.1.4: Practices regarding pain assessment and management

The determination of pain assessment and management practices encompassed evaluating the frequency and significance of pain assessment tools for both self-reporting and non-self-reporting patients, alongside the frequency of assessment in various ICU patient classifications and preceding specific procedures. These aspects were gauged through a series of questions. Subsequently, the variable was categorized as either poor practice with a score over 70% or good practice with a score under 70%, as illustrated in the figure below:

Table 6: Participants responses on practices of nurses on pain assessment and management

	Practice variable		Frequency	Percentage (%)
1.	How often do you use a pain assessment tool for patients able to self-report in the ICU?	Always	24	44.4
		Often	14	25.9
		Not done	15	29.9
		I do not know	0	0
2.	How frequently do you use a pain assessment tool for patients unable to self-report pain in the ICU?	Always	42	77.7
		Often	7	14.8
		Not done	3	7.5
		I do not know	0	0
3.	How frequent do you assess the need for pre-emptive analgesia prior to endotracheal suctioning?	Always	18	33.3
		Often	22	40.7
		Not done	13	24.1
		I do not know	0	0
4.	How frequent do you assess the need for pre-emptive analgesia prior to wound care?	Always	19	35.2
		Often	25	46.3
		Not done	9	16.7
		I do not know	0	0
5.	How frequent do you assess the need for pre-emptive analgesia prior to drain removal?	Always	15	27.8
		Often	20	37
		Not done	16	29.6
		I do not know	2	3.7
6.	How frequent do you assess the need for pre-emptive analgesia prior to invasive line placement?	Always	17	31.5
		Often	16	29.6
		Not done	17	31.5
		I do not know	3	5.6
7.	How frequent do you assess the need for pre-emptive analgesia prior to Spontaneous breathing (weaning) trial?	Always	8	14.8
		Often	14	25.9
		Not done	16	29.6
		I do not know	15	27
8.	How frequent do you assess the need for pre-emptive analgesia prior to patient repositioning?	Always	2	3.7
		Often	10	18.9
		Not done	39	73.6
		I do not know	1	1.9
9.	How frequently is pain management discussed during nurse handovers or physician to nurse reports?	Always	8	15.1
		Often	25	47.1
		Not done	15	28.3
		I don't know	5	9.4
10.	How frequently patients are pain scores discussed during nurse handovers or physician reports?	Always	10	18.8
		Often	23	43.3
		Not done	12	22.6

		I don't know	8	15.1
	Practice Variable		**Frequency**	**Percentage (%)**
11.	How frequently are pain assessment scores utilized before administration of pain medication to patients in ICU?	Always	7	13.1
		Often	19	35.8
		Not done	24	45.3
		I don't know	3	5.6
12.	How often do you administer opioids for pain management?	Always	40	75.1
		Often	10	18.8
		Not done	3	5.6
		I don't know	0	0
13.	How frequently is pain management effectiveness discussed during nurse-to-nurse report (endorsement)?	Always	5	9.4
		Often	23	43.3
		Not done	21	39.6
		I don't know	4	7.5
14.	How often do you experience difficulties in managing pain in your patients?	Always	16	30.1
		Often	26	49.1
		Never	3	5.6
		I don't know	8	15.1
15.	How often do you adjust pain management plans based on patient feedback?	Always	16	30.2
		Often	34	64.2
		Not done	3	5.6
		I don't know	0	0
16.	How often do you assess pain after the initial administration of pain medications?	Always	25	47.2
		Often	21	39.6
		Not done	2	3.8
		I don't know	0	0
17.	Have you seen a reduction in pain related complications e.g agitation, respiratory depression in your current pain management strategies?	Yes	32	60.4
		No	9	16.9
		Not sure	12	22.6

Table 6 shows that 77.7% (n=42) of nurses frequently use the pain assessment tool for patients unable to self-report pain in the ICU. The results also show that 73.6% (n=39) of nurses do not assess the need for pre-emptive analgesia before patient repositioning. In addition, 75.1% (n=40) the findings show that opioids are prescribed in critically ill patient and only 14% (n=7) stated having utilized pain assessment scores before administration of pain medication. Unfortunately, only 9.4% (n=8) of the participants stated that effectiveness of pain management is not discussed during nursing reports. In addition, 27% (n=15) did not know the how frequently pre-emptive analgesia assessment is conducted in spontaneous breathing trials. Pain management plans were

adjusted often in 64.2% (n=34) of the participants while 60.4% (n=32) saw a reduction in pain related complications

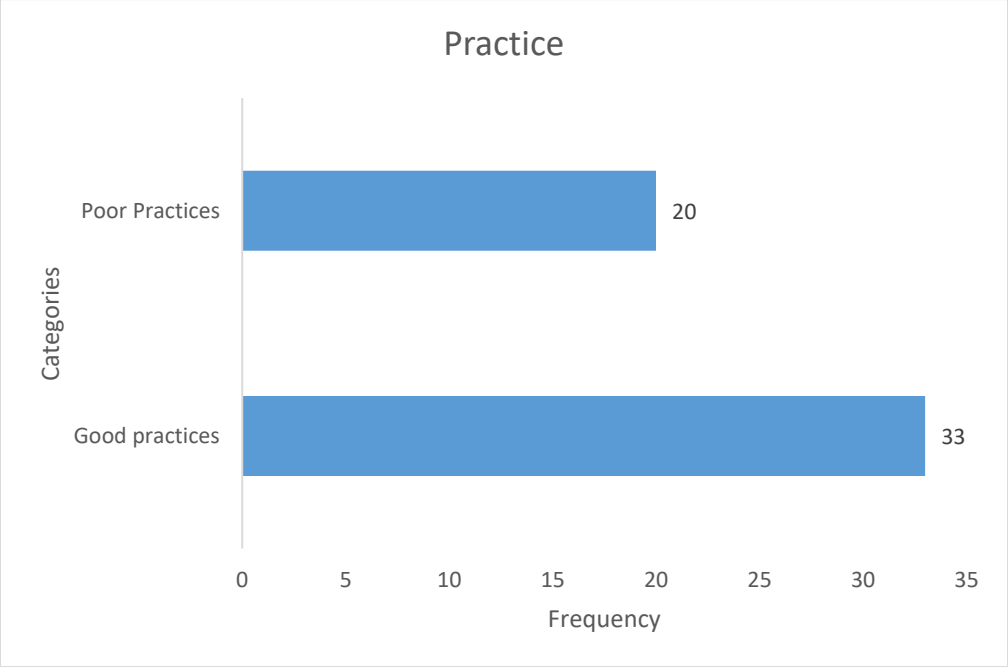

Figure 4: Practices regarding pain assessment and management

As depicted in the figure above, it was observed that the majority of participants 62.3% (n=33), demonstrated good practice in the assessment and management of critically ill patients.

