DEVELOPMENT AND PILOT TESTING OF A CLINICAL GUIDELINE FOR THE COMPREHENSIVE MANAGEMENT OF PAIN IN AN ADULT INTENSIVE CARE UNIT IN GHANA – AN INTERVENTION STUDY

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DECLARATION

I, Bridget Senanu Ofori, declare that this research report is my own work. It is being submitted for the degree of Doctor of Philosophy at the University of the Witwatersrand, Johannesburg. It has not previously been submitted for any degree or examination at this or any other university.

Signature 

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DEDICATION

Great is your faithfulness Lord, I am so grateful.

I dedicate this work to my little angels, Setornam, Sedem and Senam, and dear husband, Selasee, for standing by me through this very tough journey and to my mother, brother and the rest of my family for their continuous support and sacrifices.

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ABSTRACT

The purpose of the study was to develop and pilot test a clinical guideline for the comprehensive management of acute pain in the adult Cardiothoracic Intensive Care Unit (CT-ICU) in Ghana.

The intervention study employed both qualitative and quantitative designs using the pre- and post-intervention method. The objectives of the study were to develop and pilot test a clinical guideline for the comprehensive management of acute pain in adult patients admitted to the CT-ICU post cardiothoracic surgery. The site for the study was a six-bedded cardiothoracic Intensive Care Unit (ICU) of an academic hospital in the Greater Accra region of Ghana.

The intervention was assessed in terms of a primary outcome of patients' comfort and secondary outcomes of patients' satisfaction with pain management, length of stay in the CT-ICU and cost of CT-ICU care. To meet the objectives of the study, it was conducted in three (3) phases: Phase 1 - Exploratory phase, Phase 2 - Development and validation phase and Phase 3 – Pilot testing phase. In Phase 1 of the study, a systematic review of literature was undertaken to identify methods that would ensure effective pain management in adult Intensive Care Units. CT-ICU nurse experts (n=12) and CT-ICU doctors' (n=8), patients who were treated in the CT-ICU (n=3) and their relatives (n=3) were interviewed using focus groups and individual interviews to identify their views and opinions on pain and its management in the CT-ICU and measures to improve pain management. In Phase 2, a draft clinical guideline for the comprehensive management of pain in the CT-ICU was developed based on the findings from the exploratory phase (Phase 1). The guideline was presented to CT-ICU nurse experts and doctors, patients who received treatment in the CT- ICU and their relatives for validation. In Phase 3, the clinical guideline was piloted and outcomes assessed. Baseline assessments of patients (n=65) comfort and satisfaction with pain management in the CT-ICU was conducted and patients (n=65) length of stay and cost of patients (n=65) CT-ICU treatment was assessed before implementing the guideline (pre- test). Outcomes were then assessed by repeating the tests with the same sample size (n=65) for each assessment after the intervention (post-test). A comparison was then undertaken between the pre-and post-test to determine the effect of the intervention.

The systematic review of literature was analysed using the narrative approach and qualitative data using the six steps of qualitative analysis by Creswell (2014). Statistical tests employed in the study included the Fisher's Exact and two-sample t-tests. Testing was done on the 0.05 ($p<0.05$) level of significance. The statistical software package STATA© version 14 was used to analyse the data.

The comparison of pre-and post-tests indicated that the intervention significantly reduced patients' pain scores ($p=0.000$), increased satisfaction with nurses' administration of analgesia ($p=0.001$), increased satisfaction with nurses' responsiveness to patients' complaints of pain ($p=0.000$) increased satisfaction with pre-operative education on post-operative pain ($p=0.001$) and reduced cost of CT-ICU care ($p=0.001$).

The intervention improved pain management in the CT-ICU and it is recommended that pain be given the priority that it deserves to improve ICU patients' outcomes.

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LIST OF ABBREVIATIONS

The following is a list of abbreviations used in the study:

AACN	American Association of Critical Nurses
ACCCM	American College of Critical Care Medicine
AGREE	Appraisal of Guidelines Research and Evaluation in Europe
ATICE	Adaptation of Intensive Care Environment
BPAS	Behavioural Pain Assessment Scale
BPS-NI	Behavioural Pain Scale- Non-intubated
BPS-sf	Brief Pain Inventory-short form
CABG	Coronary Artery Bypass graft
CAM-ICU	Confusion Assessment Method in ICU
CCNGG	Critical Care Nurses Group of Ghana
CEO	Chief Executive Officer
CINAHL	Cumulative Index to Nursing and Allied Health Literature
CPOT	Critical-Care Pain Observation tool
CT	Cardiothoracic
CTICU	Cardiothoracic Intensive Care Unit
IASP	International Association for the Study of Pain
ICU	Intensive Care Unit
JBI	Joana Briggs Institute
JSTOR	Journal Storage
MAStARI	Meta-Analysis of Statistics Assessment
MeSH	Medical Subject Heading
NGO	Non-Governmental Organisation
NHIS	National Health Insurance Scheme
NICE	National Institute for Clinical Excellence
NMC	Nursing and Midwifery Council of Ghana
NRS	Numerical Rating Scale
PAD	Pain Agitation Delirium
PRISMA	Preferred Reporting Items for Systematic Reviews
QARI	Qualitative Assessment and Review Instrument

RASS	Richmond Agitation and Sedation Scale
RNAO	Registered Nurses Association of Ontario
SAE	Serious Adverse Event
SASA	South African Society of Anaesthesiologist
SICU	Surgical Intensive Care Unit
SIGN	Scottish Intercollegiate Guidelines Network
VAS	Visual Analogue Scale
VCS	Verbal Category Scale
VDS	Visual Descriptor Scale
WFCCN	World Federation of Critical Care Nurses
WHO	World Health Organisation
JCS	Joint Commission Standards
AHRQ	Agency for Healthcare Research and Quality
APS	American Pain Society
ICS	Intensive Care Society
IOM	Institute of Medicine
SAPS	Simplified Acute Physiology Score
CCRN	Critical Care Registered Nurse
BSN	Bachelor of Science in Nursing
NCCAM	National Centre for Complementary and Alternative Medicine
ASPMN	American Society for Pain Management Nursing
JCACHO	Joint Commission on Accreditation of Healthcare Organisations
ANA	American Nurses Association
APS	American Pain Society
Mg	Milligram
JBI	Joanna Briggs Institute
JBI-MAStARI	Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument
JBI-QARI	Institute Qualitative Assessment and Review Instrument

CHAPTER ONE

OVERVIEW OF THE STUDY

1.1 INTRODUCTION

Chapter One seeks to provide an overview of the study as planned. The background to the study is described followed by the problem statement, purpose of the study, research objectives and questions, significance of the study, the researcher's assumptions and relevant definitions. This is followed by an overview of the research method and the outlay of the study.

1.2 BACKGROUND

The World Health Organization (WHO), which has direct oversight responsibility over health issues globally, especially in developing countries, does not provide guidelines for pain management in critically ill patients even though this would assist countries such as Ghana to manage acute pain in the Intensive Care Unit effectively. It might be argued that most clinical guidelines for pain management in critically ill patients are from developed countries and cannot be applied effectively in resource-constrained developing countries like Ghana. A guideline by WHO would have put into consideration the peculiar challenges of developing countries. The resource constraints and socio-cultural beliefs regarding pain and its management in Ghana are unique thus the need to explore the views of stakeholders in order to develop a context appropriate guideline to meet the needs of this population. Barr, Fraser, Puntillo *et al.* (2013) suggests that clinical practice guidelines should be adapted to local practice patterns and resource availability.

This study intends to put in place a clinical guideline for the comprehensive management of acute pain in the CT-ICU in Ghana, which may improve patients comfort, increase their satisfaction with the pain management in the CT-ICU, reduce their length of stay in the CT-ICU and reduce the cost of CT-ICU care. Effective acute pain management will promote early recovery and reduce complications in the ICU patient, and will decrease the length of stay and cost of ICU treatment. This is crucial for a developing country like Ghana with limited resources, healthcare facilities, staff and equipment. Reducing the length of stay and

cost of ICU treatment will also ensure the many other patients who need this highly specialised service are accommodated.

Apart from the acute pain guideline developed by the South African Society of Anaesthesiologists (SASA, 2009), no other guideline for pain management in ICU patients was found in Africa especially in resource constraint countries with a special focus on CT-ICU patients and considerations to the opinions of ICU nurses, doctors, patients and their relatives.

The International Association for the Study of Pain (IASP) defines pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage (Merskey & Bogduk, 1994:210). Acute pain is complex, and is described as an unpleasant experience with an identifiable precipitating cause. It has defined pathology, and can resolve with healing of the underlying injury. Acute pain in individuals can also be seen as a reflexive and a protective response (American Pain Society, 2007; Alexander, 2013).

Adult Medical, Surgical, and Trauma Intensive Care Unit patients routinely experience pain; both at rest and with routine ICU care (Barr *et al.*, 2013:271). According to Barr *et al*. (2013), procedural pain is very common in adult ICU patients and pain in adult cardiac surgery patients is common and often poorly treated; women experience more pain than do men after cardiac surgery. Nearly five (5) million patients are admitted to the ICU each year (Pronovost & Goeschel, 2005) and an estimated 71% of these remember experiencing pain during their stay in the ICU (Klein, Dumpe, Katz & Bena, 2010). Painful procedures, such as turning and tracheal suctioning, are common in the ICU patient and precipitate acute pain (Cade, 2008). Pain remains a major problem for ICU patients postoperatively (Gelinas, 2007) hence the focus of the study on CT-ICU patients who experience acute pain post cardiac or thoracic surgeries, which are major surgeries.

Most critically ill patients will likely experience pain sometime during their stay in the ICU (Erstad, Puntillo, Gilbert *et al.*, 2009) and identify it as a great source of stress (So and Chan, 2004; Hweidi, 2007). However, many critically ill patients may be unable to self-report their pain (either verbally or with other signs) because of an altered level of consciousness, the use of mechanical ventilation, sedative agents or neuromuscular blocking agents (Shannon & Bucknall, 2003). Yet, the ability to assess patient's pain reliably is the foundation for

effective pain treatment. As the International Association for the Study of Pain states, the inability to communicate verbally does not negate the possibility that a patient is experiencing pain and is in need of appropriate pain-relieving treatment (IASP, 2010).

Pain is one of the most common symptoms in critically ill patients and is experienced by each patient in a unique manner (Puntillo, Smith, Arai & Stotts, 2008). The routine use of an appropriate assessment of pain has been mandated by the Agency for Healthcare Research and Quality (AHRQ) and the Joint Commission (Gelinas, Fortier, Viens *et al.,* 2004). Professional organisations such as the American Association of Critical-Care Nurses, the American College of Chest Physicians, The Society for Critical Care Medicine and the American Society for Pain Management agree. All these organisations advocate for implementation of standardised pain assessment tools that include behavioural indicators in patients who are sedated and receiving mechanical ventilation and incapable of self-reporting or whose self-reports may be unreliable (Pun & Dunn, 2007). The identification and treatment of pain is an important component of the plan of care to improve patients' outcome (Joint Commission Standards (JCS), 2010). Patients can expect that their healthcare providers will assess their pain, and when pain is identified will be treated and services provided in accordance with care and services provided by the organisation (JCS, 2010).

Ineffective pain management can lead to hormone fluctuation, electrolyte and glucose imbalance, hypertension, tachycardia, increased oxygen consumption, impaired intake and output, fatigue, depressed immune response, reduced cognitive function, insomnia, anxiety, depression, hopelessness, and thoughts of suicide (American Pain Society, 2007; CPM Resource Center, 2010d). Failure to relieve acute pain may result in increasing anxiety, inability to sleep, demoralisation, a feeling of helplessness, loss of control, inability to think and interact with others in extreme situations, where patients can no longer communicate; effectively they have lost their autonomy (Cousins, Brennan & Carr, 2004). Furthermore, studies have indicated that ineffective treatment of pain is associated with increased duration of mechanical ventilation (8 vs. 11 days; $P < .01$) (Payen, Bosson, Chanques *et al.,* 2009) increased rate of nosocomial infections (Chanques, Jaber & Barbotte *et al*., 2006) and decreased patient satisfaction with pain control (Gelinas *et al.,* 2004). Additionally, unsystematic pain assessment in critically ill patients can increase ICU length of stay (13 vs. 18 days; $P < .01$) (Payen *et al*., 2009). There is therefore the urgent need to manage pain effectively to improve patient outcomes.

1.3 PROBLEM STATEMENT

Currently, no standardised pain assessment tools are used in the adult ICUs in Ghana; this questions the effectiveness of pain management in these ICUs. There are also no clinical guidelines for the assessment and management of critically ill patient's pain in the adult ICUs in Ghana. Thus, the researcher is of the opinion that pain in the critically ill patients in the adult ICU's in Ghana is not effectively managed.

The problem leads to the following question - will a clinical guideline for the comprehensive management of pain in the CT-ICU developed with the input of Intensive Care nurses, doctors, CT-ICU patients and their relatives improve the management of acute pain in the post cardiothoracic surgery patient in the adult Cardiothoracic Intensive Care Unit?

1.4 PURPOSE OF THE STUDY

To develop and pilot test a clinical guideline for the comprehensive management of acute pain in the adult Cardiothoracic Intensive Care Unit in Ghana.

1.5 RESEARCH OBJECTIVES

The objectives of the study were to:

- Develop a clinical guideline for the comprehensive management of acute pain in adult patients admitted to the CT-ICU post cardiothoracic surgery.
- Pilot test the clinical guideline developed for the comprehensive management of acute pain in the CT-ICU.

1.6 SIGNIFICANCE OF THE STUDY

The World Health Organization does not provide any guidelines for pain management in critically ill patients, which will assist countries such as Ghana to manage acute pain in the ICU effectively. It might be argued that most clinical guidelines for pain management in critically ill patients are from developed countries and cannot be applied effectively in resource-constrained developing countries like Ghana. Research suggests that clinical practice guidelines should be adapted to local practice patterns and resource availability. No

nursing guidelines have been found for pain assessment and management in critically ill patients in ICUs in Africa. This guideline will therefore be useful for clinicians, administrators and nursing educators in the quest to improve ICU patients' pain and hopefully lead to further research into this important area of practice especially in Africa.

Intervention research is a new approach to nursing research aimed at bridging the gap between knowledge and practice and this approach will be used to put in place a clinical guideline, which may improve patients comfort by managing their pain effectively and increasing their satisfaction with pain management in the CT-ICU. It may also reduce their length of stay and cost of CT-ICU care.

1.7 RESEARCHER'S ASSUMPTIONS

An assumption refers to statements that are taken for granted or are considered true, even though they have not been scientifically tested (Burns & Grove 2011:48). It was earlier described as a basic principle that is believed to be true without proof or verification (Polit & Beck, 2004: 13). The study was based on a number of assumptions.

1.7.1 Meta-theoretical Assumptions

These are based on Virginia Henderson's major assumptions (1966) particularly related to the four main Constructs of Nursing, namely person, environment, nursing and health. The Nursing Need Theory developed by Henderson (1966) defines the unique focus of nursing practice. Her theory focuses on the importance of increasing the patient's independence to hasten their progress to recovery. The theory emphasises basic human needs, and how these needs can be met by nurses. Comfort is an important need of all patients and can be improved with effective pain management.

- **Person**

The person in this case refers to the critically ill adult CT-ICU patient. The person must maintain physiological and emotional balance and pain control is important to maintain this balance; any person in severe pain cannot be said to have such balance. The mind and body of the person are inseparable. Critically ill patients require help towards independence and

it is the major role of ICU nurses to ensure these patients attain independence by accurate assessment and management of their needs. These needs include pain relief especially in critically ill patients who are unable to function independently. Guidelines especially when adapted to local practice can assist care providers to render care based on evidence. The patient and the family are a unit and that must be considered in all nursing activities including pain assessment and treatment.

- **Environment**

The environment in this case refers to the CT-ICU in which post cardio-thoracic surgery patients were admitted. Healthy individuals may be able to control their environment but illness may interfere with their ability especially in critically ill patients who are unable to verbalise their needs. Intensive Care nurses should protect patients from mechanical injury and physiological injury, such as poorly managed pain that can lead to complications. Nurses should minimise the chances of injury through recommendations regarding construction of ICUs, purchase of equipment and their maintenance. ICU doctors use Intensive Care nurses' observations and judgements upon which to base prescriptions for protective devices and that applies to pain management as well. Nurses must know about social customs and religious practices to assess danger.

- **Nursing**

The Intensive Care nurse has a unique function to help well or sick individuals, in this case the critically ill patient in the attainment of their needs. Although the ICU nurse functions as a member of a medical team (pain management requires a team effort), he/she can also function independently of the physician by doing his/her own nursing assessment but promote his/her plan if there is a physician in attendance. Henderson (1966) stressed that the nurse can function independently and must if he/she is the best-prepared health worker in a situation. The nurse can and must diagnose and treat if the situation demands it. This can be applied in pain management by using alternative ways of pain management, such as changing the position of the patient and pressure point care. Henderson (1966) believes that the nurse is knowledgeable in both biological and social sciences and can assess the patient's basic needs.

- **Health**

Health is a quality of life. No good quality of life can be achieved by an individual if he/she is constantly in pain. Health is basic to human functioning, which can be promoted with adequate management of pain. Health requires independence and interdependence of patients on health workers. Critically ill patients rely almost entirely on Intensive Care nurses for their needs. Promotion of health is more important than care of the sick. Preventing the patient from getting complications from poorly managed pain is better than treating the complications of poorly managed pain, and individuals will achieve and maintain health if they have the necessary strength, will and knowledge.

1.7.2 Theoretical Assumptions

The researcher draws her assumptions from the Synergy Model (Curley, 1998; McKinley, 2007, Plass, 2014). The desired goal of the American Association Critical-Care Nurses (AACN) Synergy Model is to optimise patient outcomes.

Patients, including critically ill patients, are biological, spiritual and social entities who present at a particular stage of their development to the hospital/ICU. The patient as a whole must be considered when being nursed, especially when managing their pain since pain has physical, psychological and spiritual components. According to the Synergy model, when patient characteristics match and synergise with nurse characteristics, optimal patient outcome can result. This is ideal for pain management in the ICU, as synergy between patient characteristics and nurse characteristics will improve pain outcomes in the ICU. The ICU patients' need for pain relief must match the nurses' ability to assess and manage pain effectively.

The researcher identifies with the patient and nurse characteristics stated by the Synergy Model (Curley, 1998; McKinley, 2007, Plass, 2014), which are discussed below.

Patient Characteristics (Plass, 2014)

- **Vulnerability** is the level of patients' susceptibility to actual or potential stressors that may affect their outcomes adversely. ICU patients are particularly vulnerable because of the severity of their illness and the fact that most of them cannot verbalise their needs, especially the need for pain medication
- **Stability** is the patient's ability to attain and maintain a steady state of equilibrium. The patients' response to nursing interventions and therapies can affect their stability. ICU patients are less likely to quickly attain and maintain study equilibrium because of the nature of their disease conditions. These are mostly severe and life-threatening conditions.
- **Complexity** is the intricate entanglement of two or more systems. Systems refer to physiological or emotional states of the body, or family dynamics, or the environment and its interactions with the patient. ICU patients have complex systems since their physiological and emotional states are compromised, and relatives are very anxious. The ICU environment is also complex with all the machines and devices that can assist the patient. These machines increase patients' anxiety and noise levels in the ICU.
- **Resource availability** is the extent of resources brought to the situation by the patient his or her family and community. The resources can be technical, fiscal, personal, psychological, social or supportive in nature. The more resources a person or patient brings to the healthcare situation, the greater potential he or she has for a positive outcome. Patients in the ICU need a lot of support both emotionally and physically, especially family support. These can positively influence their outcome including pain outcomes.
- **Participation in care** is the participation by a patient and family in being involved in the delivery of care. Patient and family participation can be influenced by factors such as educational background, resource availability and cultural background. Unfortunately, ICU patients are limited in their participation in care, mostly due to the severity of their disease conditions, but family participation goes a long way to enhance recovery.
- **Participation in decisions making** is the involvement of the patient and his or her family in understanding the information provided by healthcare providers and acting upon this information make an informed decision. Patient and family engagement in

clinical decisions can be impacted by their level of knowledge, their capacity to make decisions given the insult, cultural background, which includes their beliefs and values, and the level of inner strength during a crisis. Having a relative admitted to the ICU is normally a crisis time for the family. Their participation in the care is therefore important to allay their anxiety. Family can also participate in the assessment and management of pain of their relatives by reporting behaviours that normally denote pain.

- **Resiliency** is the capacity to return to a level of normal functioning using compensatory/coping mechanisms thus the ability to get one's health back quickly after an illness. The ability of a critically ill patient to get back to health normally takes longer than that of other patients due to the severity of their ailments. Systems can thus be put in place to assist the patient and his/her family to cope better with the situation.
- **Predictability** is a characteristic that allows a person or patient to expect a certain course of events or course of illness, thus the ability to expect to either get well or deteriorate. Education by ICU nurses can assist the patient and his or her family to have some predictability about his or her illness and pain outcomes.

Nurse Characteristics (Plass, 2014)

- **Clinical judgment** is the clinical reasoning employed by a healthcare provider, in this case an Intensive Care nurse in the delivery of care. It consists of critical thinking and nursing skills that are acquired through a process of integrating formal education and experience to care for the patient. Clinical judgment is an important nurse characteristic in the ICU, since the ICU nurse needs to make clinical decisions based on many parameters, including making a decision about pain.
- **Advocacy** is working on another's behalf when the other is not capable of doing that for him or herself. The nurse serves as an agent in identifying and helping to resolve ethical and clinical concerns and issues within the clinical setting, thus the ICU. Advocacy is an important function of the ICU nurse especially because patients in the ICU are unable to communicate their needs including pain and need the nurse to advocate on their behalf.
- **Caring practices** are a combination of unique nursing interventions rendered to meet needs of the patient and family. Caring behaviours include compassion, vigilance,

engagement of patient and family in the care of the patient, and responsiveness to the needs of the patient and family. Pain assessment and management are important caring practices that can be rendered by the nurse to the patient to make his or her stay in the ICU more comfortable.

- **Collaboration** is the nurse working with others to promote optimal patient outcomes. The patient, their family, and members of the healthcare team work together toward promoting the needs of patients. Pain management is a team effort and requires all members of the health team to be committed to ensuring that the patient is pain free during their stay in the ICU.
- **Systems thinking** is the knowledge and tools the nurse uses within the healthcare system. The ability to understand how one's decision can make an impact on the healthcare system is integral to systems thinking. The nurse uses a global perspective in clinical decisions and has the ability to negotiate the needs of the patient and family through the healthcare system.
- **Response to diversity** is the ability and sensitivity to recognise, appreciate and incorporate differences into the provision of patient care. Nurses need to recognise the individuality, especially in how patients experience pain. Individuality can be observed in the patient's beliefs especially their spiritual beliefs, ethnicity, culture and family configuration, lifestyle values and their use of alternative and other therapies.
- **Clinical enquiry** is the process of questioning and evaluating practice, providing informed practice or evidence based practice and innovation through research and experience. Clinical enquiry evolves as the nurse moves from a novice to an expert. At the expert level, the nurse improves, sometimes deviates, and/or individualises standards, protocols and guidelines to meet the needs of the patient including their need for pain relief.
- **Facilitation of learning** is the nurse's ability to facilitate patient and family learning through education. Education should be provided based upon the patient and family individual strengths and weaknesses. Educating a critically ill patient can be challenging for the nurse, especially if the patient is very ill, and requires skills and creative methods to ensure the patient and family are well informed about the patient's disease condition. Pre-operative education of patient and family about pain is an important factor that can improve pain outcomes.

The following statements are applicable to this study:

- Pain is a major stressor in ICU patients and can lead to complications, which prolong their stay in ICU and increase the cost of hospitalisation.
- Pain assessment and management is not given the priority it deserves by Intensive Care nurses.
- Pain assessment and management tools and protocols are not routinely used especially in critically ill patients.
- The need to educate ICU nurses about the importance of pain assessment and management cannot be over-emphasised.
- The gap between research and practice when it comes to pain management in the ICU needs to be bridged.
- Guidelines, especially when adapted to local practice, can help to assess and manage pain more effectively.

1.7.3 Methodological Assumptions

Methodological assumptions consist of the assumptions made by the researcher regarding the methods used in the process of his or her research (Creswell, 2003). The procedures used by the researcher are inductive and are based on the researcher's own experience in collecting and analysing data.

- Research is scientific and follows a rigorous process of enquiry.
- Intervention studies do not only come up with evidence, they ensure that the findings of the study are applied on the population its intended for and outcomes assessed. Intervention studies thus bridge the gap between knowledge and practice.
- The quantitative design is both objective and systematic and uses statistics to test relationships and examine cause and effect interactions between variables.
- Interviews during a qualitative study help the researcher explore the lived experiences of participants.
- Using both the quantitative and qualitative designs for a study brings on the benefits of both designs in the study. They complement each other in that where quantitative method cannot be used effectively, qualitative data can and vice-versa. The researcher thus has the benefit of words and numbers.

- The blending of qualitative and quantitative data in a single project can be advantageous in developing an evidence base for nursing practice. Advantages include: the two methods have complementary strengths and weaknesses; an integrated approach can lead to theoretical and substantive insights into the multidimensional nature of reality; multi-method research can provide feedback loops that augment the incremental gains in knowledge from a single-method study; confirmation of hypotheses through multiple types of data can strengthen study validity; and if findings are inconsistent, a careful scrutiny of the discrepancies could push the line of enquiry further. In nursing, one of the most frequent uses of multimethod research has been in the area of instrument development and refinement (Polit & Beck, 2004:286)
- Recommendations from a study must be based on findings and must be used to the benefit of those for whom it is intended.

1.8 OPERATIONAL DEFINITIONS

The following operational definitions are used consistently throughout the report.

- **Pain**

The International Association for the Study of Pain defines pain as an "unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage" (Merskey & Bogduk, 1994:210).

- **Acute Pain**

For the purpose of the study, acute pain is pain associated with a degree of tissue damage and decreases with healing and is often associated with the autonomic nervous system and protective responses such as guarding behaviours (American Pain Society, 2007; Alexander, 2013). In this study, it will refer to acute pain critically ill adult CT-ICU patients.

- **Critically Ill Patient**

Critically ill patients are patients at risk of actual or potential life-threatening health conditions (American Association of Critical Care Nurses, 2010). For the purpose of this study, this will refer to post cardiothoracic surgery patients admitted to the adult CT-ICU, after cardiac or thoracic surgery.

Post ICU Patient

For the purpose of the study, post ICU patient will refer to adult patients who has been treated in the CT-ICU and transferred from to the CT ward post cardiothoracic surgery and is able to communicate verbally.

- **Intensive Care Unit**

According to the Intensive Care Society (2014), an ICU is a unit that caters for patients with the most severe and life-threatening illnesses and injuries, which require constant, close monitoring and support from specialist equipment and medication in order to ensure normal bodily functions. They are staffed by highly trained doctors and Intensive Care nurses who specialise in caring for seriously ill patients. Common conditions that are treated within ICUs include major surgery, trauma, multiple organ failure and sepsis. In this study, it will refer to the cardiothoracic ICU of an academic hospital in Ghana.

- **Intensive Care Nurse**

A specialised nurse who cares for critically ill patients who have potential or manifest disturbances of vital organ functions. An Intensive Care nurse assists, supports and restores the patient towards health, or to ease pain, or to prepare them for a dignified death. The aim of an Intensive Care nurse is to establish a therapeutic relationship with patients and their relatives and to empower their individual physical, psychological, sociological, cultural and spiritual capabilities by preventive, curative and rehabilitative interventions (World Federation of Critical Care Nurses (WFCCN), 2007). For the purpose of this study, this will also refer to any nurse registered with the Nursing and Midwifery Council (NMC) of Ghana as a registered nurse and has undergone an accredited course in Intensive Care nursing and

is also registered in that capacity. Intensive Care and critical care nurses are used in the same sense in this study.

- **Nurse Expert**

According to Benner (1982) a nurse expert is a nurse who no longer needs to rely on principles, rules or guidelines to connect situations and determine actions. He/she has much more background or experience and has an intuitive grasp of clinical situations. His/her performance is now fluid, flexible, and highly proficient. It will refer to a nurse with ICU training with at least three (3) years of ICU experience in the study.

- **Pain outcomes**

According to the National Veteran Affairs Pain Outcomes Working Group (2003), pain outcomes focus on changes in individuals' pain experiences following an intervention. For the purpose of the study, pain outcomes will refer to comfort, satisfaction with the pain management process, length of stay in the CT-ICU and cost of CT-ICU care.

- **Comfort**

Comfort is the experience in which the basic human needs for ease, relief, and transcendence of a person have been met (Kolcaba, 1991a). Comfort in nursing is to relieve patients of their discomfort and to support their pain (Morse, 2000). The major sources of patient's discomfort have been identified as anxiety, pain, thirst and sleep disturbances (Novaes, Knobel, Bork *et al.*, 1999; Nelson, Meier, Oei *et al.*, 2001; Puntillo, Arai, Cohen *et al.*, 2010; Kalfon, Mimoz, Auquier *et a*l., 2010). In this study, comfort will refer to pain relief, which will be measured by assessing the post adult CT-ICU patients' pain pre-and post-intervention.

- **Satisfaction**

A degree to which the patient's desired expectations, goals and or preferences are met by the healthcare provider and or services provided (Debono & Travaglia, 2009:6), and will refer

to satisfaction of pain management in the CT-ICU in the study. This outcome will be measured by assessing the post ICU patients' satisfaction with pain management pre-and post-intervention.

- **Clinical Guidelines**

Clinical guidelines are statements that include recommendations intended to optimise patient care and informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options (Institute of Medicine, 2011). Clinical guidelines can change clinical practice and influence patient outcome.

1.9 RESEARCH DESIGN AND METHOD

According to Denzin and Lincoln (2011), designs in research are types of enquiry within quantitative, qualitative and mixed method approaches that provide the researcher with specific direction for procedures in a research design. It is the overall plan for answering the research question.

A research method involves the approach of data collection, analysis and interpretation that the researchers propose for their studies (Creswell, 2014: 16).

This is an intervention study, employing both qualitative and quantitative designs using a pre-and post-intervention method. In an intervention study, a research design is the process of specifying who will receive an intervention and how outcomes will be observed. In addition, the research design indicates when an intervention occurs and for what period it will be provided (Fraser, Richman, Galinsky & Day, 2009).

1.9.1 Research Setting

The site for the study is an academic hospital in the Greater – Accra region of Ghana. It is the leading national referral hospital in Ghana, with a bed capacity of approximately 1,600, and 3,000 members of staff. There is an average daily outpatient attendance of 1,000 and an average of 120 people are admitted daily. The hospital has the only cardiothoracic centre in Ghana and all cardiothoracic patients and surgeries, in both children and adults, are treated

and done at the centre. The centre has an outpatient section for initial assessment and follow-up of patients, an operating theatre equipped to carry out a whole spectrum of cardiothoracic and vascular surgeries, a six (6) bedded Intensive Care Unit (the specific setting for the study) with all the facilities for the pre-and post-operative care of cardiothoracic patients and a 32-bedded ward for patients discharged from the ICU, or who do not need Intensive Care, amongst many other services. Although Ghana has a National Health Insurance Scheme (NHIS), it does not cover cardio-thoracic surgery, but the centre is supported by the government of Ghana and non-governmental organisations (NGO's).

To meet the objectives of the study, it was conducted in three (3) phases. These include:
Phase 1 = Exploratory phase
Phase 2 = Development and validation phase
Phase 3 = Pilot testing phase

1.9.2 Phase 1- Exploratory Phase

A systematic literature search on pain assessment and management was carried out (2004-2015) and validated methods were identified within the literature. CT-ICU nurse experts (n=12) and CT-ICU doctors (n=8), post CT-ICU patients (n=3) and patients' relatives (n=3) demographic data was collected. Focus group interviews were conducted with nurses and individual interviews with doctors, to obtain their opinions about patients' pain and its management in the CT-ICU, and their thoughts on how these practices could be improved. Findings from the systematic literature review and the interviews informed the guideline.

1.9.3 Phase 2 – Development and Validation Phase

A draft clinical guideline for the comprehensive management of acute pain in the ICU was developed. This was based on validated methods of pain assessment and management identified in literature and opinions of expert nurses and doctors, patients and their relatives (phase 1). The guideline was presented to Intensive Care nurse experts, doctors, post ICU patients and patients' families for validation using a Likert scale and necessary changes were made to some statements. They were also allowed to make comments, which informed the changes made to the guideline statements.

1.9.4 Phase 3 – Pilot-Testing Phase

The clinical guideline for the comprehensive management of pain in the ICU was then piloted tested and outcomes assessed. This was done by doing a pre-intervention test (baseline assessment) of post ICU patients (n=65), educational intervention involving ICU nurses and doctors and then a post-intervention test (outcome assessment) of post ICU patients (n=65). The intervention was assessed in terms of a primary outcome of patients' comfort and secondary outcomes of patients' satisfaction with the pain management process, length of stay of patients in the CT-ICU and cost of ICU care. Appraisal of the clinical guideline was then done by four ICU nurse experts (n=4) using the AGREE II instrument for guideline appraisal.

1.10 OUTLAY OF THE THESIS

This study is therefore presented as follows:

Chapter One : Overview of the study
Chapter Two : Research design and methods
Chapter Three : Exploratory phase - part one Systematic Review of Literature
Chapter Four : Exploratory phase - part two Qualitative Interviews
Chapter Five : Development and validation phase
Chapter Six : Pilot testing phase
Chapter Seven : Appraisal of the clinical guideline
Chapter Eight : Summary, limitations, recommendations and conclusion

1.11 SUMMARY

In this chapter, an overview of the research has been given. The background to the study, purpose, problem statement and significance of the study were described. The researcher's assumptions were discussed and the research design and method were addressed.

In the next chapter, the research design and method will be described in detail.

CHAPTER TWO

RESEARCH DESIGN AND METHOD

2.1 INTRODUCTION

This chapter focuses on the research design, research method involving the target population, sample and sampling method, data collection process and method of data analysis. The chapter is divided into two sections. The first section discusses the research designs employed in the study and the second section discusses the guideline development and intervention, which examines the three phases of the study in detail, and the method used to address the objectives. The purpose of the study was to develop and pilot test a clinical guideline for the comprehensive management of acute pain in an adult Cardiothoracic Intensive Care Unit in Ghana.

2.2 OBJECTIVES OF THE STUDY

For consistency, the objectives of study, which are repeated, were to:

- Develop a clinical guideline for comprehensive management of acute pain in adult patients admitted to the CT-ICU post cardiothoracic surgery.
- Pilot test the clinical guideline developed for the comprehensive management of acute pain in the CT-ICU.

The intervention was assessed in terms of a primary outcome of patients' comfort and secondary outcomes of patients' satisfaction with pain management, length of stay of patients in the CT-ICU and cost of CT-ICU care.

The research design and method used to achieve the objectives of the study will now be discussed into details.

2.3 RESEARCH DESIGN

A research design refers to the procedures of enquiry (Creswell, 2014) and is the overall plan for answering research questions. In quantitative studies, the design indicates whether there is an intervention, the nature of any comparisons, the methods used to control confounding variables, whether there will be blinding, and the timing and location of data collection. (Polit & Beck, 2010: 254). The authors earlier described it as "the overall plan for obtaining answers to the research questions being studied and for handling some of the difficulties encountered during the research process" (Polit & Beck, 2008:66). A research design is a "blueprint for the conduct of a study that maximises control over factors that could interfere with the studies desired outcomes" (Burns & Grove, 2011: 49). Simply put, it is how a researcher intends to conduct a study.

The overall plan for this intervention study was to employ both the qualitative and quantitative designs, and use a pre-and post-intervention method to answer the research questions and achieve the objectives of the study.

Qualitative and quantitative paradigms have different and unique epistemological and ontological assumptions, world views and perspectives. While the qualitative approach is interested in studying naturally occurring phenomenon such as pain, the quantitative paradigm focuses on numbers, statistics, is highly structured and controlled and aimed at generalisability. Both paradigms were found appropriate to answer the research questions and meet the objectives of the study.

2.3.1 Intervention Study

Intervention research is a term sometimes used to refer to a distinctive process of planning, developing, implementing, testing, and disseminating interventions (Polit and Beck (2004:240). Intervention studies examine the effect of an independent or intervention on a dependent variable or outcome (Grove, Gray & Burns, 2015: 38). A clinical guideline for the comprehensive management of acute pain was developed based on findings from a systematic literature review and interviews with CT-ICU nurse experts, CT-ICU doctors, patient who were treated in the CT-ICU and their relatives. The intervention study method

was used to implement the clinical guideline in the CT-ICU in Ghana using a pre-and post-intervention method and outcomes of the guideline implementation assessed.

2.3.2 Pre-and Post-Intervention Method

Pre- and post-intervention method involves administering an experimental treatment (or intervention) to some subjects while withholding it from others. It involves the observation of the dependent variable at two points in time before and after the treatment (Polit & Beck, 2010:226). The pre- and post-intervention tests, which included assessing patients' level of comfort and satisfaction with pain management in the CT-ICU, their length of stay and cost of CT-ICU care, was done before and after the intervention to improve pain management in the CT-ICU. The pre-and post-intervention method was chosen for this educational intervention as the intention of the researcher was to educate all nurses and doctors who practice in the CTI-CU and determine the effect of the intervention on patients' pain. A randomised control trial was not chosen as this will mean that some of the healthcare professionals will not be given the education and this was not the aim of the researcher.

2.3.3 Qualitative

Qualitative research is an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem (Creswell, 2014:4); a form of social enquiry, focusing on the way people make sense of experiences and the world in which they live (Holloway & Galvin, 2017:3).

The descriptive qualitative research design was used to understand the views and experiences of Intensive Care nurse experts, doctors, patients and their relatives, their opinions about pain assessment and management, and the improvements they think could be made in the ICUs in Ghana. This informed the clinical guideline and put it into the Ghanaian context.

Descriptive qualitative research is an approach used to gain more information about characteristics within a particular field, and to provide a picture of a situation as it naturally occurs. It explores new areas of research and describes situations, as they exist in the world

(Burns & Grove 2011:21). The descriptive qualitative approach leads to a summary in everyday, factual language that facilitates understanding of a selected phenomenon (Colorafi & Evans, 2016). The qualitative part of the study was descriptive, as it provided an in-depth description of the study participants' experiences of pain and its management in the CT-ICU. In descriptive qualitative studies, researchers tend not to penetrate their data in any interpretive depth. These studies present comprehensive summaries of a phenomenon or of events in everyday language. Descriptive qualitative designs tend to be eclectic, with their basis on the general premises of naturalistic enquiry (Polit & Beck, 2010:273).

The study had three phases and the qualitative approach was used for the first part of the first phase of the study, thus the exploratory phase**.** Qualitative interviews were conducted with CT-ICU nurse experts, CT-ICU doctors, patients who were treated in the CT-ICU and their relatives. The way the qualitative method was employed in the study is discussed in detail under the phases of the study. Knowledge that is generated from qualitative research will provide meaning and understanding of specific emotions, values and life experiences (Burns & Grove, 2011:21).

2.3.4 Quantitative

Quantitative research is an approach for testing objective theories by examining the relationship among variables (Creswell, 2014:4). According to Grove, Gray and Burns (2015:32), quantitative design is a formal, objective, systematic process for generating numerical information about the world. It is conducted to describe new situations, events or concepts, to examine relationships among variables and determine the effectiveness of treatments or interventions on selected health outcomes throughout the world.

The quantitative research method was used to determine if studies met the cut off score to be included in the systematic review. It was also used to validate the clinical guideline before it was pilot tested and to assess the effectiveness of the intervention. This was done by asking patients who were treated in the CT-ICU to assess their level of comfort and satisfaction and assess the length and cost of CT-ICU stay before and after the intervention and to examine the relationship between the intervention and the outcomes. The quantitative research approach was thus used for the second and third phases of the study, thus the

development and pilot testing phases. The way the quantitative method was used in the study is also discussed under the phases of the study.

2.4 THE INTERVENTION PROCESS

A clinical guideline for the comprehensive management of pain was developed and the intervention study method was used to implement the clinical guideline in the CT-ICU in Ghana, using a pre- and post-intervention method and outcomes of the guideline implementation assessed. The method for the guideline development and intervention will now be discussed.

2.4.2 Research Method

Research method involves the method of data collection, analysis and interpretation (Creswell, 2014). It is the specific way in which the researcher choses to conduct the study within the chosen design (Gray, Grove & Sutherland, 2017:38). The research method in the study will be discussed under the three (3) phases of the study. The target population, sample and sampling methods, data collection and data analysis for each of the phases were described and situated in the phases of guideline development

2.4.3 Phases of Guideline Development

The three (3) phases of the guideline development in the study followed standard processes established by recognised bodies, including the National Institute for Clinical Excellence (NICE, 2014) in the United Kingdom, the Scottish Intercollegiate Guidelines Network (SIGN, 2015) in Scotland, and The Appraisal of Guidelines Research and Evaluation in Europe (AGREE II, 2010) collaboration. This study draws from the standard processes outlined by the clinical guideline development authorities to develop a clinical guideline for acute pain management, in critically ill adult patients, in the ICUs in Ghana. Clinical guidelines are normally designed for national or international use by most development bodies. Unlike in these instances, this study sought to develop a guideline for local pain management in the ICUs in Ghana. As stated by Barr *et al*. (2013), guidelines should be

adapted to local practice and resource availability and that is what this guideline sought to achieve.