4.1.5 Results of association between variables

Table 7: Chi square Associations between socio-demographic characteristics, knowledge, attitudes and practices of pain assessment and management (n=53)

VARIABLES	PRACTICE				
	Good Practices		Poor practices		
	Frequency	Percentage	Frequency	Percentage	P-value
GENDER					
Female	17	50.0%	17	50.0%	0.014
Male	16	84.2%	3	15.8%	
Total	**33**		**20**		
YEARS OF EXPERIENCE					0.046
<2 years	13	68.4%	6	31.6%	
3-5 years	15	62.5%	9	37.5%	
6-9 years	4	44.4%	5	55.6%	
>10	1	100.0%	0	0.0%	
Total	**33**		**20**		
ATTITUDE					0.002
Negative Attitude	21	51.2%	20	48.8%	
Positive Attitude	12	100.0%	0	0.0%	
Total	**33**		**20**		

In Table 7, the chi-square test revealed significant associations ($P \leq 0.05$) between certain variables and practices related to pain assessment. Gender ($P = 0.014$), years of experience ($P = 0.046$), and attitude ($P = 0.002$) all had P-values less than 0.05 hence had significant influences on the practices of nurses in regard to pain assessment. While no significant associations were observed between age groups, location of work units, level of education, and knowledge levels with the practices related to pain assessment and management as the P-values were greater than 0.05.

4.1.6 Logistic regression results of factors associated with practice of pain assessment and management

Data analysis was conducted to assess factors associated with good practice, encompassing gender, age, years of experience, level of education, the level of knowledge, and attitude regarding pain assessment and management. The results are presented in the tabular diagram below.

Table 8: Factors associated with practice of pain assessment and management (n=53).

Practice	UOR	P-value	95% CI		AOR	P-value	95% CI	
Gender								
Male	Ref				Ref			
Female	9.692	0.022	1.389	67.644	6.247	0.030*	1.193	32.705
Years of experience								
<2 years	Ref				Ref			
3-5 years	0.406	0.331	0.066	2.498	1.357	0.360	1.561	17.007
6-9 years	0.052	0.069	0.002	1.259	2.070	0.188	0.615	11.894
>10	2.000	0.865	0.072	2.473	3.962	0.002*	1.258	23.490
Location of work								
Micu	Ref				Ref			
Picu	0.162	0.052	0.026	1.015	3.504	0.019*	0.001	11.508
Nicu	0.873	0.901	0.104	7.353	6.098	0.002*	2.854	5.325
Knowledge								
Not knowledgeable	Ref				Ref			
knowledgeable	2.086	0.371	0.416	10.451	3.267	0.004*	0.985	2.468
Attitude								
Poor	Ref				Ref			
Good	0.762	1.093	2.876	5.854	2.007	0.016*	2.326	22.231

UOR=Unadjusted Odd Ratio, AOR=Adjusted Odd Ratio, CL=Confidence Interval

Table 8 revealed significant associations between various factors and good practice in pain assessment and management. Females exhibited a significantly higher likelihood of good practice compared to males (AOR: 67.644, p = 0.030), while participants with more than 10 years of experience also showed significantly higher odds of good practice (AOR: 3.962, p = 0.002). Additionally, working in the Pediatric Intensive Care Unit (PICU) and Neonatal Intensive Care Unit (NICU) significantly increased the odds of good practice compared to the

Main Intensive Care Unit (MICU) (PICU: AOR: 3.504, p = 0.019; NICU: AOR: 6.098, p = 0.002). Moreover, having a positive attitude and possessing knowledge about pain assessment and management was significantly associated with higher odds of good practice (Attitude: AOR: 2.007, p = 0.016; Knowledge: AOR: 3.267, p = 0.004).

4.6 Conclusion

This chapter presented the results of the study on nurses' knowledge, attitudes and practices of pain assessment and management among ICU patients at Kasama General Hospital. The results showed that nurses demonstrated good practices to pain assessment and management, with relatively adequate knowledge. However, attitude was generally poor impacting on the quality of care offered to ICU admitted patients. Chi-square Test revealed that gender, years of experience and attitudes were significantly related to pain assessment and management. The binary logistic regression model identified gender, years of experience, location of practice and knowledge as key predictors of pain assessment and management. These results highlight the importance of improving the attitudes and knowledge levels regarding pain assessment and management.

CHAPTER FIVE

DISCUSSION

5.1 Introduction

This chapter provides a comprehensive discussion of findings, focusing on the assessment of nurses' knowledge, attitudes, and practices concerning pain assessment and management in the intensive care unit at Kasama General Hospital. This discussion probes into the implications of the findings, explores potential explanations for observed results, and identifies areas for improvement in nursing education, training, and clinical practice. Additionally, it highlights the significance of addressing gaps in knowledge, rectifying misconceptions, and fostering positive attitudes among nurses to enhance the quality of pain management for critically ill patients in the ICU setting.

5.1.1 Socio-demographic characteristics among nurses

Social demographic characteristics are individual characteristics of nurses that work in the ICU that can influence their behaviors, experiences and patient outcomes. Characteristics such as age, gender and level of education are crucial in understanding various aspects of their practice regarding pain assessment and management that can ultimately influence and affect the patients' wellbeing. Examining these factors helps to understand the complex association between social-demographic characteristics and practices of pain assessment and management ultimately informing strategies to improve and promote patient wellbeing.

The socio-demographic characteristics of nurses in this study revealed some characteristics that could influence their knowledge, attitudes, and practices regarding pain assessment and management in the ICU setting. Firstly, the predominance of female nurses (64.2%) aligns with global trends in nursing demographics, where women make up the majority of the nursing workforce. Shen et al (2022) observed higher proportion of female nurses (73%) highlighting potential gender imbalances in nursing demographics across different regions, gender distribution imbalance might have implications for communication styles in the ICU, empathy, and caregiving approaches, which could impact pain assessment and management practices as

females tend to be more inclined to cultural roles of caring and subtle role of submissiveness inhibiting their ability to effectively communicate in the health care team but with increased capacity of providing adequate care to ICU patients. However, Alnajar et al, 2021 found a slightly higher proportion of male nurses of (53%) working in the ICU attributed to increased knowledge levels in males and willingness to take on more difficult tasks. These differences highlight the differences in gender distribution across different settings in the ICU. This study further revealed that female nurses have higher likelihood of good practice than their male counterparts with a p=0.03 indicating the need for equity in distribution of nurses that should include both male and female. Further studies should investigate the impact of gender distribution on pain assessment and management to identify what the effects of uneven gender distribution.

Years of experience showed a significant proportion of nurses with 3-5 years of experience (45.3%), suggesting a relative balance between novice and experienced practitioners in the ICU. This study also showed that there is an association between years of experience and practice of pain assessment and management in which the p= 0.046. In addition, nurses that worked for longer than 10 years had higher likelihood of good practice p=0.002. This is in agreement with a study by Olaolorunpo et al., (2024) in a tertiary hospital in Nigeria that reported a higher percentage of nurses with over seven years of experience, suggesting a more seasoned workforce, whose results were similar to studies by Ndlovu et al, (2022) and Castaño-García et al, (2024) which could stem from similarities in healthcare systems, workforce retention strategies, and cultural norms regarding nursing careers and job stability, indicating that the mix of nurses with different years of experience is critical to diversify perspectives on pain assessment and management approaches, and increase potential mentorship opportunities

Regarding the location of work units, this study revealed even distribution of nurses across MICU, PICU and NICU (32%) highlighting the need for tailored pain management strategies to suit different patient populations and ICU care settings. Additionally, working in the Pediatric Intensive Care Unit (PICU) p=0.019 and Neonatal Intensive Care Unit (NICU) p=0.002 significantly increased the odds of good practice. This is in line with a study by Cha et al, (2020) that revealed that location affected nurses' practice to pain assessment and management. Further studies should be done to assess the personalized needs of different ICU settings and adopt

strategies that will help improve patients' wellbeing by identifying, initiating and adopting adequate staffing needs for each ICU location.

The results of this study align with the Knowledge, Attitude and Practice model employed. The model underscores the importance of personal experiences, cultural roles and beliefs on the behaviours of nurses in the ICU including practices (Lenard et al., 2018). This model highlights how experiences, culture and beliefs affect the nursing care practices in the health care setting. Familiarity with these factors can promote understanding of why nurses may practice in a certain way indicating the need for mentorship programs in enhancing positive practices.

The implications of these findings underscore the importance of considering socio-demographic factors when designing interventions to improve pain assessment and management practices in ICU settings. Targeted educational programs, mentorship initiatives, and competency assessments should take into account the varying backgrounds, experiences, and career aspirations of nurses. Additionally, cross-cultural perspectives and best practices from diverse healthcare settings can enrich training curricula and foster a more holistic approach to pain management education (Cadoy and Park, 2018). Ultimately, a nuanced understanding of socio-demographic factors and their impact on pain assessment and management practices is important for developing evidence-based interventions that address the unique needs and challenges faced by ICU nurses worldwide.

5.1.2 Knowledge of nurses on pain assessment and management

Knowledge is acquisition, organization and utilization of information and skills from documented articles and experiences. The results of this study relatively reiterate this connotation. The analysis of the nurses' level of knowledge on pain assessment and management in this study revealed significant misconceptions and knowledge gaps. The study revealed average levels of knowledge (54%) among nurses which is in contrast to a study done by Younis, (2021) conducted in Jordan, that showed that majority (63.4%) of nurses had inadequate knowledge about pain assessment that emulates studies done by Iklima et al., (2022) and Al-Sayaghi et al, (2022) in United Arabic Emirates (UAE) that showed that majority of the respondents (70%) had poor knowledge on pain assessment and management by ICU nurses.

The difference in knowledge levels suggests the need for standardized education resources and facilities to increase information access and retention amongst nurses in ICUs.

On another hand, a study conducted in Kazakhstani, showed that the nurses level of knowledge about pain assessment was low (34%) (Azighu, 2020), which was related to lack of proper training and lack of pain assessment tools indicating varying knowledge levels among ICU nurses due to different constraints, highlighting the need for ICU nurses to undergo some form of training on pain assessment and provision of adequate resources to help improve performance of pain assessment and management.

Examining the results of knowledge levels and good practice in this study revealed that nurses who were knowledgeable were more likely to have good practice p=0.004 than those that were less knowledgeable. Adequate knowledge is the basis and cornerstone for good practice as it increases the ability of nurses to utilize evidence based practice regarding pain assessment and management. The findings mirror those of a study by Adenkule et al., (2020) in a study conducted in Nigeria in which nurses who were knowledgeable had higher likelihood of good practice P=0.003. These findings highlight the need for targeted education and clarification during training and practice in order to enhance nurses' knowledge and optimize pain management practices in the ICU setting.

The gaps revealed in this study revealed that relatively a significant number of participants had inadequate knowledge (46%) despite having had training on pain assessment and management. This can be attributed to poor retention of knowledge, over familiarization to the ICU environment and lack of utilization of evidence based practice when managing pain (Liyeu, et al, 2020) indicating potential differences in educational approaches, clinical practices, educational priorities and cultural influences on the application of knowledge in the management of pain among patients in the ICU.

The KAP model further contextualized these findings. Knowledge of nurses corresponds to the knowledge context of the model emphasizing the need for evidence based practice and need for clinical expertise in the management of pain. This model requires that nurses utilize the information and skills acquired through training to promote the wellbeing of the patients in ICU. Therefore, training provides the basis for increased knowledge, experiences as well as journaling

can increase the levels of knowledge and help improve the selection of the best practices that can be employed to yield the best possible outcome (Thwala et al., 2020).