Clinical practice guidelines are statements and recommendations, which are for the optimisation of patient care, and are informed by a systematic review of evidence and an assessment of the benefits and harms of alternative care options (IOM, 2011). Clinical guidelines can also play important roles in health policy formation (Browman, Snider, Ellis, 2003) and have evolved to cover topics across the healthcare continuum. Clinical guideline statements are based on the best available evidence relating to the specific aspect of care or procedure. Guidelines represent an effort to distil a large body of evidence into a more manageable form (Polit & Beck, 2008:34).

According to the guideline development bodies (NICE, 2014; SIGN, 2015 & AGREE II, 2010) and Hewitt-Taylor (2004), the first step to a clinical guideline development is describing the overall objective(s) of the guideline, the health question(s) covered by the guideline and the population (patients, public, etc.) to whom the guideline is meant to apply. This study sought to develop and pilot test a clinical guideline for the comprehensive management of pain in critically ill adult patients and sought to answer the question: will a clinical guideline for the comprehensive management of acute pain in the CT-ICU, developed with the input of Intensive Care nurses, doctors, CT-ICU patients and their families, improve the management of pain in the post cardiothoracic surgery patient in the adult Cardiothoracic Intensive Care Unit? The specific patient populations for this guideline are critically ill adult patients, and the care procedure of interest is pain management. This guideline was developed for local (Ghana) use, unlike other guidelines that are national or international. The scope of the guideline was defined to avoid any confusion. The guideline was adapted to the Ghanaian practice context and availability of resources and adopted by the Critical Care Nurses Group of Ghana (CCNGG).

The next step according to guideline development bodies was the inclusion of individuals or stakeholders from all relevant professional groups (multidisciplinary team) and the views and preferences of the target population (patients, public, etc.) sought and the target users of the guideline clearly defined. At the national or international level of clinical guideline development, the multidisciplinary teams are the main developers of the guideline. The multidisciplinary team should have a balance of disciplines and the membership should be

kept at a reasonable size to ensure effectiveness. In this study, the stakeholders included critical care nurses, CT- ICU doctors of all specialties, patients who received care in the CT-ICU and their relatives who visited them in the hospital. The stakeholders will also be involved in the refinement of the draft guideline before it is pilot tested and outcomes assessed.

The third step of clinical guideline development involves the systematic review of the evidence. In this study, however, the systematic review of literature was done before the interviews with stakeholders to enable the researcher to understand the current issues, progress and challenges in pain management in the adult ICU. It also enabled the researcher to form the framework for the interview questions based on literature. The systematic literature review was done after describing the objectives of the study, thus forming the second instead of third step. According to the guideline development groups (NICE, 2014; SIGN, 2015 & AGREE II, 2010), a systematic review involves a scientific process of focused literature review that identifies, critically appraises, selects and synthesises all relevant research evidence about a particular research question. The guideline organisations stated that systematic methods should be used to search for evidence and the criteria for selecting the evidence and the strengths and limitations of the body of evidence should be clearly described. The research question addressed in the literature search was "What measures would ensure effective pain management among critically ill adult patients?" This question was answered in the study to identify evidence about measures that promote pain management in the adult ICU according to literature. The literature search followed the Joanna Briggs Institute's (JB1, 2014) format for systematic reviews. JBI is a recognised body for systematic reviews and this format was used to ensure credibility and minimise bias. The method for the systematic review is discussed in detail under the exploratory phase.

The next step, according to NICE (2014), SIGN (2015) and AGREE II (2010), in the development of a clinical guideline is incorporating expert opinions and consulting experts to validate the draft guideline. The draft guideline should also be subjected to peer-review and pre-testing or pilot testing. This phase ensures that inputs are received from stakeholders so that the final guideline introduced into the area of practice is used effectively and it achieves the purpose for which it was developed. The reviewers and researchers must consider the health benefits, side effects and risks in formulating the recommendations. There should be an explicit link between the recommendations and the supporting evidence. The guideline should be externally reviewed by experts prior to publication. The draft

guideline in this study was reviewed and validated by both stakeholders and experts before being pilot tested.

The final step of clinical guideline development involves finalising, publishing and disseminating guidelines. However, this is beyond the scope of this study, therefore only recommendations were made. NICE (2014), SIGN (2015) and AGREE II (2010) stated that guideline recommendations should be specific and unambiguous and the different options for management of the condition (pain) should be clearly presented. Key recommendations should be easily identifiable. The guideline should describe facilitators and barriers to its application. The guideline should provide advice and/or tools on how the recommendations can be put into practice and the potential cost implications of applying the recommendations should be considered. The guideline should present monitoring and/or auditing criteria and the procedure for updating the guideline should be provided to accommodate current evidence. The guideline instructions should be less rigid and give the flexibility required in pain management. It is important to be flexible because pain is a subjective experience (Keeley, 2003), as demonstrated in the study. The effective use of a clinical guideline could lead to change in practice that enhances pain management in the ICU (Miller & Kearney, 2004). The fact that the guideline was piloted helped to educate health professionals and ensure it was put into practice.

The guideline developed in this study draws from those of the South African Acute Pain Guidelines from The South African Society of Anaesthesiologists (SASA, 2009) the American College of Critical Care Medicine's (ACCCM) Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium in Adult Patients in the Intensive Care Unit by Barr *et al.* (2013). Practice alert was taken from the Assessing Pain in the Critically Ill Adult from the American Association of Critical Care Nurses (AACN, 2013) and Registered Nurses Association of Ontario, Canada's (RNAO, 2013) Clinical Best Practice Guidelines for Assessment and Management of Pain.

The suggested steps by the international guideline development bodies (NICE, 2014; SIGN 2015 & AGREE II 2010) and Hewitt-Taylor (2004), were incorporated into the (3) phases of the study. The three (3) phases included:

Phase 1 = Exploratory phase

Phase 2 = Development and validation phase

Phase 3 = Pilot testing phase

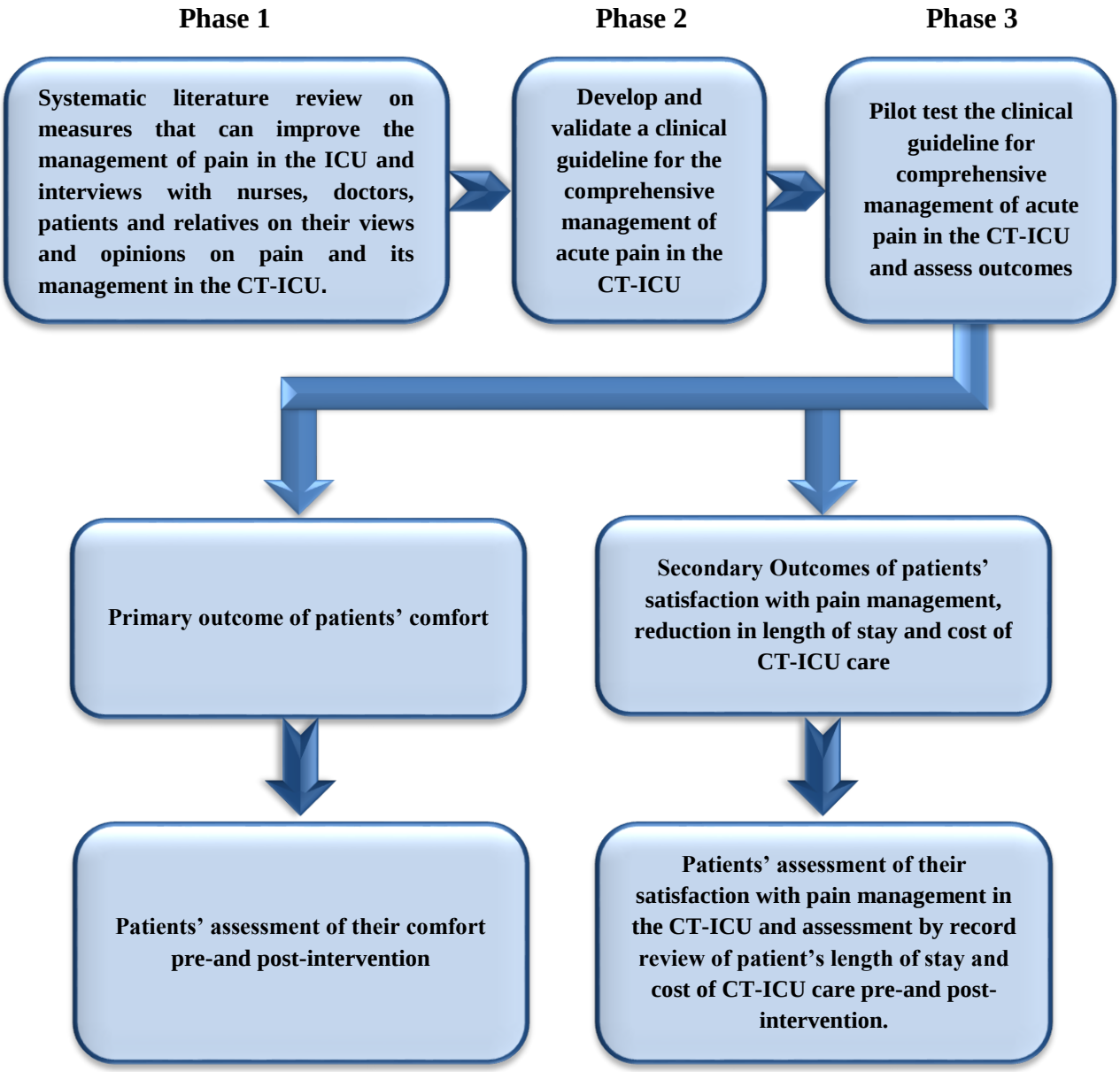

Figure 2.1: The Intervention Process

The first two (2) phases addressed the first objective by developing the guideline and the third phase addressed the second objective by pilot testing the guideline.

2.5 PHASE 1 – EXPLORATORY PHASE

The first phase of the study partly addressed objective one (1) of the study by exploring literature and viewpoints and opinions of key stakeholders (CT-ICU nurse experts, CT-ICU doctors, patients who had received treatment in the CT-ICU and their relatives). The

exploratory phase informed the development of the clinical guideline. This phase was made up of two (2) parts. Part one addressed the literature search and part two the interviews with the nurses, doctors, patients and their relatives. This phase of the study explored the available evidence, views and opinions of relevant stakeholders.

2.5.1 Phase 1: Part 1 Systematic Literature Review

The objective of the systematic review was to determine the measures that would ensure effective pain management among critically ill adult patients. The review was carried out on studies published from 2004 to 2015 as the first part of Phase 1 of the study. The Joanna Briggs Institute (JBI) Reviewers Manual (2014**)** served as a guide for the review.

2.5.1.1 Research design

The systematic review included both quantitative and qualitative studies and followed the Joanna Briggs Institute (JBI, 2014) format of systematic reviews. Recent methodological debates have highlighted the usefulness of including both types of studies in a systematic review (Dixon-Woods, Agarwal, Jones *et al.*, 2005; Mays, Pope, Popay, 2005), as there is a risk of missing out relevant information if only one type is used (Roberts, Dixon-Woods, Fitzpatrick *et al.*, 2002). These authors also stated that qualitative studies fill in the gaps and provide results, reasons and explanations for situations unlike quantitative studies, which do not give reasons and explanations. Considering this, both quantitative and qualitative studies were included in the review to determine what measures would ensure effective pain management in critically ill adult patients in ICUs.

2.5.1.2 Research method

The research method describes the target population for the systematic review of literature, sample and sampling method, data collection process and data synthesis.

- *Target population*

The review was conducted to explore quantitative and qualitative studies in an adult (18 years and above) critical care patient population.

- *Sample and sampling method*

All quantitative and qualitative studies found during the literature search were included and reviewed in the study to determine whether they meet the inclusion criteria set by the researcher.

Inclusion Criteria

Evidence for this review was provided by searching:

- All studies with published abstracts and full text in English (due to challenges with translation)
- Both qualitative and quantitative studies.
- All peer reviewed research articles, which were published in referenced journals from the year 2004 and 2015 (to cover more than 10 years of published studies)
- Studies in the ICU adult patient population.
- Published studies that focus on acute pain in the intensive care unit.

Exclusion criteria

- Studies in critically ill children.
- Studies that focused on chronic pain in the intensive care unit.
- Editorials and letters to the editor.
- Interventions in pain management that did not improve pain outcomes.

- *Data collection process*

Data was collected by repeatedly searching the selected databases with the key words. All keywords were limited to the year between 2004 and 2015. International studies were searched, as well as all from the 54 African countries, to identify studies. All studies that met the inclusion criteria were included in the study.

- *Objective of the review*

The objective of the systematic review in this phase of the study was to:

- Determine measures that would ensure effective pain management among critically ill adult patients.

- *Question formulation.*

Based on the objective of the review the main question answered by this review was, **what measures would ensure effective pain management among critically ill adult patients?** According to JBI (2014), systematic reviewers must adopt the PICO model, which aims to focus the systematic review and defines the properties of studies to be considered for inclusion in the review. The PICO is used to construct a clear and meaningful question when searching for evidence (JBI, 2014:55).

Population - The population in this review were critically ill adult patients (18 years and above) in adult Intensive Care Units.

Intervention - The interventions of interest were pharmacological and non-pharmacological measures employed in the management of the critically ill adult patients pain. This also includes interventions in pain assessment and patient's education on pain.

Comparison -This describes what the intervention is being compared with (e.g. placebo, standard care, another therapy or no treatment). According to JBI, for reviews of effectiveness, the comparator is the one element of the PICO mnemonic that can be either left out of the question/s, or posited as a generalised statement (JBI, 2014:55)**.** Therefore, comparison in this study was replaced with study design or method. The review included both quantitative and qualitative studies. Intervention studies in critically ill adult patients were searched.

Outcome(s) - The study must report on the level of pain, thus decreased pain intensity or improved pain management or outcome after the pharmacologic or non-pharmacologic intervention.

- *Conducting literature search and data extraction*

The systematic review was based on a systematic search of 11 databases including: Science Direct, PubMed, Cochrane library (Cochrane Database of Systematic Reviews), Medline, Cumulative Index to Nursing and Allied Health Literature (CINAHL), with full text, and Health Source: Nursing and Academic Edition all in EBSCO host, Journal storage (JSTOR), Scopus, Taylor and Francis, Google Scholar and Google search. In addition, electronic searches of journals, hand searches of reference list of articles, books, thesis, government documents and grey literature were also conducted. All studies were taken between the year 2004 and 2015, and all investigated the intervention in pain management in critically ill adult patients. An extended period over 10 years has also been undertaken for a thorough search.

The medical subject headings (MeSH) including pain in critically ill/Intensive Care adult patients, pain assessment in critically ill/Intensive Care adult patients, pain management in critically ill/Intensive Care adult patients, post–operative pain in critically ill/Intensive Care adult patients, preoperative patients' education on pain, pain assessment and management in critically ill/Intensive Care adult patients and pain management interventions in critically ill/Intensive Care adult patients were used in the search. The medical subject headings were narrowed down by the year 2004 to 2015. These databases were searched repeatedly using the key words to ensure that all articles relevant to the topic were identified. The search was also done individually on studies from all 54 African countries.

With the review question in mind, the quantitative data was extracted using the Joanna Briggs Institute Meta-Analysis of Statistics Assessment and Review Instrument (JBI – MAStARI) data extraction instrument from JBI (2014) (*Appendix A*). The data extraction tool allows the reviewer to extract randomised control/pseudo-randomised trials, comparable cohort/case control studies and descriptive/case series studies. Data was extracted with topics that would help to ensure that relevant data from the papers were being extracted to answer the research question. The JBI MAStARI data extraction form has portions for the study method, participants, sample size, interventions, authors and reviewers' conclusions.

Qualitative data was extracted from the studies included in the review using the standardised data extraction tool, from Joanna Briggs Institute Qualitative Assessment and Review Instrument (JBI-QARI) (*Appendix A)*. The data extraction template for a JBI qualitative

review incorporates methodology, method, phenomena of interest, setting, geographical location, culture, participants, method of data analysis used in the primary study, the author's conclusions and comments the reviewer might wish to record about the paper at that point in time (JBI, 2014).

- *Appraisal of retrieved literature*

A critical appraisal of the studies was conducted prior to inclusion in the systematic review. Joanna Briggs Institute has adopted a position that requires critical appraisal of all papers selected for inclusion of the literature review. Joanna Briggs Institute requires reviewers to use standardised critical appraisal instruments, and emphasises the need for evidence to be subjected to rigorous appraisal of two critical appraisers. The purpose of the appraisal was to include only studies of high quality and exclude those of poor quality, and ensure validity of the retrieved research (JBI, 2014). Using different checklists, studies were screened and appraised, as described below.

- *Appraisal of quantitative studies*

Quantitative studies selected for retrieval were assessed by two independent reviewers for methodological validity prior to inclusion in the review using standardised critical appraisal instruments from the Joanna Briggs Institute (JBI-MAStARI) (JBI,2014:180) (*Appendix B*). Any disagreements that arose between the reviewers were resolved through discussion or with a third reviewer. Within quantitative reviews, there is a range of study designs that may be incorporated. A common approach is to state a preferred hierarchy of types of studies, often beginning with randomised/quasi-randomised controlled trials, then other controlled designs (cohort and case controlled), followed by descriptive and case series studies (JBI, 2014 :182). There are appraisal tools for the different types of studies in the MAStARI for this hierarchy (*Appendix B*). The appraisal tools have a discussion of the items in the checklist for better understanding. Systematic reviews were appraised using the JBI, and Godfrey and Harrison (2015:10) appraisal tool for systematic reviews (*Appendix B*).

- *Appraisal of qualitative studies*

Qualitative studies selected for retrieval were assessed by two independent reviewers (researcher and her supervisor) for methodological validity prior to inclusion in the review using standardised critical appraisal instruments from the Joanna Briggs Institute (JBI-QARI) *(Appendix B)* (JBI, 2014:177). Any disagreements that arose between the reviewers were resolved through discussion, or with a third reviewer. There are 10 questions for appraisal in the QARI module. They relate not to validity or bias in the process-orientated methods related to reviews of effects, but to establishing the nature and appropriateness of the methodological approach, specific methods and the representation of the voices or meanings of study participants (JBI, 2014:32). There is a discussion of the items in the checklist for better understanding.

2.5.1.3. Data Synthesis

Although there is an increased value integrating both quantitative and qualitative studies in a systematic review, it presents theoretical and practical problems with data analysis and interpretation (Thomas, Harden, Oakley *et al.,* 2004). According to JBI, a synthesis can be either descriptive (narrative summary) or statistical (meta-analysis) (JBI, 2014:63). Due to the different approaches used in the studies reviewed (heterogeneity in strategies), samples, outcomes and settings, evidence from the studies was synthesised using a narrative approach and no meta-analysis was done. Study results and characteristics were tabulated and only statistically significant results from the quantitative studies were reported. The quantitative studies were discussed and backed up with qualitative studies. The qualitative studies gave a more in-depth and explanatory understanding to the statistical results presented in the quantitative studies (Keenam, van Teijlingen & Pitchforth, 2005; Yardley, 2008).

2.5.1.4 Rigour

Rigour is the "striving for excellence in research using discipline, scrupulous adherence to detail and strict accuracy" (Burns & Grove, 2009:720). According to Schlosser (2007), strict rigour must be ensured in systematic reviews by ensuring that a strict procedure is followed to ensure quality of the findings; this approach was followed to ensure rigour in this review. The review had a defined population and a main question to keep it in focus. The main

databases in health and nursing were included in the review in addition to grey and unpublished literature, and a hand search of literature was carried out. Multiple databases were searched so that the risk of introducing database bias, source selection bias and publication bias would be reduced (Schlosser, 2007). Eleven years of literature was searched to cover all aspects (2004-2015). At least two reviewers appraised each study included in the study. A defined selection principle was adhered to by having an inclusion and exclusion criteria for studies included within the study, and the criterion for excluding studies was stated. Data was also extracted systematically and the quality of each study was rated based on commonly considered variables that contribute to the internal validity of the study, such as design, blinding, confounding factors, treatment, interventions and participant follow-up.

2.5.1.5 Methodological quality assessment of the selected studies

Studies were extracted and appraised by two independent reviewers using standardised JBI tools (*Appendices A & B*) for methodological validity prior to inclusion in the review. Any disagreements that arose between the reviewers were resolved through discussion and consensus, or with a third reviewer (Second supervisor).

Quality assessments are usually based on standardised tools, which are checklists of criteria that need to be assessed for each study and if quality items within a checklist are assigned, numerical scale and numerical assessments of quality can be obtained (Kitchenham, 2004) Each tool had questions that must be answered with yes, no, unclear or not applicable responses (*Appendix B*). Scores were allocated to the answers yes=2, unclear=1 no= 0 and no score was allocated to not applicable answers. Some of the tools have 10 items with a total score of 20 (100%) and others have nine items, with a total score of 18 (100%). While there is no set level of the quality score (Cooper, 2010), the minimum quality score agreed by the reviewers for this assessment was set at 70% in order to ensure that only high quality studies were included in the review. The study must score at least **70%** in the methodological quality assessment to be included in the study.

- *Quantitative studies*

Quantitative studies were assessed using the JBI-MAStARI (JBI, 2014:180). The JBI MAStARI tool has 10 questions to guide the appraisal of randomised and quasi-randomised controlled trials with a total score of 20 (100%) *(Appendix B*). The questions included:
"(1) Is the assignment to treatment groups truly random? (2) Are participants blinded to treatment allocation? (3) Is allocation to treatment groups concealed from the allocator? (4) Are the outcomes of people who withdrew described and included in the analysis? (5) Are those assessing the outcomes blind to the treatment allocation? (6) Are the control and treatment groups comparable at entry? (7) Are groups treated identically other than for the named intervention? (8) Are outcomes measured in the same way for all groups? (9) Are outcomes measured in a reliable way? (10) Is appropriate statistical analysis used?"

Cohort (with control)/case-controlled studies were also appraised with the JBI MAStARI (JBI 2014:181) tool, but with nine questions with a total score of 18 (100%) (*Appendix B*). The questions included: "(1) Is the sample representative of patients in the population as a whole? (2) Are the patients at a similar point in the course of their condition/illness? (3) Has bias been minimised in relation to selection of cases and controls? (4) Are confounding factors identified and strategies to deal with them stated? (5) Are outcomes assessed using objective criteria? (6) Is follow-up carried out over a sufficient timeframe? (7) Are the outcomes of people who withdrew described and included in the analysis? (8) Are outcomes measured in a reliable way? (9) Is appropriate statistical analysis used?"

Descriptive/case-series appraised with JBI MAStARI (JBI 2014:181) with nine questions and a total score of 18 (100%) (*Appendix B*). The questions were: "(1) Is the study based on a random or pseudo-random sample? (2) Are the criteria for inclusion in the sample clearly defined? (3) Are confounding factors identified and strategies to deal with them stated? (4) Are outcomes assessed using objective criteria? (5) If comparisons are being made, is there sufficient description of groups? (6) Is follow-up carried out over a sufficient timeframe? (7) Are the outcomes of people who withdraw described and included in the analysis? (8) Are outcomes measured in a reliable way? (9) Is appropriate statistical analysis used?"

Systematic reviews retrieved were appraised using the appraisal tool for systematic reviews from JBI and Godfrey and Harrison's (2015:10) appraisal tool for systematic reviews

(*Appendix B*). The appraisal tool had options for yes, no and unclear as responses. The not applicable was added as it is in all the JBI tools. The appraisal tool has 10 questions with a total score of 20 (100%). The questions included: "(1) Was the review question clearly and explicitly stated? (2) Was the search strategy appropriate? (3) Were the sources of studies adequate? 4. Were the inclusion criteria appropriate for the review question? (5) Were the criteria for appraising studies appropriate? (6) Was critical appraisal conducted by two or more reviewers independently? (7) Were there methods used to minimise error in data extraction? (8) Were the methods used to combine studies appropriate? (9) Were the recommendations supported by the reported data? (10) Were the specific directives for new research appropriate? "

All the quantitative studies included in the review met the minimum methodological quality assessment and scores ranged from 70% to100%. The results of the review are discussed in Chapter Three (table 3.2).

- *Qualitative studies*

Qualitative studies were assessed using standardised critical appraisal instruments from the Joanna Briggs Institute (JBI-QARI) (JBI, 2014:177) (*Appendix B*). In the JBI- QARI checklist, there are 10 questions with a total score of 20 (100%) and these include: "(1) Is there congruity between the stated philosophical perspective and the research methodology? (2) Is there congruity between the research methodology and the research question or objectives? (3) Is there congruity between the research methodology and the methods used to collect data? (4) Is there congruity between the research methodology and the representation and analysis of data? (5) Is there congruence between the research methodology and the interpretation of results? (6) Do any statements locate the researcher culturally or theoretically? (7) Is the Influence of the researcher on the research, and vice-versa, addressed? (8) Are participants and their voices adequately represented? (9) Is the research ethical according to current criteria or for recent studies and is there evidence of ethical approval by an appropriate body? (10) Are the conclusions drawn in the research report flowing from the analysis, or from interpretation of the data?"

Table 3.3 in Chapter Three of this study presents the findings of the quality assessment of the qualitative studies included in the review. All the qualitative studies included met the minimum quality assessment score and had between 85 and 95%.

2.5.2 Phase 1: Part 2 Interviews with Stakeholders

The second part of Phase 1 of the study partly addressed the first objective of the study by interviewing key stakeholders (CT-ICU nurse experts, CT-ICU doctors, patients who received care and their relatives). The exploratory phase informed the development of the clinical guideline. This part is made up of four different interviews and the methods of data collection will be presented separately for each interview. The data collected in the interviews is presented and discussed in Chapter Four.

2.5.2.1 Focus group interviews with ICU nurse experts

The focus group interview method was used to collect data from CT-ICU nurse experts who worked in the research setting. The nurses' demographic data was collected and they were asked to answer a questionnaire about the analgesics they used in the ICU, then the focus group interview was carried out (*Appendix D*). The demographic data of the ICU nurse experts who participated in the focus group interview was analysed descriptively and the focus group interviews analysed using the six steps of qualitative analysis by Creswell (2014:197) and coding using the eight steps of Tesch (1990 in Creswell, 2014:198).

2.5.2.2 Research design and method

- *Research design*

The exploratory, descriptive, qualitative design was used to elicit the views and opinions of nurse experts on pain, its assessment and treatment in the CT-ICU.

- *Research method*

Population

According to the statistics obtained from the CT-ICU, there are 17 (n=17) full time registered nurses who work in the six-bed unit. Out of this number, 14 (n=14) are trained and certified by the Nursing and Midwifery Council of Ghana as critical care nurses.

Sample and Sampling Method

Of the 14 full-time ICU nurses who work in the unit, 12 (n=12) were purposively sampled with their consent and included in two focus group interviews with six (n=6) in each focus group. Purposive sampling is the researcher's intentional choice of individuals or groups of people who will assist in the study (Polit & Beck, 2012). The researchers earlier described it as a method of sampling in which "participants are handpicked for inclusion in the sample, based on the researcher's knowledge about the population" (Polit & Beck, 2004:311).

Nurses were recruited with the help of a gatekeeper (nurse manager), who are individuals who provide access to the site and allow or permit the research to be done (Creswell, 2014:188). It is important to gain access to a research site by seeking the approval of gatekeepers (Creswell, 2014:188). Each nurse included in the study had worked in the CT-ICU for at least three years. ICU nurses on leave or off duty were also invited.

Inclusion criteria

Inclusion criteria are a set of characteristics that are predefined and used to identify subjects who will be included in a research study (Salkind, 2010).

- Registered nurses with ICU training and certification by the Nurses and Midwives' Council of Ghana.
- ICU nurses who have practiced in the ICU for at least three years.
- ICU nurses on day or night shifts.

Data Collection Procedure

Two focus group interviews were conducted with two groups of CT-ICU nurse experts with six nurses (n=6) using an interview guide *(Appendix D)*. A focus group interview is a validated method of qualitative data collection and involves a group of six to 12 individuals usually brought together in a room to engage in a guided discussion on a selected topic (Crossman, 2014). Sullivan and Foltz (2000) found there are positive aspects to using focus groups for collecting data in nursing research, as participants gain support and acceptance as they share their attitudes and beliefs. According to Asbury (1995), exploration of health-

related topics from a specific population of interest, using the focus group design, can be an effective method to validate experiences. Goss (1998) found that focus group design is an appropriate method for exploring and validating beliefs, thoughts, and intentions of individuals.

Written permission (*Appendices E & F*) was obtained from the management of the hospital (nursing and medical) with the consent of the medical and nursing directors of the CT-ICU. Permission was also obtained from the nurses and doctors managing the CT-ICU to undertake the data collection in the unit. The two focus group interviews with six (n=6) nurse experts each were carried out to determine the nurses' opinion of their pain management practices in the CT-ICU and how they can be improved. The focus groups were carried out within one week of each other. Twelve (n=12) nurse experts with more than three years of experience in the CT-ICU were purposively sampled and participated in the focus groups.

The researcher made several trips to the hospital, specifically the CT-ICU, to personally inform the nurses about the focus groups and answer all questions with the help of the gatekeeper (Nurse Manager). Goss (1998) stated that one of the principal concepts to consider is the identification of a contact person from the population of interest to the researcher. This person is usually valuable in helping to establish trust within the population, encouraging participation and identifying an appropriate time and venue for the study.

Nurses who were not available during the visits of the researcher were informed by telephone about the focus groups and their purpose. A time convenient for the nurses was also agreed upon days before the interview. The nurse's information sheet *(Appendix G)* was made available to nurses who agreed to take part in the focus group; they were then asked to complete a form with their demographic data (*Appendix D*), and the interview was conducted using the interview guide in *Appendix D*. Each ICU nurse was allocated a research code to ensure anonymity. Participation was confirmed a day before the focus group by phone. All the nurses were invited, including those who were on leave and off duty. The interviews were organised in the afternoon so those who were on morning shift could join after their shift. The researcher tape-recorded the interviews and took notes. Refreshment was offered during and after the interview but no other incentive was given.

Ten (n=10) nurses agreed to take part in the first focus group, but only six (n=6) made it and the other four (n=4) joined the second focus group. The first interview was carried out in the conference room of the hospital with the permission of the Nursing Director of the Cardiothoracic Centre. The researcher and an assistant arrived before the time agreed for the interview to prepare the venue. As the nurses arrived they were welcomed, given seats and asked to read the information sheet again, sign the consent form (*Appendix H*) and complete their demographic data before the discussion.

Six (n=6) nurses took part in the second focus group which took place a week after the first focus group in the conference room with permission. As the nurses arrived they were welcomed, asked to complete a form with their demographic data and sign a consent form after reading the information letter before the discussion. The interview was tape-recorded and notes were taken as part of the data collection.

Nurses were asked their opinion regarding the management of pain in the CT-ICU as the main question. Probes were then introduced to get a better understanding of their opinions. Six probes in all were introduced regarding their views and opinions about pain management in the CT-ICU *(Appendix D).*

2.5.2.3 Data Analysis

After the two focus groups, it was seen that nurses in both groups had similar opinions about pain, its assessment and treatment in the CT- ICU and no new information emerged, thus data saturation was achieved (Charmaz, 2006). After the first focus group discussion, verbatim transcription of the tape was carried out to understand the issues raised by the nurses and to prepare for the second interview and data analysis. In qualitative studies, data collection and data analysis occur simultaneously (De Vos, Strydom, Fouche, Delport, 2011). Verbatim transcription was again done following the second interview to organise and prepare the data for analysis (Creswell, 2014). After transcribing each interview, the researcher checked for accuracy by listening to the tape while reading the transcripts to make necessary corrections (Kvale, 2009). The recordings were listened to repeatedly until the researcher was sure all statements were transcribed as stated by the nurses. The transcribed data were also compared to the field notes to ensure that all notes taken during the interview were captured. Data analysis was done by employing the six steps of qualitative analysis by

Creswell (2014: I97) and coding using the eight steps of Tesch (1990:142-145 *in* Creswell, 2014:198). According to Creswell (2014:197), the following steps must be applied in qualitative data analysis:

Step 1 – Organise and get the data ready for analysis. This involves transcribing interviews, scanning material if necessary, typing of field notes, cataloguing all the audio and visual materials and also sorting and arranging the data into different types of format depending on the sources of information. This was done by the researcher by ensuring that the interviews and field notes were typed, transcripts were accurate and printed out.

Step 2 – Look through and read all the data. This provides an overview of the information and an opportunity to reflect on its overall meaning. The transcripts were then read through to get a general sense of the information and to reflect on the overall meaning the nurses were trying to communicate to understand the totality of the data (Creswell, 2014:197).

Step 3 – Start coding all the data obtained by organising the data and bracketing chunks (or text or image segment) and writing a word representing a category in the margins of the transcript (Rossman & Rallis, 2012 in Creswell, 2014:198). This involves taking text data or pictures collected during data collection, segmenting sentences or paragraphs if necessary or images into categories, and labelling the categories with a term, often based on the actual language of the participants (in vivo term). Data in this study was then coded by organising the data by bracketing chunks and writing a word representing a category in the margins (Rossman & Rallis, 2012 in Creswell, 2014:198). It involved segmenting sentences or paragraphs into different categories, and labelling them with terms mostly based on the words of the nurses. The detailed coding process followed the steps of Tesch (1990).

According to Tesch (1990:142-149), qualitative data coding must follow eight steps:

- Get a sense of the whole data. Read the entire transcriptions carefully. Perhaps jot down some notes or ideas as they come to mind.
- Pick a document e.g. an interview - the most interesting and possibly the shortest, or the one on the top of the pile. Go through the interview, asking yourself "What is this about? Do not worry about the "Substance" of the information but its underlying meaning. Write thoughts as they occur to you in the margin.

- After this is completed for several participants, make a list of all topics. Put together similar topics. Form these topics into columns that might be arranged as major topics, unique topics and leftovers.
- Take this list you've created and go back to your data. Abbreviate the topics as codes and write them next to the appropriate segments of the text. Try this initial organising scheme to see if new categories and codes emerge from the data.
- Find the word that most describes your topics and turn them into categories. Look also for ways of reducing your total list of categories by putting together topics that relate to each other. You may draw lines between your categories to show interrelationships.
- Decide on the abbreviation you want to use for each category and alphabetise these codes.
- Put together the data material belonging to each category in one place and perform an initial analysis.
- Recode your existing data if there is a need to do so.

Step 4: Employ the coding process to develop a description of the setting or people as well as categories or themes for analysis. Description involves an in-depth recording of information about participants, places, or events in a setting. Codes may be generated for this description. Employ the coding for generating a small number of themes or categories; about five to seven themes for a research study. These themes appear as major findings in qualitative studies and headings in the results sections of studies. They show different perspectives from participants supported by verbatim quotations and specific evidence.

Step 5 – Show how the description and themes will be represented in the qualitative narrative. The most popular being the narrative passage to describe findings of the analysis, which might be a discussion that mentions the order of events, the detailed discussion of themes, or a discussion with interconnecting themes.

Step 6 – The last step in data analysis involves making an interpretation in qualitative research of findings or results. It also determines lessons learnt from the data generated. The lessons could be the researcher's own interpretation, couched in the view that the researcher brings personal culture, history and experiences to the study. It could also be a meaning

deduced from a comparison of the findings with information obtained from literature. Thus, authors suggest that findings from qualitative studies confirm past information or differ from it. It can also suggest questions that need to be asked – questions raised by the data and analysis that the researcher had not foreseen earlier in the study.

The researcher did the transcription and followed the above steps for coding and analysis by organising the data by bracketing chunks and writing a word representing a category in the margins (Rossman & Rallis, 2012 in Creswell, 2014:198). It involved segmenting sentences or paragraphs into categories, and labelling the categories with terms mostly based on the words of the nurses, as stated by Tesch (1990). The themes from the major findings in the study were supported by subthemes, which are smaller groups that fall under the major groups. Three major themes and 10 subthemes were identified and presented in Table 4.3 in Chapter Four. The study was presented as a narrative, with the themes and subthemes supported by actual nurse quotations about pain in the CT-ICU. A discussion compared the findings of the study to what is already known about pain in the critical care population lessons learned, and conclusions drawn informed the guideline.

The aforementioned steps were used to analyse all the interviews with stakeholders in this phase of the study.

2.5.2.4 Individual interviews with ICU doctors

Individual interviews were carried out with eight ICU doctors at various locations to explore their views and opinions about pain management in the CT-ICU. Since pain management is a team effort, the input of the doctors is considered valuable in developing a guideline for pain management in the ICU. Doctors are the prescribers of pain medication, it is therefore very important to elicit their views on the subject.

2.5.2.5 Research Design and Method

- *Research design*

The exploratory, descriptive, qualitative design was used to elicit the opinions of doctors on pain, its assessment, treatment and measures that they think can improve the management of patients' pain in the CT-ICU.

- *Research method*

Population

The statistics obtained from the CT-ICU allocation list indicated that the number of full time medical doctors practicing in the CT-ICU was ten (n=10), which included two cardiothoracic surgeons, one cardiologists, three anaesthesiologists, one senior registrar and three registrars.

Sample and Sampling Method

Of the 10 (n=10) full-time CT-ICU doctors who work in the unit, eight (n=8) were purposively sampled with their consent and took part in the individual interviews. Doctors were recruited by talking to them and following up with calls and by recommendation from the Medical Manager of the ICU. Each doctor included in the study had worked in the CT-ICU for more than six months. This was to ensure the doctors would have some level of experience in the ICU to share and assist in the development of the guideline.

Inclusion criteria:

- Doctors registered with the Medical and Dental Council of Ghana.
- Have practiced for at least six months in the CT-ICU.
- Work on the day or night shift.

Data Collection Procedure

Permission was obtained in writing from the management of the hospital (nursing and medical) *(Appendix E & F)* with the consent of the Medical and Nursing Directors of the CT-ICU. Permission was also obtained from the nurse and doctor managing the CT-ICU to undertake the data collection in the unit. The doctors' individual interviews were carried out to determine the opinions of the doctors on their pain management practices in the CT-ICU and how according to them, pain management can be improved. Eight doctors were purposively sampled, with the help of the ICU Medical Manager, and participated in the individual interviews. The initial plan was to have focus group interviews with doctors as was done with nurses but after several attempts to get the doctors together for the focus group discussion failed, the researcher in consultation with her supervisor decided to have individual interviews with the doctors.

The researcher went to the study setting on several occasions to recruit participants before the interviews. Those who agreed to participate were given the doctors' information sheet *(Appendix I).* The doctors were called the day prior to or on the day of the interview, depending on the appointment, to confirm the interview and the venue. The interviews were carried out at different locations at the convenience of the doctors after consent was obtained *(Appendix H).* Interviews with three doctors were carried out in the consulting room after they had seen their patients. Two doctors were interviewed in an empty High Care Unit next to the CT-ICU, which was not being used by the hospital, two were interviewed in their offices and one in the CTU Nurse Managers' office. All the interviews were tape-recorded and notes were taken.

On the day of the interview, the doctors were again informed about the aim of the study and they agreed to take part in the interview. They were asked to complete a form with their demographic data and the analgesics they give in the CT-ICU, according to their protocol (*Appendix D*). Each CT-ICU doctor was allocated a research code to ensure anonymity. The interviews were then conducted and tape-recorded. Field notes were also taken by the researcher as an additional source of information. The doctors were given a chance to review the transcripts and elaborate on statements to assist with interpretation.

The doctors were asked their opinions regarding the management of pain in the CT-ICU. To probe further to get a better understanding of their opinions, six probes were introduced *(Appendix D).*

2.5.2.6 Data Analysis

Data saturation was achieved after eight individual interviews, since no new information was emerging the interviews. Verbatim transcription of the tapes was carried out after each interview to understand the data, prepare for subsequent interviews, and prepare the data for analysis (Creswell, 2014). Data collection and data analysis occurred simultaneously to obtain a better understanding and appreciation of the data (De Vos, *et al.*, 2011). After transcribing each interview, the researcher checked for accuracy by listening to the tape while reading the transcripts to make necessary corrections (Kvale, 2009). The recordings were listened to repeatedly until the researcher was sure all the statements were transcribed as stated by the doctors. The transcribed data was also compared to the field notes to ensure all the notes taken during the interview were captured.

Data analysis was done by employing the six steps of qualitative analysis by Creswell (2014) and coding using the eight steps of Tesch (1990 in Creswell, 2014). After ensuring the transcripts were accurate, the researcher printed them all. Each interview transcript was then read through to get a general sense of the information and to reflect on the overall meaning of what each doctor said about pain to understand the totality of the data (Creswell, 2014). Data was then coded by organising it by bracketing chunks and writing a word representing a category in the margins (Rossman & Rallis, 2012 in Creswell, 2014:198). This involved segmenting sentences or paragraphs into categories, and labelling the categories. The detailed coding process followed the steps of Tesch's (1990) approach.

After getting a sense of the whole, each transcription was read thoroughly and thoughts about the data written down. After accomplishing this for all the transcripts, lists of similar topics were clustered together into major topics. The topics were converted into codes and the codes written next to the appropriate segments, sentences and paragraphs. The most descriptive wording was identified and turned into categories. To reduce the categories, similar topics or topics that related to each other were grouped together. Data material belonging to each

category was grouped together. Each category was grouped by writing down the category then identifying how many doctors made a similar statement.

After the coding process, the analysis continued with the steps of Creswell (2014). Themes and subthemes were generated for the analysis. The themes form the major findings in the study supported by sub-themes, which are smaller groups that fall under the major group. The study was then presented as a narrative with all the themes and sub-themes supported by doctors' actual quotations about pain in the CT-ICU. A discussion of the study findings compared the findings of the study to what is already known about pain in the critical care population. Lessons learned and conclusions drawn, in addition to the systematic review and interview with nurses, informed the guideline. It will also help to determine how pain assessment and management can be improved in the opinion of doctors, considering our resource constraints as a developing country. Three major themes and 10 subthemes were identified in the interviews with the doctors and presented in Table 4.6 in Chapter Four.