The implications of these findings underscore the importance of tailored educational interventions to address specific knowledge gaps and misconceptions identified among ICU nurses. Targeted training programs should focus on enhancing awareness and understanding of evidence-based practices in pain assessment and management, particularly concerning the appropriate use of analgesics and the assessment of pain in specific patient populations (Rashid et al., 2019). Furthermore, interdisciplinary collaboration and knowledge exchange initiatives can facilitate the dissemination of best practices and promote a more holistic approach to pain management in critical care settings (Azighu, (2020). Ultimately, a comprehensive understanding of nurses' knowledge levels and educational needs is essential for developing effective strategies to improve pain management outcomes and enhance patient care in the ICU.

5.1.3 Attitude regarding pain assessment and management

The perceptions, preferences, beliefs, were analyzed to assess the attitudes of nurses towards pain management. The study illustrated that the majority of participants (77.4%), held a negative attitude towards the assessment and management of pain in critically ill patients. These findings align with a study by Tobiloba et al., (2023) conducted in a rural hospital in Gambia that found similar trends of negative attitudes (68%) towards pain management among ICU nurses, highlighting the need for comprehensive educational programs and organizational support to foster a positive attitude towards pain assessment and management. Conversely, a study by Pangiliya et al., (2022) in an urban hospital in Australia reported higher levels of positive attitudes (65%) towards pain management among ICU nurses, indicating potential differences in healthcare practices and cultural perceptions of pain underscoring the importance of individualized approaches to address the diverse needs and perspectives of healthcare professionals.

Attitude of nurses in this study revealed having an association with practice p=0.002. Similar findings were revealed in a study conducted in which a small proportion of participants with positive attitudes was 25.76% (95% CI: 11.01-44.12) (McCabe et al, 2023). This prevailing negative attitude suggests potential barriers to effective pain management practices in the ICU

setting, which could have negative implications for patient outcomes and quality of care, suggesting the need to address the negative attitudes through mentorship programs and training to help improve the attitude of nurses towards pain assessment and management and prevent impeding on effective practice.

The KAP model provides a framework that sights attitudes as a major influence on behaviours of people. Therefore, behaviour of nurses towards pain assessment and management is in line with their opinions and believes. This variable is in relation with the attitude context of the KAP model emphasizing the influence of various factors in portrayed attitudes by nurses working in the ICU indicating the need to reinforce mentorship and coaching to help improve the nurses' opinions, beliefs and perceptions.

Further analysis and exploration of these attitudes is necessary to identify underlying factors contributing to negative perceptions and develop targeted interventions to address them. These findings emphasize the importance of addressing negative attitudes towards pain assessment and management among ICU nurses through targeted educational interventions, organizational support, and interdisciplinary collaboration (Younis, 2021). Strategies aimed at promoting a positive attitude towards pain management should focus on enhancing awareness of evidence-based practices, addressing misconceptions and biases, and fostering a patient-centered approach among nurses when caring for patients admitted in the ICU. Furthermore, creating a supportive work environment that values open communication, empathy, and collaboration can empower nurses to advocate for optimal pain management practices and improve patient outcomes in the ICU setting.

5.1.4 Practices regarding pain assessment and management

Practice is the ability of nurses to carry out effective skills through application of knowledge. Practices of nurses in the ICU are affected by various factors. In this study, it was observed that the majority of participants (62.3%) demonstrated good practice in the assessment and management of critically ill patients. Similar proportions of good practice (68%) in pain assessment among ICU nurses was reported in Baghdad (Haider et al., 2023) indicating the universality of standardized pain assessment protocols and their integration into clinical practice.

Further research needs to be conducted to explore the impact of practice on pain assessment and management.

In this study, it was revealed that good practice was associated with gender p=0.014, years of experience p= 0.046 and attitudes (p=0.002), this is in disparity with results from a study by Kizza and Muliira (2015) in which knowledge had a very high association with utilization of recommended pain assessment practices among ICU nurses (OR=0.103, CI=0.031-0.345) suggesting potential disparities in healthcare resources and organizational support. Additionally, a study by Jones et al. (2020) in a regional hospital in the United States identified varying levels of pain assessment practices among ICU nurses, highlighting the influence of organizational culture and leadership on clinical practice.

Positive practice suggests a positive trend in the adherence to recommended pain assessment protocols and highlights the commitment of ICU nurses to ensuring optimal pain management outcomes Fekede L et al (2023). However, further exploration is warranted to identify specific areas of strength and potential areas for improvement in pain assessment practices, which could enhance the overall quality of care provided to critically ill patients in the ICU setting.

The findings of this study underscore the importance of fostering a culture of excellence in pain assessment and management practices within ICU settings through ongoing education, training, and quality improvement initiatives through involvement of health educators, nursing schools and policy makers Alnajar et al (2021). Strategies aimed at promoting good practice should focus on enhancing nurses' knowledge and skills in pain assessment techniques, reinforcing the importance of regular pain assessment in patient care plans, and providing adequate support and resources to facilitate effective pain management. Furthermore, fostering interdisciplinary collaboration and communication among healthcare team members can optimize pain assessment practices and contribute to improved patient outcomes and satisfaction in the ICU.

5.2 Conclusion

This chapter comprehensively discussed the knowledge, attitudes, and practices (KAP) of nurses regarding pain assessment and management in the ICU setting at Kasama General Hospital. This study identified that nurses had negative attitudes to pain assessment and management, average knowledge levels and had a significant level of good practice, with significant association

between genders, years of experience, attitude, and specific practices related to pain assessment and management. Moreover, logistic regression analysis revealed that factors such as gender, years of experience, work unit location, attitude, and knowledge were likely to influence good practices in pain assessment and management. These findings underscore the importance of targeted interventions to enhance nurses' KAP towards pain management, thereby improving patient outcomes and quality of care in critical care settings.

5.3 Implications

1. **Nursing Research**

This study highlights the need for further research in the field of pain assessment and management in ICU settings. Future research could explore the efficacy of specific pain assessment tools, interventions, and educational programs tailored to the needs of ICU patients to facilitate adequate understanding of the complexities of the pain assessment tools and interventions with the view of improving the practices of pain assessment and management. Additionally, studies investigating the impact of cultural factors, healthcare policies, and organizational structures on pain management practices would contribute to a deeper understanding of this critical aspect of nursing care.

2. **Nursing Administration**

Nursing administrators can use the findings of this study to inform policy development within healthcare institutions. By prioritizing pain management initiatives, administrators can ensure that adequate staffing, training, and support systems are in place to facilitate optimal pain assessment and management practices. Furthermore, incorporating evidence-based guidelines into institutional protocols can promote consistency and standardization in care delivery across different units and healthcare settings.

3. **Nursing Practice**

The findings underscore the importance of integrating evidence-based pain assessment and management strategies into everyday nursing practice. Nurses working in ICU settings should

receive ongoing education and training to enhance their knowledge and skills in this area. Moreover, fostering a culture of interdisciplinary collaboration and patient-centered care can empower nurses to advocate for effective pain management and improve patient outcomes.

4. **Nursing Education**

Nursing educators can use the findings of this study to develop curriculum content and learning experiences that prepare students for the complexities of pain assessment and management in critical care settings. Incorporating case studies, simulation scenarios, and experiential learning opportunities can help students develop critical thinking skills and clinical competence in addressing pain-related challenges. Additionally, educators should emphasize the importance of cultural competence, communication skills, and ethical considerations in pain management education.

5.4 Recommendations

In critical care settings, it is cardinal that hospitals perform their own assessments of the ways to best manage the patient's pain; the results can be utilized for improved pain assessment and management. Effective pain assessment of patients can hugely improve the patient's chances of survival as it minimizes the patients' rates of progressing into neurogenic shock and developing chronic pain.

Based on the findings of this study, several recommendations are made to enhance the knowledge and attitudes of nurses towards pain assessment and management practices in the ICU at Kasama General Hospital:

1. **Education and Training Programs-** In the study, the findings revealed significant likelihood that knowledge can improve practice of nurses on pain assessment and management. Therefore, it is imperative to implement comprehensive education and training programs focused on pain assessment and management for nurses working in the ICU. These programs should cover updated evidence-based practices on pain assessment and management, pain assessment tools, pharmacological and non-pharmacological interventions, and strategies for effectively communicating with patients about pain. In addition, nurses should be encouraged to pursue ongoing professional development

opportunities for nurses to stay updated on advancements in pain management practices through online trainings, attending workshops, seminars, and conferences related to critical care, pain assessment and pain management.

2. **Interdisciplinary Collaboration-** The study finding revealed significant association between attitude and practices of nurses towards pain assessment and management. Attitudes can be improved through fostering interdisciplinary collaboration between nurses and other healthcare professionals involved in patient care, and holding regular discussions of patients' pain assessment and management should be encouraged. Team meetings can assist in development of standardized protocols and guidelines for pain assessment and management tailored to the ICU setting. An effective interdisciplinary team will allow for effective communication that will aid in improved practices regarding patient care in the ICU.

3. **Mentorship Programs-** The study revealed that nurses in the ICU at Kasama General Hospital had negative attitudes towards pain assessment and management. Hence, it is of importance to establish mentorship programs in the ICU, where experienced ICU nurses provide guidance and support to novice nurses to mitigate this gap and acquire desired attitudes. This can facilitate knowledge transfer, skill development, and confidence building among newer staff members.

4. **Regular Performance Review-** The practice of nurses regarding pain assessment and management requires nurses to have adequate knowledge and skills, therefore, regular performance reviews and audits should be implemented among nurses in the ICU to assess adherence to pain management protocols and identify areas for improvement. Feedback from these reviews can guide quality improvement initiatives and ensure consistent delivery of high-quality care to patients admitted in the ICU. Therefore, it is important to note that continued evaluation of interventions and practices is essential to drive evidence-based improvements in care delivery focusing in the intensive care unit.

5. **Research and Evaluation-** Finally, the study revealed significant gaps in the attitudes, knowledge levels which affect the practices of pain assessment and management. Further research on pain assessment and management should be encouraged to explore factors influencing pain assessment and management practices in the ICU setting, including cultural

influences, organizational factors, and patient outcomes. In addition, further research can be done to determine if patients with negative knowledge may portray good practice and factors that can lead to that discrepancy.

5.5 Limitations

Despite its contributions, this study has several limitations that should be acknowledged. Firstly, the sample size was relatively small and confined to a single healthcare institution, potentially limiting the generalizability of the findings to other settings. To ensure the results are generalizable, the research included the entire population of the study to allow total representation.

Additionally, the study relied on self-reported data, which may be subject to response bias and inaccuracies. The researcher utilized a standardized data collection instrument that allowed responses to be adequate and easily understood by the participants, giving their responses without misconceptions. Moreover, the study did not explore certain potentially influential factors such as cultural beliefs, organizational dynamics, and individual patient characteristics which could provide awareness into overall factors that affect the nurses' practice of pain assessment and management.

In addition, the study's cross-sectional design captured pain assessment and management practices and its associated factors at a single point in time, which limits the ability to establish causality between variables. To address this limitation, statistical methods such as binary logistic regression were used to identify significant predictors of nurses' pain assessment and management practices, laying the foundation for future longitudinal studies that could assess trends over time.

Finally, the study did not assess the impact of interventions or changes in practice over time, which could provide valuable insights into the effectiveness of initiatives aimed at improving pain assessment and management in the ICU. These limitations highlight areas for further research and suggest caution in interpreting the findings of this study.

5.6 Dissemination of findings

The dissemination of findings from this study will be conducted through various channels to ensure widespread access and visibility within the academic and healthcare communities. Printed out copies of the research results will be submitted to the University of Zambia Medical Library, University of Zambia School of Nursing, and the University of Zambia repository to make them accessible to students, faculty, and researchers as reference for research. Additionally, the findings have been published in medical journal of Zambia to reach a broader audience and contribute to the body of knowledge in the field of nursing and critical care. Furthermore, a copy of the findings has been shared with the Kasama District Health Office to inform healthcare policies and practices at the local level. A copy has been given to both Kasama general management and Kasama General Hospital ICUs nurses to facilitate improvement in the assessment and management of pain. Finally, the researcher will retain a copy of the findings for future reference and continued dissemination as needed. Through these dissemination efforts, the findings of this study aim to inform evidence-based practice, education, and policy development in the field of pain assessment and management in intensive care units.