2.5.2.7 Individual interviews with post CT-ICU patients

Individual interviews were carried out with three patients who received treatment in the CT-ICU, to explore their views and opinions about their experiences of pain and its management in the CT-CIU. Adult patients were recruited into the study 48 hours after transfer from the CT-ICU into the CT ward, which is a step-down unit of the CT-ICU (high care). These groups of patients were selected to ensure that the CT- ICU experience was still fresh in their memories. Patients were not interviewed in the CT-ICU because of the possibility of being on opioid or narcotic analgesics, sedatives and ventilation. According to Aslan, Badir, Arli and Cakmakci (2009), various factors alter verbal communication with patients in the ICU and thus they interviewed post-cardiac surgery patients, 48 hours after being transferred to the surgical ward from the surgical ICU.

2.5.2.8 Research Design and Method

- *Research design*

The exploratory, descriptive, qualitative design was used to elicit the opinions of post CT-ICU patients on pain, its assessment and treatment in the CT-ICU.

- *Research method*

Population

The statistics obtained from the CT-ICU suggested that about 30 patients are admitted each month, including children. All the patients interviewed had undergone cardiothoracic surgery and were adults.

Sample and Sampling Method

Out of the average number of 10 adult patients admitted to the CT-ICU each month, three (n=3) were purposively sampled within 48 hours of their transfer to the CT ward and interviewed for the study. The patients might have spent at least 48 hours in the CT-ICU. The patients were recruited by talking to them and their families and only with their consent. The three patients were recruited over a period of one month.

Inclusion Criteria

- Patients 18 years and above.
- Had undergone cardiac or thoracic surgery.
- Patients who had been in the CT-ICU for more than 24 hours.
- Within 48 hours of discharge to the CT ward.

Data Collection Procedure

Permission was obtained in writing from the management of the hospital (nursing and medical) (*Appendices E & F*) with the consent of the Medical and Nursing Directors of the CT-ICU. Permission was also obtained from the nurse managing the cardiothoracic ward to undertake the data collection in the unit. The patients' individual interviews were carried out to determine their opinions of their pain management experience in the CT-ICU and how according to them, pain management in the ICU could be improved. Three (n=3) CT-ICU patients, who spent at least 24 hours in the CT-ICU and had been discharged to the CT ward within 48 hours, were purposively sampled with the help of the CT ward manager and

participated in the individual face-to-face interviews. The patient needed to have spent about 24 hours in the ICU to relate an adequate experience about pain in the CT-ICU.

The researcher recruited the patients from the CT ward with their consent after explaining the purpose of the study to them. All three (n=3) patients interviewed could speak and read English, thus all interviews were done in English. The researcher is not fluent in the different local languages of the selected patients and relatives thus interviews were conducted in English. Patients who agreed to participate in the interview were given the information sheet *(Appendix J).* The interviews were carried out in empty wards of the unit at the convenience of the patients when they were not undergoing any procedure and permission was granted by the nurse manager. The researcher did the interview, recording and note taking. The patients were again informed about the aim of the study before they agreed to take part in the interview. They were asked to sign a consent form *(Appendix K),* after reading the information letter again, and to complete a form with their demographic data *(Appendix L).* The interviews were tape-recorded. Field notes were taken as an additional source of information. Patients were first asked about the experience regarding pain in the CT-ICU and probes were introduced *(Appendix L).*

2.5.2.9 Data Analysis

Interviews were done within one week of each other and it was realised after the third interview that patients were talking about the same issues and as no new information was emerging, the data collection ended after the interview with the third patient. Verbatim transcription of the tapes was carried out after each interview to understand the data, prepare for subsequent interviews, and prepare the data for analysis (Creswell, 2014). Data collection and data analysis occurred simultaneously to obtain a better understanding and appreciation of the data (De Vos *et al.,* 2011).

Data analysis followed the six steps of qualitative analysis by Creswell (2014) and coding using the eight steps of Tesch (1990 in Creswell, 2014) and followed the same methods employed in analysing the interviews with nurses and doctors (*refer to point 2.5.2.3*)

Three major themes and 11 subthemes were identified in the study and presented in Table 4.8 in Chapter Four. The study was then presented as a narrative, with all the themes and sub-themes supported by the patients' actual quotations about pain in the CT-ICU.

2.5.2.10 Individual interviews with patients' relatives

Individual interviews were carried out with three (n=3) relatives of the post CT-ICU patients who were also recruited and interviewed in the study. The relatives at the time of recruitment might have visited the CT-ICU more than twice. The relatives were included to explore their views and opinions about their experiences of pain management in the CT-CIU when their relatives were admitted. The relatives must have visited for more than twice to have enough experience about the care to share in the interview.

2.5.2.11 Research design and method

- *Research design*

The exploratory, descriptive, qualitative design was used to elicit the opinions of post CT-ICU patients on pain, its assessment and treatment in the CT-ICU.

- *Research method*

Population

All relatives who visited their family members in the CT-ICU form the population in this phase of the study. Three relatives who had visited the patient more than twice were purposively sampled and individually interviewed. All those interviewed had relatives whom had undergone cardiothoracic surgery and been transferred to the CT ward.

Sample and Sampling Method

Of the relatives, whose family members were transferred to the CT ward, three were purposively sampled within 48 hours of the transfer and interviewed for the study.

Inclusion Criteria

- Relatives of patients who were in the ICU for more than 24 hours.
- Relatives of patients who had been transferred to the CT ward within 48 hours.
- Had visited their relatives on more than two occasions.

Data Collection Procedure

Permission was obtained in writing from the management of the hospital *(Appendix E & F),* with the consent of the Medical and Nursing Directors of the CT-ICU. Permission was also obtained from the nurse managing the cardiothoracic ward to undertake the data collection in the unit. The patients' relatives' individual interviews were carried out to determine their opinions of the pain management experience when their relatives were admitted the CT-ICU and how according to them, pain management in the CT-ICU could be improved. Three (n=3) post CT-ICU patients', who spent at least 24 hours in the CT-ICUs, relatives were purposively sampled with the help of the CT ward manager and participated in the individual interviews.

The researcher recruited the patient's relatives within one month from the CT ward with their consent after explaining the purpose of the study to them. All three patients' relatives interviewed could speak and read English, thus all interviews were done in English. Patients' relatives who agreed to participate in the interview were given the information sheet *(Appendix M).* The interviews were carried out in the homes of the three (n=3) relatives, at their convenience. Phone appointments were made and directions to their homes were given to the researcher and one met the researcher and accompanied her home. The relatives were again informed about the aim of the study before they agreed to take part in the interview. They were asked to sign a consent form (*Appendix N)* after reading the information letter again. The relatives provided a quiet place in the house for the interviews to be done. One was done under a tree and the other two in the living rooms of the participants. The interviews were tape-recorded. Field notes were also taken by the researcher to provide an additional source of information.

The patients' families' demographic data was collected *(Appendix O)* and using an interview guide (*Appendix O),* the patients' relatives were first asked their opinion regarding how pain was in the CT-ICU and probed further on their experiences of the pain management.

2.5.2.12 Data Analysis

It took three weeks to interview all three relatives. It was determined that the relatives had the same issues, complaints and suggestions, and as no new information was emerging, it was realised that data saturation was achieved therefore the interviews ended after the third relative. Verbatim transcription of the tapes was carried out after each interview to understand the data, to prepare for subsequent interviews and to prepare the data for analysis (Creswell, 2014). Data collection and data analysis occurred simultaneously to enhance the researchers understanding and appreciation of the data (De Vos, et al, 2011). After transcribing each interview, the researcher checked for accuracy by listening to the tape while reading the transcripts to make necessary corrections (Kvale, 2009). The recordings were listened to repeatedly until the researcher was sure that all statements were transcribed as stated by the relatives.

Data analysis was done by following the six steps of qualitative analysis by Creswell (2014) and coding using the eight steps of Tesch (1990 in Creswell, 2014). The analysis here also followed the same methods employed in analysing the interviews with nurses and doctors (*refer to point 2.5.2.3*)

Three major themes and nine subthemes were identified in the study and presented in Table 4.10 in Chapter Four. The study was then presented as a narrative with all the themes and sub-themes supported by the actual relative's quotations about pain in the CT-ICU.

Findings of the exploratory phase of the study, inclusive of systematic review, focus group discussions and individual interviews are presented in Chapters Three and Four.

2.6 PHASE 2 – DEVELOPMENT AND VALIDATION PHASE

This phase also addressed objective one by developing and validating the clinical guideline for acute pain management in the adult CT-ICU, which was based on Phase 1 of the study. Phase 2 comprises two parts, part one addressed the development of the guideline and part two, the validation of the guideline.

2.6.1 Phase 2: Part I Development Phase

The guideline was developed based on evidence from the systematic literature review and findings from the focus group interviews with CT-ICU nurses and individual interviews with CT-ICU doctors, patients who received treatment in the CT-ICU and their relatives, to put it in the Ghanaian context. A framework for the clinical guideline was developed and had four equally important anchors based on the findings from the systematic review of literature and interviews (*refer figure 5.1*). The framework represents the researcher's synthesis of literature and the interviews on how to explain the phenomenon of achieving a comprehensive and effective acute pain management in the CT-ICU with the use of the clinical guideline (Regonieol, 2015). The guideline statements and recommendations were deduced from the systematic review of literature and interviews with stakeholders based on the aspects of pain management explored. Page numbers were allocated to the statements that informed the guideline, to refer to the specific aspects they were taken from in the systematic review and interviews (*refer Table 5.1 and 5.2).* The individual conclusions from the systematic literature review, the opinions of CT-ICU nurses, doctors, patients and their relatives were listed and repetitions removed to arrive at the guideline statements and recommendations. Level of evidence for the guideline statements and recommendations were categorised according to the quality of evidence and definitions from the Joanna Briggs Institute as stated in Table 2.1.

Table 2.1-The JBI Levels of Evidence

Levels of Evidence – Effectiveness	
"Level 1 – Experimental Designs"	"Level 1.a – Systematic review of Randomised Controlled Trials (RCTs)"
	"Level 1.b – Systematic review of RCTs and other study designs"
	"Level 1.c – RCT"
	"Level 1.d – Pseudo-RCTs"
"Level 2 – Quasi-experimental Designs"	"Level 2.a – Systematic review of quasi-experimental studies"
	"Level 2.b – Systematic review of quasi-experimental and other lower study designs"
	"Level 2.c – Quasi-experimental prospectively controlled study"
	"Level 2.d – Pre-test – post-test or historic/retrospective control group study"
"Level 3 – Observational – Analytic Designs"	"Level 3.a – Systematic review of comparable cohort studies"
	"Level 3.b – Systematic review of comparable cohort and other lower study designs"
	"Level 3.c – Cohort study with control group"
	"Level 3.d – Case – controlled study"
	"Level 3.e – Observational study without a control group"
"Level 4 – Observational – Descriptive Studies"	"Level 4.a – Systematic review of descriptive studies"
	"Level 4.b – Cross-sectional study"
	"Level 4.c – Case series"
	"Level 4.d – Case study"
"Level 5 – Expert Opinion and Bench Research"	"Level 5.a – Systematic review of expert opinion"
	"Level 5.b – Expert consensus"
	"Level 5.c – Bench research/ single expert opinion"

Source: http://joannabriggs.org/jbi-approach.htm//tabbed-nav=levels-of-Evidence

2.6.2 Phase 2: Part 2 Validation Phase

This formed the final part of the first objective by validating the guideline, which was then ready to be pilot tested. The validation was a way of further involving the key stakeholders, as recommended by the guideline development groups (NICE, 2014; SIGN, 2015 & AGREE II, 2010) and Hewitt-Taylor, 2004. The reviewers at this stage validated the guideline recommendations and statements for clarity applicability to the local context and the inclusiveness or the scope. An information sheet was provided to the participants *(Appendix P*) and consent *(Appendix Q)* obtained. A form was provided for them to rate and give feedback on the draft guideline (*Appendix R*). To ensure anonymity, reviewers were not required to give their name. The process of incorporating the input of the stakeholders, which included experts, compensated for the deficit of the team requirement for the initial drafting of a clinical guideline. The validation led to changes in the draft guideline by re-structuring of statements, modification of sentences, re-ordering of statements. The levels of evidence in the guideline statements were removed before validation to avoid bias *(Appendix R)*.

The guideline was validated by 22 (n=22) stakeholders who were purposively sampled and included eight ICU nurses, eight ICU doctors, three post CT-ICU patients and three ICU patient relatives. The guideline was provided to the stakeholders to agree or disagree on what they thought should be included or excluded from the guideline. The questions were in a Likert scale format and they could agree (maintain statement - 2), be uncertain (go by others decision -1) or disagree (remove statement - 0) *(Appendix R)***.** They were also given a chance to express their opinions about the guideline by making comments on the recommendations after agreeing or disagreeing with the statement; this was done by leaving a blank portion by every question for open-ended comments.

The Likert Scale, which was used for the validation, is designed to determine the opinions or attitude of a subject and contains a number of declarative statements. Response choices on a Likert Scale most commonly address agreement, evaluation and frequency (Burns & Grove, 2001:431). The Likert Scale assigns a numerical score to individuals to place them on a continuum with respect to the attribute being measured. Declarative statements expressing a viewpoint on the topic are developed and participants are asked to indicate the degree to which they agree or disagree (Polit & Hungler, 1997). Numbers are allocated to the responses, which are quantitatively analysed to elicit group opinions.

Data was analysed descriptively to determine what the nurses, doctors, patients and relatives thought of the guideline. It was determined whether they all agreed with statements and if not, why they disagreed or were uncertain by analysing their comments. The result of the validation process is presented in Chapter Five.

2.7 PHASE 3: PILOT-TESTING PHASE

This phase of the study, made up of three parts, addressed the second objective of the study. Part 1 was the pre-intervention test, Part 2 - the implementation of the guideline, Part 3 - the post-intervention test.

2.7.1 Phase 3: Part 1 Pre-intervention Tests

Before the guideline was implemented, assessment of post ICU patients' comfort and satisfaction with pain management whilst in the CT-ICU, cost of CT-ICU care and length of CT-ICU stay were assessed to determine if the intervention would have any effect on these.

Target Population

Adult patients who were transferred from the CT-ICU to the cardiothoracic ward post cardiothoracic surgery. The patients were assessed within 48 hours of their discharge to the CT ward.

Sample and Sampling Method

Sixty-five (n=65) post CT-ICU patients were sampled using a convenience sampling method. Patients who met the inclusion criteria were asked to participate in the study when they were available and willing. Every patient who was transferred from the CT-ICU post cardiothoracic surgery was approached until the number was achieved. It took approximately (six) months to obtain the sample size.

Thabane, Ma, Chu *et al.* (2010) state that pilot studies, amongst other things, can be used to assess treatment or intervention. The authors also stated there is no need for a sample size calculation in a pilot study. Cohen (1992) however stated that to achieve power (confidence level) for a pilot study, when expecting a medium effect in an intervention study, a sample size of 64 (n=64) is adequate. For the purposes of this study however, 65 (n= 65) patients, who were treated in the CT-ICU, were included in the sample for the pilot study.

Inclusion Criteria

- Adult patients 18 years and above.
- Verbal post CT-ICU patients who have been discharged to the CT ward.
- Patient must have undergone cardiac or thoracic surgery.
- Glasgow Coma Scale (GCS) of 15/15.
- Must be available within 48 hours after transfer to the CT ward to participate in the study.
- Must have a record of date and time of admission and transfer.
- Analgesics used must be recorded on patients' ICU chart.

Exclusion Criteria

- Must not be on any sedative.
- Must not be on any analgesia for chronic pain.

Data Collection

Procedure

Patients meeting the inclusion criteria and willing to participate in the study had their demographic data collected *(Appendix S)* after they had read the information sheet (*Appendix J*) and signed the consent form (*Appendix K*). Their length of stay, cost of CT-ICU care and cost of analgesics used were determined by the researcher by assessing them from the CT-ICU documents and obtaining the cost of ICU stay per day from the CT-ICU accountant and the price of analgesics from the pharmacy. The cost of a CT-ICU bed per patient was

obtained from the ward administrator, the cost was higher for ventilated patients compared to non-ventilated patients, and the cost of analgesics was obtained from the CT pharmacy. The patients were then asked to rate their level of pain and satisfaction with pain management in the CT-ICU *(Appendix S)*. The patients' Simplified Acute Physiology Score (SAPS II score), which determines their level of illness/mortality, was also determined to ascertain how sick they were on admission to the CT-ICU (*Appendix T)*. All the information for the SAPS II score was obtained from the patients' ICU charts and folders.

Instrument

The level of pain while in the CT-ICU was assessed by asking the patient to rate his or her pain using the universal pain assessment tool (*Appendix S*). The universal pain assessment tool is a widely-used instrument for pain assessment with a rating from 0 to10, with 0 being no pain and 10 being the worse possible pain. The ratings were then classified as no pain, mild pain, moderate pain and severe pain. The ratings were collapsed to make statistical analysis possible, thus 0 was classified as no pain, 1 to 2 as mild pain, 3 to 6 as moderate pain and 7 to 10 as severe pain.

Patients' Satisfaction with Pain Management

Satisfaction was assessed by asking the patients to rate their level of satisfaction with pain management while in the CT-ICU. They were given a numerical rating scale with a rating of 0-10 with 0 not satisfied and 10 very satisfied. (*Appendix S)*. The rating was collapsed to make statistical analysis possible. Therefore 0 – 3 not satisfied, 4 – 7 fairly satisfied and 8–10 satisfied. The patients were to determine their satisfaction with the administration of pain medication by nurses when needed, and satisfaction with the nurses response to their complaints of pain. The patients were also asked to determine, on a numerical scale, if they were satisfied with the education given on how post- operative pain would be managed.

Data Analysis

The quantitative data was analysed descriptively to determine cost of analgesia and CT-ICU care, length of CT-ICU stay, patients level of pain, satisfaction with pain management and preoperative education on post-operative care. Analysis determined the level of patients'

pain while in the CT-ICU before the intervention, their satisfaction with the way their pain was managed, and pre-operative education on post-operative pain. Forming the baseline, before the implementation of the guideline, this was compared to the post-intervention assessment to determine the impact of the intervention.

2.7.2 Phase 3: Part 2 Implementation of the Guideline

Based on the findings and recommendations in the guideline, the researcher, in consultation with her supervisors, decided to do a multifaceted intervention, which included an educational intervention, provision of pain assessment tools including the numerical rating scale (NRS) and the Critical Care Pain Observation Tool (CPOT) *(Appendix U),* with all nurses and attaching pain assessment tools to each patient's bed, providing a form for both nurses and doctors to document pain assessment, treatment and follow up *(Appendix V).* Educational interventions have been used before in improving pain management practices amongst critical care nurses (Edek & Pronovost, 2004; Van Gulik, Ahlers, Brkic *et al.*, 2010; Gelinas, Arbour, Michaud *et al.*, 2011; Rose, Haslam, Dale *et al.*, 2013 & Gelinas, Ross, Boitor *et al*., 2014).

The researcher spent about one month in the CT-ICU to implement the guideline and educate nurses and doctors with the assistance of the Critical Care Nurses Group of Ghana (CCNGG) who helped to organise the educational intervention for ICU nurses. All these were done with the permission, consent and co-operation of the Medical Director, Nurse Manager and the nurses and doctors in the CT-ICU. Details of the implementation of the guideline is discussed in Chapter Six.

2.7.2.1 Education

The guideline and its recommendations were shown to all CT-ICU nurses and doctors and they were educated on the components and their implementation. The researcher held small group and individual discussions with nurses and doctors. The guideline was discussed in detail with ICU nurses at a PowerPoint presentation, facilitated by the CCNGG, and nurses were allowed to ask questions, which were addressed and clarifications given. Nurses were also educated and given the numerical rating scale and the CPOT pain assessment tools.

2.7.2.2 Pain Assessment Tools

The researcher made available all pain tools *(Appendix U)* that were validated for use in the assessment of the different groups of patients, thus verbal and non-verbal patients. For the verbal patients, the numerical scale (Ahlers, Gulik, van der Veen, 2008; Chanques, Viel, Constantin *et al.,* 2010) was made available at every patient's bedside. For non-verbal patients, the CPOT (Gelinas, Fillion, Puntillo *et al.*, 2006; Young, Siffleet, Nikoletti & Shaw, 2006; Gelinas & Johnson, 2007; Gelinas, Harel, Fillion et al., 2009; Vazquez, Pardavilla, Lucia *et al.*, 2011; Gelinas, Arbour, Michaud *et al*., 2011; Barr *et al.*, 2013;) was made available at every patient's bedside after nurses were educated on how to score it. Although not a focus of this study, the Wong Baker Faces scale was also made available to be used for children who are admitted to the CT-ICU post cardiothoracic surgery. CT-ICU nurse supervisors were encouraged to ensure that the guideline recommendations were carried out.

The guideline was used to manage the pain of all post-operative cardiothoracic patients from the pre-operative phase, until they were transferred from the CT-ICU to the CT ward. Pain assessment and management were done following the guideline statement and recommendations and lessons learnt from the educational intervention. Patients' pain was also assessed with the pain assessment tools provided. The researcher was available to support and clarify issues, personally or by telephone, that were not well understood by the ICU nurses and doctors.

2.7.3 Phase 3: Part 3 Post-intervention Test (Outcome Assessment)

Patients who were admitted after the intervention was done were assessed within 48 hours of their transfer to the CT ward. The patients' level of pain and satisfaction with pain management while in the CT-ICU, cost of CT-ICU care and length of CT-ICU stay were assessed; this was done to determine if the intervention had any effect on any of these. The findings from the post intervention test were compared to the pre-intervention test to determine the impact of the guideline and intervention on pain management in the CT-ICU. The results of the post intervention are discussed in Chapter Six.

Target Population

Patients who had been transferred from the CT-ICU to the cardiothoracic ward post cardiothoracic surgery.

Sample and Sampling Method

Sixty-five (n=65) using convenience sampling method. Patients who met the inclusion criteria were asked to participate in the study when they were available and willing.

Inclusion Criteria

- Adult patient 18 years and above.
- Verbal post CT-ICU patients who had been transferred to the ward.
- Patient must have undergone a cardiac or thoracic surgery.
- The surgery must be planned and not an emergency procedure.
- Glasgow Coma Scale (GCS) of 15/15.
- Transferred to the CT ward for not more than 48 hours.
- Must have a record of date and time of admission and discharge.
- Analgesics used must be recorded on patient's ICU chart.

Exclusion Criteria

- Must not be on any sedative.
- Must not be on any analgesia for chronic pain.

Data Collection

Procedure

Demographic data of patients who met the inclusion criteria and were willing to participate in the study (*Appendix S*) was collected after they had read the information sheet (*Appendix J*) and signed the consent form (*Appendix K*). Their length of stay and cost of CT-ICU care and analgesics used were obtained from patients CT-ICU documents. The cost of an ICU bed per patient was obtained from the ward administrator and cost of analgesics from the CT

pharmacy. They were then asked to rate their level of pain and satisfaction with pain management in the CT-ICU. The patients SAPS 11 score, which determines their level of illness/mortality, was also determined to ascertain how sick they were on admission to the CT-ICU (*Appendix T).* All this information was obtained from the patients' CT-ICU chart and folder.

Instrument

The level of pain while in the CT-ICU was assessed by asking the patient to rate his or her pain using the Universal Pain Assessment Tool (*Appendix S*), which has a rating from 0 to10, with 0 being no pain and 10 being the worse possible pain. The ratings were then classified as no pain, mild pain, moderate pain and severe pain. The ratings were collapsed to make statistical analysis possible, therefore 0 was classified as no pain, 1 to 2 as mild pain, 3 to 6 as moderate pain and 7 to 10 as severe pain.

Patients' Satisfaction with Pain Management

Satisfaction was assessed by asking the patients to rate their level of satisfaction with pain management while in the CT-ICU. They were given a numerical rating scale with a rating of 0 to 10, with 0 not satisfied and 10 very satisfied. (*Appendix S).* The Likert scale was used for the rating and was collapsed to make statistical analysis possible, therefore 0 to 3 was rated as not satisfied, 4 to 7 fairly satisfied and 8 to 10 satisfied. The patients were to determine their satisfaction with the administration of pain medication by nurses when they needed it and satisfaction with the nurses response to their complaints of pain. The patients were also asked to determine, on a numerical scale, if they were satisfied with the education given on how post- operative pain would be managed. Their answers were compared to the pre-intervention test to determine if the intervention made any impact.

Data Analysis

The quantitative data was analysed descriptively to determine patients level of pain, satisfaction with pain management, cost and length of CT-ICU stay after the intervention. This formed post-intervention test results after the implementation of the guideline and was compared to the pre-intervention test to determine if there had been any improvement in pain

management after the intervention. Statistical tests employed included the Fisher's Exact and two-sample t-tests. Testing was done on the 0.05 ($p<0.05$) level of significance. The results of the post-intervention test are discussed in Chapter Six.

2.7.4 Appraisal of the Clinical Guideline

The guideline was appraised using the Appraisal of Guidelines for Research and Evaluation (AGREE II) instrument by Brouwers, Kho, Browman *et al* (2010) for the AGREE research trust *(Appendix W).*

After the validation and ensuring that all the comments were considered in rephrasing the guideline statements and the recommendations and pilot testing, the guideline was appraised by an expert panel of four participants to ensure the distribution of the guide in a broader context. The AGREE II instrument (2010) was used to verify the guideline for the comprehensive management of pain in the adult CT-ICU. The verification was meant to present the guideline to ICU experts, to check if the guideline met all the steps as set up in the AGREE trust (2010) to appraise guidelines and ensure they met international standards. The method used for the verification is presented below.

Target Population

The target population for the expert panel to appraise the guideline included experts from different disciplines that had experience in the nursing care of critically ill adult patients and had also researched into pain in critically ill patients or taught ICU nurses about pain in ICU patients.

Sample and Sampling Method

A purposive sampling method was used to select the panel from the different disciplines in critical care to verify the guideline. All participants had many years of clinical experience in caring for critically ill adult patients. The AGREE II instrument (2010) was used in this process of guideline verification, recommending that each guideline was assessed by at least two appraisers and preferably four, as this would increase the reliability of the assessment.

Four (n=4) expert verifiers were involved in this stage of the study and included an:

- ICU nurse manager from an academic hospital.
- ICU nurse educator and an executive of the Critical Care Nurses Group of Ghana (a member of the World Federation of Critical Care Nursing).
- ICU nurse educator/lecturer with an advanced nursing degree in critical care nursing.
- An American nurse researcher/lecturer who had previously researched into pain in adult cardiothoracic ICU patients.

2.7.4.1 The Process of Appraisal

The appraisal was intended to assess the quality of the guideline for pain management, refine and further clarify the guideline and ensure its content validity using the AGREE II instrument (2010). The purposively selected panel was approached by the researcher and informed of their selection as expert panel reviewers for verification of the guideline. After a verbal consent, the researcher forwarded documents containing an information letter, consent form *(Appendix X and Y),* the research work to the point of the appraisal and an AGREE II instrument users guide attached to the AGREE II instrument *(Appendix W)* to all expert panel members by email and post.

The guideline for pain management was rated on a "7-point scale (strongly agrees - 7, strongly disagrees -1). A score of 1 was given when there was no information relevant to the AGREE II item or the concept was poorly reported" (AGREE II, 2010:11). "A score between 2 and 6 was assigned when the AGREE II item did not meet the full criteria or considerations". "Scores increased as more criteria were met and considerations addressed (AGREE II, 2010:11)". A column for comments and two for overall assessment of best practice guidelines was provided at the end of the AGREE II instrument. The expert panel verifiers were requested to comment as to whether they would recommend the guideline for use, or recommend with modifications, or would not recommend. They were asked to rate the overall quality of the guideline with 1 being the 'lowest possible quality' and 7 being the 'highest possible quality.' This overall assessment was used to make a judgement of quality of the guideline and its recommendations.

The AGREE II Instrument

The AGREE II instrument is meant to "address the issue of variability in guideline quality" (Brouwers *et al.*, 2010:1). It provides a framework for assessing the quality of clinical guidelines, to refine and further develop best practice guidelines and ensure content validity. This appraisal ensures the confidence that potential biases of guideline development have been addressed and that the best practice guidelines are both internally and externally valid, and are feasible for practice. The AGREE instrument therefore is a tool that assesses the rigour in development and transparency of a guideline (Brouwers *et al.,* 2010:1). It also assesses the benefits, harms and costs of the recommendations and the practical issues related to implementation of the guideline. "It is designed to assess guidelines developed by local, regional, national or international groups or affiliated organisations" (Brouwers *et al.,* 2010:4). The AGREE II instrument is used to assess new guidelines, existing practice guidelines and guidelines that have been updated. The purpose for the use of the instrument in this study was to appraise a new clinical guideline developed for the comprehensive management of acute pain in the CT-ICU in Ghana. Brouwers *et al*. (2010:14-40) states that guideline developers and those carrying out appraisals on guidelines must ensure they meet all the 23 key items organised into six domains. Each of the following domains is intended to capture a separate dimension of guideline quality as stated below.

Domain 1: Scope and Purpose

- "The overall objective(s) of the guideline is (are) specifically described."
- "The health question(s) covered by the guideline is (are) specifically described."
- "The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described."

Domain 2: Stakeholder Involvement

- "The guideline development group includes individuals from all relevant professional groups."
- "The views and preferences of the target population (patients, public, etc.) have been sought."

- “The target users of the guideline are clearly defined.”

Domain 3: Rigour and Development

- “Systematic methods were used to search for evidence”.
- “The criteria for selecting the evidence are clearly described.”
- “The strengths and limitations of the body of evidence are clearly described.”
- “The methods for formulating the recommendations are clearly described.”
- “The health benefits, side effects, and risks have been considered in formulating the recommendations.”
- “There is an explicit link between the recommendations and the supporting evidence”
- “The guideline has been externally reviewed by experts prior to its publication.”
- “A procedure for updating the guideline is provided.”

Domain 4: Clarity of Presentation

The recommendations are specific and unambiguous.

- “The different options for management of the condition or health issue are clearly presented.”
- “Key recommendations are easily identifiable.”
- “The guideline describes facilitators and barriers to its application.”

Domain 5: Applicability

- “The guideline provides advice and/or tools on how the recommendations can be put into practice.”
- “The potential resource implications of applying the recommendations have been considered.”
- “The guideline presents monitoring and/or auditing criteria.”

Domain 6: Editorial Independence

- "The views of the funding body have not influenced the content of the guideline."
- "Competing interests of guideline development group members have been recorded and addressed."

A score was calculated for each of the six (6) of the AGREE II domains. Domain scores were calculated by summing up all the scores of the individual items in a domain and by scaling the total as a percentage of the maximum possible score for that domain. Although the domain scores are useful in appraising guidelines for whether a guideline should be recommended for use, the AGREE consortium has not set any minimum domain score to differentiate a high-quality guideline from one of poor quality (AGREE research trust, 2010). No universal agreement thus exists about specific cut off scores to identify high quality guidelines. For the purpose of this study however, a score of 70% was considered by the researcher as an acceptable quality score to ensure reliability of the guideline. Comments, feedback, recommendations, criticisms and suggestions of the expert panel after the appraisal were incorporated into the guideline by the researcher before coming up with the final guideline. The results of the appraisal are discussed in Chapter Seven**.**

2.8 ETHICAL CONSIDERATIONS

Researchers must endeavour to reduce risk especially when dealing with human participants. There are many ways reduce risk, including informed consent, confidentiality, data protection, right to withdraw and informing participants about potential benefits and harms (Royal College of Nursing, 2009).

Approval to conduct the study was obtained by the researcher from the Postgraduate Committee, University of the Witwatersrand (*(Appendix AA)*, the Committee for Human Research, University of the Witwatersrand and the Ethical Review Committee of the Central University College in Ghana *(Appendix Z)*. Permission was also obtained from the Chief Executive Officer (CEO)/ Medical director and Nursing Director of the hospital where the study was conducted. Informed, written consent was obtained from all participants (*Appendices H, K & F).*

The researcher ensured that participation in the study was voluntary and participants were free to withdraw from the study at any stage. Confidentiality and anonymity of participants was maintained at all times and they were assured their data was safely kept. Participants could have access to research findings upon request. Raw data was handled by only the researcher and her supervisors and data was coded before submission to the statistician.
Informed consent is considered vital to ethical practice and should be obtained before recruiting any subject or participant into a research project/study. Participants should be fully aware of the research aims and any potential benefits and harms and should give their consent voluntarily without cohesion. The individual should not feel forced or coerced to take part in a study, or be unduly persuaded by the promise of a reward. Participants need to know of any risks that may occur because of their involvement in the study. Information provided to the participants must be transparent and in a language, that they understand. Verbal and written information should be given to the participant to inform their decision to be involved in the study and allowed to ask questions. It is ideal that consent forms be signed and also witnessed (Royal College of Nursing, 2009). Informed written consent was obtained from all participants in this study.

Participants recruited for a study are not obliged to stay in the study and can withdraw and that will in any way affect their care in any way. They should be made aware of this right when obtaining their consent (Royal College of Nursing, 2009). Participants in this study were informed that they could withdraw from the study at any time and that it would not have an impact on the care they will receive from the hospital.

Research participants should be informed and reassured that their data would be kept safe and protected by the researcher (Royal College of Nursing, 2009). Participants in this study were informed that their data was kept safe and handled only by the researcher and her supervisors.

2.9 RIGOUR OF THE STUDY

Rigour, according to Burns and Grove (2009:720)," is the striving for excellence in research through the use of discipline, scrupulous adherence to detail and strict accuracy."

2.9.1 Quantitative data

Validity is the extent to which a concept is accurately measured in a quantitative study (Heale & Twycross, 2015). "It broadly concerns the soundness of the study's evidence, which is whether the findings are unbiased, cogent and well-grounded" (Polit & Beck, 2008:196).

The data collection instrument for patient's pain assessment is a validated instrument for pain assessment and this was used to assess patient's pain while in the CT-ICU. Content and face validity of the data collection instrument was assessed by ICU and nursing education experts (n=2) with more than 10 years of nursing experience in the field of Intensive Care nursing and nursing education. The two nurse experts were given the data collection instrument to determine if it was the appropriate tool to measure pain in ICU patients. After careful scrutiny of the instrument the two experts agreed that it was a valid tool for the data collection. The clinical guideline was designed based on the results of the exploratory phase and validated methods of pain assessment and management in literature to ensure validity. It was also validated by Intensive Care nurses, doctors, patients and their families.

Reliability in a quantitative study relates to the consistency of a measure (Heale & Twycross, 2015). "It also refers to the accuracy and consistency of information obtained in a study" (Polit & Beck, 2008:196). This was maintained in the study by ensuring that the same method of data collection and instrument would be used throughout the study. All the data was collected by the researcher alone and collected independently without influence from anyone. Only the data in ICU patients' records was taken. The same clinical guideline was discussed with all the participants to ensure consistency. The intervention was implemented only by Intensive Care nurses to ensure consistency. The implementation of the guideline was supervised by the researcher.

2.9.2 Qualitative data

Strategies for ensuring trustworthiness in qualitative research projects by Polit and Beck, (2012) and Shenton (2004) were employed in the study. These strategies were earlier described by Lincoln and Guba (1985).

Credibility was ensured by using focus group and individual interviews, which are well-established methods of data collection in qualitative investigations. All interviews were recorded and transcribed verbatim. Notes were also taken during interviews to support what was recorded, thus ensuring that only what the participants said was recorded. Participants were asked to read any transcripts of dialogues in which they participated to consider whether their words matched what they actually intended. To ensure honesty during the interviews, each person approached to participate in the study was given the opportunity to refuse to participate to ensure that the data collection sessions involved only those genuinely willing to take part and prepared to offer data freely. Probes were used to elicit detailed and related data through rephrased questions. The proposal was presented to colleagues, peers and academics and feedback was offered to promote credibility. There was a detailed description of the pain assessment and management and all the methods used in the study.

Transferability was ensured by the provision of background data to establish the context of the study and detailed description of pain to allow comparisons to be made.

The study was reported in detail to ensure dependability thereby enabling a future researcher to repeat the work, if not necessarily to gain the same results.

To ensure confirmability, the researcher ensured, as far as possible, that the study's findings were the results of the experiences and ideas of the participants, rather than the characteristics and preferences of the researcher.

2.10 SUMMARY

Chapter Two outlined the research design and research method, including the target population, sample and sampling method as well as the process of data collection, analysis,

pilot study, ethical considerations and rigour in the study. The next chapter will look at the systematic literature review and interviews with stakeholders, which will form the first phase of the study.

CHAPTER THREE

EXPLORATORY PHASE – PART ONE

SYSTEMATIC LITERATURE REVIEW

3.1 INTRODUCTION

Phase one of the study, the Exploratory Phase, has two parts. The first part, Systematic Literature Review, aims at describing measures that have been proven in literature to ensure effective pain management in critically ill adult patients. The second part, Qualitative Interviews, describes the experiences of CT-ICU nurses, doctors, patients and their families with pain management in the CT-ICU post cardiothoracic surgery and what in their opinion can improve pain management in the CT-ICU. The exploratory phase informed the development of the guideline statements and recommendations. This chapter describes the systematic review of literature and the next chapter focuses on the Qualitative Interviews.

3.2 SYSTEMATIC LITERATURE REVIEW

The systematic literature review was conducted on studies published from 2004 to 2015 as the first part of Phase 1 of the study. The objective of the review was to determine the measures that would ensure effective pain management among critically ill adult patients. The chapter starts by providing a summarised version of the method employed for the review, thereafter the results of the systematic review are presented and discussed. The search strategy and results are described and a list of articles that are included in the review provided. The results of the methodological quality assessment are provided, including the characteristics of the included studies. Data is then presented and discussed to determine the measures identified in the review that ensure effective pain management in adult ICU patients. The results from this chapter contribute to the development of the clinical guideline in Chapter Five. The Joanna Biggs Institute Reviewers Manual (2014) served as a guide for the review. Details of the design and method employed in the review are discussed in Chapter Two.

3.2.1 Research Design

The systematic review included both quantitative and qualitative studies.

3.2.2 Research Method

The review looked at quantitative and qualitative studies in the adult critical care patient population. All quantitative and qualitative studies found during the literature search were included and reviewed in the study if they meet the inclusion criteria (*Refer Chapter Two).* Data was collected by repeatedly searching the selected databases with the key words. The main question answered by this review was:

> **What measures would ensure effective pain management among critically ill adult patients?**

The review was based on a systematic search of 11 databases of studies, between 2004 and 2015, using medical subject headings. Quantitative data was extracted using the JBI – MAStARI and qualitative with JBI-QARI (JBI, 2010) *(Appendix A)* and appraised by two reviewers. Quantitative studies were appraised using the JBI-MAStARI, qualitative with the JBI-QARI (JBI, 2010) and systematic reviews with an appraisal tool for systematic reviews from JBI and Godfrey and Harrison (2015:10) *(Appendix B)*. The narrative approach was chosen to synthesise the results.

3.2.3 Selection of Included Studies

The literature search from the 11 databases, from 2004 to 2015, yielded numerous articles, but only 1433 and two studies from hand search were relevant. Duplicates were removed and studies, titles and abstracts further examined. After full text, quality assessment and critical analysis of the studies, 30 met the inclusion criteria and were included in the review with 11 studies excluded with reasons *(Appendix C).* Figure 3.1 shows the PRISMA (2009) flow diagram of the search outcome as recommended by JBI.

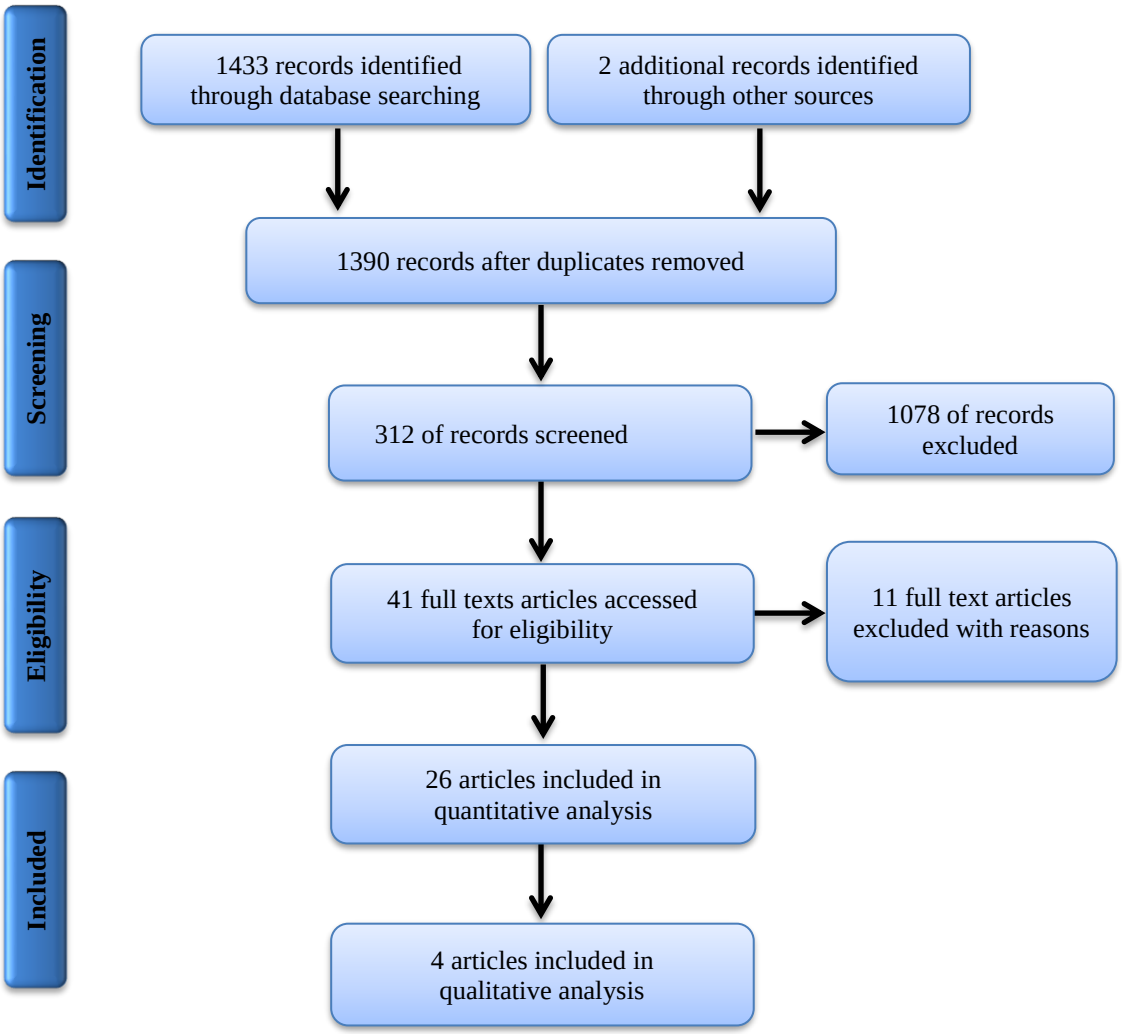

Figure 3.1 PRISMA (2009) Flow Diagram of Search Outcome

3.2.4 List of Included Studies in the Final Review

After quality assessment, 30 articles were found eligible for inclusion in the review and presented in Table 3.1. The studies listed without countries of origin are systematic reviews.

Table 3.1 List of studies included in the final review

Author(s)	Country	Title	Journal, Issue, volume and page (s)
Rose, Haslam, Dale, *et al.* (2013)	Canada	"Behavioural pain assessment tool for critically ill adults unable to self-report."	American Journal of Critical Care 22 (3): 246-255
Cade (2008)		"Clinical tools for the assessment of pain in sedated critically ill adults."	Nursing in Critical Care 13(6): 288-297
Friesner, Curry and Modderman (2006)	United States of America (USA)	"Comparison of two pain management strategies during chest tube removal: relaxation exercise with opioids and opioids alone".	Heart and Lung 35 (4): 269-276
Gelinas, Arbour, Michaud *et al.* (2011)	Canada	"Implementation of the critical-care pain observation tool on pain assessment/management nursing practices in an Intensive Care Unit with nonverbal critically ill adults: a before and after study."	International Journal of Nursing Studies, 48:1495-1504
Gelinas, Ross, Boitor *el al.* (2014)	Canada	"Nurses' evaluations of the CPOT use at 12-month post-implementation in the Intensive Care Unit."	Nursing in Critical Care, 19 (6):272-280
Aslan, Badir, Arli and Cakmakci (2010)	Turkey	"Patients' experiences of pain after cardiac surgery."	Contemporary Nurse, 34 (1): 48-54
de Jong, Molinari, de Lattre *et al.* (2013)	France	"Decreasing severe pain and serious adverse events while moving Intensive Care Unit patients: a prospective interventional study (the NURSE-DO project)."	Critical Care, 17: R74 :1-13
Chlan & Halm (2013)		"Does music ease pain and anxiety in the critically ill?"	American Journal of Critical Care 22 (6): 528-532
Porhomayon, Nader, El-Solh *et al.* (2013)	United States of America	"Pre- and post-intervention study to assess the impact of a sedation protocol in critically ill surgical patients."	Journal of Surgical Research, 184: 966-972

Author(s)	Country	Title	Journal, Issue, volume and page (s)
Ozer, Ozlu, Aslan & Gunes (2013)	Turkey	"Effect of music on post-operative pain and physiologic parameters of patients after open-heart surgery."	Pain Management Nursing, 14 (1): 20-28
Demir and Khorshid, (2010)	Turkey	"The effect of cold application in combination with standard analgesic administration on pain and anxiety during chest tube removal: a single-blinded, randomized, double-controlled study."	Pain Management Nursing, 11 (3):186-196
Mansouri, Javadpour, Zand *et al.* (2013)	Iran	"Implementation of a protocol for integrated management of pain, agitation, and delirium can improve clinical outcomes in the Intensive Care Unit: A randomised clinical trial."	Journal of Critical Care, 28: 918-922
van Gulik, Ahlers, Brkic *et al.* (2010)	The Netherlands	"Improved analgesia after the realisation of a pain management programme in ICU patients after cardiac surgery."	European Journal of Anaesthesiology, 27 (10): 900-905
Erdek & Pronovost (2004)	United States of America	"Improving assessment and treatment of pain in the critically ill."	International Journal for Quality in Health Care, 16 (1): 59-64
Woien, Vaeroy, Aamodt & Bjork (2012)	Norway	"Improving the systematic approach to pain and sedation management in the ICU by using assessment tools"	Journal of Clinical Nursing, 23: 1552 -1561
Georgiou, Hadjibalassi, Lambrinou *et al.* (2015)	Greece	"The impact of pain assessment on critically ill patients' outcomes: a systematic review"	BioMed Research International, 1-18
Diby, Romand, Frick *et al.* (2010)	Switzerland	"Reducing pain in patients undergoing cardiac surgery after implementation of a quality improvement postoperative pain treatment programme."	Journal of Critical Care, 23:359-371
Vazquez, Pardavilla, Lucia *et al* (2011)	Spain	"Pain assessment in turning procedures for patients with invasive mechanical ventilation."	Nursing in Critical Care, 16 (4): 178-185
Payen, Bosson, Chanques *et al.* (2009)	France and Luxembourg	"Pain Assessment Is Associated with Decreased Duration of Mechanical Ventilation in the Intensive Care Unit."	Anaesthesiology, 111(6):1308-1316
O'Brien, McKeough & Abbasi (2013)	Australia	"Pre-surgery education for elective cardiac surgery patients: A survey from the patient's perspective."	Australian Occupational Therapy Journal 60: 404-409

Author(s)	Country	Title	Journal, Issue, volume and page (s)
Kol, Alpar & Erdogan (2014)	Turkey	"Pre-operative education and use of analgesic before onset of pain routinely for post-thoracotomy pain control can reduce pain effect and total amount of analgesics administered post-operatively."	Pain Management Nursing, 15 (1): 331 -339
Guo, East & Arthur (2012)	China	"Pre-operative education and use of analgesic before onset of pain routinely for post-thoracotomy pain control can reduce pain effect and total amount of analgesics administered post-operatively"	International Journal of Nursing Studies, 49: 129-137
Payen, Genty, Mimoz *et al* (2013)	France and Luxembourg	"Prescribing non-opioids in mechanically ventilated critically ill patients."	Journal of Critical Care, 28: 534e7-534.e12
Lewis, Corley, Lake *et al* (2015)	United States of America	"Overcoming Barriers to Effective Pain Management: The Use of Professionally Directed Small Group Discussions."	Pain Management Nursing, 16 (2): 121-127
Topolevec- Vranic, Canzian, Inis *et al* (2010)	Canada	"Patient satisfaction and documentation of pain assessments and management after implementing the adult non-verbal pain scale."	American Journal of Critical Care, 19 (4): 345-354
Linde, Badger, Machan *et al* (2013)	United States of America	"Re-evaluation of the critical-care pain observation tool in intubated adults after cardiac surgery."	American Journal of Critical Care, 22 (6): 491-497
Subramanian, Allock, James & Lathlean (2011)	United Kingdom	"Challenges faced by nurses in managing pain in a critical care setting."	Journal of Clinical Nursing, 21:1254-1262
Martorella, Boitor, Michaud & Gelinas (2014)	Canada	"Feasibility and acceptability of hand massage therapy for pain management of post-operative cardiac surgery patients in the ICU"	Heart & Lung, 43: 437-444
Woien & Bjork (2013)	Norway	"Intensive Care pain treatment and sedation: Nurses' experiences of the conflict between clinical judgement and standardised care: An explorative study."	Intensive and Critical Care Nursing, 29:128-136

Author(s)	Country	Title	Journal, Issue, volume and page (s)
Gelinas, Arbour, Michaud *et al* (2012)	Canada	"Patients and ICU nurses' perspectives of non-pharmacological interventions for pain management."	Nursing in Critical Care 18 (6): 307-318

3.2.5 List of Excluded Studies

After full text and methodological quality assessment, 11 (n=11) studies were excluded with reasons. Out of the 11 studies excluded, four (n=4) did not answer the research question, six (n=6) did not meet the inclusion criteria, and one (n=1) did not meet methodological quality assessment cut off mark. Please refer to *Appendix C* for the list of excluded studies with reasons for their exclusion.

3.2.6 Methodological Quality Assessment of the Selected Studies

Studies were extracted and appraised by two independent reviewers using standardised JBI tools (*Appendix A & B*). Scores were allocated to the answers, yes=2, unclear=1 and no= 0 and no score was allocated to not applicable answers. Some of the tools have 10 items with a total score of 20 (100%), and others have nine items with a total score of 18 (100%). While there is no set level of the quality score (Cooper, 2010), the minimum quality score agreed by the reviewers for this assessment was set at 70% to ensure that only high-quality studies were included in the review. Detailed description of the methodological quality assessment is described in Chapter Two.

3.2.6.1 Quantitative studies

Quality assessment of quantitative studies was done using the JBI-MAStARI, with 10 questions to guide the appraisal of randomised and quasi-randomised controlled trials, nine questions to guide cohort with control/case-controlled studies, nine questions to guide descriptive/case-series, while 10 questions guided the appraisal of systematic reviews (*Appendix B*).

All the quantitative studies included in the review met the minimum methodological quality assessment score and scores ranged from 70% to 100%. Table 3.2 gives results of the

methodological quality assessment of quantitative studies appraised. Percentages were brought to the nearest decimal.

Table 3.2 Methodological items for quantitative studies assessed on checklist (questions 1 to 9 or 1 to 10)

Author and year	1	2	3	4	5	6	7	8	9	10	Total score (%)
Rose *et al*. (2013)	2	2	1	2	2	2	1	2	2	-	16 (89%)
Cade (2008)	2	2	1	2	1	1	1	2	2	2	16 (80%)
Friesner *et al*. (2006)	2	1	0	2	1	2	2	2	2	2	16 (80%)
Gelinas *et al*. (2011)	2	2	1	1	2	2	2	2	2	-	16 (89%)
Gelinas *et al*. (2014)	0	2	2	2	2	2	2	2	2	2	16 (89%)
Aslan *et al*. (2010)	0	2	2	2	1	0	2	2	2	2	15 (72%)
Jong *et al*. (2013)	2	2	1	2	2	2	2	2	2	2	17 (94 %)
Chlan & Halm (2013)	2	2	1	2	1	1	1	2	2	2	16 (80%)
Porhomayon *et al*. (2013)	2	2	2	1	2	2	2	2	2	-	17 (94%)
Ozer *et al*. (2013)	0	1	0	2	1	2	2	2	2	2	14 (70%)
Demir & Khorshid, (2010)	2	2	0	1	0	2	2	2	2	2	15 (75%)
Monsouri *et al*. (2013)	2	1	1	2	0	2	2	2	2	2	17 (85%)
Van Gulik et *al*. (2010)	2	2	2	2	2	1	1	2	2	-	16 (88%)
Erdek & Pronovost (2004)	2	2	2	2	2	2	1	2	2	-	17 (94%)
Woien *et al*. (2012)	2	2	1	2	2	2	2	2	2	-	17 (94%)
Georgiou *et al*. (2015)	2	2	2	2	2	2	2	2	2	2	20 (100%)
Diby *et al*. (2008)	0	2	1	1	1	2	2	2	2	2	15 (75%)
Vazquez *et al*. (2011)	0	2	2	2	2	2	1	2	2	-	14 (78%)
Payen *et al*. (2009)	2	2	2	2	2	2	2	2	2	-	18 (100%)
O'Brien et *al* (2013)	1	2	1	2	1	2	2	2	2	-	14 (78%)
Kol *et al*. (2014)	1	2	0	1	0	2	2	2	2	2	14 (70%)
Guo *et al*. (2012)	2	0	2	2	2	2	2	2	2	2	16 (88%)
Payen *et al*. (2013)	2	2	2	2	2	2	2	2	2	-	18 (100%)
Lewis *et al*. (2015)	2	2	1	1	2	0	2	2	2	-	14 (78%)
Topolevec-Vranic *et al*. (2010)	2	2	2	2	2	2	1	2	2	-	17 (94%)
Linde *et al*. (2013)	2	2	1	2	2	2	1	2	2		16 (89%)

3.2.6.2 Qualitative studies

There are 10 questions in the JBI- QARI checklist for appraising qualitative studies with a total score of 20 (100%) (*Appendix B*). Table 3.3 presents the findings of the quality

assessment of the qualitative studies included in the review. Percentages were reported to the nearest decimal. All the qualitative studies included met the minimum quality assessment score and had between 85 and 95%.

Table 3.3 Methodological items for qualitative studies assessed checklist (questions1-10)

Author and year	1	2	3	4	5	6	7	8	9	10	Total score (%)
Subramanian *et al.* (2011)	2	2	2	2	2	2	1	2	2	2	19 (95%)
Martorella *et al.* (2014)	1	2	2	2	0	0	2	2	2	2	17 (85%)
Woien & Bjork (2013)	2	2	2	2	2	2	1	2	2	2	19 (95%)
Gelinas *et al.* (2012)	2	2	2	2	2	2	1	2	2	2	19 (95%)

3.2.7 Results of Included Studies

The summaries of the studies (n=30) included in the systematic review are presented in Table 3.4, according to the JBI (2014) data extraction requirements. The results of quantitative studies (n=26) are presented first, followed by the qualitative studies (n=4). Unexplained abbreviations in the table are explained at the bottom of the last table.

Table 3.4 Summary of the results of studies (n=30) included in the systematic review

Author and year	**Design, Sampling, Sample size, Setting**	**Interventions, Instruments (if used)**	**Findings, Conclusions (C)**
Rose *et al.* (2013)	Before and after design Purposive Sampling Before (n=189) adult ICU patients (n=184) after 2 adult ICUs (Cardiovascular and Medical/ Surgical, Trauma), Canada	Educational Intervention Instrument - CPOT	"Pain assessment documentation and opioid administration in the ICUs increased" **C** – "Implementation of the CPOT increased frequency of pain assessment and administration of analgesics in both ICUs".
Cade (2008)	Systematic Review Literature Search, Five studies included in the review	A Systematic Review	"BPS was found to be a reliable and valid tool in three studies" **C-** "Implementation of the BPS and CPOT may improve the management of pain among sedated ICU patients"

Author and year	Design, Sampling, Sample size, Setting	Interventions, Instruments (if used)	Findings, Conclusions (C)
Friesner *et al*. (2006)	Two group quasi-experimental pre-test/post-test design Control (n=21) Experimental (n=19) adult ICU post CABG patients Convenience sampling CT-ICUs in the USA	Non-pharmacological intervention (slow breathing relaxation exercises) during chest tube removal (CTR) Instrument - VAS	"Significant decrease in pain ratings immediately and 15 minutes after CTR". **C**- "The study supports the use of slow deep-breathing relaxation exercise as an adjunct in pain management during CTR in CABG patients."
Gelinas *et al*. (2011)	A before and after study design ICU nurses (n = 60) Pre-adult (n=30) ICU patients After 3 months (n=30) After 12 months (n=30) Purposive Sampling ICU, Canada	Educational Intervention and implementation of CPOT Instrument – CPOT	"Reports of pain assessments were more frequently documented compared to pre-implementation" **C – "**The CPOT had a positive effect on pain assessment and management nursing practices in the ICU."
Gelinas *et a*l. (2014)	Descriptive Design ICU Nurses (n=38) Purpose Sampling Medical/ Surgical ICU, Canada	Post training evaluation	"Nurses (90-100%) rated the CPOT as quick, simple and easy and influenced practice (70%)" **C**- "CPOT is feasible and relevant in practice, improved assessment and management of pain and communication of pain results among nurses"
Aslan *et al*. (2010)	Descriptive Design Post cardiac surgery adult ICU patient (n=300) Cardiac Surgery ICU, Turkey	Description of quality of pain and activities that affect the patients pain while in ICU	"Patients described their pain as throbbing, aching and chest tubes, ET tube dressing change caused them pain but some activities also reduced pain." **C – "**Patients experience pain in the ICU but analgesic medication, removal of chest tubes staying immobile, nurses showing interest in them decreased their pain."
Jong *et al.* (2013)	Prospective Interventional study Adult Critically ill patients Phase 1(n=53) Phase 2 (n= 47) Phase 3 (n= 43) Phase 4 (n=50) Consecutive Sampling 16 bed Med/Surg ICU, France	Quality improvement project Instruments - NRS, BPS-NI	"Incidence of severe pain and adverse events decreased significantly." **C**- **"**ICU patients have severe pain when they are moved for procedures. Quality improvement intervention is associated with a decrease of serious adverse events."

Author and year	Design, Sampling, Sample size, Setting	Interventions, Instruments (if used)	Findings, Conclusions (C)
Chlan and Halm (2013)	Systematic Clinical Review Focused literature search 13 studies from two databases	Systematic Review Numerical and Universal Pain Scales	"Effects of music on mechanical ventilation/weaning trials, turning, femoral sheath removal, and the post-operative cardiac surgery recovery process." **C– "**Listening to music was effective in reducing pain scores in some cardiac surgery patients"
Porhomayon *et al*. (2013)	Two-phase prospective observational control study Convenience Sampling Pre- analgesia sedation protocol (ASP) (n=100) Post-ASP (n=100) Critically ill adult patients 12 bed SICU, USA	Implementation of an analgesic sedation protocol	"Significant reduction in the use of fentanyl and midazolam. Sedation goals higher in post-ASP group. Mean mechanical ventilation days reduced in post-ASP group." **C– "**Use of protocols resulted in reduced use of sedatives, analgesics and reduced mechanical ventilation days"
Ozer *et al*. (2013)	Quasi –experimental design (two group, pre-test-post-test) Convenience Sampling Music group (n=44) Control group (n=43) Post CABG adult ICU patients CTICU, Turkey	Non-pharmacological intervention (Music) Instrument - unidimensional verbal pain intensity scale	"Significant increase in oxygen saturation and a lower pain score in the music group as compared to the control group." **C- "**Music might be effective method of reducing pain in patients after open heart surgery"
Demir and Khorshid, (2010)	Randomised controlled study Convenience Sampling Cold – (n=30) Placebo- (n=30) Control (n=30) adult post cardiac surgery patients CTICU, Turkey	Non-Pharmacological intervention (Application of cold parks during chest tube removal) Instrument - VAS	"The pain scores obtained 15 minutes after CTR in the cold application group produced the most improvement in pain scores. **C- "**Application of cold pack**s** reduced the intensity of pain due to CTR post cardiac surgery."
Monsouri *et al* (2013)	Randomised control trial (RCT) Random Sampling Experimental Protocol group (n=96) Control group (n=105) Two mixed Medical- Surgical ICUs, Iran	Implementation of pain agitation and delirium (PAD) protocol Instruments – NRS, BPS, RASS, CAM-ICU	"Duration of mechanical ventilation, length of ICU stay and mortality rate in the protocol group was significantly reduced." **C -** "Improved outcomes for ICU patients through protocol-directed management of PAD."

Author and year	Design, Sampling, Sample size, Setting	Interventions, Instruments (if used)	Findings, Conclusions (C)
Van Gulik *et al.* (2010)	Two-phase prospective controlled study Convenience Sampling Intervention (n=130) Control group (n=60) Adult Cardiac surgery ICU patients ICU, Netherlands	Educational Intervention Instrument - NRS	"Pain was significantly lower in the intervention group and they also received more morphine." **C – "**The intervention successfully reduced the occurrence of unacceptable pain in the ICU."
Erdek and Pronovost (2004)	Prospective pre- and post-intervention study Random Sampling 10-15 adult ICU patients per week for 5 weeks Two surgical ICUs, USA	Implementation of a pain assessment and treatment programme Instruments – VAS, BPS	"Pain assessment and treatment improved after five weeks of implementing the programme." **C- "**The intervention significantly improved pain assessment and treatment without an increase in adverse events related to pain."
Woien *et al*. (2012)	Two site prospective implementation study Purposive Sampling Adult ICU patient (n=139) ICU nurses before (n=55) ICU nurses after (n=55) Two medical/ surgical ICUs, Norway	Implementation of three (3) assessment tools in two ICUs. Instruments - NRS, RASS, ATICE	"Patients assessed by the tools had a documented pain score 2-5 times daily and a sedation score three times daily." **C –** "Improvement in assessment and documentation routines by nurses after the implementation of the tools"
Georgiou *et al*. (2015)	Systematic Review Focused literature search 10 studies in the review from five databases	Systematic review on pain assessment tools	10 studies from 5 databases were reviewed **C –** "Systematic approaches to pain assessment is associated with improved pain outcomes."
Diby *et al*. (2008)	Prospective, quasi-experimental study Purposive Sampling Baseline (n =79), Reassessment (n=54) Adult post cardiac surgery ICU patients 18 bed Surgical ICU, Switzerland	Implementation of an algorithm for acute pain management Instrument - VAS	"Pain intensity at rest and the number of patients with sleep disturbances decreased." **C –** "Implementation of the algorithm improved pain outcomes."
Vazquez *et al.* (2011)	Prospective descriptive study Convenience sampling Adult ICU patients (n=96)	Data gathering carried out before, during and after the turning.	ICU patients experience pain during turning **C –** "Observation of the patient's behaviour during turning helped professionals

Author and year	Design, Sampling, Sample size, Setting	Interventions, Instruments (if used)	Findings, Conclusions (C)
	12 bed general ICU, Spain	Instrument – CPOT	to objectify non-verbal patients pain."
Payen, et *al*. (2009)	Prospective cohort study Purposive Sampling ICU patients (n=1144) Pain assessed (n=513) Not assessed (n=631) 43 ICUs in France One ICU in Luxembourg	Comparison of outcomes of patients who were assessed for pain and those who were not. Instrument – VAS, NRS, BPS, Harris Scale	"Patients whose pain was assessed had a shorter duration of mechanical ventilation and a reduced duration of stay in the ICU." **C – "**Pain assessment associated with a reduction in the duration of ventilator support and duration of ICU stay."
O'Brien *et al.* (2013)	Cross-sectional study Purposive Sampling Adult post CTICU patients (n=118) CTICU, Australia	Survey of post cardiac surgery patients.	"Reading the pre-surgery information booklet correlated with feeling prepared for the post-operative experience and adherence to precautions." **C-** "Education appears to be providing patients with a good understanding of what to expect after surgery"
Kol *et al*. (2014)	Prospective, randomised, single-blind clinical trial Random Sampling Adult ICU patients (n=70) Study group (n=35) Control group (n=35) Eight bedded thoracic surgery ICU, Turkey	Pre-operative patients' education on pain Instruments – VCS, BPAS	"Pain scores lower in study group as compared to the control group and lower analgesic consumption in study group." **C-** "Pre-operative education and pre-emptive analgesia reduced the amount of analgesics used."
Guo *et al.* (2012)	Randomised Control trial Random Sampling Adult ICU patient (n=153) Pre- operative education (n=76) Control group (n=77) Two Cardiac surgical ICU, China	Pre-operative education of patients Instruments – BPI-sf, Hospital Anxiety and Depression Scale (HADS)	"Decrease in anxiety, depression and less interference from pain in sleeping and reduced number of hours spent in the ICU reported in study group **C-** "Pre-operative education reduces anxiety and depression."
Payen *et al.* 2013	Post Hoc Analysis of a Cohort study ICU adult patient (n=474) Multimodal analgesia (n=172) One opioid (n=302) 43 ICUs France and one ICU in Luxembourg	Post hoc analysis of a cohort study Instruments – VAS, VDS, BPS and Harris Scale	"Patients given multimodal analgesia may have fewer organ failures, received fewer hypnotics and self-reported their pain more frequently" **C- "**The concept of multimodal analgesia must be promoted in the ICU"

Author and year	Design, Sampling, Sample size, Setting	Interventions, Instruments (if used)	Findings, Conclusions (C)
Lewis *et al*. (2015)	Quasi –experimental Convenience sampling ICU nurses (n=32) 12 bed CT-ICU, USA	Small group discussion of nurses on effective pain management strategies.	"Nurses knowledge scores differed significantly in a positive direction" **C-** "Knowledge levels related to pain management increased and biases toward specific patient populations decreased after implementation of discussions."
Topolevec-Vranic *et al*. (2010)	Retrospective before and after study Adult ICU patients (n=40) Before (n=20) After (n=20) 17 bed neuro-surgical and trauma ICU, Canada	Implementation of a pain assessment tool Instrument – Non-Verbal Pain Scale (NVPS)	"Increase confidence in assessing and documenting pain assessment. Patients reported decreased retrospective pain ratings and time required to receive analgesia." **C-** Implementation of the NVPS improved pain outcomes
Linde *et al*. (2013)	Prospective Repeated Measure within subject design Convenience Sampling Adult CT-ICU patients (n=30) CT-ICU, USA	Observational data collection during procedures Instrument - CPOT	"Pain scores did not increase during dressing change but increased during turning." **C -** "Pain assessment was accomplished quickly within a few seconds using the CPOT and its reliable."
Subramanian et al. (2011)	Qualitative prospective exploratory design Purposive Sampling ICU nurses (n=21) ICU, United Kingdom	Semi structured interviews with nurses.	"Challenges in managing pain include lack of clinical guidelines, lack of structured pain assessment tools limited autonomy in decision-making and the patient's condition itself." **C-** **"**Nurses' decision-making and pain management can influence the quality of care given to critically ill patients"
Martorella *et al*. (2014)	Qualitative descriptive design Purposive Sampling Adult CTICU patients (n=40) Experimental group (n=21) Control group (n=19) CT-ICU, Canada	Non-pharmacological intervention (Hand Massage)	"Participants who received the massage perceived it as appropriate" **C – "**Hand massage is appropriate for addressing pain relief"
Woien and Bjork (2013)	Exploratory qualitative design Purposive Sampling	Implementation of four assessment tools.	Four themes emerged from the interviews.

Author and year	Design, Sampling, Sample size, Setting	Interventions, Instruments (if used)	Findings, Conclusions (C)
	ICU nurses (n=14) Two Medical /Surgical ICUs in Norway	Instruments – NRS, RASS, ATICE and CAM-ICU	**C**- *"*Use of tools was perceived to improve the quality of pain and sedation control and supported nurses in their decision-making."
Gelinas *et al*. (2012)	Qualitative descriptive design Convenience sampling Adult ICU patients and family (n=6) ICU nurses (n=32) Adult ICU, Canada	Patient, family and nurse participant's perspectives on non-pharmacological interventions	**"Music therapy distraction, simple massage and family presence facilitation** were found to be useful, relevant and feasible." . **C- "**Four non-pharmacological interventions reached consensus in patients and nurses' to be useful, relevant and feasible for pain management in the ICU."

Key: CPOT = Critical-Care Pain Observation tool; NRS = Numerical Rating Scale, BPS-NI = Behavioural Pain Scale- Non-intubated; SAE = Serious Adverse Event; SICU = Surgical Intensive Care Unit; PAD = Pain Agitation Delirium; VAS = Visual Analogue Scale; VDS = Visual Descriptor Scale; RASS = Richmond Agitation and Sedation Scale; CAM-ICU = Confusion Assessment Method in ICU; ATICE = Adaptation of Intensive Care Environment, CT-ICU = Cardiothoracic ICU; VCS = Verbal Category Scale; BPAS = Behavioural Pain Assessment Scale; BPS-sf = Brief Pain Inventory-short form; CABG = Coronary Artery Bypass graft

3.2.8 Presentation of the Results of Quantitative Studies

The quantitative studies included in the study involved 4605 critically ill patients and ICU nurses from 102 ICUs in 10 countries. Of the quantitative studies included in the study (n=26), three (n=3) were systematic reviews, four (n=4) randomised control trials, four (n=4) quasi-experimental studies, three (n=3) before and after designs, three (n=3) prospective interventional studies, three (n=3) prospective cohort studies, two (n=2) prospective controlled studies, one (n=1) prospective repeated measure within subject designs, one (n=1) cross-sectional study and three (n=3) descriptive designs. Level of evidence of the included quantitative studies, according to JBI level of evidence (http://joannabriggs.org/jbi-approach.htm//tabbed-nav=levels-of-Evidence), ranged from level 1b to 4b, as stated in

Chapter Two Table 2.0. The studies have different aims, designs, methods, findings and conclusions. Details of the studies follow.

Rose *et al.* (2013), in their study determined the effect of the CPOT tool on how often non-verbal critically ill patients pain assessment, administration of analgesics and sedatives are documented. A before-and-after design was used to examine the effect of CPOT implementation in two ICUs at Sunnybrook Health Sciences Centre, a 600-bed university-affiliated hospital in Toronto, Ontario in Canada. Included were 130 patients before and 132 after from the CT-ICU and 59 patients before and 52 after the implementation from the medical/surgical/trauma unit. Before the CPOT was implemented, all nurses attended educational sessions, which included video demonstration of pain behaviours and instruction on application of CPOT. **Existing unit protocols and ICU flow sheets were modified to incorporate the CPOT. Point-of care CPOT scoring guides were available at every bedside, posters were displayed in prominent locations, and educational materials were posted on the ICUs'** web portal and published in newsletters. The senior nursing team provided focused one-on-one bedside education during implementation and monitored compliance via audits.

Findings from the study indicated that pain assessment intervals with pain assessment documented increased from 15% to 64% ($P < .001$) in the cardiovascular unit and from 22% to 80% ($P < .001$) in the medical/surgical/trauma unit. Median total dose of opioid analgesics decreased from 5mg to 4 mg in the cardiovascular ICU ($P = .02$) and increased from 27 mg to 75 mg ($P = .002$) in the other ICUs in the study. Median total dose of benzodiazepines decreased from 12 mg to 2 mg ($P <.001$). The researchers concluded that implementation of the, increased frequency of pain assessment and appeared to influence administration of analgesics in both ICUs.

Cade (2008) aimed to review the evidence regarding pain assessment tools for sedated patients and to establish whether the use of a tool could be recommended in practice. Five papers that tested pain assessment tools for sedated patients were reviewed. The papers were identified through the CINAHL and MEDLINE databases.

The review concluded that BPS had been tested amongst the broadest range of patients and was found to be a reliable and valid tool in three studies. The researchers further stated that

implementation of the BPS and CPOT could be recommended in the ICU and may improve the management of pain among sedated patients by providing a systematic and consistent approach to pain assessment.

The purpose of the study by Friesner *et al.* (2006) was to ascertain if slow deep-breathing relaxation exercise when used with opioid analgesia, decreased pain during the removal of chest tube (CTR) after coronary artery bypass surgery. They used a two-group quasi-experimental pre-and post-test design and convenience sampling method to recruit 40 adults who had undergone coronary artery bypass graft surgery before their chest tubes were removed. CTR. They collected data were from the CT-ICUs of three acute care hospitals in the Midwestern United States of America. They used the 10cm vertical Visual Analog Scale to measure pain at three different points which included: before CTR, immediately after CTR, and again after 15 minutes of CTR. Slow breathing relaxation exercise was added to the usual opioid doses for the experimental group.

The results of the study indicated that there was a significant difference in pain levels immediately after CTR and 15 minutes after CTR in the group that was given the relaxation exercise in addition to opioid analgesic, **thus supporting slow deep-breathing relaxation exercises**, in addition to the use of opioid analgesics for pain management during the removal of chest tubes, among patients who have undergone coronary artery bypass surgery.

The purpose of the study by Gelinas *et al.* (2011) was to complete a pre-and post-evaluation of the effect of implementing the CPOT scale on pain assessment and management nursing practices in the ICU with non-verbal critically ill adults, with a pre-and-post study design in a university hospital in Montérégie in Canada. ICU nurses were educated on the CPOT, medical files of adult patients from 18 years and mechanically ventilated were included in the study. During the pre-implementation phase, 30 medical files were reviewed to describe the current nursing practice in pain assessment and management. During the implementation phase, 60 ICU nurses attended educational sessions on the use of the CPOT. Thirty medical files were reviewed at 3 months, and 30 more at 12 months' after the implementation.
Results from the study showed that nurses' percentage of agreement, when scoring patients with the CPOT, was high after the implementation of the tool (>87%). They also documented pain assessments more frequently in the medical files in the after the implementation (10.5 to 12 assessments in a 24-hour period) as compared to the pre-

implementation phase (3 assessments in a 24-hour period). However, fewer analgesics and sedatives were administered during the post-implementation phase.

In another study, Gelinas *et al.* (2014) the researchers described nurses' evaluation of the feasibility, clinical relevance and satisfaction with CPOT use 12 months after it was implemented in the ICU. A descriptive study design method was used and the study was conducted in the medical-surgical ICU of a university hospital at Greenfield Park in Québec, Canada. A self-administered questionnaire for evaluating the CPOT was completed by ICU nurses who were trained to use the CPOT without revealing their identities.

Thirty-eight ICU nurses submitted their completed questionnaire (63% participation rate). In terms of feasibility, majority of nurses rated the **CPOT to be quick, simple to understand and use and easy to complete (92%–100%).** When rating the clinical importance, almost 70% of ICU nurses said the CPOT had influenced their practice and promoted communication among them. More than 80% of ICU nurses were content with the daily use of the CPOT and concluded that it was feasible and relevant in daily practice.

The purpose of the descriptive study by Aslan *et al.* (2010) was to describe the quality of post-cardiac surgery patients pain and the situations and activities that affect their pain in the ICU. The study was conducted with 300 adult patients post cardiothoracic surgeries, who had stayed in the ICU for a minimum of 48 hours, in a 60-bed Ministry of Health hospital ICU in Istanbul, Turkey. Face–to–face individual interviews were conducted **within 48 hours** of the ICU patients transfer to the ward.

Patients in this study described their pain as throbbing (n=154), arching (n=177) and indicated that the presence of chest tube (n=95), ET tube (n=95), dressing change (n=27) caused them pain. Of the patients in the study, 65% reported that **analgesic medication, 3.3% the removal of chest tubes, 18.8% staying immobile and 2.2% nurses showing interest in them decreased their pain.** It was concluded that cardiac surgery patients have pain, verbalised it in different ways and identified different situations that decrease or increase their pain.

Jong *et al*. (2013**)** in a prospective interventional (quality improvement project) study, used a Plan-Do-Check-Adjust cycle during four one-month phases, separated by five-month

interphases to improve how pain is managed. A multidisciplinary team was created and nurses' knowledge assessed and educated on pain assessment and management. Pharmacological and non-pharmacological (**explanation of nursing procedure**, **therapeutic massage**, **music and music therapy**) were used. All consecutive critically ill patients, staying in the ICU for more than 24 hours, were assessed every morning while being moved for nursing care (bathing, massage, sheet-change, repositioning). The tools used for pain assessment were the BPS and VRS.

Findings from the study showed that 630 procedures were analysed in 53, 47, 43 and 50 patients, respectively. Incidence of severe pain reduced significantly from 16% (baseline) to 6% in Phase 3. Incidence of severe adverse effects also reduced significantly from 37% (baseline) to 17% in Phase 3 and 21% in Phase 4. The researchers therefore concluded that severe pain and serious adverse events are common and strongly associated with moving critically ill patients for nursing care procedures. They also found that quality improvement of pain management is associated with a reduction of serious adverse events. **Careful documentation of pain management employed during mobilisation of ICU patients for nursing care procedures could be implemented as a health quality indicator in ICUs**.

Chlan and Halm (2013), in a systematic review, answered the question: "How effective are music interventions at reducing pain and/or anxiety in critically ill patients?" The researchers searched MEDLINE and CINAHL databases for publications. They limited the search to only original research articles published in English in the seven years before the year of the publication.

The 13 publications reviewed included one case-control experimental study, one was quasi-experimental, nine randomised clinical trials, and one meta-analysis/systematic review. The articles they retrieved tested music during mechanical ventilation/weaning trials, turning, femoral sheath removal, and the postoperative cardiac surgery recovery process. The researchers concluded that music is a safe non-pharmacological intervention with no adverse effects. Listening to music was thus effective in decreasing pain scores in some cardiac surgery patients who had moderate pain. Music had immediate benefits and can be used safely as an adjunct to the usual medical plan of care. **Music is therefore another intervention nurses can use to make a difference in the patient's pain experience**.

The objectives of Porhomayon *et al*. (2013) was to "develop an analgesia/sedation protocol (ASP) in an attempt to standardise care and to decrease the duration of mechanical ventilation and length of stay in the hospital". The researchers performed a two-phase prospective observational control study and assessed a prescriber driven analgesia/sedation protocol in a 12-bed surgical ICU. The pre-ASP group was sedated as usual (n =100) and the post-ASP group was managed with the new ASP (n =100). Each phase of the study lasted for five months. They then compared two groups of ICU patients.

There was a significant decrease in the use of fentanyl ($P < 0.001$) and midazolam ($P = 0.001$). Sedation goals of 86.8% were reached in the post-ASP group compared to 74.4% in the pre-ASP ($P < 0.001$). The mean mechanical ventilations days in pre- and post-ASP groups were 5.9 as compared to 3.8 ($P= 0.033$). They found that in a cohort of critically ill surgery patients' implementation of an ASP resulted in a reduction in the use of continuous benzodiazepines and opioids infusion, a decrease in benzodiazepine and analgesic dosages and reduced mechanical ventilation days. **Thus, the use of the protocols resulted in decreased use of sedatives, analgesics, reduced mechanical ventilation days in the ICU.**

Ozer *et al.* (2013) aimed to investigate "the effect of listening to a personal choice of music on self-report of pain intensity and the physiologic parameters in patients who have undergone open-heart surgery." The study design was a pre-test post-test quasi-experimental employing the convenience sampling method in the cardiovascular surgery ICU of a university hospital. The study was conducted with 87 patients who had open-heart surgery with 44 in the music group, 43 in the control group and aged between 18 and 78 years. Patients on post-operative day one's data were collected and a unidimensional verbal pain intensity scale was applied to all. The control group thereafter had rest in their beds while the music group listened to their choice of music for 30 minutes. Findings from the study indicated a significant increase in oxygen saturation ($p = .001$) and a lower pain score ($p = .001$) than in the control group. The study provides evidence to support the use of music as an adjunct in the ICU. **Music could be a simple, safe, and effective method of decreasing potentially harmful responses to pain in ICU patients after open-heart surgery**.

Demir and Khorshid (2010) aimed to describe the effect of cold application on pain and anxiety during chest tube removal in patients who had heart surgery. A single-blinded randomised control design was employed for the study and patients included were 18 to 74

years (n=90) and had chest tubes for at least 24 hours. Convenience sampling was employed and patients randomised into the application of cold, placebo, or control therapy groups and each group had 30 patients. Before chest tube removal was scheduled, 10 mg/kg of paracetamol was given by the intravenous route to all study participants. Cold compresses covered with a gauze dressing was used for the cold group, and warm packs applied in the placebo group, they were applied to the area surrounding the chest tubes for 20 minutes. Pain intensity, pain quality and situational anxiety for chest tube removal were assesses with VAS and McGill Melzack Pain Questionnaire tools.

The ICU patients in the cold group had significantly lower pain scores than the placebo group. The perception of pain intensity measured using the VAS tools of patients in the cold group showed the least variation. The researchers concluded that the **application of cold packs increased the length of time until analgesics were needed after the removal of chest tubes**. The findings indicated that cold application reduced patients' level of pain due to CTR but did not affect anxiety levels or the type of pain. **Cold application is therefore recommended as a pain-relieving technique during the removal of chest tubes.**

Monsouri *et al*. (2013), in their randomised control trial, put together and used a protocol for the systematic assessment and management of PAD to improve clinical ICU outcomes in Intensive Care settings. Two hundred and one patients who were admitted to two mixed medical-surgical ICUs in a university hospital in Iran, were randomly allocated into two groups; protocol and control groups. A multidisciplinary team assessed and approved the protocol. Pain was assessed by NRS and BPS, agitation by RASS, and delirium by CAM-ICU tools. The protocol group were managed pharmacologically according using the protocol and those in the control group managed according to the ICU routine.

The study found that median score for the duration of mechanical ventilation in the protocol and control groups was 19 (9.3-67.8) and 40 (0-217) hours respectively ($p = .038$). The median length of ICU stay of patients in the study was 97 (54.5-189) hours in the protocol group versus 170 (80-408) hours in the control group ($p < .001$). The mortality rate in the protocol group was significantly decreased from 23.8% to 12.5% ($p = .046$). **The study showed evidence for a significant reduction in the duration of the need for ventilator support, length of ICU stay, and mortality rates in ICU patients through protocol-directed management of PAD**.

A prospective two-phase study by Van Gulik *et al.* (2010) aimed to describe the effect of a pain management programme in the ICU. Pain levels scored by ICU patients after cardiac surgery, intervention group (n=130) and control (n=30), were compared before and after the implementation of a pain management programme. The programme consisted of a three-fold strategy: **all staff were educated in assessing pain** and in providing adequate analgesia, a patient **data management system obliged all nurses to ask patients for their pain level three times a day** and the preferred analgesic treatment was optimised. The **numeric rating scale (NRS 0–10) was employed and a NRS of at least 4 considered unacceptable**.