5.7 Data Utilization

The utilization of data from this study holds significant potential across various domains within the healthcare system. Firstly, the findings can inform evidence-based practice guidelines for pain assessment and management, aiding healthcare professionals in delivering optimal care to critically ill patients. Additionally, the data can be utilized to develop targeted educational programs such as simulations and experiential learning aimed at enhancing nurses' knowledge and attitudes regarding pain management. Furthermore, healthcare administrators can leverage the insights gained from this study to allocate resources effectively and implement quality improvement initiatives such as workshops and seminars focused on educating nurses on pain management protocols. Finally, the data can contribute to nursing research by serving as a foundation for further investigations into pain assessment and management practices in different healthcare settings, thereby advancing the scientific understanding of this critical aspect of patient care.

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APPENDICES

Appendix I: Participation information sheet

Title: Nurses Knowledge, attitudes and practices towards pain assessment and management of patients in the intensive care units at Kasama general hospital, Kasama, Zambia.

Introduction

I_____ (Students' name) is a student at the University of Zambia, ridgeway campus in the School of Nursing Sciences wishes to have you take part in this study. Your participation in this study is to be voluntary and you will not incur any consequences for not agreeing to participate in this study but if you agree to participate in this study, you will be expected to sign a consent form. However, agreeing to participate in this study will not have any direct benefits of any form.

Investigators

This research study is going to be conducted by Chibochi Kaminsa a researcher under the University of Zambia which is part of the required fulfillment of completion of the course.

Purpose

The purpose of this study is to assess the nurses' knowledge, attitudes and practice in the assessment and management of pain among critically ill adult patients in the intensive care unit. You have being asked to participate in order to help with providing the necessary information in relation to the topic.

Procedure

During the study you will be required to answer a self-administered questionnaire for 30 minutes. Participants are not to write their names on the questionnaire before answering it to maintain anonymity.

Participants

All nurses' currently are working in the ICU including those that have worked in the ICU in the longer than 6 months.

Duration

The expected number of participating nurses is 60 nurses. Each participant will be actively involved in the study for 30 minutes.

Risks

There will be minimal or no risks in your participation in this study in any way. This questionnaire can be answered when you are alone in order to promote privacy and no name should be written on the questionnaire. The answered questionnaire will not be shared with any other person other than you to ensure confidentiality

Benefits

There will be no favors, direct benefits or incentives to the participant for taking part in this study. However, the information that will be given will helpful in assessing the knowledge, attitudes and practices of nurses regards to pain assessment and management. The results of this research paper will help to bring about improved pain assessment and management and create awareness among nurses in the ICU on how best pain can be assessed and managed. The results will consequently lead to enhanced patient outcomes such as early discharge from the intensive care unit, better patient satisfaction, reduced risks of developing chronic pain and fewer days of disability and reduced lost work productivity. In addition, there will be reduced chances of patients' developing adverse outcomes related to poor or undertreated pain.

Sharing of results

The results of this study will be shared with the Kasama general hospital management, Kasama general Hospital intensive care unit, the University of Zambia: school of nursing sciences, library (medical and main library), Kasama General Hospital management and ICU nurses and in a peer reviewed journal.

Cost

The participants will not incur any monetary costs; however, the participant will lose time as they will have to spend 30 minutes to answer the questionnaire

Questions (whom to contact)

Participants have the right to ask questions were not clear and the researcher will be available to answer the question for clarity. The questions can be asked by forwarding the questions to the researcher Kaminsa Chibochi- 0972353849. Email: kaminsacemelia@gmail.com Or you may contact the chairperson at the University of Zambia Biomedical Research Ethics committee Dr. S. Munsaka on +260977925304 or email unzarec@unza.zm or s.munsaka@unza.zm

Statement of voluntariness

Participants' participation in the study is voluntary and is at their own free will. However, they are free to withdraw at any point as it is their right which will be respected.

Confidentiality

Any information that the participant gives in this study will be confidential as the answers to the questionnaire will only be accessed by the researchers involved in the study. The participant will only be identified by a number and no name should be given.

Appendix II: Informed consent

You have been requested to participate in an interview conducted by Kaminsa Chibochi. The purpose of this interview is to assess the nurses' knowledge, attitudes and practices of nurses towards pain assessment and management of patients in the intensive care units at Kasama general hospital, Kasama, Zambia.

I_____ (Names or initials of participant) have been explained to what is to be done, the risks, the benefits involved and my rights regarding the study. I understand that my decision in this study will not alter my usual medical care. In the use of this information, my identity will be concealed. I am aware that I may withdraw at any time. I understand that by signing this form, I do not waive any of my legal rights but merely indicate that I have been informed about the research study in which I am voluntarily agreeing to participate. A copy of this form has been provided to me.

Signature_____ Date _____ (Participant)

Name _____ Signed_____ Date _____ (Witness)

Name _____ Signed _____Date _____ (Researcher)

Appendix III: Questionnaire

THE UNIVERSITY OF ZAMBIA

SCHOOL OF NURSING SCIENCES

FORMAL- STRUCTURED QUESTIONNAIRE

RESEARCH TOPIC

NURSES KNOWLEDGE, ATTITUDES AND PRACTICES REGARDING PAIN ASSESSMENT AND MANAGEMENT OF PATIENTS IN THE INTENSIVE CARE UNITS AT KASAMA GENERAL HOSPITAL, KASAMA, ZAMBIA

QUESTIONNAIRE NUMBER …….

DATE OF QUESTIONNAIRE ADMINISTRATION……

INSTRUCTIONS TO PARTICIPANTS

1. Do not write your name on this questionnaire.

2. Tick [ ] in the box next to the chosen response or encircle the chosen response, for questions with alternatives.

3. Answer all question(s).

4. Write all responses clearly.

5. Keep the questionnaire safe.

SECTION A: SOCIO-DEMOGRAPHIC DATA

Select the most appropriate answer.