The findings of the study indicated that the occurrence of unacceptable pain (NRS ≥4) significantly decreased in the intervention group (P>0.01). Patients in the intervention group were also given significantly more morphine (P<0.01), with higher morphine amounts given to patients with higher NRS scores (P=0.01). However, in the control group, no such relationship was observed (p =0.66). It can therefore be concluded that the intervention programme successfully decreased the occurrence of unacceptable pain. **For more improvement of pain management in the ICU, focus should be placed on the prevention of pain** according to the researchers**.**

Erdek and Pronovost (2004) aimed to improve pain assessment and treatment in patients in a surgical Intensive Care Unit of an academic hospital. A prospective pre- and post-intervention study of pain assessment and treatment in two surgical ICUs in John Hopkins Hospital in Baltimore, USA, was carried out. The study **assessed pain as the percentage of 4 hourly intervals** where the patient's pain was measured using a VAS tool. Pain treatment as the percentage of 4 hourly intervals where the patient's pain score on the scale was ≤3 was measured and a four separate 'plan–do–study–act' cycle to improve pain assessment and treatment undertaken. The intervention included providing **in-service education of nurses and physicians, providing VAS and protocol by each bedside to improve documentation, and doctors' forms reformed to include sections for patients' pain scores.**

Findings from the study indicated that baseline assessment and treatment of pain, which was 42% and 59% respectively, improved after 5 weeks, to 71% and 97%. They concluded that the pain management interventions were associated with significant improvements in the assessment and treatment of ICU patients pain without an increase in adverse events

associated with pain therapy. The researchers stated that their pain interventions were quite simple and could be implemented in many other ICUs.

Woien *et al.* (2012) also assessed "the effects of introducing a systematic approach to pain and sedation management in the ICU" in a prospective implementation two-site study. Three assessment tools (NRS, RASS and ATICE) were implemented in two Norwegian ICUs measure patients pain and sedation levels. Frequency of pain and sedation level documentation, the number of days when a sedation level was prescribed by doctors and the amount of analgesics and sedatives used were documented for 958 ICU days in 139 mechanically ventilated ICU patients. ICU nurses (n=55) were asked to complete a questionnaire on the effects of the assessment tools before and after the implementation of the tools.

Patients assessed by the tools had daily documented pain score of 2.5 times and a sedation score three times a day. Continuous analgesia and sedation were prescribed by doctors with wide therapeutic ranges. Significant improvements were observed in the ICU's assessment and documentation routines scored by the nurses' post implementation of the tools. The researchers stated that although the tools were well accepted, they were not used as often as recommended. **The tools assisted nurses to focus on important signs and symptoms of pain, and the implementation of tools contributed to a systematic approach of the assessment and treatment of pain and sedation in the ICU**.

Georgiou *et al.* (2015**)** used a systematic review method to synthesise current evidence on the effect of a systematic approach to pain assessment on critically ill patients' outcomes in the ICU. A systematic review of published literature (CINAHL, PUBMED, SCOPUS, EMBASE, and COCHRANE databases) was undertaken where 10 eligible studies were identified.

The review concluded that **implementing systematic approaches to pain assessment seems to be associated with more frequent documented reports of pain and more efficient decisions for pain management in ICUs**. The findings indicated a favourable effect of the implementation on pain intensity, duration of mechanical ventilation, length of ICU stay, mortality, adverse events and ICU complications. This review shows a link between systematic pain assessment and positive outcomes in critical ICU patients. Implementation of systematic approaches to pain assessment seems to be associated with

more frequently documented reports of pain and its management and more efficient decisions.

Diby *et al.* (2008), in their study, aimed to test how effective a quality improvement post-operative pain management programme (pain intensity evaluation, administration of analgesics, re-evaluation until patient has only mild pain) after cardiac surgery would be. They used a prospective, quasi-experimental study design, using non-equivalent groups and 133 adult patients post elective cardiac surgery. The study had three periods, baseline (group baseline – n=79), implementation of the algorithm for acute pain management and reassessment (group reassessment – n=54), in an 18-bed SICU at a Swiss university affiliated hospital. The algorithm was implemented by **education or training, providing pocket guidelines, regular audits, and feedback**. The implementation period took a period of about two months and the algorithm was implemented by the nurses at **least four hourly and after every administration of morphine.** VAS tool for pain assessment, morphine consumption, pain perception and sleep quality were measured during the patients stay in SICU and after one and six months.

Pain intensity at rest decreased (VAS; p = .008). Retrospective perception of pain intensity at rest also decreased (p = .004) and the proportion of ICU patients with no pain or frequently without pain increased from 11% to 37% (p = .005). The number of ICU patients with sleep disturbances reduced from 68% to 35% (p = .012). No differences were observed at one and six months post-operatively. The researchers therefore concluded that **after the algorithm implementation in the SICU, ICU patients pain intensity at rest decreased and their quality of sleep improved.**

The prospective descriptive study by Vazquez *et al.* (2011) was to compared the behavioural responses to pain, assessed on the CPOT scale, and the physiological responses before, during and after the positioning in ICU patients with invasive mechanical ventilation. The study also sought to describe whether there were differences in the CPOT scores between medical and surgical ICU patients and between conscious and unconscious patients in a 12-bed university hospital in Spain. Pain scores were evaluated in 96 ICU patients. The data was collected one minute before, during and 10 minutes after turning by means of the CPOT tool, which includes four behavioural indicators and each indicator scored from 0 to 2.

The total mean score on the CPOT tool before the positioning procedure was 0·27; during turning it was 1·93 and 0·10 after the procedure ($p < 0·05$). Facial expression was one indicator that increased most as compared to the baseline situation, followed by body movements, compliance with the ventilator and lastly, muscle tension. The study concluded that the observing the ICU patient's behaviour during the turning and the physiological changes produced affords health professionals to objectively assess pain in critically ill patients with verbal communication challenges. **The results also highlight the need to administer additional analgesia prior to painful procedures, particularly in post-surgical critically ill patients.**

Payen *et al.* (2009) in a prospective multicentre cohort study of mechanically ventilated patients who received analgesia on day two of their stay in the ICU, performed a propensity-adjusted score analysis to compare the duration of ventilator support and duration of ICU stay between patients (n=513) who were assessed for pain and patients (n=631) who were not assessed. Instruments used to assess patients were VAS, NRS, BPS and the Harris Scale.

Patients assessed for pain on day two were more likely to receive sedation level assessment, non-opioids and dedicated analgesia during painful procedures than patients whose pain was not assessed. They also received fewer hypnotics and lower daily doses of midazolam (dormicum). Patients with pain assessment had a shorter duration of mechanical ventilation (8 *vs.* 11 days; P <0.01) and a reduced duration of stay in the ICU (13 *vs.* 18 days; $P < 0.01$). In conclusion, **pain assessment in mechanically ventilated patients is independently associated with a reduction in the duration of ventilator support and ICU stay.** This might be related to higher concomitant rates of sedation assessments and a restricted use of hypnotic drugs when pain is assessed.

The study by O'Brien *et al*. (2013) described cardiac surgery patients' perception of the effectiveness and timing of multidisciplinary team written educational information and post-operative verbal education before admission. They employed the cross-sectional study design and a written survey was posted to 375 post ICU patients who had cardiac surgery. Questions were designed to explore patient perceptions of both pre-operative written information and post-operative education relating to post-operative precautions and return to normal activity after surgery

Of the 375 questions posted, 118 surveys were received totalling a 31.4% response rate. Of the respondents, 89% recalled receiving and also reading the pre-surgery information booklet, **and this was significantly related to feeling prepared for the post-operative experience and adherence with precautions** ($p < 0.0001$). Of the respondents, 30.4% said they experienced stress and anxiety in relation to post-operative expectations.

Kol *et al.* (2014) investigated the efficiency of pre-operative pain management education and the role of analgesics administration before the onset of pain post-operatively. The study design was a prospective, randomised, and single-blind clinical trial at a thoracic surgery ICU of Akdeniz University Hospital in Turkey. Seventy patients who underwent a thoracotomy (35 in the control group and 35 in the study group) were included in the study. The same analgesia medication was used for both patient groups, but the study group, additionally, was educated on how to deal with pain pre-operatively and on the pharmacological methods to be used after surgery. Analgesics were administered to the study group regardless of whether or not they reported pain in the first two post-operative hours. The control group did not receive pre-operative education, and analgesics were not administered to them unless they reported pain in the post-operative period. Verbal Category Scale and the Behavioural Pain Assessment Scale were used for pain assessment.

The rate of pain, which patients described as sharp, stabbing and exhausting, was higher in the control group than in the study group ($p<.05$). Analgesic consumption was lower in the study group than in the control group ($p<.05$). As a result, it was determined that **pre-operative thoracic pain management education and analgesics administered post-operatively, before the onset of pain, reduced the amount of analgesics used in the first post-operative 48 hours in the ICU.**

A randomised controlled trial by Guo *et al.* (2012) was to determine whether a pre-operative educational intervention designed for Chinese cardiac patients could reduce anxiety and improve their recovery. The study was conducted at the Cardiac surgical ICUs of two public hospitals in Luoyang, China. Adult ICU patients (n=153) undergoing cardiac surgery were randomised and included in the study. Seventy-seven patients were in the control group (n=77) and 76 (n=76) the pre-operative education group, which was made up of the usual care, information leaflet and verbal advice. Measurement was conducted prior to randomisation and at seven days after surgery. Hospital Anxiety and Depression Scale

(HADS) was used to measure anxiety and change in pain measured by the Brief Pain Inventory-short form (BPI-sf). Patients who had pre-operative education had a greater decrease in anxiety score (mean difference - 3.6 points, 95% confidence interval - 4.62 to -2.57; $p < 0.001$) and a greater decrease in depression score (mean difference - 2.1 points, 95% CI -3.19 to -0.92; $p < 0.001$) as compared to those who did not. Patients in the pre-operative education group reported less interference from pain in sleeping (mean difference -0.9 points, 95% CI -1.63 to -0.16; $p = 0.02$). The results also showed some evidence to suggest a decrease in the number of hours spent in the ICU among pre-operative education patients ($p = 0.05$). This form of pre-operative education was found to be effective in reducing anxiety and depression in Chinese cardiac surgery patients. **Existing evidence and international practice thus supports the conclusion that pre-operative education should be incorporated into routine practice to prepare cardiac patients for surgery.**

In a post hoc analysis of a cohort study, Payen *et al.* (2013) searched for factors independently associated with the prescription of multimodal analgesia in mechanically ventilated critically ill patients (n=172) who received a combination of one opioid with non-opioids, thus paracetamol and/or nefopam, compared with those (n=302) who received only an opioid on day 2 of their stay in the Intensive Care Unit.

The results of the study showed that ICU patients' given multimodal analgesia were more likely to have fewer organ failures and received fewer hypnotics compared with patients who received opioid only; they self-reported more about their pain level. A low illness severity score, no more than one organ failure on day 2, the ability to self-rate pain, and a moderate-to-severe pain rated on day 2 were all factors independently related to the prescription of multimodal analgesia on day 2 (all $p < .01$**). The researchers suggest that the concept of multimodal analgesia must be promoted in the Intensive Care Unit.**

The aim of Lewis *et al.* (2015), in a quasi-experimental study, was to describe the effectiveness of professionally directed small group discussions on intensive care nurses' knowledge and biases related to pain management in the ICU. Thirty-two ICU nurses (n= 32) participated in the study. A modified Brockopp and Warden Pain Knowledge Questionnaire were administered before and after the small group discussions. The sessions were 45 minutes in length each and consisted of two to six nurses per group and focused on effective pain management strategies in the ICU. The study results indicated that knowledge

scores increased significantly after the intervention [pre-intervention mean = 18.28, standard deviation = 2.33; post-intervention mean = 22.16, standard deviation = 1.70; t (31) = 8.87, p<.001]. Post-bias scores (the amount of time and energy the ICU nurses spent attending to their patients' pain) were significantly increased for six of 15 ICU patients. The strongest bias against treating patients' pain was toward unconscious and mechanically ventilated patients. The researchers thus concluded that after the **implementation of professionally directed small group discussions with ICU nurses, knowledge levels related to pain management increased and biases toward specific patient populations decreased**.

Topolevec-Vranic *et al*. (2010), in a retrospective before and after study, evaluated the "effect of implementing a new pain assessment tool in a trauma/neurosurgery ICU". Staff and patient satisfaction questionnaires and retrospective chart reviews were used before and after implementation of the Nonverbal Pain Scale. The questionnaire responses, frequency of pain documentation and amount of pain medication given were compared before and after the implementation. After the implementation, most staff (78%) ranked the tool as easy to use. **Implementation of the tool increased staff confidence in assessing pain in nonverbal, sedated patients** (57% before vs 81% after implementation, p = .02) **and increased the number of pain assessments documented by the nursing staff for non – communicative patients per day in the Intensive Care Unit** (2.2 before vs. 3.4 after, p = .02). **Patients also reported decreased retrospective pain ratings** (8.5 before vs. 7.2 after, p = .04) and a trend toward a decrease in the time required to receive pain medication (38% before vs. 10% after requiring >5 minutes to receive medication, p = .06). Implementation of the Nonverbal Pain Scale in a critical care setting improved patients' ratings of their pain experience, improved documentation by nurses, and increased nurses' confidence in assessing pain in nonverbal patients.

Linde *et al.* (2013) sought to examine concurrent validation of scores in the Critical-Care Pain Observation Tool for a painful and a non-painful procedure, and to examine interrater reliability of the scores between two nurse raters using prospective, repeated measures within subject design. A convenience sample was used to recruit patients (n= 30) during a five-month period. Observational data were collected on patients intubated after cardiac surgery during routine turning and during dressing changes for central catheters.

Results indicated that mean scores did not increase significantly during dressing changes (increase, +0.25; 95% CI, -0.07 to 0.57; $p = .12$), but did increase significantly during turning (increase, +3.04; 95% CI 2.11-3.98; $p < .001$). The degree to which mean scores increased was significantly greater during turning than during dressing changes (increase, +2.80; 95% CI,1.84-3.75; $p < .001$). The researchers concluded that the CPOT was a valid and reliable tool for evaluating pain in intubated, critically ill adults. **Research nurses reported that pain assessment was accomplished quickly within a few seconds**.

3.2.9 Presentation of the Results of Qualitative Studies (n=4)

The qualitative studies within the study involved 75 ICU patients and nurses, from five ICUs in three countries. Four (n=4) qualitative descriptive studies/case series with a 4c level of evidence, according JBI (http://joannabriggs.org/jbi-approach.htm//tabbed-nav=levels-of-Evidence), were included in the review. The qualitative studies and their findings are described in detail below.

A qualitative prospective exploratory design was used by Subramanian *et al.* (2011) to explore the challenges nurses face in managing pain among patients in the ICU. The study employed semi-structured interviews with nurses, using critical incident technique. Twenty-one nurses were selected from ICU settings in a large acute teaching healthcare trust in the UK. The critical incident interview guide used in the study was constructed from literature and used to elicit responses from the nurses.

The findings indicated that nurses perceived four main challenges in managing pain in the ICU, namely **lack of clinical guidelines, lack of structured pain assessment tool, limited autonomy in decision-making and the patient's condition itself**. The study concluded that nurses' decision-making and pain management can influence the quality of care given to critically ill patients, but it is important to overcome the clinical problems that they face when dealing with the pain experience. **There is also a need for nursing education on pain management. Providing current and practical strategies may help to reduce nurses' challenges in managing pain among critically ill patients.** Broader autonomy and effective decision-making can be seen as useful for the nurses, besides having a clearer and structured pain management guideline to assist in patient care.

Martorella *et al*. (2014) used a qualitative descriptive design to assess the acceptability and feasibility of hand massage therapy in a cardiac surgery ICU in Canada. The findings presented are secondary to a pilot randomised control trial evaluating the preliminary effectiveness of hand massage on pain post cardiac surgery. Acceptability was evaluated using individual interviews with participants in both groups thus experimental and control (n = 40). Feasibility of the intervention was examined using field notes and video recordings.

The participants who were given a massage said it was appropriate for addressing pain, as stated by one participant, **"It removed the pain."** The control group suggested different doses of the treatment and body areas targeted **"I would like to have a foot massage, maybe a massage on my forearms and arms."** Barriers that hinder effective hand massage include noise and the many clinical activities in the ICU. Improving staff acceptance, decreasing the rest period, family involvement and repeating the treatment are options to consider. **The experimental group said hand massage was appropriate for addressing their pain.**

Woien and Bjork (2013) examined nurses' experiences of performing clinical judgements of patient pain and sedative requirements, after implementation of assessment tools (NRS, RASS, ATICE and CAM-ICU) and how the tools influenced these judgements. An exploratory qualitative investigation, based on principles from Tanners Clinical Judgment, was employed. Two focus groups, including 14 ICU nurses, were included and interviewed twice during the period of implementation.

The interviews reflected central themes on the use of assessment tools related to the nurses' clinical experience in ICU pain treatment and sedation. Four themes emerged as central: balancing clinical judgement and the use of tools, improvement of collaboration, documentation and goal achievement, enhanced evaluation of the patient's response and emphasis on the ICU patient's characteristics. According to the ICU nurses, the use of tools was perceived to improve the quality of pain control and sedation and supported nurses in their decision-making, as stated by one nurse participant **''Before, we used only personal clinical judgment without relating our observations to a scale. By scoring the patient, it is easier to pinpoint precise levels.''**

The study by Gelinas *et al.* (2012) was to describe the opinions of ICU patients, relatives and nurses about the usefulness, relevance and feasibility of non-pharmacological interventions for pain management in the ICU. A qualitative descriptive design was

employed using a semi-structured discussion guide. Participants were asked to share their opinions about the non-pharmacological interventions they found useful, relevant and feasible for pain management in the ICU. Patients and relatives (n = 6) with previous admission to the ICU and ICU nurses (n = 32) were recruited into the study. Eight focus groups interviews with patients, relatives and ICU nurses were conducted and 33 non-pharmacological interventions discussed.

The top four non-pharmacological interventions that the participants found to be **useful**, **relevant** and **feasible were music therapy and distraction, simple massage and family presence facilitation**. Non-pharmacological interventions are adjuncts to pharmacological treatments of pain as they are cheap and safe.

3.2.10 Discussion of Results

Involved in the quantitative and qualitative systematic review were 4680 patients, from 107 ICUs in 12 countries. The review was based on a systematic search of 11 databases. In addition, electronic searches of journals, hand search of reference list of articles, books, thesis, government documents and grey literature were conducted. Medical subject headings used in the search included,

- pain in critically ill/Intensive Care adult patients;
- pain assessment in critically ill/Intensive Care adult patients;
- pain management in critically ill/ Intensive Care adult patients;
- post–operative pain in critically ill/Intensive Care adult patients;
- pre-operative patients' education on pain;
- pain assessment and management in critically ill/Intensive Care adult patients;
- pain management interventions in critically ill/Intensive Care adult patients.

Studies with different designs (n=30) were included in the study, including quantitative (n=26) and qualitative (n=4), to answer the review question: **What measures would ensure effective pain management among critically ill adult patients in the adult Intensive Care Unit?** Methodological assessment confirmed that all studies scored between 70 and 100%, with 70% being the cut-off score agreed for the review. Many similar findings were made among the studies and grouped together to enhance the discussion.

3.2.10.1 **Factors That Influence Pain Management in the ICU**

From the studies reviewed, it was realised that the ICU has many sources of pain, which remains a major problem for critically ill patients (Aslan *et a*l., 2010; Jong *et al.*, 2013). According to Jong *et al.* (2013), severe pain and serious adverse events occur very often in the ICU and are associated with moving ICU patients for nursing care procedures. Many factors affect pain, its assessment and treatment in the ICU and can be patient, nurse, doctor or environmental related among other things.

According to Aslan *et al.* (2010), chest tubes, ET tubes and dressing change caused pain in ICU patients. Positioning was also found to be a major cause of pain in the ICU patient (Jong *et al*., 2013). However, analgesic medications, removal of chest tubes, staying immobile and nurses showing interest in the patients were factors that decreased their pain**.**

Quality improvement programmes and interventions done to improve nurses' knowledge, introduction of objective pain assessment tools, programmes and protocols for pain management, standardising pain assessment and treatment and monitoring were factors that positively influenced nurses' management of patients' pain (Diby *et al*., 2008; van Gulik *et al*., 2010; Porhomayon *et al*., 2013; Jong *et al*., 2013 Mansouri *et al*., 2013).

Severe pain and adverse events decreased when a multidisciplinary team was created, nurses' knowledge assessed and education given on pain management and giving analgesics. Non-pharmacological measures (nurses explaining procedures to patients, therapeutic massage, music and music therapy) were employed in a quality improvement programme (Jong *et al*., 2013). The researchers believe that careful documentation of pain management during moving patients for nursing procedures could influence pain management. van Gulik *et al.* (2010) quantified the effect of a pain management programme involving training of all staff in assessing pain, providing adequate analgesia, a system that obliged nurses to ask patients for their pain score three times a day and the preferred analgesic treatment optimised, and an NRS score of at least 4 was considered unacceptable. The protocol reduced the occurrence of unacceptable pain significantly and the amount of morphine given to patients. They also stated that improvement of pain management should concentrate more on the prevention of pain.

The effectiveness of a quality improvement post-operative pain treatment programme was again tested by Diby *et al.* (2008) after cardiac surgery. The implementation involved training of staff, providing pocket guidelines, regular audits and feedback. The number of patients with no pain or frequently without pain, increased and the number of patients with sleep disturbances reduced. They concluded that after implementing a pain management algorithm in the SICU, pain intensity at rest reduced and quality of patients sleep improved. As in quality improvement programmes, the development and implementation of protocols also seem to influence pain management positively. Porhomayon *et al.* (2013) developed and implemented an analgesia/sedation protocol in an attempt to standardise care and to decrease the duration of mechanical ventilation and length of hospital stay and found that the protocol significantly reduced the use of fentanyl, midazolam and mean mechanical ventilations days.

Mansouri *et al.* (2013) also used a protocol for the systematic assessment and management of pain, agitation and delirium by nurses to improve clinical ICU outcomes of patients. In Porhomayon *et al*. (2013), provided evidence for a significant reduction in the duration of the need for ventilator support, reduction in mortality rate and length of ICU stay in patients admitted to the ICU through a protocol-directed management of their pain, agitation and delirium.

A professionally directed small group discussion on critical care nurses' knowledge and biases related to pain management, by Lewis *et al.* (2015), also influenced ICU nurses' management of their patient's pain. After the implementation of professionally directed small group discussions with critical care nurses, knowledge levels related to pain management increased and biases toward specific ICU patient population decreased.

It can therefore be concluded from the studies reviewed that implementing quality improvement programmes and protocols, which educate nurses on pain assessment and management, standardising pain assessment and treatment, making pocket guidelines available with regular audits and feedback, can positively influence pain management. Documentation of pain assessment, assessing pain regularly, explanation of nursing procedures, therapeutic massage, music therapy, removal of chest tubes as soon as no longer needed, nurses showing interest in the care of their patients and only moving them when

necessary, giving analgesics on time and as prescribed and teamwork are factors that can positively influence pain management of the patient.

Nurses also have challenges that negatively influence their management of the critically ill patient's pain. In a qualitative study by Subramanian *et al.* (2011), to describe the challenges nurses encounter in managing pain among patients in the ICU, nurses perceived four main challenges, namely lack of clinical guidelines, lack of structured pain assessment tool, limited autonomy in decision making and the patient's condition itself. Nurses' decision making and pain management can influence the quality of care given too, but more autonomy and effective decision-making can be seen as useful besides having clearer and well-structured pain management guidelines. There is however a need for nursing education on pain management and provision of current and practical strategies, which may help to reduce nurses' challenges in managing pain among critically ill patients.

3.2.10.2 Assessment of pain in the ICU

The studies reviewed showed evidence to support the use of pain assessments tools, the CPOT and the BPS for non-verbal patients and the NRS and the VAS in verbal patients, which improved pain management in critically ill patients. The studies also concluded that systematic pain assessment improves pain management (Erdek and Pronovost 2004; Cade, 2008; Diby *et al*., 2008; Payen *et al*., 2009; Topolevec- Vranic *et al.*, 2010; Gelinas *et al*., 2011; Vazquez et al., 2011; Rose et al., 2013; Linde et al., 2013; Gelinas et al., 2014 and Georgiou *et al*., 2015). The use of physiological parameters for pain assessment was not endorsed in the studies. The following studies tested different pain assessment tools and their influence on pain management in the ICU. Education on the pain tools and making them available and accessible before implementation also improved outcomes.

In critically ill patients unable to self-report, Rose *et al.* (2013) found that pain assessment intervals with documented pain assessment increased and opioid analgesics and benzodiazepines decreased, thus concluding that implementation of the CPOT tool after all nurses attended educational sessions, CPOT scoring guides, posters and educational materials made available in the ICUs' and the senior nursing team providing education during implementation and monitoring compliance increased frequency of pain assessment and appeared to influence administration of analgesics. Cade (2008) supported the findings

of Rose *et al.* (2013) that implementation of the BPS and CPOT can be recommended in the ICU and may improve the management of pain among sedated patients by providing a systematic and consistent approach to pain assessment to guide interventions.

Gelinas *et al.* (2011) also found that after nurses attended standardised training sessions on the use of the CPOT and the tool implemented, reports of pain assessments were more frequently documented and fewer analgesic and sedative agents were administered. In another study by Gelinas *et al.* (2014), the CPOT was found to be quick to use, simple to understand and easy to use amongst nurses who were trained to use it. ICU nurses also acknowledged that the CPOT had influenced their practice, and promoted communication among nurses. ICU nurses were satisfied with its daily use and concluded that the CPOT use was feasible and relevant in daily practice.

A comparison of the behavioural responses to pain, measured on the CPOT scale, and the physiological responses prior to, during and after the positioning procedure in mechanically ventilated patients concluded that the observation of the patient's behaviour during turning and the physiological changes produced allowed professionals to objectify pain in critical patients with verbal communication difficulties. The results highlight the need to administer additional analgesia before painful procedures, particularly in post-surgical patients (Vazquez *et al*., 2011). Linde *et al.* (2013) also found that mean scores of the CPOT did not increase significantly during dressing changes, but did increase significantly during turning**.** The researchers conclude that the CPOT is a valid and reliable tool for evaluating pain in intubated, critically ill adults, and nurses reported that pain assessment was accomplished quickly, within a few seconds.

More studies confirmed the importance of standardised pain assessment in ensuring effective pain management. The Nonverbal Pain Scale was ranked by staff as easy to use and increased confidence in assessing pain in nonverbal, sedated patients and the number of pain assessments documented by the nursing staff for non–communicative patients per day in the Intensive Care Unit. The researchers thus concluded that the tool improved patients' ratings of their pain experience, improved documentation by nurses and increased nurses' confidence in assessing pain in nonverbal patients (Topolevec- Vranic *et al.*, 2010).
Erdek and Pronovost (2004) measured pain assessment as the percentage of 4-hour intervals, where the patient's pain was measured using a VAS and implemented, and a plan to improve

pain assessment and treatment. In-service education of nurses and physicians, providing VAS and the protocol by each bedside to improve documentation and doctors' forms reformed to include sections for patients' pain scores, were all parts of the intervention. Baseline assessment and treatment of pain improved and the interventions recorded significant improvements in pain assessment and treatment without an increase in adverse events related to pain therapy.

Diby *et al.* (2008), in their attempt to improve pain management, introduced a pain management programme that entreats nurses to assess pain using the VAS, give analgesia and re-evaluate until the patient had mild pain, and this must be done four hourly at least and after administering morphine. This was found to decrease pain intensity and improve patients' sleep.

Also in a bid to introduce a systematic approach to pain and sedation management, Woien *et al.* (2012) introduced three assessment tools (NRS, RASS and ATICE) to the ICUs. They found that patients assessed by the tools had more documented pain and sedation scores. Combinations of continuous analgesia and sedation were prescribed with wide therapeutic ranges. Significant improvements were seen in the ICUs assessment and documentation routines scored by the nurses after the implementation of the tools. The tools helped nurses to focus on significant signs and symptoms and the implementation of tools contributed to a systematic approach of the assessment and treatment of pain and sedation in the ICU. Woien and Bjork (2013) also found that after implementation the use of NRS, RASS, ATICE and CAM-ICU in the ICU was perceived by the nurses to have improved the quality of pain control and sedation and supported nurses in decision-making.

A systematic review by Georgiou *et al*. (2015) concluded that implementation of systematic ways of pain assessment seems to be associated with more frequent documented reports of pain and more accurate decisions for pain management. There was evidence of favourable effects on pain levels, duration of mechanical ventilation, length of ICU stay, mortality, adverse events, ICU complications and demonstrated a connection between systematic pain assessment and outcome in critical illness. Payen *et al.* (2009) confirmed the effectiveness of pain assessment tools by concluding that pain assessment in mechanically ventilated patients is independently associated with a reduction in the duration of ventilator support

and duration of ICU stay. This might be related to higher rates of sedation assessments and a restricted use of hypnotic drugs when pain is assessed.

It can therefore be concluded that the use of pain assessment tools (NRS, VAS, BPS, CPOT and NVPS) and standardising pain assessment positively influenced pain outcomes. Nurses education on the use of the tools, assessing pain 3 to 4 hourly, treating pain scores of 3 and above and making the pain tools available and accessible were all ways of ensuring effective pain management, however there must also be auditing, monitoring and feedback.

3.2.10.3 Pharmacological Treatment of Pain

Use of analgesics was one of the major ways of managing pain in the ICU. The use of multimodal analgesia (Payen *et al.*, 2013) and pre-emptive (Kol *et al.*, 2014; Ong, Lirk *et al.*, 2005) analgesia were concepts associated with effective pain management pain in the studies reviewed.

Payen *et al*. (2013) found that patients' given multimodal analgesia were more likely to have fewer organ failures and received fewer hypnotics compared to patients who received opioid only and they self-reported their pain level more frequently. The researchers suggest that the concept of multimodal analgesia must be promoted in the ICU. Pre-emptive analgesia was also associated with effective pain management. After comparing two groups, Kol *et al* (2014) determined that pre-operative thoracic pain management education and analgesics administered post-operatively, before the onset of pain, reduced the amount of analgesics used in the first 48 hours following surgery. Pre-emptive analgesics improved analgesic consumption and time to first rescue analgesic request.

3.2.10.4 Non-pharmacological treatment of pain

The use of non-pharmacological methods of pain management was one of the concepts identified in the studies to enhance effective pain management in critically ill patients (Friesner *et al.*, 2006; Gelinas *et al.*, 2012; Chlan and Halm 2013; Ozer *et al.*, 2013)**.** The non-pharmacological methods advocated included deep-breathing relaxation exercise, music and music therapy, hand massage, simple massage, distraction and family presence facilitation. According to Friesner *et al* (2006), there is a significant difference in pain ratings

immediately after chest tube removal and after 15 minutes for the group receiving relaxation exercise as an adjunct to opioid analgesic compared to the group that had analgesics only. The researchers therefore support slow deep-breathing relaxation exercise as an adjunct to the use of opioids for pain management during chest tube removal among patients who have undergone coronary bypass surgery. Demir and Khorshid (2010) also found that applying cold compresses before removal of chest tubes in post cardiac surgery patients in the ICU reduced patient's intensity of pain and prolonged time to first rescue analgesic.

Music, as a non-pharmacological method of pain management, was advocated by Chlan and Halm (2013) in their systematic review. They concluded music was a safe intervention with no adverse effects. Music has immediate benefits, and its implementation can be done safely in conjunction with the normal medical plan of care. Thus, music interventions are just another way nurses can make a difference in the patient's experience. ICU patients who listened to their choice of music had a significant increase in oxygen saturation, and lower pain scores. The study provided evidence to support the use of music and stated that music might be a simple, safe and effective method of reducing potentially harmful physiologic responses arising from pain in patients after open-heart surgery (Ozer *et al.*, 2013).

In a study by Martorella *et al.* (2014), although participants who received hand massage thought it as appropriate for relieving pain, the control group suggested different dosages of the treatment and body areas targeted. Factors that hinder effective hand massage therapy include noise and clinical activities. Enhancing staff acceptance, reducing the rest period, involving families, and repeating the treatment are avenues to consider. Building evidence for non-pharmacological pain management in the critical care setting is necessary.

Gelinas *et al.* (2012) described the perspectives of patients, family members and nurses about the usefulness, relevance and feasibility of non-pharmacological interventions for pain management in the ICU. The researchers found out that non-pharmacological interventions were useful, relevant and feasible and include music therapy and distraction, simple massage and family presence facilitation. Non-pharmacological pain interventions are complementary to pharmacological treatments of pain as they are safe and affordable.

3.2.10.5 Pre-operative pain education

The studies included in the review found that pre-operative pain education was an effective measure in improving ICU patient's pain outcomes, therefore incorporating this into routine pre-operative care will be beneficial (Guo et al., 2012; O'Brien et al., 2013; Kol et al., 2014).

In a study by O'Brien *et al.* (2013), cardiac surgery patients recalled reading a prepared pre-operative information booklet, and this was significantly correlated with feeling prepared for the post-operative experience and adhering to post-operative precautions. Kol *et al.* (2014) also determined that pre-operative thoracic pain management education and analgesics administered after surgery before the onset of pain, decreased the amount of pain medication used in the first 48 hours after surgery.

Participants who received pre-operative education experienced a greater reduction in their anxiety score and a greater decrease in depression compared with those who did not and also reported minimal interference from pain when sleeping. The researchers recommended that pre-operative education be incorporated into routine practice to prepare cardiac patients for surgery (Guo *et al.*, 2012).

3.3 SUMMARY

The review attempted to answer the question: What measures ensure effective pain management among critically ill adult patients? From the review, it can be determined that:

- Implementing quality improvement programmes and protocols that educate nurses on pain assessment and treatment, standardising pain assessment and treatment, making pocket size guidelines and protocols available with regular audits, monitoring compliance and feedback, can all positively influence pain management.

- Nurse's education, especially on the use of assessment tools, providing nurses with pain assessment tools and making them available and accessible especially by the bedside and providing pocket size tools and posting reminders of pain assessment and treatment in the ICU, will ensure effective pain management. The studies also found that pain intensity evaluation, administration of analgesics and re-evaluation until patient had only mild pain was helpful.

- The CPOT, BPS, NVPS, NRS and VAS were the tools assessed in the studies reviewed with positive outcomes. Providing support and monitoring compliance in the use of these tools could improve pain management in the ICU. Assessing pain at least 4 hourly and treating any pain scores of more than 3 on the VAS and 4 on the NRS.
- Providing a section for doctors to write their pain scores during the patients' assessment were all associated with positive outcomes.

- In addition, documentation of pain assessment, removal of chest tubes as soon as no longer needed, nurses showing interest in the care of their patients and only moving them when necessary, giving analgesics on time and as prescribed and teamwork are also factors that can positively influence pain management of the patient.

- Effective pain management can also be achieved, according to the studies reviewed, by employing non-pharmacological management measures, which include deep-breathing relaxation exercises and application of cold compress before chest tube removal, music and music therapy, hand massage, simple massage, distraction and family visit facilitation.

- Giving of pre-emptive analgesia and employing multimodal instead of monotherapy could also be effective measures in improving pain outcomes.

- Pre-operative pain education was also helpful in improving ICU patient's pain outcomes in the studies reviewed.

Part one of the exploratory phase presented methods and procedures undertaken during the systematic review, including its findings and answers to the review question. The next chapter presents part two of the Exploratory Phase which discusses the findings of the experiences of CT-ICU nurses, doctors, patients and relatives on pain and its management in the CT-ICU through focus groups and individual interviews.

CHAPTER FOUR

EXPLORATORY PHASE – PART TWO

QUALITATIVE INTERVIEWS

4.1 INTRODUCTION

This chapter presents part two of the exploratory phase. Four different interviews formed the second part of the exploratory phase of the study. Two focus group interviews were carried out with CT-ICU nurses and individual interviews with CT-ICU doctors, patients and their relatives. The interviews and the systematic review of literature, which formed the first part of the exploratory phase, informed the guideline and its recommendations.

4.2 FOCUS GROUP INTERVIEWS WITH ICU NURSES

This is included in the second part of the exploratory phase, which involves the analysis of the focus group interviews with CT- ICU nurse experts.

4.2.1 Demographic Data of Nurse Participants

Twelve CT-ICU nurse experts took part in the focus group interviews, with six (n=6) nurses in each focus group. The demographic data section, which was obtained through a self-administered questionnaire comprising of nine items, related to the CT-ICU nurse experts (Appendix D). This was inclusive of research codes, gender, age, professional qualification, years of professional experience, period worked in ICU and period working in CT-ICU. The nurses were also asked to identify the analgesics used in the CT-ICU where they practice and standard analgesics they give to patients according to the CT-ICU protocol. Research codes were assigned by the researcher to all participants, to ensure anonymity and confidentiality. Random numbers were used as identity codes and ranged from one to 12 (N1- N12). N1-N6 for focus group one and N6-N12 for focus group two. The letter N was used to differentiate the nurses from doctors, patients and relatives. The participants were identified and arranged by these codes in the analysis.

To ensure anonymity and avoid labelling, the demographic data of nurses was reported in ranges. All nurse experts (n=12), (N1-N12) ICU trained and certified by the Nursing and Midwifery Council of Ghana as ICU nurses, who participated in the focus group interviews were female and aged between 31 and 60 years.

Number of years of professional experience of the nurses ranged from six (6) years to 36 years. The number of years of ICU and CT-ICU experience of the participants ranged from four (4) to 23 years. Table 4.1 summarises the demographic data of nurse participants.

Table 4.1 Demographic data of nurse participants

Research Code	Gender	Age Range	Professional Qualification	Years of Professional Experience	Period in ICU (years)	Period in CTICU (years)
Nurses 1-12 (N1-N12)	Female	31-60	CCRN -10 CCRN/BSN-2	6-30	4-23	4-23

Key: CCRN = Critical Care Registered Nurse; BSN = Bachelor of Science in Nursing

4.2.2 Availability of Analgesics

The nurses were also asked to state the analgesics available in the CT-ICU where they practice and those they give to patients according the CT-ICU protocol. Varied responses were given and are presented in Table 4.2.

Table 4.2 Analgesics

Research Code	Analgesics Available in the CTICU	Standard Analgesics (According to ICU protocol)
NI	IV Morphine, IV Paracetamol, Cap Tramadol, Tab Paracod, Tab Diclofenac, Syrup Brufen, Suppository Paracetamol/ Diclofenac	No Protocol
N2	IV Paracetamol, IV Morphine, Paracetamol, Fentanyl	No protocol
N3	IV Morphine, Paracetamol, Tramadol Paracod, Brufen, Doretta	IV Morphine. Paracetamol, Tramadol Paracod.Brufen, Doretta
N4	IV Morphine, Parcetamol, Fentanyl, Diclofenac	No protocol
N5	IV Morphine, Diclofenac, IV Paracetamol, Plain Marcain, Fentanyl (epidural), IV pethidine	IV Morphine, IV Paracetamol, Plain Marcain/ Fentanyl
N6	IV Morphine, IV Paracetamol, Fentanyl and Marcain (Epidural Mixture). Tab Paracetamol	IVMorphine, IVParacetamol Tab Paracetamol
N7	IV paracetamol, Tab Paracetamol, Supp Paracetamol, Syrup Paracetamol, Morphine Diclofenac, Fentanyl, Paracod, Pethidine	Morphine, Paracetamol Pethidine, Marcain and Fentanyl Cocktail(Epidural)
N8	Morphine, Paracetamol, Fentanyl,Pethidine Fentanyl and Marcaine (Epidural Mixture)	Morphine, Paracetamol Fentanyl, Fentanyl and Macaine (Epidural Mixture)
N9	Morphine, Ketamine, Pethidine	No Protocol
N10	IV morphine, Paracetamol	No protocol
N11	IV morphine, IV pethidine, IV Paracetamol	IV morphine, IV pethidine IV Paracetamol
N12	Paracetamol, Diclofenac, Morphine, Pethidine, Fentanyl, Paracod	No protocol yet

4.2.3 Contextual Findings and Discussion

This section presents the findings of the focus group interviews with ICU nurses. The findings are discussed in detail and supported by verbatim statements of the nurses from the interviews. Main themes are discussed and supported by sub-themes for clarity. Citation of relevant literature was used to further explain or support findings. Five main themes were identified in the analysis of the interviews with 10 sub-themes. A summary of themes and sub-themes are presented in Table 4.3, first for clarity then discussed.

Table 4.3 Themes arising from focus group interviews

Main Themes	Sub-themes
4.2.4 Medico-socio-cultural factors that influence pain management	4.2.4.1 Negative Factors 4.2.4.2 Positive Factors
4.2.5 Pain assessment and management practices	4.2.5.1 Pain assessment practices in verbal patients 4.2.5.2 Pain assessment practices in non-verbal patients 4.2.5.3 Measures that will improve pain assessment 4.2.5.4 Pharmacological interventions 4.2.5.5 Non-pharmacological interventions 4.2.5.6 Measures that will improve pain management
4.2.6 Patients education on pain	4.2.6.1 Pre-operative education on post-operative pain 4.2.6.2 Methods of improving patient's education on pain

4.2.4 Medico-socio-cultural factors that influence pain management

This theme describes medico-socio-cultural factors from the contextual analysis of the expert nurses' opinion that influence pain management practices. Two sub-themes that emerged from the main theme are the *negative* and *positive* factors that influence pain management.

4.2.4.1 Negative factors

These are patient, nurse, health system and cultural factors that negatively influence how pain is managed in the CT-ICU. It also describes the procedures that contribute to pain in the ICU. Some of these factors are due to patients' attributes, nurses' attitude and ideas about pain and its management, cultural perceptions and the effects of the health system the nurses operate in on their management of pain.

- *Patient Related Factors* - Patient characteristics have a great influence on how pain is managed by ICU nurses. Upbringing, socialisation and social status could be influencing patients' reports of pain. According to the nurses, some patients "*fear*" reporting their pain. A nurse stated in her response her general opinions on pain management in the CT-ICU:

  "…It's like they (patients) have this fear…the patient hasn't got the courage to speak up that I can't take the pain; the patient would just lie in bed in pain. When the nurse comes, the patient would tell the nurse l am in pain the pain medication is not

working but when the doctor comes, that patient would pretend like he is fine…" (N1).

Similar findings by IASP (2010) concluded that culture and ethnicity determine how people react to pain. As stated by the nurses, some patients are afraid of reporting their pain to the doctor thus making *fear* a factor negatively affecting pain management. Yorke, Walllis and McLean (2004) also found that more than 50% of ICU patients communicated their pain to nurses. Contrary to the findings in this study, that patients will rather report their pain to nurses and not doctors, Batiha (2014) found that ICU patients did not want to bother nurses with their complaints and this was a barrier to effective pain management. The patients reported their pain to doctors and not ICU nurses. It is clear that patients, in general, have difficulty reporting their pain to health professionals.

Similar concerns were reported by other nurses (N3, N1, N8). The nurses wished the patients would be bold enough to report their pain, since pain is a subjective experience and the patients self-report is the gold standard (Merskey & Bogduk, 1994). As stated by McCaffery (1968), in her clinical definition of pain, pain is whatever the experiencing person says it is, and exists whenever he/she says it does. They said:

"Some will be in pain; they won't call, because they think if they call, some think they are complaining too much" (N1).

"…some may tell us they are in pain and others don't" (N8).

Another nurse (N3) thought it was better for the patient to report his/her pain than for the nurse to advocate for him/her. She said:

"Sometimes we advocate and sometimes we encourage them to speak up because when you advocate for someone, it's not like the patient talking themselves…" (N3).

Patient's reluctance to report their pain and to take analgesics was reported as the two top barriers to pain management in a study by Clarke, French, Bilodeau *et al.* (1996). Some patients are reluctant to report their pain, thus the need for regular pain assessment to elicit

a response from these patients and to assess the intensity of the pain to help those who would otherwise not report their pain.

Nurses think that patients also worry about becoming dependent on pain medication.

*"…the patient will insist, if l take it l will be dependent on the medication and l don't want it…" (*N1).

The nurse participants also reported on the patients' pain threshold, with many reporting that patient's pain threshold is *low,* thus confirming the subjective nature of pain.

> *"I realised that patients their pain tolerance is quite low so some of them complain more for analgesia*" (N4).

> *"Sometimes some people can't endure pain at all..." (N2).*

Nurses think patients complain too much about their pain. This is negative because pain is a subjective experience and the patients' report of pain must be believed. Other nurses (N1, N2, N4, N8) also stated that patients *complain* about pain because of their low pain threshold.

> *"Sometimes nurses are of the opinion that patients complain too much of pain because pain is pain and it's always going to be pain no matter what we do okay" (N4).*

This variability in pain sensitivity may partly be explained by environmental factors, age, sex or anxiety (Rudin, Wolner-Hanssen, Hellbom & Werner 2008; Ip, Abrishami, Peng *et al.*, 2009; Sommer, de Rijke, van Kleef *et al.*, 2010) and some genes have also been associated with differential pain sensitivity (Allegri, De Gregori, Niebel *et al*., 2010; Young, Lariviere & Belfer, 2012). The fact that nurses think patients have *low pain thresholds* and *complain* about pain makes appears as though nurses expect the patients to endure pain.

- *Nurse Related Factors* - There are factors inherent in nurses that affect the way they manage their patients' pain. The participants related factors they observed in colleague nurses and from their own experiences that influence their pain

management. The nurses stated there is a nurse phobia for analgesics, thus fear that patients will get addicted to opioids; this is one factor affecting the way they administer analgesics. Some of the nurses (N4, N1, and N3, N12, N2) said:

"We have this nurse's phobia for opioids that they (patients) will be addicted to the drug so we usually don't give them the maximum that the patient needs and they are always in pain" (N1).

"…and also because some have the notion that morphine is a narcotic and we may get addicted to it, we tend to tell this to the patients that l just gave you some pain medicine and if l give you too much, you will be addicted to it, this is too strong for you and all that …" (N4).

Similarly, a study by Aziato and Adejumo (2014a) found that Ghanaian surgical nurses fear their patients will be addicted to opioids and do not administer adequate analgesics, especially opioids. One of the ICU nurse related barriers to pain management identified by Batiha (2014) was ICU nurses' fear of the side effects of pain drugs. The American Pain Society (2007) concluded that there are still many myths and misbeliefs about the use of opioids and addiction, which can lead to under-treatment of pain.

Nurses also think that pain is a psychological experience and patients need to be '*psyched up'* to endure pain and know that they should expect pain. This shows patients are expected to experience pain and must be psychologically prepared to endure it. Some nurses (N3, N4) said:

"…we should psyche the patients up. Because sometimes l think pain is psychological…So, when they come, we should let them know their condition and let them know that they are going to experience pain and the pain is the least of their problems (laughing)…. So just tell them, psyche them up so they don't get so worried…" (N3).

Some nurses also perceive that some patients "*exaggerate"* their pain to get attention from health professionals.

"*…patient is anxious and sometimes they exaggerate …so you don't know whether it's a real pain or exaggerated pain … because some can exaggerate…" (N3).*

"Some can really exaggerate. The patient was talking and laughing and the next time the patient sees you, he is like I am in pain…" (N1).

It must be noted that pain is one of the most common symptoms in critically ill patients and is experienced by each patient in a unique manner (Puntillo, Arai, Smith & Stotts, 2008). The patient might actually be feeling pain and not exaggerating.

Nurses also perceive that patients sometimes do not tell the truth about their pain during self-reports because they do not know how to describe their pain. One nurse (N4) however thinks that assessing their level of pain will help to elicit correct responses.

"*…the patients to see and tell you that this is the level of pain l have and l believe when you show it to them, naturally they will speak the truth they wouldn't lie compared to when you ask them how is the pain because some people they have pain but they don't know how to describe the pain" (N4).*

Another nurse stated (N2) that patients sometimes "*shout and misbehave"* when they are in pain. Patients could "*misbehave*" because they are in unbearable pain or having delirium due to the ICU environment and drugs.

"…otherwise you can have a patient who will shout or cry like a baby…the person can shout or misbehave or even bite you whoever is close so we should inform the patient of our expectation" (N2).

Many studies have shown that ICU patients have severe pain. Barr *et al*. (2013) found that adult medical, surgical, and trauma ICU patients experience pain routinely, both at rest and with routine ICU care. An estimated 71% of ICU patients remember experiencing pain during their stay in the ICU (Klein, Dumpe, Katz & Bena, 2010); patients could therefore be "misbehaving" because they are in severe pain.

The nurses (N3, N7, N9, N11) also described the negative or "*bad attitude"* of some colleagues, which according to the participants influences their management of the patients' pain. They said:

> *"I think some nurses too, some of us we have a bad attitude towards pain management. When patients are in pain, we don't want to give them (analgesia). And sometimes, we give the drug but at the wrong time" (N3).*

> *"When you are doing suctioning into the ET tube, the patients feel a bit of pain but we ignore them because we think we have to take our secretions" (N7).*

Unreasonable failure to treat the patient's pain is viewed internationally as poor medicine, an unethical practice and an abrogation of fundamental human rights of the patient (Brennan, Carr, Cousin, 2007). Effective pain and symptom management is an ethical obligation for all healthcare providers, health institutions or organisations (Mosenthal, 2005). One of the enablers to effective pain management includes prioritisation of pain by ICU nurses.

Some of the expert nurses have a negative opinion about the effectiveness of the pain management regimen employed in the management of the patient's pain in the ICU. They (N1, N2, N3, N4, N5, N6, N7, N11) had similar opinions.

> *"Pain medications are reduced the moment the patient is extubated which to me is bad because probably, the patient might still need breakthrough pain medication ..." (N3).*

> *Somebody will come and will not give (pain medication) at all for the whole 24 hours…" (N11).*

A nurse participant also stated that pain management, especially in sedated or unconscious patients, is not optimal. She said:

> *"Indeed, we are not doing well in giving analgesics to our clients more especially when the client is on sedation and unconscious patients, we assume they are not in pain…." (N11).*

The International Association for the Study of Pain states that the inability of the patient to communicate verbally does not negate the possibility that an individual is experiencing pain and is in need of appropriate pain-relieving treatment (IASP, 2010). This implies that even when a patient is unconscious or sedated pain should be treated, since not being able to report does not mean the patient is not in pain. These groups of patients are always vulnerable to inadequate treatment of pain because they cannot self-report.

No assessment of pain before pain management was also noted by another nurse. She said:

> *"I think the patient's pain is not really assessed before they give the pain management ... They give it when they (nurses) feel the patient has pain but the assessment of the patient so that you can be able to know which drug or the dosage of the drug to give I think it's not really done ..." (N12).*

Another nurse (N4) however stated that although there is some pre-operative assessment, such as weight to prescribe the analgesics, she does not think analgesics are enough for the patients. She said:

> *"So far l have also noticed that some of the patients they don't receive enough pain relievers. You know even though we weigh the patients ... (N4).*

Some (N2, N3, N4, N7) of the nurse experts also think that the amount of analgesia and anaesthetics given is not enough to adequately manage the patient's pain when doctors do invasive procedures. Nurses are however supposed to advocate for the patients if they think the patients are not receiving adequate analgesia. The nurses stated:

> *"... a very painful procedure like she rightly said, sometimes l don't think they have enough pain relieve so some of the patients, they will be shouting, screaming and all that" (N7).*

> *"Invasive procedures...because they don't give anything, any analgesia or any local anaesthesia, the patients find it very, very painful" (N2).*

- *Health System Factors* - Health system related factors are issues in the hospital's structure and how they are organised and managed, affects the way pain is managed in the CT-ICU in the teaching hospital.

According to the nurses, the fact that the dosage of analgesia can only be adjusted by the doctor, although the nurse spends a lot more time with the patient and can determine if he/she needs more analgesia is a challenge. According to one nurse (N7), the doctor will have to be convinced that the patient needs more analgesia before the dose can be increased. She said:

> *"The system we run here is geared towards the doctors' prescriptions and it makes us a bit handicapped in trying to administer pain medications religiously…. Sometimes they give you analgesic for like three times a day but you sitting by the patient you really know that this three times a day is not helping us. You really need to consult with them, speak to them to really agree before the analgesic is continued or otherwise you administer it at that lower dose until they are convinced that the regime has to change" (N7)*

Similarly, findings from a study by Batiha (2014) stated that physicians' lack of trust in the ICU nurses' assessment of pain in the patient is a barrier to effective pain management. An effective collaboration between nurses and doctors was found to be a factor that facilitated post-operative pain management (Rejeh, Ahmadi, Mohammadi *et al.*, 2008).

There is also a concern about the 'when necessary' (prn) order the doctors give, which when followed and any adverse effects occur, they are left fully responsible and without support from doctors although the order is for prn, showing lack of collaboration between doctors and nurses in pain management.

> *"…they (doctors) do order drugs for prn but as to what is prn is a challenge sometimes to the nurses because they also administer skeptically because in anything, they put the responsibility on you (the nurse) even though the thing has been written prn"* (*N7).*

Literature (Batiha, 2014) also found that nurses consider inconsistent practices around administering 'when necessary' (prn) medications in the ICU a barrier that affects their pain management.

Lack of a written pain assessment and management protocol was also a major concern of the nurses and doctors in subsequent interviews. According to the nurses and patient ICU charts observed by the researcher during data collection, morphine 4 hourly and paracetamol 1g 6 hourly are routinely prescribed for adult patients and sometimes prn is added. As to whether that is adequate for all patients is of concern to some of the nurses and they wished they had a document that directed them when they were unsure of what to do. They currently have no documentary guidance on pain management, relying solely on their knowledge, experience and the doctor's prescription. They (N4, N10, N9, N7) said:

> *"…We don't have a protocol, I don't know how much pain management this patient is supposed to receive but l only follow what the doctor states"* (N4).

Studies have however demonstrated the effectiveness of protocols for pain management in improving ICU patients' outcomes (Skrobic, Ahern, Leblanc *et al.*, 2010; Mansouri, Javadpour, Zand *et al.*, 2013). Following protocols could guide nurses in times when they are unsure of what to do, or in a dilemma.

Another hospital policy of concern to a nurse is the policy on visitation. The belief is that allowing the family to spend a little more time with the patient could divert their attention from pain.

> *"Patients' relatives do not have enough time with their patients. Also, when they are late to visit in the morning, they (health professionals) tell them to come back in the afternoon. These relatives could help to divert the patient's attention from the pain but they are not allowed. Lastly, they are not so clear on the rules of visitation because they tell the relatives 30 minutes but in reality, relatives are given less than that" (N3).*

Family presence facilitation was identified by patients, relatives and nurses to be useful, relevant and feasible in the management of pain in the ICU by Gelinas, Arbour Michaud *et*

al. (2012). Subsequent interviews with patients and their families also identified the issue of inadequate time to be with their relatives.

- *Cultural Factors* - In the Ghanaian culture, expressing pain means an individual is weak and not stoic and patients are expected to have pain. Men are not supposed to express their pain as that is a sign of weakness. It is also believed that labour pains make a woman a mother. Some nurses (NI, N4, N7, N10) confirmed the effect culture has on patients' expression of pain and nurses' management of the pain.

  "…in our health sector, most of the things are partially accepted by our culture…. We believe as a man, you are not supposed to show your emotion when you are in pain…. So, for a long time, even if there were pain medications that could subside the pain, we believe you have to go through that process and the pain…" (N1).

  "My concern is more of our cultural practices in relation to the pain, culturally we think that women (in labour) should go through pain, we think people should go through pain and we should be able to tolerate pain. That is the perception some people have about management of pain so even now even if they are on duty, the administration of the pain killers is a bit skeptical" (N7).

Other nurse participants stated the effects of the Ghanaian culture on reporting pain. They said:

> *"…how do we know that this person is having enough pain management because in our culture, people think that if they are in pain and they say that they are in pain, we will say that they are complaining too much…" (N4).*

The effect of culture on pain has been described extensively in literature (Lach, 2000; Nayaran, 2003, Callister, 2003; Kopf & Patel, 2010; Aziato and Adejumo, 2015b). Narayan (2003) describes the value of exploring attitudes and responses to patient's pain in the context of a cultural assessment. She stated that culture has a strong influence on patient's expression and behaviour. According to the study, some cultures believe in very vocal pain expression and others are stoic. A study in Central Africa found cultural factors greatly influence how nurses managed pain and patients will benefit if nurses received additional education about diagnosis and management of acute pain (Rampanjato, Florence, Patrick &

Finucaine, 2007). Aziato and Adejumo (2015b) concluded that health professionals have to understand the socio-cultural effects of pain on the patient to give effective care.

- *Procedures that Contribute to Pain in the ICU* - The nurse experts identified procedures done by nurses and doctors that in their opinion patients find quite painful. These procedures are not in themselves negative but mostly therapeutic. The fact that nurses considered them as painful means that pain is not well controlled in these patients before or during these procedures.

The nurses (N1, N9, N12) mentioned *bed bath* and *turning, wound dressing, intubation and invasive procedures* as procedures that cause pain. Turning has been identified as a major cause of cardiothoracic patients' pain (Cade, 2008).

> "*... their pain is heightened when they are maintaining their personal hygiene ... this is in regards to changing of position ..." (N1).*
>
> *"...turning, intubation, wound dressing, bed bath, the others and maybe invasive procedures…." (N12).*

More nurses (N2, N4, N6, N8, N9, N11, N12) also identified *suctioning, wound dressing, turning/positioning* as painful.

> *"...Yes, wound dressing is one of the procedures. Suctioning the patient, doing bed bath for the patient are the other things" (N4).*
>
> *"...when you are doing suctioning into the ET tube, the patients feel a bit of pain, the invasive procedures and the injections, chest physio…" (N11).*

Male catheterisation was also identified by a nurse (N9) as painful.

> *"...urethral catheterisation is also a means of inflicting pain on patients…the male patients really have pains during these procedures (N9).*

Physiotherapy and *ambulation*, though not routine nursing procedures, were identified as painful for the ICU patient by some of the nurses (N4, N11).

"And when we try to ambulate the patient and do chest physiotherapy for the patients" (N3).

Apart from the procedures mentioned above, of particular interest to the some of the nurses (N2, N3) was the *type of plasters* used in the ICU and *stitch removal*. The nurses think the plasters cause pain, as they stick to the patient's skin and are painful when removed.

"*…the kind of plasters that we use when you are removing it, it's so painful and you can see the extent of the pain especially in the fair coloured people. The site where the pain was reddens…" (N2).*

"... I think before we put the plaster on the patient's skin, we should find out if the patient is hairy because when the patient is hairy and you are removing the plaster, it is very difficult. And the other procedure which causes pain to patients is removal of stitches; it's very painful to most of the patients…" (N3).

Literature collaborates the findings that nurses need to recognise that certain procedures, although routine, can cause pain and should therefore plan the ICU patients care with this in mind (Siffleet, Young, Nikoletti & Shaw, 2007). Apart from pain at rest, ICU patients also suffer from unavoidable painful routine procedures. Procedure related pain is the most common type of health-induced pain, of which ICU patients have vivid memories (van der Leur, van der Schans, Loef, *et al.*, 2004; Jones, Backman, Capuzzo *et al.*, 2007). Cade (2008) found that tracheal suctioning, catheter insertion, turning and sheath removal is performed commonly in the ICU and precipitates acute pain in the ICU patient. According to Siffleet *et al.* (2007), routine ICU procedures cause pain, including drain removal, deep breathing and coughing exercises, suctioning, positional change and line removal. Patients in a study by Aslan *et al*. (2010) reported that the presence of chest tubes, endotracheal tube suctioning, dressing change and the use of air mattress caused them considerable pain. In a large multicentre (28 countries) study of 3851 ICU patients, chest tube removal, wound drain removal and arterial line insertion were the three most painful procedures for critically ill patients (Puntillo, Max, Timsit *et al.*, 2014).

Some nurses (N2, N3, N4, N5, N8, N12) also stated that some procedures performed by doctors gave patients a lot of pain. Most of the procedures nurses identified were invasive.

"I think procedures which are done under local anaesthesia normally causes pain to patients because sometimes the local anaesthetic agents are not enough and patients are anxious ...." (N3).

"I think the invasive procedures like the insertion of chest tube or passing central line things ....and even the passing of the ET tube when they are intubating the patient, the way we extend the neck, mostly we don't lubricate the tube and then it causes pain as its going because we think the patient is paralysed or sedated, we just do it..." (N5).

4.2.4.2 Positive factors

This subtheme discusses the positive attributes that participants have that could promote pain management in the ICU. The nurses mentioned that they managed pain according to the type of surgery or patient's diagnosis thus individualising pain, the fact they are managing pain to the best of their ability and the positive effects of analgesia.

- *Type of Surgery and Diagnosis* - Some nurses mentioned that pain is managed according to the type of procedure, surgery or diagnosis thus pain management is *indiviualised.* The nurses (N4, N12) said:

"Depending on the kind of surgery the patient had, for open heart surgeries which include the ventricular septal defect, tetralogy of fallots total correction, they are very intensive surgeries so we really give a lot of pain medications" (N12).

Individualised pain management is recommended by research, and literature suggests individualised pain management must be performed by healthcare providers to respond to critically ill patients needs as they undergo painful procedures (Arroyo-Novoa *et al.*, 2008).

Nurses also identified reasons why they think certain analgesics are given. These reasons range from the pharmacokinetics of the drug, diagnosis, type of admission and the source of pain. Having knowledge of the types of drugs given, and why they are given, to a certain group of patients is positive as it shows the nurses are mindful of the fact that pain management must be individualised. They (N1, N5, N7, N9, N10, N12) said:

"...Here l will say that pain management is usually based on the diagnosis of the patient, the basic diagnosis of the patient and type of admission" (N5).

- *Adequate Pain Management* - Despite the challenges discussed above, including lack of protocols and challenges with the health system, some of the nurse experts also believe their pain management is adequate and they are "*doing well"* in the management of their patient's pain. Nurses (N7, N8, N6, N9, N10) are of the opinion that pain management in the ICU is "*quite good."* Subsequent interviews with patient and relatives found that although patients reported high pain levels, they were satisfied with the pain management they received from some of the health professionals.

  "...we really do proper pain management because soon after surgery, soon as the patient starts coming out, we don't wait till we see anything we just start any pain management that the patient is on..." (N7).

  "...For this ICU, I would say our pain management is quite good. I won't say perfect but good" (N8).

- *Effects of Analgesics* - The ICU nurses identified positive effects of adequate pain management. They are of the opinion that adequate pain management helps patients to "*recover quicker," stabilises their vital signs"* and "*calms and relaxes"* the patients. The nurses (N6, N7, N8, N10, N12) are thus mindful of the benefits of adequate analgesia. They stated:

  "...we try to give the drugs as prescribed; I think it helps the patients recover quicker" (N10).

  "I think if the patient's pain is managed well, we get good results. Because the vital signs and everything are stable, but if there is pain we will start having problems all over" (N7).

Literature collaborates the above finding, a patient without pain after surgery implies increased well-being and shorter hospitalisation (Linderberg & Engstrom, 2011).

4.2.5 Pain Assessment and Management Practices

This theme discusses the pain assessment and management practices employed by the ICU nurses and what, in their expert opinion, can be done to improve pain assessment and management. Assessment and management are discussed together because effective management can only be achieved if pain is assessed. The sub-themes emanating from this theme include *pain assessment practices in verbal patients, pain assessment practices in non-verbal patients, measures that will improve pain assessment, pharmacological interventions, non-pharmacological interventions* and *measures that will improve pain management.*

4.2.5.1 Pain assessment practices in verbal patients

The nurses' assessment practices ranged from no assessment to verbal assessment of patients' pain by "*asking them",* using their facial expressions, their response to procedures and vital signs. However, no pain assessment tool was used to assess pain in these patients and no assessment of intensity was done. A nurse (N12) stated they do not do any assessment of the patient's pain. She said:

> *"As for the assessment, we do not really do it…" (N12).*

The nurses (N1, N3, N5, N12, N11, N9) stated that they ask verbal patients about their pain.

> *"All l do is ask the patient, are you in pain?" (N1).*

Some nurses (N10, N4) however said they '*once in a while'* or '*sometimes'* ask them to determine their pain on a scale of 1to 10, but this is not routine.

> *"Once in a while we do it …. the patients but it's the adults that we use 1-10 or we will ask you to rate your pain from 1-10 how will you rate your pain?...but with the children we ask "eye wu ya anaa?" (are you in pain?) "nie me ye eye wu ya anaa" (is the procedure causing you pain?) if the person responds or the person will cry then you know that the person is really in pain" (N10).*

Other nurses (N8, N5) however stated they do **not** ask the patients to determine the level of their pain/severity of pain. They said:

> *"We don't usually use any tools. I mean we can ask them are you in pain? But we don't do the on a scale of one to ten, we don't do that; I mean I know we are supposed to but **we don't**." (N8).*

> *"… we don't usually ask them **how severe** or how serious is your pain?" (N5).*

Literature confirms the 'gold standard' for pain assessment is the patient's own report (Merskey, 1994), therefore it is accurate for nurses to ask verbal patients for their verbal report. However, considering the socio-cultural effects of pain, the fact that patients fear reporting their pain and it is culturally expected that they bear pain, pain management will be more effective if pain intensity is also assessed with the use of tools. Asking them, *are you in pain*, to which they will respond yes or no may not adequately identify the intensity of their pain. Priority should be given to regular assessment of the **intensity** of patient's post-operative pain and evaluation of the effects of analgesic therapy (Milutinovic, Milovanoic, Pjevic *et al.*, 2009). The tool extensively validated and recommended for use in verbal and or conscious ICU patients is the **numerical rating scale pain** (Ahlers *et al.*, 2008; Chanques *et al.*, 2010). Chanques *et al* (2010) found the visually enlarged horizontal numeric rating scale was the most valid and feasible pain tool tested in over 100 critically ill patients for pain intensity. A study in Ghana among surgical patients also validated the numerical rating scale and other tools for use in the socio-cultural context and found it to be sensitive to change in the intensity or level of pain experienced before and after analgesia (Aziato, Dedey, Marfo *et al.*, 2015).

The nurses (N3, N5, N8, N9) stated they don't use any pain assessment tool.

> *"… But we don't use any scale, we ask them" (N3).*

The majority (96%) of ICU nurse participants in a study in Uganda do not use pain assessment tools to assess pain and almost half lacked knowledge about key pain assessment principles (Kizza, 2012).

Facial expression and vital signs are used by some of the nurses (N11, N8, N10, N9) to assess the patient's pain in addition to asking them.

> *"…most of the time, they might be having a good facial expression, all of a sudden, the facial expression changes, then you might see the heart rate going up so you get to ask the patient whether he or she is in pain" (N10).*

> *"Aside the deviations from the vital signs, sometimes the patient's facial expression can also give you an idea whether he or she is in pain …Sometimes the heartrate and the BP will also go up then we will realise the person is in pain" (N10).*

Vital signs are only to serve as a cue for further pain assessment and not an accurate measure for the assessment of pain in ICU patients, more objective pain assessment measures are required (Young, Siffleet, Nikoletti & Shaw (2006).

The use of procedures for pain assessment was mentioned by some of the nurses (N1, N6). They determine if a patient is in pain when they are doing a procedure and the patient complains.

> *"At times, we ask them to carry out a procedure like use incentive spirometre or cough out they refuse to do it means they may be in pain" (N6).*

4.2.5.2 Pain assessment practices in non-verbal patients

From the data generated, it was determined that pain assessment of non-verbal patients in the CTICU was carried out basically using their *vital signs* and sometimes the patients' facial expression; no assessment tools were used in assessing non-verbal patients pain. Nurses sometimes "*presume"* pain or use their "*discretion."* Pain assessment in patients unable to express pain is critical to appropriate care (Herr, Coyne, McCaffery 2011 *et al*.; IASP 2012b).

Nurses (N1, N2, N3, N4, N8, N10, N11, N12) mentioned how they assess pain in non-verbal patients using the patients' vital signs. They said:

"Yes, we use the vital signs, that is why l say we use the BP and the heart rate to assess to see whether the patient is in pain or not" (N10).

As stated earlier, literature suggests that vital signs only serve as a cue for pain assessment in non-verbal patients (Young *et al.,* 2006; Siffleet *et al.,* 2007; Abour & Gelinas, 2010; Chen & Chen, 2015). According to Siffleet *et al.* (2007), haemodynamic (heart rate, systolic and diastolic blood pressure) measures are not suitable indicators for the presence of pain. Current practice recommendations state that vital signs alone should not be used for pain assessment in the adult ICU patient (Barr *et al.,* 2013). Vital signs should only be used as a cue when behavioural indicators are no longer available in ventilated or unconscious patients (Arbour & Gelinas, 2010). Haemodynamic parameters are not an accurate measure for the assessment of pain in the critically ill unconscious patients, they require a more objective pain assessment (Young *et al*., 2006). Chen and Chen (2015) also found that heart rate and blood pressure could only be used as a cue for pain assessment.

A study in the ICU in South Africa found that ICU nurses were more confident in assessing pain in verbal ICU patients than non-verbal patients (Onwong, 2014). Rose, Smith and Gelinas *et al.* (2012) found in a survey in ICUs in Canada that a substantial proportion of ICU nurses did not use pain assessment tools for patients unable to communicate and the nurses were unaware of pain management guidelines. A Tanzanian study by Karlsson and Lundebo (2010) also found that nurses assessed pain by measuring vital signs.

Almost all the nurses (N1, N2, N3, N4, N5, N8, N11, N12) said they don't use any pain assessment tool to assess non-verbal patients. They noted:

"…it is true, we don't have any formal assessment tool right now" (N3).

"We don't have any at all they are no pain assessments tools at all" (N5).

Research however has determined that the use of pain assessment tools with behavioural parameters can improve pain management in non-verbal critically ill patients (Puntillo, Morris, Thompson *et al.,* 2004; Woien *et al.,* 2012; Haslam, Dale, Knechtel & Rose, 2012). Woien *et al* (2012) stated that the implementation of tools contributes to a systematic approach to the assessment and treatment of pain and sedation in critically ill patients. A strong relationship exists between procedural pain and behavioural responses. Clinicians can

therefore use behavioural responses of verbal and non-verbal patients to plan for, implement and evaluate analgesic interventions (Puntillo et al., 2004). According to Haslam *et al.* (2012), using valid and reliable pain assessment measures may improve documentation, which will facilitate appropriate analgesic management.

Numerous assessment tools have been created for non-verbal ICU patients. According to Barr *et al.* (2013:264), The Critical-Care Pain Observation Tool (CPOT) and the Behavioural Pain Scale (BPS) are the most valid and reliable for monitoring pain in medical, post-operative, or trauma (except for brain injury) adult ICU patients, who are unable to self-report and in whom motor function is intact and behaviours are observable. Many studies have also found the CPOT and the BPS to be valid and reliable for use in the non-verbal ICU patients (Yorke, Wallis & McClean, 2004; Gelinas *et al.*, 2006; Young *et al.*, 2006; Gelinas & Johnson, 2007; Gelinas *et al.*, 2009; Vazquez *et al*, 2011; Gelinas *et al*., 2011; Rijkenberg, Stilma, Enderman *et al*., 2015;). Stites (2013) however stated that the **CPOT was superior** to other tools in reliably detecting pain after a comprehensive search on the reliability and validity of observational pain scales. Rijkenberg *et al*. (2015) also stated that the CPOT is preferable in uncommunicative and sedated patients. The CPOT could be used to assess the effects of various measures for pain management. It also showed that no matter the level of the ICU patients' consciousness, they react to different stimuli by experiencing different behaviours that could be associated with pain (Gelinas *et al.*, 2006). Gelinas and Johnson (2007) also found that the CPOT is a valid and reliable tool to assess pain in critically ill adults. Implementation of the CPOT was found to increase frequency of pain assessment and appeared to influence administration of analgesics in the ICU (Rose *et al.*, 2013).

The nurses also stated that they either "*presume"* pain in the patient, use their own "*discretion"* or *"initiative."* Aziato and Adejumo, (2014a) found that Ghanaian surgical nurses were influenced in their response to patient's pain by individual factors, including using their discretion, however this can be a very subjective way of pain assessment and not objective as stated. The Nurses said:

"In ICU, most of our patients are unconscious so we mostly ***presume*** *pain …" (N1).*

Others (N7, N12) also use their *discretion,* which can be very subjective.

"…so, we only use our ***discretion*** *to manage pain…" (N7).*

Others (N8, N9) either *assume pain* or use their *initiative*, which can lead to under- or over-treatment of pain.

> *"... Apart from our own assumption that patient should be in pain at a particular time we don't have any scale" (N9).*

> *"...so, you do give the analgesia with your initiative..." (N8).*

- *Pain Assessment Tools Known* -The ICU nurses in discussing their pain assessment practices mentioned some of the pain assessment tools that they know. It was observed that most of the nurses were not aware of most of the tools that can be used to assess pain in critically ill patients. Some could describe the tools but did not know the names.
  Some nurses (N1, N2, N5) mentioned the pain assessment tools they knew.

  > *"l know of at least three but l don't use any of them. I know of the scale from 1-10, facial expression and the hand" (N1).*

  > *"Some of the pain assessment tools that l know are the Likert scale, Wong and Alice" (N2).*

Another nurse said:

> *"Verbal is the scale 1-10 scale, the drawings, you draw small circles and it increases the width as it goes higher to let the patient show you where the pain is.... but for the people who are unconscious, I don't know any scale that can be used to assess their pain" (N5).*

Kizza (2012) found that barriers to ICU nurses' pain assessment in Uganda included lack of pain assessment tools (74%), lack of education on pain assessment tools (82.4%) and lack of familiarity with tools (78.2%).

4.2.5.3 Measures that will improve pain assessment

The ICU nurse experts suggested ways pain assessment can be improved from their practical experience. These views are one evidence-based aspect of the generated data that would inform the development of the guideline.

- *Use of pain assessment tools* - Eight out of the 12 nurse experts suggested the use of pain assessment tools to improve the assessment of the ICU patient's pain. They (N1, N2, N4, N5, N6, N7, N8, N11) said:

  "I believe we can adopt one or two of the assessment tools so that we can use the numerical for the literates those who can read and write and use the facial for the illiterates and children. Maybe you can make it like a board so when we go it will be easier to carry around and it will be eligible for the patients to see and tell you that this is the level of pain …So when we use the tools we will know how to treat every patient equally and know the exact pain they are going through" (N1).

  "I think if the scale can be implemented here, it will be of good help. At least those who can verbalise, they will be able to point out; this is where l am so we also follow up…" (N6).

Literature collaborates that the use of pain assessment tools helps. Without a metric for pain, it is difficult to evaluate and improve performance (Erdek & Pronovost, 2004).

- *Believing patients' self-report* - Believing the patients' self-report of pain and not using their discretion was suggested by two nurses (N3, N4).

  "I also think that we should believe what the patient is telling us. We shouldn't use our own discretion when it comes to pain management because we may be depriving the individual patient from pain relieve" (N4).

  "I also think that we should treat all patients; we shouldn't assume all patients are the same. Patients have different thresholds for pain" (N3).

- *Nurses as advocates* - Nurses must also advocate for their patients based on their assessment. A nurse said:

  "…. I think it is best for ourselves and our patients if we serve as advocates when it comes to their pain management because we are not prescribers, so we have to be the advocate of the one in pain to the prescriber based on our assessment…" (N3)

As stated by literature, nurses are directed by their code of ethics to advocate for humane and appropriate care for their patients (American Nurses Association, 2001).

- *Observation* - observing the patient will improve assessment.

"l think we should be observing the patients all the time… they won't complain they have pain but we should be observing the patient and see whether the patient is in pain or not" (N3).

- *Documentation of pain assessment* - The fact that documentation of pain assessment would improve pain assessment was suggested by nurses (N8, N9, N10). Observations in the CT-ICU by the researcher determined there is no allocated portion on the ICU chart for documenting pain assessment.

  "…l think we can assess pain better than what we are doing by having a chart to document. We need to document so that we know whether it's getting better or worse. …. Yes, so having the pain chart to document pain will help better" (N10).

The need to document pain assessment was suggested by researchers (Gelinas *et al.*, 2004; Ayasrah, O'Neill, Abdalrahim *et al*, 2014). One South African study found that one of the barriers to pain assessment was lack of a designated area for documenting pain assessment (Onwong, 2014). Kizza (2012) found that poor documentation and poor communication of pain assessment and management was a barrier to pain management amongst 77% and 74.7% of Ugandan ICU nurse participants respectively.

- *Developing protocols for pain assessment* - Development of a pain management protocol, according to nurses (N12), will improve pain assessment.

  "Pain assessment can be improved by developing protocols" (N12).

According to literature, instituting a pain titration protocol resulted in lower incidence of unacceptable pain (NRS ≥ 4) (Ahlers, van Gulik, van Dongen *et al*, 2012). Nurses in another study identified the lack of protocols and guidelines on pain assessment and management as a barrier to pain management (Kizza, 2012).

- *Continuous assessment* - Pain needs to be routinely assessed, reassessed and documented to facilitate treatment and communication among healthcare providers (Gordon, Dahl, Miaskowski *et al*, 2005). A nurse said:

  "What we can also do is to continuously ask them are you in pain? Continuous assessment …" (N10).

4.2.5.4 Pharmacological interventions

In this sub-theme, the nurses described their pharmacological interventions and pre-emptive analgesia. Nurses identified types of available pain relief, and described how it was administered in the ICU. According to the nurses, they depend mostly on pharmacological management.

"...most of the ones l see are the pharmacological means of managing pain." (N6).

The nurses stated they mostly use morphine and paracetamol, and sometimes NSAIDs and sedation with midazolam. They said (N3, N12, N3, N9):

"…we give our morphine and then we give our Paracetamol intermittently and then sometimes diclofenac. In cases when patients react to morphine, you can give the fentanyl which is another type of pain reliever and then pethidine so it depends on the patient" (N12).

The most common drug used in the ICU, according to the data generated, is intravenous (IV) morphine. This is in line with Barr *et al*. (2013), who recommended that the IV opioids be the first-line drugs to be considered in the treatment of non-neuropathic pain in ICU patients. IV morphine is followed closely by IV paracetamol in the management of pain in the CT-ICU. Other drugs mentioned were diclofenac and oral paracetamol. IV morphine is usually

given 4 hourly and/or prn, and IV paracetamol is give 6 hourly. Pharmacologic treatment was always the first choice for pain relief among nurses (Linderg & Engstrom, 2011). Morphine is the preferred analgesic for acute (moderate and severe) pain management in the ICU (Jacobi, Fraser, Coursin *et al*, 2002; Spijkstra, Gielen- Wijffels, Burger *et al.*, 2010), as it may provide some cardio-protection and anti-inflammatory response when compared to a drug such as fentanyl in post cardiac surgery patients (Murphy, Szokol, Marymont, 2007; Abdel-Wahab, Khattab, Liska *et al*, 2008). Paracetamol combined with morphine was found to induce a significant morphine sparing effect (Remy, Marret, Bonnet, 2005; Maund, McDaid, Rice *et al.,* 2011). The researchers concluded that paracetamol could be used as a supplementary analgesic agent for adult patients undergoing cardiac surgery. Ahlers, van Gulik, van Dongen *et al.* (2010) concluded there is no reason not to administer paracetamol in critically ill post cardiac surgery patients, except in liver pathology. However, non-steroidal anti-inflammatory drugs (NSAIDS) may be disadvantageous in post-operative cardiac patients, as they carry the risk of cardiovascular side effects among such patients (Ahlers, Elens, van Gulik *et al.*, 2013).

Analgesics were given routinely 4 hourly for the morphine and paracetamol 6 hourly and sometimes when necessary. An enquiry was made from the doctors to determine why morphine was prescribed 4 hourly, since that was not the routine practice where the researcher practiced for a number of years. According to the doctors, it was based on literature but no references were given. The researcher has also not come across the need for morphine to be given 4 hourly in the literature reviewed so far. The nurses (N4, N12, N5) said:

> *"So, what we do is that the doctor will write morphine four hourly or prn and that is how we give it and we add Paracetamol six hourly to the morphine so that is how we basically manage pain and the patient will be on sedation" (N12).*

Sometimes oral medications are given when patients are able to tolerate them. A nurse said:

> *"…most of the time we use IVs. If the patient is on NPO, but sometimes even if they are eating orally we still give IVs. Usually at the beginnings, but as they progress we go back to oral" (N5).*

Conversely, another nurse (NI) thought that because '*Ghanaians abuse'* paracetamol, when they are moved from IV opioids to oral paracetamol, it has no effect.

> *"…What l have noticed was that most of the time, when patients who are stable and on orals are moved from the opioids, the IV opioids like morphine then to Paracetamol and most Ghanaians abuse Paracetamol so they complain a lot…" (NI).*

The ICU nurses (N5, N12) also stated that they give a continuous infusion of morphine and midazolam. Literature however states that patients should be given analgesics first followed by sedatives. Sedation is not analgesia thus protocols and/or unit guidelines that prioritise a trial of analgesia before administration of sedatives may decrease decisional uncertainty when critically ill patients exhibit ambiguous behaviours such as restlessness and agitation (Haslam *et al*., 2012).

> *"Post-op patients...within the first 24 hours, we give them continuous pain medication like perfuser morphine plus sedation (midazolam)…." (N5).*

> *"…we have a special combination that we do, we have midazolam with morphine when we do that it runs on continuous infusion…" (N12).*

Contrary to what the nurses said, research found that giving patients a bolus of analgesia alone, with no sedation unless deemed clinically necessary, has been associated with reduction in ICU and hospital lengths of stay (Strom, Martinussen & Toft, 2010).

Another nurse however stated that they give morphine until the patient calms down and then sedation, which is as prescribed by literature (Haslam *et al.*, 2012)

> *"…we give morphine initially just to calm them down with the pain then we start with our rotation with IV Paracetamol. We use IV Paracetamol and if the patient calms down, then we start with our midazolam, 30mg in 30mls per perfuser"* (N10).

- *Pre-emptive Analgesia* - The nurses confirmed that giving pre-emptive analgesia is not a routine practice. Although some of them think that pain should be prevented,

most of them also said that they don't give or "*sometimes"* give the pre-emptive analgesics.

The nurses (N1, N2, N5) said:

"…we don't give (analgesia) before we give the baths, we just give the baths" (N1).

"…though we are supposed to prevent them from even feeling the pain, we don't do that much..." (N5).

"...because they don't give anything, any analgesia or any local anaesthesia before the procedure, the patients find it very, very painful…" (N2).

This is in contrast with what is stated in literature, as literature advocates for a routine administration of analgesics before procedures deemed to be painful (Puntillo, Wild, Morris *et al*, 2002; Payen, Chanques, Mantz *et al.*, 2007). Most ICU patients were not given analgesics intentionally, even though pain intensity increased during painful procedures. When used, analgesic amounts were low (Puntillo *et al.*, 2002). According to Payen *et al*. (2007), lack of analgesia during painful procedures must be prevented. The researchers observed in their study that procedural pain was specifically managed for less than 25% of ICU patients, but pain significantly increased from baseline pain evaluation. Giving pre-emptive analgesics improved analgesic consumption and time to first rescue analgesic request (Ong, Lirk, Seymour & Jenkins, 2005). As found in the systematic review of this chapter, pre-emptive analgesia before the onset of pain improved pain outcomes of ICU patients (Kol *et al*., 2014).