1. What is your gender?
    a. Female
    b. Male
2. How old were you on your last birthday?
    a. less than 25
    b. 25-29
    c. 30-34
    d. Above 35
3. What is your level of experience?
    a. Less than 2 years
    b. 3-5
    c. 6-9
    d. Above 10
4. Which ICU are you currently working in?
    a. MICU
    b. PICU
    c. NICU
5. What is your Level of education?
    a. Master of Science
    b. Bachelor of science
    c. Diploma
    d. Certificate
6. Have you ever undergone a training course on pain management?

a. Yes

b. No

SECTION B: **KNOWLEDGE**

Indicate whether your response is True or false/ I don't know

	True	**False**	**I don't know**
7. Vital signs are always a reliable indicator of pain intensity in patients.	[ ]	[ ]	[ ]
8. Important to assess pain in patients with GCS above 8	[ ]	[ ]	[ ]
9. Patients who can be distracted from pain usually do not have severe pain	[ ]	[ ]	[ ]
10. Aspirin and other NSAIDS are not effective in treating pain in the ICU	[ ]	[ ]	[ ]
11. Combining analgesia that have different mechanisms may result in better pain control with fewer side effects than using a single analgesia	[ ]	[ ]	[ ]
12. The usual duration of analgesia morphine of 1-2mg lasts for 4-5 hours	[ ]	[ ]	[ ]
13. Opioids should not be used in patients with history substance abuse.	[ ]	[ ]	[ ]
14. Morphine has dose ceiling (i.e dose above 2 greater pain relief can be achieved.	[ ]	[ ]	[ ]
15. Pethidine can be prescribed for chronic pain safely.	[ ]	[ ]	[ ]
16. It is important to assess for pain in patients end of life care.	[ ]	[ ]	[ ]

17. If the patients' cause of pain is unknown opioids should not be used as this can mask the ability to correctly diagnose the cause of pain.	[ ]	[ ]	[ ]
18. Benzodiazepines are not effective pain relievers unless pain is due to muscle spasms	[ ]	[ ]	[ ]
19. The recommended route of admin of opioid analgesia with persistent cancer related pain is oral.	[ ]	[ ]	[ ]
20. The recommended route of opioid administration for sudden onset of pain in patients such as in trauma patients or postoperative pain is intravenously.	[ ]	[ ]	[ ]

SECTION C: ATTITUDE

Indicate by stating Yes or No to the following statements

21. Do you think patients who can be distracted by pain usually do not have severe pain ……..
22. Do you think the patient can sleep despite pain……..
23. Do you think patients should be encouraged to endure as much pain as possible before using opioids…….
24. Do you think children below 11 cannot reliably report pain so clinicians should rely on parents for assessing the child's intensity of pain ……
25. Do you believe that giving narcotics on a regular schedule is preferred over PRN schedule for continued pain……
26. Do you think that giving patients sterile water (a placebo) is useful in determining if the pain is real……
27. Do you think that lack of pain expression does not mean lack of pain……

28. Do you think that analgesia for postop pain should initially be administered around the clock on a fixed schedule …….

29. Do you believe that patients spiritual beliefs can lead them to think pain and suffering are necessary……..

30. Do you think that the most accurate judge of the intensity of the patients' pain is the patient? ……

SECTION D: PRACTICES

31. How frequently do you use a pain assessment tool for patients able to self-report pain?

a. Always

b. Often

c. Not used

d. I don't know

How frequently do you assess the need for pre-emptive analgesia prior to the following procedures?

	Always	**Often**	**Not done**	**I don't know**
32. Endotracheal suctioning	[ ]	[ ]	[ ]	[ ]
33. Wound care	[ ]	[ ]	[ ]	[ ]
34. Drain removal	[ ]	[ ]	[ ]	[ ]
35. Invasive line placement	[ ]	[ ]	[ ]	[ ]
36. Spontaneous breathing (weaning) trial	[ ]	[ ]	[ ]	[ ]
37. Patient repositioning	[ ]	[ ]	[ ]	[ ]

38. How frequent is pain management plan discussed during nurse handovers or nurse to physician report?
    a. Always
    b. Often
    c. Not done
    d. I don’t know
39. How frequently are patients pain scores discussed during nurse handovers or nurse physician report?
    a. Always
    b. Often
    c. Not done
    d. I don’t know
40. How frequently are pain assessment scores utilized before administration of pain medication to patients in the ICU?
    A. Always
    B. Often
    C. Not done
    D. I don’t know
41. How often do you administer opioids for pain management?
    a. Always
    b. Often
    c. Not done
    d. I don’t know
42. How often is pain management effectiveness discussed during nurse reports?
    a. Always
    b. Often
    c. Not done
    d. I don’t know

43. How often do you experience challenges in managing pain in ICU patients?
    a. Always
    b. Often
    c. Never
    d. I don't know
44. How often do you adjust pain management plans based on patient feedback?
    a. Always
    b. Often
    c. Sometimes
    d. Rarely
45. How often do you assess pain after the initial assessment?
    a. Always
    b. Often
    c. Sometimes
    d. Rarely
46. Have you seen a reduction in pain related complications e.g agitation, respiratory depression in your current pain management strategies?
    a. Yes
    b. No
    c. Not sure
47. What barriers do you encounter when managing pain in your patients?
    a. Limited resources to pain management [ ]
    b. Lack of knowledge on pain management [ ]
    c. Patients fear of addiction [ ]
    d. I don't experience any challenges [ ]

Appendix IV: Budget estimation

ITEM	QUANTITY NEEDED	UNIT COST (Kw)	TOTAL COST (Kw)
Printing of authorization letter	5	5	25
Printing of consent forms	4 pages	5	20
Photocopying of consent forms	90 x 4 pages	4	1440
Printing of questionnaire	8 pages	5	40
Photocopying of questionnaire	90 x 8 pages	4	2880
Printing of proposal	70 pages	5	350
Printing of report	90 pages x 3	5	1350
Transport	14 days	100	1400
Folders	4	50	200
Ream of papers	2	250	500
Pens	1 box	100	100
UNZABREC review fee	-	1000	1000
Lunch allowance	14 days	100 x 14	1400
Binding	3	100	300
Stapler machine	1	100	100
Staples	1 pack	300	300
Flash disk	1	200	200
Envelopes	4	10	40
Padlock	1	100	100
TOTAL			**K11,745**

Table 1: Budget estimation

Budget justification

The budget in this study was allocated to mostly printing and photocopying of the ethics letters, proposals, questionnaires and reports enabling the researcher to complete the research with all the necessary paper work readily available. In addition the researcher collected data for a period of 14 days; therefore, transport fare was required to go to and from the hospital, lunch allowance was included in order to collect information with enough energy and with ease as the researcher collected data from nurses working in two shifts, the morning and afternoon shift. A portion of the budget was allocated for the UNZABREC review, a fee attached to the proposal review process, this was important to facilitate the ethics committee to review the research proposal and await approval for the research to be conducted. In addition some of the funds were utilized for presenting of research reports for submission to exams office. Lastly, equipment such as pens, stapler, stables and papers are necessary to complete the data collection process.