When probed further, other nurses (N1, N10, N6 N7, N12) said pre-emptive analgesia is "s*ometimes"* and "*once in a while given."*

"… sometimes if the wounds are very extensive, we give the pain medication right before…. like twenty minutes before the wound dressing. Once in a while if we find out that the patient has multiple tubes and multiple incisions, we in our own discretion we can give some of the pain medications before the baths" (N1).

"… we sometimes also give morphine so that the pain, they will be able to manage their pain so we will be able to do the dressing and it is very effective because if you give, the patient relaxes for you" (N10).

One nurse said patients are sometimes "*fortunate*" to receive pre-emptive analgesia

"During dressing, they go through pains a lot. Sometimes they are fortunate to get these analgesics before dressing but if there are not given, then the patient has to cope with the pain till the procedure ends" (N6).

Analgesia is given sometimes before and other times after procedures. This shows that pre-emptive analgesia is not given routinely in the CT-ICU during painful or invasive procedures.

"…Sometimes we give during dressing and sometimes after dressing. And with other invasive procedures such as central lines we also give either before or after" (N10).

The nurses stated that muscle relaxants and sedation are given during intubation and no pain medication is given.

"They don't give pain medication, before intubation they give muscle relaxants and sedation so they sedate first then they relax the muscles then they pass the tube" (N5).

"…they should have given some pain drugs. Although they gave some drugs to relax her, they should have given some pain killers so that she will be free hmmm (sighs)" (N8).

4.2.5.5 Non-pharmacological interventions

Nurses explained the non-pharmacological methods the nurses employ to treat the ICU patients' pain and the need to complement pharmacological with non-pharmacological management. They also indicated that they explain patients' conditions to them in order to

calm them down and ensure cooperation since pain could also be borne out of fear. A nurse said:

> *"... some also need you to tell them what really their condition is especially those who come off the mechanical ventilator, just explaining to them what they've gone through the stage at which they are also helps calm them down and then they appreciate what is going on and then co-operate with you more and don't complain of pain because sometimes, the pain might just be borne out of fear so yes that also helps" (N4).*

Much has been documented on the complementary and analgesic sparing effect of non-pharmacological methods of pain management (Friesner *et al.,* 2006; Gelinas *et al.*, 2012; Chlan & Margo, 2013; Cole & LoBiondo-Wood, 2014; Martorella *et al.*, 2014). Music was found to be a safe intervention with no side effects and immediate benefit, which can safely be implemented as an adjunct to the usual medical plan of care. Listening to music was effective in reducing pain scores in post cardiac surgery patients with moderate levels of pain (Gelinas *et al.*, 2012; Chlan & Halm, 2013; Cole & LoBiondo-Wood, 2014). According to Gelinas *et al*, (2012), in addition to music therapy, distraction, simple massage and family presence facilitation can be used by ICU nurses to complement pharmacological treatment of pain, as they are safe and low cost. Friesner *et al.* (2006) supports the use of slow breathing relaxation exercise as an adjunct to the use of opioids for management of ICU post coronary artery bypass patients during chest tube removal. ICU patients receiving hand massage perceived it as appropriate and experienced pain relief, relaxing and calming responses from the hand massage (Martorella *et al.*, 2014). The nurses stated the non-pharmacological methods they use that are useful and feasible in the Ghanaian context and the resources available. Diversional therapy was used by many of the nurses, amongst other things, and was found to be helpful. Diversional therapies that are helpful, according to the nurses, include listening to music, watching television and reading.

Massage, in addition to other methods such as reassurance and "*tender loving care (TLC),"* a term used locally to imply pampering the patient, were employed by some of the nurses (N4, N11, N6, N7). They said:

> "*…Then we can massage depending on where the pain is or tender loving care TLC…(N11).*

"…. We do massage them and then reassure them verbally and it helps" (N6).

Nurses use massage and reassurance because they are no reading materials in the ICU to divert the patient's attention. She said:

"...Massaging and reassuring, unfortunately in the ICU we don't have things like reading materials that will divert the attention..." (N7).

Positioning was also employed and helped with the management of pain. Nurses (N12, N4, N10) employed positioning and believed it helped the patients.

"If we feel the person position is not good, we re-position the patient and put the patient in a nice position that the person will feel comfortable…" (N10).

According to one nurse (N4), positioning helps patients to be more relaxed and even vital normalises signs. This is clinical evidence that non-pharmacological methods, if employed, can improve the patient's pain outcome. She said:

"...the position in which they are lying is not too comfortable for them therefore if you turn them in another position, they are more relaxed and their vital signs also normalizes" (N4).

Chest splinting while coughing is a method nurses teach post cardiothoracic patients to employ to reduce pain on coughing.

"...helping them to splint their chest when they are coughing, and talking to them generally" (N7).

The use of hot water bottles was said to be helpful. Nurses (N3, N11) mentioned hot water bottles and warm fomentation in addition to reassurance, communication and TLC as helpful in the management of the patient's pain. They said:

"Sometimes we use hot water bottles for the patients. Reassuring them also counts, when you reassure them, you make them know what the condition is, those things, it helps" (N3).

"Mostly it's TLC, we get closer to them, we talk, we sing those that are communicating so basically, that is what we do. We also use hot fomentation sometimes" (N11).

Many of the nurses (N1, N2, N4, N5, N9, N10) employed diversional therapy.

"We also apply diversional therapy…Sometimes, we talk to them and reassure them to divert their attention from the pain to other things" (N9).

The use of television, music and talking to the patients all diverts the patient's attention. More nurses (N2, N5, N9, N10, and N12) stated the use of diversional therapy. They said:

"We use the television set, sometimes we have radio that we give them some soothing music just to draw their mind back or to let them feel that there is no pain or we go and sit by them and chat. As you chat with the person you feel the person is relaxed. …" (N5).

"…we also give them the time to read if you have a patient who likes to read and has been on admission for a long time for quite some time, we give them something to read like newspapers" (N12).

The nurse again mentioned that she takes her time in doing a procedure when the patient complains of pain, as a way of reducing the pain.

"When the patient complains of pain, whatever procedure l do, I make sure l take my time to do it for the patient so that it won't hurt much" (N2).

Physiotherapy was also stated as a method of non-pharmacological management. This was also mentioned by the doctors in a subsequent interview, when they stated that coughing exercises during physiotherapy helped to alleviate the patient's pain.

"And then also I think that is what my colleague has said about the physiotherapy and other things that we do for them" (N12).

4.2.5.6 Measures to improve the management of pain

Nurse experts suggested numerous evidence based ways pain management can be improved, including:

- *Use of Guidelines* - They want guidelines as to how analgesics can be given so that pain can be effectively managed.

  "…we need to know whether if we give pain drugs three hourly, it's ok, is it going to affect the patient or will it do any harm to the patient? If not if that will help, maybe we do three hourly. Now if we want to stick to four hourly we have to make sure that we give it on time, so that we can effectively manage the pain" (N4).

- *Giving drugs as prescribed* - Nurses (N2, N4, N8, N12) suggested that giving analgesics as prescribed would improve the management of pain in the ICU.

  "I will suggest that we give as we are prescribed. As it's prescribed for the patient, we should give it" (N12).

  "As it has already been said, it should be according to the prescription…" (N2)

Another nurse (N4) participant said that apart from giving the medication on time, as prescribed, breakthrough pain should also be managed, as some patients will have pain before the next dose is due. This can be done by regular assessment and drugs prescribed for prn so nurses can treat pain that occurs before the next dose of treatment is due.

> *"…the problem l see is the breakthrough pain that many nurses are afraid of the breakthrough pain management and maybe we should incorporate that into our care because it's not every patient will complain within that four hours that l am having extra pain but those who are complaining, we should effectively assess them and try to give that break through pain management" (N4).*

Dirby *et al*. (2008) found that pain intensity evaluation, administration of analgesics and re-evaluation was helpful in reducing patients' pain scores, among other things. Pain intensity should therefore be evaluated often and re-evaluated to determine patients who still have

pain after prescribed analgesics are given. Assessing the patient's pain every 30 to 60 minutes, for the need for rescue doses of analgesia for breakthrough pain, is appropriate (Pasero, 2003). Breakthrough doses of analgesia should be prescribed as needed (Wong et al, 2004)

- *Individualising pain management* - As discussed above, nurses mentioned that patients have different pain thresholds and this is supported by research. Pain management can be improved by individualising it (Strobik *et al.*, 2010; Ahlers *et al.*, 2012). The nurses said:

  "I think all patients should be treated individually and no two patients are the same" (N9).

  "...I think the best we can do is to individualise the kind of pain management we meter out to them and that will help to properly manage their pain" (N4).

According to literature, individualised titration of analgesia in the ICU is associated with shorter ICU and hospital length of stay and lower mortality (Strobik *et al.*, 2010). Another study also found that individualised dosing regimen of analgesics by implementing pain titration protocol will lead to lower incidence of unacceptable pain at rest (Ahlers *et al*, 2012).

- *Use of protocols* - The nurses wished for protocols to be developed to improve pain management. Six nurses (N1, N4, N6, N9, N11, N12) shared the same view.

  "*I think they should be a protocol for pain management on the ward…l think getting a protocol is very important" (N12)*.

  "I also second the fact that a pain management protocol should be developed and followed to manage our patients in the ICU" (N9).

Mansouri *et al*. (2013) found that the use of pain management protocols reduced the duration of ventilator support, length of patients stay in the ICU and mortality rates in critically ill patients. Other nurses also gave their views on the fact that a pain management protocol would improve pain management. They said:

- *Pain Assessment before treatment* -According to the nurse participants (N2, N8), pain management can be improved by assessing pain before treatment.

  "… I think that for the management if we able to assess our patients pain well, it will go a long way to help us rather than just giving them the drugs..." (N8).

  "I think as the assessment goes, if the patient complains of pain, and the doctor has prescribed an amount to be given, you still need to assess the patient again…. to see if we should even increase or decrease the amount we should give" (N2).

Another nurse wants the "*level"* of the patient's pain to be assessed before analgesia is given, thus not only assessing the pain but also the intensity. The dosage of pain medication should depend on the assessment of the intensity of the patient's pain.

"I think sometimes when the patient complains of pain, we should assess the level of pain. Assessment of the level, although the doctors will be writing the dosage we should give according to our assessment…" (N2).

- *Use of Bed Accessories* - Using bed accessories would improve patient's pain according one nurse.

  "…except that we need more bed accessories to assist in turning patients and lifting patients so that it will make it easier for the patients and the nurses as well" (N2).

- *Research* – Nurses want research into pain management and think it would improve the management of pain.

  "I will encourage research into pain management or pain assessment in unconscious patients; this will help us in ICU to manage our patients accordingly..." (N9).

- *Alternating Pain Drugs* - According to the nurses, alternating pain drugs, would also improve pain management. They suggested the pain drugs should not all be given at the same time, so they do not wear off at the same time. According to the Spinal Gate Theory (Melzack & Wall, 1965), small doses of analgesia administered frequently are more effective than large doses at long intervals, as small doses frequently

maintain a peak level of analgesia in the blood. Thus, giving all drugs at the same time and waiting until they all wear off before giving others is not ideal.

"…we should alternate the pain drugs. I think if we give morphine now and even two hours we should give the Paracetamol …. Sometimes we give the pain drugs at the same time, they all wear off at the same time and the patient will be complaining and we think they are complaining" (N3).

- *Multimodal Analgesia* - Use of Multimodal analgesia was also suggested by the nurse experts. They said:

  "Apart from giving morphine, we should give other medications to help like the Paracetamol, brufen and we should try to give it on time" (N4).

  "We should always combine the medications as they have been prescribed. That is my opinion" (N9).

- *Pre-emptive analgesia* - A number of the nurses (N8, N9, N10, N12, N3) stated that in their opinion, pain management could be improved by preventing pain by means of pre-emptive analgesia.

  "I think every surgical patient needs to be given analgesics before wound dressing because it's very, very painful…" (N8).

  "I always think that pain should be prevented from coming to the patient in the first place, …. If the analgesic is supposed to be given four hourly, you should be giving it and not to wait for the patient to tell you that he or she is in pain or the patient to show that he or she is in pain…" (N9).

More nurses (N10, N12, N3) agreed that pain can be better managed by adopting preventive measures, even in unconscious and sedated patients.

"… even though the patient might be unconscious or sedated, we should presume the patient will be feeling some pain somewhere so we adhere strictly to the laid down

prescription to give it so we don't let the patient go to pain before we arrest it. We adopt preemptive measures" (N10).

- *Patient education before analgesia* - According to some nurses, patients should be informed that they were given analgesia; when patients are not informed, they complain about pain.

  "We nurses should talk to the patients, I am going to give you a pain drug, don't just give. Because when you give them and they are not aware, they think you have not given them anything and they will be complaining. But when you give and you tell them l am going to give you a pain drug and it will take two to three hours to start working … they become aware so they don't complain unnecessarily" (N3)

- *Need for Knowledge on Pain Drugs* - According to the nurse experts, nurses need to have knowledge about pain drugs.

  "We nurses need to know what the pain medicine is going to do..." (N4).

According to Aziato and Adejumo (2014b), Ghanaian nurses have inadequate knowledge in pain management due to curriculum gaps during training, inadequate supervision, inadequate study days and workshops, lack of funding for workshops and a gap between knowledge acquired from workshops and application of the knowledge to practice due to negative attitude of nurses. The knowledge of nurses and nurse managers need to be improved and insight given into post-operative pain management (Rejeh, Ahmadi, Mohammadi *et al.*, 2008). Nurses need to be educated, supported and encouraged to ensure pain relief post-operatively and to see pain relief as a priority (Aziato and Adejumo, 2014a).

- *Use of Non-Pharmacological Methods* - Nurses want the use of diversional therapy to be encouraged as a non-pharmacological method of managing pain, as it *really works.*

  "Moreover, we should encourage more diversional pain relieve methods..." (N2).

4.2.6 Patients Education on Pain

This theme discusses data on ICU nurses practice on pre-operative education on post-operative pain. Two (2) sub-themes were derived from this data, *pre-operative education on post-operative pain* and *methods of improving patient's education on pain*.

4.2.6.1 Pre-operative education on post-operative pain

Whether they give pre-op education on post-operative pain or not, and what they think about it, most nurse participants believe pre-operative education, especially on pain, is necessary but inadequate and there is a need for improvement. Some nurses also think it would be ideal if they had more contact with the patients pre–operatively to give the education. The nurses (N1, N2, N4, N5) said:

> *"I think we don't give any pre-op pain education or how we are going to manage their pain... Now that you've talked about it, l think it's a very good idea. It will allay anxiety, it will make the patient more relaxed, knowing that even when l go and l come back, my pain will be well managed and l think it will help our surgical patients a lot so l think it should be done pre-op" (N5).*

A nurse expert said they used to give pre-operative education in the ward but due to workload they stopped, but with the prompting of the researcher, they are considering starting again.

> *"Formerly we used to give the education. We go to the ward pre-op, talk to them tell them what they are going to go through, they are times we used to bring them to the ICU, show them the ventilators and other things but it got a time because of the workload, we stopped maybe we have to start again" (N1).*

> *"I think most of the patients that go from us to the theatre are not educated on pain. I think we should educate them l think so but it's the time because we don't have time" (N11).*

Literature affirms the role of pre-operative education on better patient outcomes (Sethares, Chin & Costa, 2013; Kol *et al.*, 2013; Sugai, Deptula, Parsa *et al.*, 2013). CT-ICU patients reported pain lasting longer than they expected and expressed the need for more education

about activity and pain management strategies (Sethares *et al.*, 2013). Pre-operative thoracic pain management education and analgesics administered before the onset of pain reduced the amount of analgesics used in the first 48 hours after surgery (Kol *et al.*, 2013). Pre-operative education and management of pain reduces pain scores after surgery and decreases the duration of pain. Education was also found to minimise narcotic analgesics after surgery (Sugai *et al.*, 2013) and reduce anxiety and depression in cardiac surgery patients (Guo *et al.*, 2012).

Other nurses stated that the pre-operative education is not enough. The challenge with pre-operative education, according to some nurses (N8, N9), is that they have little contact with the patients; it would be better if the patients were brought briefly to the ICU before theatre.

> *"I always say that our pre-op is not too good because we don't come into contact with them (patients) much…But ideally I think we should bring them up here…" (N8).*

Other nurses (N2, N3, N7, N8, N12,) said that educating the patients would "*psyche them up"* and "*allay anxiety*," because the education given currently is not adequate and there is a need for ICU nurses to "*have a go at it."* They also confirmed that shortage of staff is also a challenge to giving pre-op education.

> *"Yes, the patients should be informed about what they are going to expect in future concerning pain because when we inform they psyche themselves towards the pain and that will even help the patient to control his or her behavior… I think it is time that the ICU nurses also have a go at it but it is still all due to shortage of staff when we get enough staff, l think it can be well done" (N2).*

Another nurse thinks pre-operative education would "*keep nurses on their toes"* because the patients can prompt nurses if pain is not being managed according to the education given.

> *"…we should be able to explain to them before they go, another side is that it will also keep the nurses on their toes, even if they forget, the patients will prompt them that you said you will give me (analgesia) before l went so it will be a check on the nursing practice so I think that it's a very good idea" (N7).*

4.2.6.2 Methods of improving patient's education on pain

Nurse participants, in their expert opinion, stated ways pre-operative education on post-operative pain can be improved. This should be considered when educating patients on pain before surgery.

> *"l think as nurses… we should be educating the patients on pain and how we manage it. We should tell them that we have pain drugs and we are going to give them so anytime they are in pain, they should call" (N3).*

> *"… I think we should be talking to them about the position they will lie down if they come, all that we don't talk to them about. I think we should be talking to them about those things" (N10).*

Nurses suggested that patients be told pre-operatively about non-pharmacological methods that can help in the management of their pain.

> *"…. that apart from the pharmacologic way of relieving pain, they are other ways of doing them so that they will know that apart from medicine, I can watch a movie, l can take a walk, l can read a book so that they get used to it…if they are educated and they know that watching …listening to music can even relieve some form of pain, they will just co-operate with you so l think that health education will help" (N1)*

4.2.7 Summary of Main Findings Arising from Focus Group Discussion

This section states the main findings from the focus group interviews with ICU nurses and includes the following:

- There are patient related factors, according to the ICU nurses, that influence pain management in the CT-ICU in Ghana. These include patient's fear of reporting their pain to healthcare professionals though they may be in pain and patients complaining about pain because of their low pain threshold. Nurse related factors include nurses' perceptions, biases and myths about patients' pain, which influences their management of the patient's pain. These include nurses fear of patients getting

addicted to pain drugs, the fact that nurses believe that pain is a psychological experience and patients need to be psyched up to endure pain, nurses believe that patients can exaggerate their pain to get attention from health professions, patients don't tell the truth about their pain because they don't know how to describe their pain and some patients misbehave when they are in pain. The nurse participants believe that some of their colleagues have a negative or bad attitude towards pain management. They also believe that pain management is not always adequate and patients are left in pain. According to the nurses, inadequate pain management is experienced by extubated and sedated/unconscious patients because they are perceived not to be in pain.

- Pain is not assessed before treatment, and analgesics and anaesthetics given during invasive procedures are not always adequate and insufficient to treat the patients' pain.

- Information emanating from the data also determined that various hospital related factors influence pain management, as doctors have to be convinced before increasing analgesics even though nurses are the ones by the patients. Nurses have a problem with prn prescriptions, as they worry that if any adverse effect occurs they will be held responsible. Lack of protocols to direct the management of pain is also a challenge. The time allowed for relatives to visit patients is also inadequate as the patients' relatives visiting can divert the patients' attention from the pain.

- Cultural factors also influence pain as culturally, men are not supposed to express pain and women in labour are not to express pain as pain during labour makes them mothers or women. This influences patients' expressions of pain and in turn, how nurses relate to patients' pain. Nurses are influenced by the cultural perception that patients are supposed to tolerate pain.

- Nurses identified many nursing procedures that cause patients pain. The procedures themselves are not negative, but the fact they cause so much pain means that pain is not treated before or during the procedures. The procedures identified include, bed bath, turning, wound dressing, positioning, suctioning, male catheterisation,

physiotherapy, ambulation, types of plasters used and removal of stitches. Medical procedures (done by doctors) that cause pain also include procedures done under local anaesthesia, taking samples, chest tube insertion, intubation and removal of intercostal tubes.

- Nurses, according to the data, consider the type of surgery, diagnosis and type of admission in the management of pain therefore individualise pain. Some of the nurses mentioned they were doing well in the management of their patient's pain and identified the positive effects of giving analgesics, which shows they know that adequate pain management will improve patient outcomes.

- Nurses also mentioned how they assess pain in verbal patients. According to the data generated, they normally assess verbal patients' pain by asking them "*Are you in pain*," however assessment of pain intensity is not done routinely. Some nurses use the patient's facial expression and vital signs for pain assessment. No assessment tool is used and one nurse mentioned they do not do any assessment at all. Some nurses use the observations they make during procedures for pain assessment.

- In non-verbal patients, pain is assessed according to the data generated mostly by using vital signs and sometimes, facial expressions to assess non-verbal patients' pain. No assessment tools are used thus there is no assessment of the intensity of the patients' pain. Nurses presume patients are in pain and use their own discretion or initiative, which are all subjective to assess the non-verbal patients' pain.

- Nurses do not seem to have much knowledge about pain management tools that can be used in the ICU. They mentioned tools by description and not name and some of the tools mentioned are not pain assessment tools and cannot be used in the ICU.

- Nurses mentioned evidence based methods that can improve pain assessment. According to the ICU nurses, the use of pain assessment tools would improve pain assessment, nurses must believe the patient's self-report of pain and not use their own discretion in pain assessment, nurses are supposed to advocate for their patients for improved pain management based on their assessment of the patient's pain.

Nurses must also employ the skills of observation to improve pain assessment according to one nurse. Pain assessment must also be documented to improve pain assessment and communicate pain assessment to other health professionals. Use of protocols, according to the nurses, would also improve assessment.

- Pharmacological methods employed in the research setting included the use of opioids, especially morphine and fentanyl; non-opioids such as paracetamol and NSAIDs are also used. Epidural methods of administration of pain medication are sometimes used as well. Morphine is normally prescribed 4mg 4 hourly and paracetamol lg 6 hourly. Morphine mixed with midazolam is sometimes given, according to some of the nurses. However, one nurse mentioned that they give the analgesia to calm the patient before giving the sedation as suggested by literature. Oral analgesics are sometimes prescribed when patients can tolerate it. Nurses stated they sometimes give pre-emptive analgesia, but it is routine; some mentioned they give it before or after procedures, therefore it is not routinely given before procedures.

- Non-pharmacological methods are employed by ICU nurses, according to the data generated, and they find them effective in complementing pharmacological management of pain. The non-pharmacological methods employed include explanation of the patient's condition to the patient, reassurance, massaging, tender loving care, positioning, chest splinting during coughing, use of hot water bottles and hot fomentation and diversional therapy, which included music, television, talking to the patient. They also use physiotherapy and doing procedures slowly as non-pharmacological methods for pain management.

- Measures that will improve pain management, according to the ICU nurses, include the use of guidelines for pain management, analgesics should be given as prescribed and breakthrough pain should be treated. Pain management, according to the nurses, must be individualised. The use of protocols would also improve pain management. Pain must be assessed before management and assessment of pain intensity must be carried out. Research into pain management must be encouraged to improve pain management, and analgesics alternated and not all given at the same time. Pre-emptive analgesia must be routinely given and patients educated on analgesics before

they are given. Nurses also need knowledge on pain drugs to improve pain management.

- The nurse participants agreed, largely, that patients' pre-operative education on post-operative pain is not routinely done, but they believed it would benefit patients and reduce their anxiety and promote co-operation. Some nurses believed the pre-operative education given by doctors and ward nurses would be done better if also given by ICU nurses. Patients need education on drugs, positions they will lie in and non-pharmacological methods that can help with pain management

4.3 INDIVIDUAL INTERVIEWS WITH ICU DOCTORS

This part focuses on the individual interviews with CT-ICU doctors. The same interview guide and methods were used for both the doctors and nurses. Each doctor was asked to complete a questionnaire with his demographic data and analgesics they use in the CT-ICU before the interview was carried out.

4.3.1 Demographic Data of Doctor Participants

The demographic data section comprised of nine items related to the CT-ICU doctors, which were obtained through self-administered questionnaires *(Appendix D).* This was inclusive of research codes, gender, age, professional qualification, years of professional experience, period worked in ICU and period working in CT-ICU. The doctors were asked to identify the analgesics they use in the ICU and standard analgesics they give to patients according to the CT-ICU protocol. Research codes were assigned by the researcher to all participants, to ensure anonymity and confidentiality. Random numbers were used as codes and ranged from one to eight (D1- D8). Table 4.4 gives a summary of the doctors' demographic data.

The demographic data was reported in ranges to ensure anonymity and avoid labelling. All eight ICU doctors who participated in the individual interviews were male and their ages ranged from 31 to 60 years. Of these eight doctors, one was a resident at the CT-ICU, three were anaesthesiologists, two were senior registrars, one (1) a cardiothoracic surgeon and one (1) a senior specialist. Number of years of professional experience ranged from six years to 24 years and the number of years of ICU experience ranged from three years to 14 years.

Table 4.4 Demographic data of doctors

Research Code	Gender	Age Range	Professional Qualification	Years of Professional Experience	Period in ICU (years)	Period in CTICU (years)
Doctors 1-8 (D1-D8)	Male	31-60	Resident CT-ICU Anaesthesiologists (2) Senior Registrars (2) Cardiothoracic Surgeon Senior Specialist	6-24	5-14	3-14

4.3.2 Analgesia Availability

The doctors were asked to state the analgesics available in the CT-ICU where they practice and the analgesics they give to patients according the CT-ICU protocol. Varied responses were given and presented in Table 4.5.

Table 4.5 Analgesics

Research Code	Analgesics Available in the CTICU	Standard Analgesics Given to Patients (According to CTICU Protocol)
D1	Morphine,Tramadol, Tab Paracetamol Suppository Paracetamol, Diclofenac	Morphine, Paracetamol
D2	IV Morphine, IV Paracetamol Suppository Paracetamol, Diclofenac	IV Morphine,IV Paracetamol Suppository, Paracetamol, Diclofenac
D3	IV Morphine, IV Paracetamol Suppository Paracetamol, IV Pethidine, Suppository Diclofenac	IV Morphine,IV Paracetamol Suppository Paracetamol IV Pethidine, Suppository Diclofenac
D4	Morphine, Parcetamol, Diclofenac, Ibuprofen, Bupivacaine	IV Morphine, IV paracetamol
D5	Morphine, Fentanyl, Paracetamol	Morphine, Paracetamol
D6	NSAIDS, Morphine, Fentanyl, Pethidine, Tab Paracetamol, Suppository Paracetamol IV Paracetamol, Tramadol	No written protocol yet
D7	Morphine, Paracetamol, Fentanyl	Morphine, Paracetamol
D8	Morphine, IV Paracetamol, Tab Paracetamol, Diclofenac, Tramadol	Morphine, IV Paracetamol Tab Paracetamol

4.3.3 Contextual Findings and Discussion

This section presents the findings of the individual interviews with ICU doctors. The findings are discussed in detail and supported by verbatim excerpts from the interviews. Main themes are discussed and supported by subthemes for clarity. Citation of relevant literature is used to further explain or support findings. As ICU nurses and doctors were

interviewed using the same interview guide, similar themes and subthemes emanated from the data. Three main themes were identified in the analysis of the interviews with 10 sub-themes. A summary of themes and sub-themes are presented in Table 4.6.

Table 4.6 Themes Arising from Expert Interviews with Doctor Participants

Main Themes	Sub-themes
4.3.4 Medico-socio-cultural factors that influence pain management	4.3.4.1 Negative Factors 4.3.4.2 Positive Factors
4.3.5 Pain assessment and management practices	4.3.5.1 Pain assessment practices in verbal patients 4.3.5.2 Pain assessment practices in non-verbal patients 4.3.5.3 Measures that will improve pain assessment 4.3.5.4 Pharmacological interventions 4.3.5.5 Non-pharmacological interventions 4.3.5.6 Measures that will improve pain management
4.3.6 Patients education on pain	4.3.6.1 Pre-operative education on post-operative pain 4.3.6.2 Methods of improving patient's education on pain

4.3.4 Medico-Socio-Cultural Factors That Influence Pain Management

These factors, which were identified by doctors, are related to patients, the doctors themselves, the system in the hospital where they work and cultural factors that influence their pain management. Sub-themes arising from this theme included *positive* and *negative* factors.

4.3.4.1 Negative factors

These are factors, which were found to influence the management of pain negatively, according to the data obtained from the doctors. As with the data collected from the nurses, it was found that patient related, doctor related, nurse related, health system and cultural factors all negatively affect the management, with some procedures also contributing to pain.

- *Patient related factors* - Patients reluctant to report their pain were reported by doctors, as well as by nurses, in their focus group interview. As seen in the interview with the nurses, that patients are expected to have pain and patients may believe that

pain is expected so they find it unnecessary to report the pain but rather *endure* it. Some doctors (D1, D8) shared similar sentiments.

"Patients are supposed to communicate and at times you don't hear them say… some will just keep the pain, you know they are in pain…but they will not say anything (D1).

"Yes, pain is subjective…They are supposed to communicate and at times you don't hear them say anything" … (D8).

- *Doctor Related Factors* - Doctors confirmed that the fear of overdose and sedation influences their management of patient's pain. According to one doctor (D2), when a patient is overdosed or over-sedated they need more attention in terms of monitoring. Thus, patients are not given analgesia regularly due to fear of overdose and to keep them awake. He said:

  "… if analgesia is given regularly at regular intervals, it will work better. The only problem is that over here, we are always worried about one ***overdose*** *and then two, if you give a lot and the patients are sedated, then they need more attention in terms of monitoring, in terms of nursing care and all that so we want the patient to be a little bit more awake so we sort of prolong the intervals" (D2).*

There is a misconception about children and sedated patients and that appears to be a factor influencing their management of patient's pain. Misconceptions that children and the unconscious do not have pain are real and need to be addressed. A doctor said:

"There is a misconception that children and sedated patients don't feel pain. It's a wrong thing in our environment that children… don't feel pain. They are not able to express it but they feel pain ... Children feel pain a lot. No, it's not true that pain threshold of children is higher" (D3).

There is a lack of uniformity among the anaesthetists who run the ICU and no collaboration among doctors, because apparently, their *"bosses"* find nothing right in what the "*juniors*" say or do. One doctor said:

"… we have different anaesthetists and the way they want things done and it's not uniform…. so, once it's not uniform, we have a problem…we still have people who are and still think differently once they are your bosses and where, once coming from a junior person, it doesn't make it right. Whatever, comes from the senior most is what everybody expects to do…" (D5).

Subramanian *et al* (2011) found that limited autonomy was a challenge in the management of pain. Teamwork that creates a positive environment for every healthcare professional could lead to improved management of pain, which would lead to patient satisfaction (Meterko, Mohr &Young, 2004). Lack of collaboration, thus teamwork, between junior and senior doctors could have a great impact on patient care in the ICU as the junior doctors may feel unappreciated and intimidated by senior doctors and therefore lack motivation to give their best. Adequate pain management requires teamwork, thus the need for collaboration among the health team to promote the patient's welfare. One doctor further explained the lack of collaboration with the statement that he feels "*remote controlled".* He said:

"…we live like we are being remote controlled meanwhile, the level of care and the people around and you think this fellow is better at managing the pain but it should not be individualized, it should be something that is universal, something that is standard that anybody coming in will know where we can follow…" (D5).

"…We need the whole team of doctors and nurses to work together to achieve results. Teamwork is sometimes a problem here" (D6).

Another doctor also thought that pain assessment was a nursing role. Research however states that effective collaboration among health professionals could enhance post-operative pain management in Ghana (Aziato & Adejumo, 2013). Pain assessment should therefore not be considered as the role of the nurse only, since pain management takes a team effort. A multidisciplinary and patient-centred continuous quality improvement process is essential for identifying barriers and in implementing evidence based solutions to the problem of undertreated pain in critically ill patients (Pasero, Puntillo, Li *et al*, 2009). He stated that:

"… assessing the pain is more of a nursing role…" (D3).

Erdek and Pronovost (2004) found that doctors assessing patients pain and reforming their clinical forms to include sections for patients' pain scores greatly improved pain scores of ICU patients. Thus, pain assessment should not be for nurses only, doctors need to assess and document pain assessment to improve pain management.

Some doctors had negative impressions about how pain was managed in the ICU. The doctors thought that pain management was inadequate. They (D1, D3, D4, D5, D8) said:

> *"… Is at times when we do the small thoracic cases like we do a PD or we do a BT shunt ...we don't give the perfuser but we give them prn when the patient wants it. That is where l believe we are running short in terms of managing pain, the thoracic cases" (D1).*

Another doctor (D5) said patients need not be sedated all the time, but they are always sedated because they are always in pain. He said:

> *"I mean that patient pain is not well controlled, anaesthesia is not well controlled… Patient can be on ET tube without being sedated and then comfortable if the pain is ok and is not secreting a lot but we must sedate the patient because they are in pain" (D5).*

Pain management, according to one doctor (D8), post-extubation is not adequate. Pain is not adequately managed post-extubation because it is assumed patients are no longer in pain. This assumption can be from doctors and nurses. Lewis *et al* (2015) also found that bias existed towards treating unconscious and mechanically ventilated patients He said:

> *"When the person is on the ventilator, I think the instructions are adhered to but probably once the person is extubated and they start feeding, they may be in pain because it's a sternal wound and it takes a longer time to heal. Probably that is where those lapses will come because the assumption will be that the person has been extubated so they have no pain…" (D8)*

- *Nurse related factors* - Doctors also stated that sometimes, even when they prescribe drugs, it is *"skipped*" for fear of addiction. Since drugs are administered by nurses,

it is assumed that the fear of addiction is on the part of those administrating the drugs, thus this is a nurse-related factor that affects the management of pain according to the doctors. Fear of addiction is frequently reported as both a provider and a patient barrier to effective pain management (Sullivan & Ferrell, 2005). The nurses in the previous interview also stated that fear of addiction was a factor that negatively influenced their management of the patient's pain.

"I think that people will adhere and then we have the protocols designed and pasted there because sometimes when you even write, it is skipped by assumption that this person likes or is demanding they will get addicted that is one of the things that they develop an addiction to some specific opioid analgesics" (D8).

Another doctor said that patients do not get enough analgesia because nurses do not follow the doctor's prescriptions; they expect the nurses to call them if they are "*not comfortable with the prescription and not assume"* that the patient is not in pain.

"…the patient is not getting adequate analgesia because they are not following the instructions from the doctor. So, what the doctor has written if you are not comfortable with it the call facility here is excellent just a matter of calling…. but not assume that he is not in pain. No, you can't determine… (D2).

The doctors also reported on the negative attitude of some nurses, which influenced pain management. He mentioned the attitude towards pain is something "*nurses need to pay attention to."* He said:

" *And somebody (a nurse) will say l just gave morphine and it's not due but in-between, you walk in and like l said previously the heart rate is going up, blood pressure is going up meanwhile there is no reason why these things should go up …but you don't have to take things for granted …Somebody is very tarchypnoea, there is no reason for that patient to have tarchypnoea so this are some of the things that the nurses need to pay attention to" (D3).*

- *Health system factors* - The doctors identified factors in the management of the hospital that influenced their management of patient's pain. Nurses shared similar

sentiments. It is therefore imperative that protocols be developed in the ICUs in Ghana to promote pain management. The doctors (D5, D1, D6, D8) mentioned the effect of lack of protocols on their pain management.

"...If you want to develop, we follow systems, we follow protocols, we don't have that yet. I don't know whether you have heard this, we all want to make things look good as if the systems are working but we still have deficiencies that need to be corrected…" (D5).

Batiha (2014) found that hospitals' policies and rules were barriers to the management of pain. Most of the doctors found lack of protocols and systems as a factor that negatively influenced their pain management. The useful effect of protocols on improving pain management in the ICU has been documented (Mansouri *et al*, 2013).
The doctor again said that because they do not have protocols, patients are mostly sedated and on narcotics.

"…we do not have a protocol… most of them are sedated and are always on narcotics…" (D5).

"… As l said, we do not have intensivist, we have anaesthetist, who act as the intensivist... and in proper systems, we work through systems and we use protocols that guide practice for the advancement and betterment of our clients" (D5).

Doctors also reported lack of equipment as a factor that influences their management of pain negatively. Riviello, Letchord, Achieng and Newton (2011) stated that equipment and support services are some of the key areas of consideration in developing critical care in resource poor settings. The local setting of this study does not use patient controlled analgesics in the management of patient's pain.

"There are other things that we can employ, one will be to get reliable infusion pumps dedicated for the regional techniques …the other one is to get a PCA or nurse controlled analgesia" (D2).

The efficacy of analgesics for pain management, especially in Africa, was of concern to the doctors. Doctors identified that the efficacy of some of the analgesics cannot be assured, thus patients are in pain when put on oral analgesics. The challenge of fake drugs seems to be a worldwide phenomenon but seems more widespread in Africa. One doctor said:

> "*... in Africa, you can't be too certain especially the Paracetamol that we have you can't be too certain of the efficacy because l know there is a brand called Tylenol which is very good. Often times we have to switch our patients to Tylenol and they have done well on that…" (D4).*

Another negative factor in the health system, according to the doctors, is the poor adherence to prescriptions and the patient's inability to afford pain medications that are not on the National Health Insurance. Cost of healthcare is another factor that negatively affects the management of pain in the ICU. According to Chaibou, Sanoussi, Sani *et al*, (2012), poverty among other things contributes significantly to the underutilisation of post-operative analgesia.

> *"... you see a lot of the patients complaining of pain one because they probably are not able to buy the pain medications and the other thing, there is poor adherence to the pain management regimen that we prescribe and the other thing too is that some of the pain medications are not on National Health Insurance and it becomes a problem getting the drugs" (D8).*

Another health system related factor, according to the doctors, is that cardiac patients seem to get better treatment at the cardiothoracic centre compared to thoracic patients.

> *"…most of cardiac cases get the best of this centre. The thoracic don't get much…the thoracic cases, normally we don't do much" (D5).*

- *Cultural Factors* - As found during the interview with nurses, the Ghanaian culture has an effect on pain management. The doctors said:

  "Some tribes believe that the ability to endure pain you know makes you a man so for them, they hardly complain. I would think, especially those from the North, they

would hardly complain of pain. The same procedure, the same age, the same number of post op days they are more comfortable, not demanding so much of analgesia. Others would demand even analgesia when in the least movement; they would complain of pain" (D8).

"... you know our culture some will just keep the pain…" (D1).

- *Surgical procedures that cause the most pain* - Most of the doctors said thoracotomies and sternotomies were the most painful surgical procedures CT-ICU patients undergo. Literature states that patients after thoracotomy suffered moderate to severe pain and experienced extremely high interference with daily activities (Yin, Tse & Wong, 2012). The researchers also found there was inadequate treatment of post-thoracotomy patients' pain. All doctors (D1-D8) mentioned procedures they thought were most painful for patients.

  "…Essentially you will say that thoracotomy wounds are most painful…" (D5).

  "Thoractomies are more painful than the stenotomies so l will say thoracotomies are more painful because we have to open the ribs," (D6).

As mentioned earlier, the procedures in themselves are not negative but rather therapeutic. The fact they remain quite painful, according to the doctors, after so much advancement in medicine makes it negative. Doctors (D1, D4) stated that the patients who complain most of pain are the thoracic patients. They said:

"For what we do, we believe that the stenotomies give more pain ... but the ones who complain of pain is the thoracic cases…" (D1).

Doctors (D2, D7) also mentioned that abdominal surgeries in addition to chest surgeries cause pain.

"They do thoracotomies they get a lot of pain, we do stenotomies they get pain. These are the two main things we do occasionally we do laparotomy. But thoracotomy and stenotomy" (D7).

Chest tube insertion, according to some doctors (D3, D8), was also painful. They said:

"…and then of cause when you pass chest tube, the site of insertion is also another problem" (D8).

4.3.4.2 Positive factors

This sub-theme describes factors according to the data that positively influences pain management in the ICU. Having nurse supervisors, adequate pain management, knowing the effects of analgesics, role of anaesthetists in pain management, understanding the positive effects of analgesia, knowing indications for types of pain medication are positive factors that influence the management of pain.

- *Nurse Supervisors* - Doctors also believe that having nurse supervisors is a factor that ensures pain medications are given as prescribed.

  "…l think the nurses also have supervisors that also go through with each shift they have to hand over so I think they are given as and when due" (D4).

According to Aziato and Adejumo (2014b), pain management education for practicing nurses, with regular monitoring and evaluation of the impact of the education given, will promote post-operative pain management in Ghana. Supervision will therefore constitute monitoring which will enhance pain management.

- *Adequate pain management* - Doctors (D1, D2, D3, D4, D6, D7) believed they were "*doing their best*" and their *pain main management is generally good.*

  "…I think we are doing our best" (D3).

  "I think the pain management is quite adequate" (D4).

According to another doctor, although they are not doing badly, they could improve. He said:

"For now, I think we are above average we are not doing too badly…But once somebody can have pain I think we can improve" (D6).