Appendix V: Research time frame

Research plan/ time line

ACTIVITY	TIME FRAME									
	May, 2023	June, 2023	July, 2023	Aug, 2023	Sep, 2023	Oct, 2023	Nov, 2023	Dec, 2023	Jan, 2024	Feb, 2024
Literature review										
Proposal writing										
Proposal submission										
Presentation And clearance										
Data collection and data entry										
Data analysis										
Report Writing										
Dissemination Of results										

Appendix VI: UNZABREC approval letter

UNIVERSITY OF ZAMBIA
BIOMEDICAL RESEARCH ETHICS COMMITTEE

Telephone: +260 977925304
Telegrams: UNZA, LUSAKA
Telex: UNZALU ZA 44370
Fax: + 260-1-250753

Ridgeway Campus
P.O. Box 50110
Lusaka, Zambia
E-mail: unzarec@unza.zm

Federal Assurance No. FWA00000338 IRB00001131 of IORG0000774 NHRAR-REC No 2021-05-0002

18th January 2024

Your REF. No. 4681-2023

Chibochi Kaminsa,
University of Zambia,
School of Nursing Sciences,
P.O Box 50110,
Lusaka.

Dear Sir/Madam,

RE: KNOWLEDGE, ATTITUDES ABD PRACTICES REGARDING PAIN ASSESSMENT AND MANAGEMENT OF CRITICALLY ILL PATIENTS IN THE INTENSIVE CARE UNITS AMONG NURSES AT KASAMA GENERAL HOSPITAL, KASAMA, ZAMBIA (REF. NO. 4681-2023)

The above-mentioned research proposal was presented to the Biomedical Research Ethics Committee on 17th January, 2024. The proposal is **approved**. The approval is based on the following documents that were submitted for review:

a) Study proposal
b) Questionnaires
c) Participant Consent Form

APPROVAL NUMBER : REF. No. 4681-2023.

This number should be used on all correspondence, consent forms and documents as appropriate.

i. **APPROVAL DATE : 18th January 2024**
ii. **TYPE OF APPROVAL : Standard**
iii. **EXPIRATION DATE OF APPROVAL : 17th January 2025**
iv. After this date, this project may only continue upon renewal. For purposes of renewal, a progress report on a standard form obtainable from the UNZABREC Offices should be submitted one month before the expiration date for continuing review.
v. **SERIOUS ADVERSE EVENT REPORTING**: All SAEs and any other serious challenges/problems having to do with participant welfare, participant safety and study integrity must be reported to UNZABREC within 3 working days using standard forms obtainable from UNZABREC.

vi. **MODIFICATIONS**: Prior UNZABREC approval using standard forms obtainable from the UNZABREC Offices is required before implementing any changes in the Protocol (including changes in the consent documents).

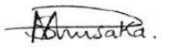
vii. **TERMINATION OF STUDY**: On termination of a study, a report has to be submitted to the UNZABREC using standard forms obtainable from the UNZABREC Offices.

viii. **NHRA:** You are advised to obtain final study clearance and approval to conduct research in Zambia from the National Health Research Authority (NHRA) before commencing the research project.

ix. **QUESTIONS**: Please contact the UNZABREC on Telephone No. +260977925304 or by e-mail on unzarec@unza.zm.

x. **OTHER**: Please be reminded to send in copies of your research findings/results for our records. You are also required to submit electronic copies of your publications in peer-reviewed journals that may emanate from this study. Use the online portal: unza.rhinno.net for further submissions.

Yours sincerely,



Prof. Sody Mweetwa Munsaka, BSc., MSc., PhD
CHAIRPERSON
Tel: +260977925304
E-mail: s.munsaka@unza.zm

Appendix VII: NATIONAL HEALTH RESEARXH AUTHORITY APPROVAL LETTER

NATIONAL HEALTH RESEARCH AUTHORITY

Lot No. 18961/M, off Kasama Road, Chalala, P.O. Box 30075, LUSAKA

Tell: +260211 250309 | Email: znhrasec@nhra.org.zm | www.nhra.org.zm

Ref No: NHRA-885/30/01/2024 **Date:7th February, 2024**

The Principal Investigator,
Chibochi Kaminsa,
University of Zambia,
School of Nursing Sciences,
Lusaka, Zambia.

Dear Ms Kaminsa,

Re: Request for Authority to Conduct Research

The National Health Research Authority is in receipt of your request for authority to conduct research titled **"Knowledge, Attitudes and Practices Regarding Pain Assessment and Management of Critically Ill Patients in The Intensive Care Units Among Nurses at Kasama General Hospital, Kasama, Zambia."**

I wish to inform you that following submission of your request to the Authority, our review of the same and in view of the ethical clearance, this study has been **approved** on condition that:

1. The relevant Provincial and District Medical Officers where the study is being conducted are fully appraised;
2. Progress updates are provided to NHRA bi-annually from the date of commencement of the study;
3. The final study report is cleared by the NHRA before any publication or dissemination within or outside the country;
4. After clearance for publication or dissemination by the NHRA, the final study report is shared with all relevant Provincial and District Directors of Health where the study was being conducted, University leadership, and all key respondents.

Yours sincerely,

Prof Victor Chalwe
Acting Director/Chief Executive Officer
National Health Research Authority

APPENDIX VIII: NATIONAL RESEARCH AUTHORITY CERTIFICATE

NATIONAL HEALTH RESEARCH AUTHORITY

The Health Research Act

(Act No. 2 of 2013)

MINISTRY OF HEALTH

ONE ZAMBIA ONE NATION

National Health Research Authority

ZAMBIA

CERTIFICATE OF REGISTRATION

THIS IS TO CERTIFY THAT

Chibochi Kaminsa

has been registered as a Health Researcher

Dated this 14th August 2023

Registration number NHRAR-R-779/15/08/2023

DIRECTOR

PROF. GODFREY BIEMBA