- *Effects of Analgesics* - Doctors appreciated the positive effects of analgesics and the consequences of inadequately managing pain. It is therefore positive that doctors were mindful of these effects.

  "…For cardiothoracic, we are dealing with the chest. If you have pain, the risks are clearly obvious the persons work of breathing will be affected, he will not be able to expectorate, risk of chest infection, if it's an adult you are concerned about DVT, pulmonary embolism and chest infection also and so good pain management, the person has a good work of breathing and then the person can expectorate so you have good post-operative outcomes. Once we deal with the chest, we should be very comfortable and confident in giving analgesia so we avoid all the complications associated" (D8).

He again said:

> *"As l said, because it's the chest, the person does not have adequate analgesia, respiratory effort is poor, you can easily develop pulmonary embolism, chest infections and* ***prolonged stay in the hospitals*** *and all that and even proceed to develop par pneumonic effusion, will be lying in bed and all that because of pain" (D8).*

Literature has extensively documented the effects of untreated pain to include an increase in cardiac work and oxygen consumption, increased stress hormone response, which results in catabolism with sodium and water retention, and hyperglycemia, which leads to immunosuppression and delay in wound healing. Ineffective cough and retention of secretions leads to reduced oxygenation and infection. Pain also leads to delayed weaning from ventilation, increased risk of chest infection among patients, prolonged ICU stay and poor quality sleep (IASP, 2010).

- *Role of Anaesthetists* - Anaesthetists seem to play a big role in the management of pain in the ICU, according to the doctors interviewed. They act as intensivists since there is none in the ICU. The role of the anaesthetists according to the doctors (D1, D3, D7) interviewed enhances pain management.

"… The anaesthetist they stay there throughout so they take chairs, they sit and they are with the patient…" (D7).

- *Indications for types of pain medication* - Doctors consider patients' diagnosis and type of surgery in their management of pain. This is positive, as literature emphasises the positive effects of individualising pain management. The same was found in the interviews with the nurses, consideration was given to types of surgery or diagnosis in the management of the patient's pain. The following are their statements:

  "It depends on the type of surgery, usually if it's a thoracic or an upper abdominal, then we combine regional technique with IV modality or suppository" (D2).

  "Yes, in the ICU we have it depends on the procedure that was done but usually we set the analgesics usually an opioid plus Paracetamol…" (D8).

The stability of the patient's condition also determined what pain medication was given.

"Once we finish the case we start with the morphine if it doesn't drop the BP or if the patient is not stable enough then maybe we continue with the anaesthesia drugs …" (D1).

According to the doctors, NSAIDS are not used routinely for open-heart surgery patients in the ICU for fear of too many side effects (D1) and it may increase bleeding tendencies (D4). Literature states that NSAID cannot be used because it has a high risk of provocation in patients who are haemodynamically unstable or with renal dysfunction (Ahlers *et al*, 2013). NSAIDS are therefore not routinely used in cardiac surgery patients for these reasons.

"NSAIDs are not used here routinely especially for the open-heart surgeries there is this fear that it may increase bleeding tendencies…if the patient has some dyspepsia or so then in adults, we tend to shy away from it because of the risk of causing dyspepsia or gastric ulcer or peptic ulcer in general is higher in adults…" (D4).

Management sometimes also depends on the severity of the patient's condition. Doctors (D6, D1) said:

"Management usually depends on the response at times or what we get from the patient one or depending on what we assess to be the severity of the condition that the patient may be having." (D6).

4.3.5 Pain Assessment and Management Practices

This theme describes how doctors assess and manage the ICU patient's pain. Pain treatment cannot be done effectively without assessment; therefore, pain assessment goes with pain management. The theme had six sub-themes that are discussed below.

4.3.5.1 Pain assessment practices in verbal patients

Doctors, as seen in the nurses' interviews, use the patient's verbal report to assess their pain - no pain assessment tools are employed. The doctors mentioned how they assess pain in verbal patients (D6, D5, D1):

"Pain as we know is subjective, if patient is able to talk and tells you I have pain and then you administer and the pain is gone, you can be happy although it's not a standardized …" (D6).

"…normally the verbal one is when you are in pain, you ask them if they are in pain but it's not a protocol thing" (D1).

Apart from using verbal reports, they also use facial expressions to assess pain in verbal patients.

"If patient is conscious and awake, we usually will ask the patient whether the patient is in pain or not and that is the most objective assessment we use and of course we use facial expression" (D2).

Almost all the doctors (D1 - D8) stated they do not use any pain assessment tool in the assessment of pain intensity in verbal patients.

"Basically, we don't have any tools for pain assessment" (D3).

According to the doctors (D1, D5), there is no rating of intensity of patients' pain:

> *"No, we don't… We don't ask them to rate the pain they just tell us whether they are in pain…" (D4).*

One doctor has not come across any pain assessment tool although he has seen them on the internet. He said:

> *"No assessment tool… I have not come across one you only see it on the net but l have not seen them use it" (D8).*

Some of the doctors said that although they do not have any pain assessment tools, they sometimes use the numerical scale or visual analogue scale. No assessment tools were available in the ICU according to the nurse in charge and the researcher's observation. What they use in the assessment of the pain cannot therefore be confirmed. They said:

> *"…For those who communicate, the numerical scale is something we use a lot" – (D6).*

> *"Yea we use the visual analogue scale, a scale from 1-10 but most of the time…we just ask the patients whether they are in pain or not without necessarily going through the scale." (D2).*

A surgeon (D7) said they do not assess pain at all because analgesia is routine.

> *"… if the patient complains we don't specifically ask are you in pain? Because we give them routine pain relieve its routine so when the patient complains then the prn come in" (D7).*

> *"… from my point of view as a surgeon we do not actually even assess and l am not aware if our intensivist or anaesthetists do…but we don't particularly assess for pain…" (D7).*

4.3.5.2 Pain Assessment Practices in Non-Verbal Patients

The doctors predominantly use the patients' vital signs to assess their pain. No tool is used for assessment in non-verbal patients. Some doctors (D1, D4) said:

> *"Yea, those who cannot talk especially those that are intubated, ...we also look at the vital signs to know. Once like the pulse rate and respiratory rate those can be indicators of whether a patient is in pain or not…" (D4).*

The doctors (D2, D5, D7, D8, D1) stated they do not use any pain assessment tool, but rely on vital signs:

> *"No, we don't have any tool at the moment for non-verbal patients and with patients who are intubated..." (D2).*

Some of the doctors (D1, D3) rely on analgesics to do an effective job in managing the pain and therefore do not do any assessment, but occasionally use the vital signs.

> *"So, we go strictly by our pain relieve chart that we give so if the drug is written every four hourly, we make sure every four hourly you get it, if its six hourly he gets it. Occasionally, we look at the monitor if somebody is having an unexplained tachycardia or the blood pressure is going high you can't tell if this patient might be in pain…" (D3).*

One doctor (D6) relied on the patients' behavioural patterns, in addition to their vital signs, to assess pain:

> *"Those who do not communicate we tend to look at their behavioural patterns and also looking at their… blood pressure, heart rate, vital signs yea" (D6).*

Those who cannot verbalise pain but can write were given a pen to write.

> *"A few patients who cannot communicate verbally but can write, at times we give them pen to also put down stuff" (D6).*

4.3.5.3 Measures that will improve pain assessment

These are measures, which will improve the assessment of the patient's pain according to the doctors. The doctors (D1, D2, D3, D4, D8, D5) believe that implementation of pain assessment tools, among other things, could help to improve pain assessment.

- *Use of pain assessment tools*- Assessment of pain according to the doctors would assist them in knowing how much analgesia to give to patients.

  " .... now talking to you, l realise that we don't have any tool to assess pain. So, if they are any modality like that that will help us to assess our patient's level of pain, so you know who to give X dose of morphine and Y dose of morphine who you have to do a combination dose of therapy and if you don't have that then all is by guessing..." (D1.)

  "...So, the use of the pain assessment tools for verbal and non-verbal patients will be very helpful" (D2).

One doctor thought boldly displaying assessment tools in the ICU would encourage health professionals to determine what they will base their assessment on.

"To improve our assessment, it's very necessary to have an assessment tool boldly displayed and they can say based on 1, 2, 3, factors, this person qualifies for A or B yes" (D8).

- *Documentation* - According to the doctors (D2, D4), *documentation* of pain assessment would promote effective pain assessment.

  "We need to draw charts; I know they are pain assessment charts and document pain assessment" (D4).

Erdek and Pronovost (2004) found reforming doctors' forms to include sections for documentation of pain scores, among other things, improved pain management and patient pain scores in the ICU.

- *Adding pain as the fifth vital sign* - Pain assessment should be added to all charts, according to one doctor (D8), so that pain can be assessed after assessing vital signs, thus making it a part of the regular monitoring of the critically ill patients. According to the Joint Commission on Accreditation of Healthcare Organization (JCACHO), pain should be added as the "fifth vital sign" and should be diligently monitored along with blood pressure, respiration, heart rate and temperature (JCACHO, 2004).

  "... pain assessment should be added maybe on all the charts so maybe after checking the pulse, respiratory and all other things, there is a pain management scale that the nurse will also take so that whoever is seeing will also take and then it becomes a part of our assessment of the patient" (D8).

- *Critical observation of patients* - Critical observation of patient's parameters by nurses would improve assessment, according one doctor. It must however be noted that the observation of a patient must also be carried out by doctors since pain management is a team effort.

  "So, for here in the ICU, critical observation, looking at your parameters that can tell you that this patient is in pain your blood pressure, heart rate, respiratory" (D3).

- *Standardising pain assessment* - According to one of the doctors, pain assessment should not be individualised by the doctors but standardised, and it must be stated how often pain should be assessed so that all healthcare workers are aware and drugs should not be given routinely every four (4) as that makes them "*strait jackets"* and its "*either here or there*. He said:

  "... because patient is sedated, he may not give you or tell you that l am in pain and you wouldn't get to know if you don't have tools ...but because we don't use the tools, we are like ***strait jackets****, every four hours which shouldn't be so sometimes you see every four hours plus prn which is neither here nor there" (D5).*

- *Regular pain assessment* – The doctor wants pain to be assessed regularly so that the patient does not go into breakthrough pain before pain is assessed. He also believes that assessment of intensity of pain will help to treat pain better. The doctors said:

"How do you manage it better? In managing it better you must be assessing it regularly. You don't wait for the patient to have a breakthrough pain before you give the analgesia…" (D5).

"… I think if we are able to develop a very comprehensive but simplified means of eliciting information from patients such that they are able to really let us know the degree of or the intensity of the pain that they have, we may be able to reach out better. We may think we are doing our best but I think that we could be more efficient if we are able to get a good feedback by way of patients really letting us know the degree or the intensity of their pain and if the analgesia is effective" (D6).

According to researchers, pain assessment in the ICU should be performed regularly and consistently, not only to assess the initial onset and severity of a patient's pain, but also to assess a patient's response to treatment (Slonim, 2004; Mosenthal, 2005).

4.3.5.4 Pharmacological interventions

The doctors mentioned the pharmacological treatments employed in the CT-ICU for pain management. As stated by the ICU nurses, most of the doctors said they use morphine and paracetamol and sometimes NSAIDS. Morphine remains the preferred analgesic for acute pain management (Jacobi *et al*, 2002; Spijkstra *et al*, 2010). The doctors (D1, D2, D8) mentioned the drugs they prescribe in the ICU:

"If it is a cardiac case we use IV morphine by perfuser and we have IV Paracetamol and at times we have oral diclo and tramadol" (D1).

"…an opioid plus Paracetamol either we have continuous administration through the perfuser or we give boluses usually 4 hourly, 6 hourly regimens, that is what we usually do, 4 hourly, 6 hourly" (D8).

NSAIDS are however not used often because of side effects. A doctor said:

"…open heart cases that we do, they are on morphine and Paracetamol, IV morphine and IV Paracetamol and then, for some occasionally we add an NSAID to it but we hardly use the NSAIDS these days because of the side effects…" (D8).

Morphine, according to the data generated, is prescribed 4 hourly or prn and paracetamol 6 hourly and sometimes epidural blocks for thoracotomies. The doctors said:

"Here, we usually prescribe morphine four hourly or prn" (D3).

"We use opioids, morphine… The morphine we give it in small doses but frequently four hourly and we also add the IV Paracetamol based on the patient's weight and we give that six-hourly depending so six to eight hourly depending on how much the patient needs. For our thoracotomies, we do intercostal blocks too using bupivacaine and sometimes we do sub–arachnoid blocks for especially for the thoracotomies" (D4).

A stepladder approach is also applied in the management of patients' pain, according to a doctor, as patients in the ICU are started on the highest analgesics and graduate down to the lowest, while those in the ward do the opposite. He said:

"…we tend to use the step ladder approach really but for patients in the ICU, we start from the highest analgesics and tend to come down. We start with the IV morphine and IV Paracetamol and as the wound heals we go down a step lower, we now change to oral medications. The oral Paracetamol and for those that cannot swallow, we can give them the oral diclofenac those are the NSAIDs diclofenac or the ibuprofen so we can give those rectally so we start from the highest analgesic…" (D4).

One doctor mentioned that drugs are prescribed according to the patient's weight. However, the researcher observed that almost all reviewed adult patient's charts showed they were on morphine 4mg 4 hourly and paracetamol 1g 6 hourly and wondered how the weight is factored into the dosage of analgesics. This was not explored further as prescribing is not a nursing duty and is not the focus of the study. It would however be of interest to know how the weight is factored into the calculation of the dosage. The doctors (D5, D7) said:

"The most common drug we use is morphine which is given per weight" (D7).

"…We give them boluses of morphine depending on the age and weight of the patient" (D5).

- *Multimodal analgesia* - One doctor said they employ multimodal analgesics in the pharmacological management of the patient's pain.

  "We tend to usually give a combination of drug, most of the time, multidisciplinary or multimodal approach to manage whatever pain. We hardly use a monotherapy. We combine maybe the opioids with the NSAIDs in patients if indicated or we give some other adjuncts and we tend to use a lot of local techniques and regional procedures…" (D6).

Payen *et al.* (2013) found critically ill patients given multimodal analgesia (one opioid with a non-opioid) are more likely to experience fewer organ failures and received fewer hypnotics compared to patients who received opioids only. These patients also reported their pain level to health professionals more frequently and it was recommended that the concept of multimodal analgesia be promoted in the ICU (Payen *et al.*, 2013).

- *Pre-emptive analgesia* - The ICU doctors (D1, D3. D6) mentioned that they *try* to give and *sometimes* give analgesics before patients feel pain or before procedures. He said;

  "…if you want to change dressing sometimes t*hey are not co-operative so you say give him morphine …. especially if you want to pass a chest tube, it's painful you give pain relieve to do that in addition to the local infiltration you need to give them something to do that" (D3).*

A study in Ghana, by Aziato and Adejumo (2014a), also found that analgesics were not given preemptively. There is a need to administer additional analgesia to the patient before a painful procedure (Vazquez et al., 2011).

"We are trying to improve upon pain management by ensuring that patients receive analgesia as stipulated periods of time…we are trying to use pre-emptive analgesia we don't wait for the pain to start before we administer the pain medication" (D6).

Some of the doctors use their intuition to give analgesia, as do nurses.

"The other thing is that you just use your intuition that for two, three hours if you haven't given this person something, he should be in pain" (D1).

- *Route of administration* - Many different routes, ranging from oral, suppository, IV and epidural blocks, are some of the ways of administering drugs in the ICU. The most common route however seems to be the IV route and morphine the most common drug. The doctors (D4, D2, D1, D4) said:

"The IV morphine, IV Paracetamol. For our thoracotomies, we do intercostal blocks too using bupivacaine and sometimes we do sub–arachnoid blocks for especially for the thoracotomies and sometimes suppository" (D4).

IV opioids are sometimes combined with oral medications.

"If it is a cardiac case we use IV morphine by perfuser and we have IV Paracetamol and at times we have oral diclo and tramadol" (D1).

4.3.5.5 Non- pharmacological interventions

The doctors stated that they do not employ particular non-pharmacological methods, but some of them mentioned *positioning*, *physiotherapy*, *prayer* and *psychotherapy* among others. They (D1, D5, D7) said:

"We do not use any non-pharmacological management at our end here, we don't have anything that l know of in our ICU" (D5).

Literature however confirms the usefulness of non-pharmacological methods in the management of pain (Woodrow, 2006; Puntillo, 2007; Ozer *et al*, 2013). Non-

pharmacological interventions can include explanation and reassurance, provision of information to the patient, breathing exercises, distractions (television, music), guided imagery, meditation, repositioning and massage (Woodrow, 2006). Others include endotracheal and enteral tube positioning and patient positioning (Puntillo, 2007), as well as acupuncture, a quiet environment, physical therapy, spinal cord stimulation and transcutaneous nerve stimulation (National Centre for Complementary and Alternative Medicine (NCCAM), 2008). These strategies alone may not achieve a pain free experience but they have the capacity to enhance drug therapy and humanise the ICU patients' experience (Elliot, Atiken, Chaboyer, 2006).

Unlike the nurses who employ numerous non-pharmacological methods for pain management, the doctors do not seem to use many in their pain management, which could be because the doctors spend very little time with the patients. A doctor said non-pharmacological methods are more appropriate for chronic pain and not acute pain.

> *"Because here it's more of the acute pain, maybe when it comes to chronic pain where even some of them have become addicted you want to look at other means but the critical situation, immediate post- op, somebody on ventilator and all that, I think pharmacological is the best" (D3).*

Another doctor however said physiotherapy and positioning could be helpful in the management of pain.

> *"Non-pharmacological therapy like physiotherapy to help them excrete so that they cough less, that we do, we do chest physiotherapy and others to help the patient cough out most of the secretions in the chest then they don't cough often so they are relieved… Positioning, sometimes we do that. If the patient says that in this position l feel less pain ..." (D2).*

Another doctor mentioned that physiotherapy, psychotherapy and prayer have all been helpful as nonpharmacological methods of pain management. Aziato and Adejumo (2015) found that Ghanaians are faith people and families of post-operative patients are influenced by faith and fear, among other things, when their relatives are in hospital. Prayer and

psychotherapy will therefore assist patients and their families to manage their fear and affirm their faith. He said:

> *"…we tend to like for instance physiotherapy. It's something that we actively you know use within the ICU, psychotherapy has been very helpful …. Prayer is one tool that we believe has helped in a lot of our patients…our people are generally are faith people and this is the little area that we minister to them in terms of healing" (D6).*

Verbal reassurance and explanation, as stated by the nurses interviewed, has been helpful in the management of patient's pain. This was affirmed by another doctor (D4), as he also found reassurance and explanation helpful as non-pharmacological methods of pain management.

> *"Just verbal reassurances and explanation and it does work…" (D4).*

4.3.5.6 Measures that will improve pain management

Doctors, in their expert opinion, stated evidence based ways pain management can be improved in the CT-ICU.

- *Giving analgesics as prescribed* - According to one doctor (D3), giving pain medications as prescribed by the doctor will improve pain management in the ICU. Literature confirms that (Diby *et al*, 2008) administration of analgesics as prescribed, among other measures, decreased the pain intensity in critically ill patients and improved the quality of sleep. He said:

  "… it's to give the drug as prescribed by the doctor…If the doctor has written, the doctor has a reason for saying this one I want morphine two hourly, this one l want morphine four hourly, this one I want IV Paracetamol. There is a reason for it, so what is prescribed must be given" (D3).

- *Giving analgesics at regular intervals* - Giving analgesia at regular intervals will help to improve pain management according to another doctor.

"…if analgesia is given regularly at regular intervals, it will work better" (D2)

Similarly, Edek and Pronovost (2004) found that regular pain assessment (4 hourly) and management improved pain scores. According to the Spinal Gate Theory (Melzack & Wall, 1965), small doses of analgesia administered frequently are more effective than large doses at long intervals, as small doses frequently maintain a peak level of analgesia in the patient's blood.

- *Development of protocols* - The doctors, as seen in the interview with the nurses, thought the development of protocols would improve the management of pain. Some doctors said:

  "I think that people will adhere when we have the protocols designed and pasted..." (D8).
  "… protocols may be more helpful …" (D6).

- *Pre-emptive analgesics* - As stated earlier, pre-emptive analgesia is one of the evidence based measures that can improve pain management in the ICU.

  "You don't wait for the patient to have a breakthrough pain before you give analgesia…We should be able to project when the patient is coming off anaesthesia then and make sure that it does not happen, patient is comfortable, patient can sleep without having to be in pain" (D5).

- *Pumps and PCA* - Doctors want pumps and PCA to be provided to enhance the management of the patients' pain. Consideration must be given to equipment and support services in resource-poor settings to develop critical care *(*Riviello *et al*., 2011).

  "There are other things that we can employ, one will be to get reliable infusion pumps dedicated for the regional techniques...the other one is to get a PCA or nurse controlled analgesia" (D2).

  "… they are patient controlled analgesics ways by which patients can press a button whenever they are in pain and get a dose of analgesia and when they tend to press it

too much the machine can lock so I think we still have to go a step further in patients' pain management" (D4).

Hudcova, McNicol, Quah *et al* (2006) found that PCA provided better pain control and greater patient satisfaction than the conventional parenteral PRN analgesia.

- "*Scope of more drugs*" - As with equipment, the doctors also wanted more drugs to be added to the drugs currently used, as the traditional drugs, such as morphine, have numerous side effects.

  "We will have to get a scope of more drugs for our management instead of morphine that we are all limited to morphine and possibly Paracetamol that we introduced lately…" (D1).

  "And also, the kind of analgesics we use, there are newer versions of analgesia. We are still on morphine, Paracetamol is ok but morphine, we can get something better and patient does not necessarily have to go through the side effects of morphine. You need to put them off the side effects; you have to get them antiemetic's, and you have to give them a laxative or a purgative to solve all these things. So, there are better medications or agents with better profiles in terms of the adverse effects compared to that of morphine" (D5).

- *Improved health financing* - Although surgeries done in the CT-ICU are partly supported by NGOs and benevolent individuals, the doctors believed they would have used more paracetamol and less morphine, because of its side effects, if not for the fact paracetamol is more expensive.

  "… For financial reasons if we use IV Paracetamol, it turns out to be quite better for management of pain because it does not have many side effects and problems like morphine. Morphine turns out to be quite cheaper than Paracetamol but it's got many problems. It makes them drowsy, respiratory depression, GI depression, they are vomiting so that is what I think could be better if for financial seasons but the price difference is quite significant so we don't use the IV Paracetamol for a long time… it could be better" (D7).

- *Education of health professionals* - Doctors believed that to improve management of pain in the ICU, there is a need to create awareness among health professions on the negative effects of pain. Nurses were found to lack knowledge in three care areas, including pain management. Education and feedback strategies when implemented lead to improvement in pain assessment and reassessment (Ista *et al.,* 2013).

  "To improve, health professionals should be aware. We should create the awareness on the need for pain and the consequences…education of all health professionals concerning pain is very necessary" (D8).

4.3.6 Patients' Education on Pain

This theme has two sub-themes, *pre-operative education on post-operative pain and methods of improving patients' education on pain.* Most of the doctors agreed that pre-operative education on post-operative pain is not done and if done, it is inadequate. According to literature, patients should be provided with information and be involved in pain treatment decisions to the degree they desire (Schwenkglenks, Gerberhagen, Taylor *et al*., 2014). There is a need for patient education by Ghanaian health professionals and it is important that healthcare professionals understand context-specific factors that influence the management of post-operative pain (Aziato & Adejumo, 2015). Kastanias, Denny, Robinson *et al*. (2009) found what was important to patients, was to receive information about pain. Patients in the CT-ICU expressed the need for more education about activity and pain management strategies in the ICU (Sathares *et al.,* 2013).

It was observed at the study setting that education about surgery was normally given in the outpatient department, when the decision was made to admit the patient for cardio-thoracic surgery. Most of the doctors who operate in the outpatient department are registrars and senior registrars. The education is enforced by anaesthetists before surgery and again by surgeons also just before surgery is done. It can be seen that most doctors get a chance to educate the patient in the course of their treatment in the ICU, thus patient education is not done by one particular group of doctors.

4.3.6.1 Pre-operative education on post-operative pain

The doctors expressed their views about education on post-operative pain. According to one doctor, although they have a checklist for pre-operative education some doctors may not follow it.

> *"For the pre-op education, there is a checklist we tick everything that we've spoken of… Of cause, you know human being somebody may tick but he has not done it but there is a check procedure explained to the patient…" (D3).*

Some doctors (D1, D5, D6, D7) however stated that pre-operative education on pain is not given, although patients are informed about the type of surgery they will undergo.

> *"No, we don't give any pre-op education on pain. All that we tell our patients is that you are going for this kind of surgery …but I think we could do better" (D5).*

> *"Education pre-operatively about pain and how it will be managed unfortunately, it's not something that is routinely done but it is very important to talk about pain peri-operatively, intra … Patients should know what to expect" (D6).*

According to the doctors (D4, D5, D7), there are some positive effects of pre-operative education, as shown in literature. They stated that pre-operative education reassures the patients and allays their anxiety.

> *"Yea, I think we should so that it reassures them that of cause when the procedure is done, they will be no pain…so I think if we add it, it will help" (D7).*
> *"… In terms of letting the fellow know allaying the fellow's anxieties…Once they know, that anticipation, that anxiety is allayed so they don't experience the pain. This will also cut down on the analgesics used" (D5).*

> Another doctor mentioned that pre-operative education helps with morbidity and mortality.

"…the outcomes in terms of morbidity sometimes mortality is better when the patient is aware of what he is going to undergo I think yes, pre-op education is very important" (D4).

4.3.6.2 Methods of improving patients' education on pain

Two doctors (D2, D3) mentioned what they tell patients about post-operative pain pre-operatively and if routinely done could improve the education of patients on post-operative pain. Both these doctors are anaesthetists and it appears they educate patients about pain. Patients however in subsequent interviews mentioned they did not receive any education on pain although they are educated on the surgery itself. The doctors (D2, D3) stated how education should be given.

"… I take the patients through the pain modalities that I will use and l tell them about the side effects and the fact that we will have drugs to remedy them if need be such as the post-operative nausea and vomiting and others…" (D2).

"…We tell them that this is a bit painful and after the surgery we give them the incentive spirometer and we tell them that you must be able to do this thing despite the pain so we give you adequate pain relieve so that you will be able to do it so that the lungs get expanded, so that you don't get atelectasis which can lead to pneumonia and all that so we try to explain to them" (D3).

A doctor also stated that pre-operative education could be improved if a system was in place to allow more contact between nurses and patients before they go to theatre. He said:

"The unfortunate aspect is that the ICU nurse does not come into contact with the patient much pre-op, they only come into contact with them post-op so if we have a system such that the ICU nurses get to talk to the patients, well before the surgery, I think that will also help" (D2).

4.3.7 Summary of Main Findings Arising from the Individual Interviews with ICU Doctors

This section states the main findings from the individual interviews with ICU doctors. It was determined that since the same interview guide was used for both nurses and doctors, similar findings and conclusions were made.

- Doctors stated that patients do not report their pain, although they may be in pain.
- Doctor related factors that influence how pain is managed in the CT-ICU, including the fact that doctors worry about overdose and sedation and there are misconceptions about pain especially in children and sedated patients. Lack of collaboration and teamwork is also a factor that negatively influences pain management. Some doctors also believe that assessing pain is a nursing role. They also believe that pain in the ICU could be better managed. Thoracic patients do not get their pain adequately relieved, according to the doctors, patients are always sedated because they are in pain and patients experience more pain when extubated because it is assumed they are not in pain after extubation.
- Nurse related factors, according to the doctors, that negatively affect how pain is managed in the CT-ICU include the fact that nurses do not adhere to the prescriptions that doctors give and some have a negative attitude towards pain. Nurses need to consult doctors when they are not comfortable with prescriptions to ensure effective pain management instead assuming that patients are not in pain.
- Lack of protocols, the fact that different doctors have different ways of treating patients and there is no uniformity, lack of equipment and PCA, poor efficacy of drugs and the fact that cardiac patients seems to get more attention than thoracic patients are all health system factors that negatively affect the management of pain.
- Cultural factors negatively affect pain management, as it is believed in Ghana that men should not have pain and are to bear pain, thus they do not complain when they are in pain.

- Many surgical procedures, according to the doctors, cause severe pain including thoracotomies and stenotomies. Abdominal surgeries as well as insertion of chest tubes also cause pain.

- Some positive factors influence how pain is managed and include the fact there are nursing supervisors in the ICU who monitor how medications are given. Doctors think they are doing their best in the management of the patients' pain. They appreciate the effects pain has on the patient's outcome, which is a plus because this knowledge will promote pain management. Anaesthetists seem to play an important role in the management of the patients' pain and assess patients pre-operatively. Doctors also individualise pain management depending on the patient's condition and type of surgery
- Pain assessment in verbal patients is normally done by asking the patients, thus their verbal report, but no pain assessment tool is used. There is also no assessment of the severity of the pain. Some doctors stated they sometimes use the NRS and VAS, although they do not have any tools and some doctors do not assess pain at all, because they rely on the analgesics given to manage the patients pain adequately.

- Pain is assessed in non-verbal patients mostly by using vital signs and sometimes their facial expressions to assess pain. No assessment tools are used, thus there is no assessment of the intensity of the patients' pain. Some doctors also rely on the routine nature of the analgesics given to manage the patient's pain.

- On measures that will improve how pain is assessed, the doctors mentioned that introduction of pain assessment tools, including pain assessment when assessing vital signs, documentation of pain assessment, critical observation of ICU patients to determine pain, individualising pain assessment and assessment of breakthrough pain, are all measures that could improve the assessment of the patient's pain.

- According to the doctors, the pharmacological methods employed in the research setting include the use of opioids, especially morphine and fentanyl. Non-opioids, such as paracetamol and NSAIDs, are also used, as well as epidural methods of administration of pain medication. Morphine is normally prescribed 4mg 4 hourly

prn for adult patients and paracetamol l gram, 6 hourly. Oral analgesics are also given if the patient can tolerate them. The IV route seems to be the route of choice according to the data generated. The stepladder approach is applied when analgesics are given from higher to lower in the ICU and from lower to higher in the ward. Drugs are also normally calculated according to the patient's weight and multimodal analgesia is employed. Pre-emptive analgesia is sometimes given.

- Most doctors do not routinely employ non-pharmacological methods in the management of the patient's pain. Some consider it as more appropriate for chronic than for acute pain. Some of the doctors however use positioning, physiotherapy, reassurance and explanation of procedures, psychotherapy and prayer in the management of the patients' pain.

- Measures that would improve pain management, according to the doctors, include giving analgesics as prescribed, giving analgesics regularly, use of protocols, routinely giving pre-emptive analgesics, employing dedicated pumps for analgesics and the use of PCA, using newer analgesics with less side effects, improving health financing and educating health professions on the effects of pain.

- Pre-operative education is not routinely given by most doctors, but they think it could be helpful in the management of pain in the ICU. Some anaesthetists however said they give pre-operative education on pain. Doctors also stated that pre-operative education has many benefits, including the reduction in anxiety, reduction in how much analgesics patients need and improved patient outcomes in morbidity and mortality. Pre-operative education can be improved, according to the doctors, if nurses have more contact with the patient pre-operatively, if patients are told about the analgesics they will be given, their side effects and how the side effects will be treated.

4.4 INDIVIDUAL INTERVIEWS POST CT-ICU PATIENTS

This part focuses on individual face-to-face interviews with post CT-ICU patients. Data saturation was achieved after three individual interviews. The demographic of the participants is discussed first, followed by contextual findings.

4.4.1 Demographic Data of Post CT-ICU Patients

The three patients interviewed were two females and a male. Two of the patients were aged between 37 and 57 years and one was between 18 and 36. Two of the patients had tertiary education and one had secondary education. All three could communicate fluently in English and all interviews were conducted in English. Two of the patient participants were Ewes and the other an Akan (major tribes in Ghana). Since it has been established that culture has an influence on how pain is expressed, the ethnic groups of these patients was significant in how they express pain. One participant was a teacher, the other a student and the third a soldier. Two of the participants were married, the other single; the support of family could influence how patients cope with pain, thus the need to determine their marital status. All participants were Christians, a dominant religion in Ghana. From the interviews, it was determined that faith has a lot to do with how patients cope with pain. The three patients were post cardiothoracic surgery patients, admitted to the ICU for tricuspid valve replacement, tetralogy of fallot-total correction and mitral valve replacement. The demographic details of the patients are summarised in Table 4.7

Table 4.7 Patient Participants Demographic Data

Code	Gender	Age	Level of Education	Ethnicity	Occupation	Marital status	Religion	Operation Done
PT1	Female	37-57	Tertiary	Ewe	Teacher	Married	Christian	Tricuspid valve replacement
PT2	Female	18-36	Secondary	Ewe	Student	Single	Christian	Tetralogy of Fallot- Total Correction
PT3	Male	37-57	Tertiary	Akan	Soldier	Married	Christian	Mitral Valve replacement Re-exploratory

4.4.2 Contextual Findings and Discussion

This section presents the findings of the individual face-to-face interviews with post ICU patients. The findings of the interviews are discussed in detail and supported by verbatim excerpts from the interviews, main themes are discussed and supported by subthemes for clarity and relevant literature cited to further explain or support findings. Three main themes were identified in the analysis of the interviews with 11 sub-themes. A summary of themes and sub-themes are presented in Table 4.8.

Table 4.8 Themes Arising from Individual Interviews with Patients

Main Themes	Sub-themes
4.4.3 Patients Experience of Post – operative pain	4.4.3.1 Severity of pain 4.4.3.2 Reaction to Pain 4.4.3.3 Procedures that gave the most pain 4.4.3.4 Attitude of health professional towards pain
4.4.4 Pain assessment and management	4.4.4.1 Assessment of Pain 4.4.4.2 Measures that will improve pain assessment 4.4.4.3 Pharmacological management of pain 4.4.4.4 Non-Pharmacological Management of Pain 4.4.4.5 Measures that will improve pain management
4.4.5 Patients education on postoperative pain	4.4.5.1 Pre-operative education on post-operative pain 4.4.5.2 Methods of improving patients' education on pain

4.4.3 Patients Experience of Post–operative Pain

This theme describes the experiences of post CT-ICU patients, especially with pain, when they were admitted to the CT-ICU post cardiothoracic surgery. The four sub-themes emanating from the data include the *severity of pain, reaction to pain, procedures that gave the most pain* and *attitude of health professional towards pain.*

4.4.3.1 Severity of pain

All three patients interviewed reported pain when they were in the CT-ICU, ranging from 4 to10 when asked to rate their pain on a scale of 0-10, where 0 means no pain and 10 severe pain. One patient (PT2) rated her pain as severe, as in 10. The patients in the study reported their pain as moderate (4), *"severe" and "excruciating."* They (PT1, PT2, PT3) said:

Well, I was in a lot of pain after the operation, very severe pain, I will put it at 10. I will describe it as very severe pain (PT2).

"…when I am given the pain medication, it comes down quite considerably. I will rate that one at about 4. So, let's say between 4 to 8 depending on the time the pain medication was given – PT1

"I think I can say it's 9 out of 10. It was quite severe" (PT3).

One (PT3) later described his pain as "*excruciating".* He said:

*"Well, my experience with pain, I went through very excruciating pain during my period in the ICU. I went through very severe pain…(*PT3).

The patient further described the severity of the pain with the parts of the body where he felt the most pain. He said:

"Sometimes I feel feverish as a result of the pain. Sometimes I feel breathless. I find it difficult to even breathe. It was quite difficult. In fact, the pain is actually from my chest region but as it continuous, it graduates through to my arms, my legs, almost my whole body unless I am given some pain medication to reduce the pain, it goes that far" (PT3).

PT3 stated that the pain was so severe that it must not be "*taken for granted".*

"...the sort of pain that you go through after operation is not easy, it is not easy at all and we must not take it for granted. …" (PT3).

The above findings are supported in a study by Strohbueker, Mayer, Evers and Sabatowski (2005), who found that out of 561 patients, 58% suffered moderate to severe pain, 30% did not receive analgesia and only 24% received appropriately prescribed medication. According to Ahlers, van der Veen, van Dijk *et al*. (2010), scores of greater than 3 on the numeric scale are unacceptable. About 70% of patients were found to have unrecognised and undertreated

pain in the ICU. Gelinas (2007) found that about 32% of ICU patients recalled having severe pain and pain was reported as moderate to severe for 60% of the patients.

4.4.3.2 Reaction to pain

Patients also described how they reacted to pain as part of the pain experience. Their reactions ranged from "*praying," "watching TV or listening to music," "positive thinking," "holding a pillow to their side," "groaning," "moaning and frowning."* Patients reported that although they felt a lot of pain, they "*did not cry."*

> *".... I prayed a lot to God to help me in my hour of need and .... There was also TV in the ICU so sometimes if there was a nice program I would watch and sort of take my mind off the pain. Then l would.... Hmm (Sighs) then I would listen to the radio if there was some nice programme and I did a lot of positive thinking...., and I would sometimes, if the nurses come around and they have time, I would talk to them and sometimes I held the pillow to the sides of the cut and I would try to hold myself and try and take my mind off the pain" (PT1).*

Apart from sweating and feeling feverish, another patient frowned and groaned.

> *"...when the pain is severe like that, I feel that I am sweating, l feel feverish, I frown my face, I groan most often and I try to explain to the nurses it's difficult to explain what you are going through but somehow, we manage to explain" (PT3).*

Another patient raised her leg because the line in the leg was painful but she did not cry.

> *"Sometimes l raised up my legs, because they put a tube and it was paining me so I removed it so, that place started paining me so I had to raise my legs. I did not cry..." (PT2).*

Some patients did not react for fear of being accused of exaggeration.

"...l don't want to react as if l was exaggerating so l try to bear the pain as much as possible but when it gets too bad, then I can't help but groaning and moaning especially when l am

turning and its very painful, l can try to groan and moan. I try as much as possible not to cry or to moan or groan too much. I try to contain myself" (PT1)

According to Mann (2006:32), patients report their pain by moaning, crying, screaming and silence. Other cues include grimacing, wincing, eye signals, rubbing, rocking and rhythmic movement of an extremity, shaking or tapping bedrails and grabbing a nurse's arm. Ghanaians are people of faith, with approximately 71.2% of the population being Christian and 17.6% Muslim (Ghana Statistical Service, 2012) and thus prayer seems to be a way they cope with difficult situations.

4.4.3.3 Procedures that gave the most pain

The patients interviewed reported procedures that gave them the most pain, which included *wound dressing*, *coughing*, *turning* and *tubes in the neck* (CVP lines) *and sides* (Chest drain). All the patients (PT1, PT2, PT3) reported that turning was painful. They said:

> *"…it is during the dressing and when they are trying to wipe me, bath me and wipe me. Sometimes when they want to turn me it gets very painful" (PT1).*

> *"…Sometimes they come and bath you and I think the process of turning...Coughing is very painful and you know we have these tubes around your sides and around your neck and they are also very painful" (*PT3).

Literature states procedures potentially produce pain and anxiety and require assessment before commencement (Czarnecki, Turner, Colling *et al.*, 2011). Pain during procedures is undertreated in about 63% of patients, as no analgesia is given before positioning (Puntillo *et al.*, 2004).

Patients also reported nurses' reaction to their reports of pain during procedures. One said the nurses either "*Don't say anything or give her courage."*

> *"Sometimes l do tell the nurses when they were doing this procedures that it was painful. Sometimes they will not say anything…Sometimes they will just give me courage that everything will be okay" (PT2).*

"…Some will think that you are exaggerating the pain, others want to finish whatever they are doing with you before giving the pain medication even though you are complaining about pain. Others will wait until you complain about pain before giving you your pain medication (PT3).

4.4.3.4 Attitude of health professionals towards pain

Patients also reported nurses' attitude to their pain and stated that sometimes the nurses are *pleasant* and other times they are not. The attitude of the nurses was put into two sub-themes, *negative* and *positive* attitude of health professionals towards patients' pain.

- *Negative Attitude of Health Professionals* - The patients stated that some nurses do not explain the procedure they are going to do to them, some are unpleasant and others think they are exaggerating their pain.

  "…but some of them don't (explain procedure). They just come and do what they are supposed to do and leave. They don't always…some of them do, some of them don't" (PT1).

  "…sometimes the nurses are not so pleasant… (PT1).

A patient complained that sometimes the nurses do not *"mind"* her when she calls. She said:

"…Hmm (Sighs)… Sometimes, if l call, they (nurses) don't mind me (PT2).

As mentioned by the nurses in the earlier interview, patients assume nurses think they are exaggerating their pain because of the nurses' behaviour and utterances or comments.

"…Some too, will think you are just exaggerating the pain and they don't really take you seriously. Mostly some of them will say, why are you exaggerating? Why are you behaving like a baby? Are you not a man? If you behave like this, what do you expect your children to do? They pass these comments telling you that you are just making noise or trying to exaggerate a condition which is not there..." (PT3).

He again thinks that the health professionals, especially the nurses, do not really understand the severity of pain they go through. He said:

> *"...with my experience, in the ICU, I think that the health officials especially the nurses don't really understand the pain, or the level of pain patients go through in the ICU ... (PT3).*

- *Positive Attitude of Health Professionals* - Some patients reported the ways in which health professionals made the experience of pain bearable. They said (PT2, PT3) said:

  > *"Well most of them (nurses)are sympathetic even though they don't really appreciate the level of pain you are feeling, they are sympathetic towards your plight and they try to help in whatever way they can (PT3).*

The patient thought the doctors understand their pain better than do nurses, because the doctors focus more on their pain. He said:

> *"I think the doctors better understand the situation than the nurses because often, their focus is on the pain anytime they come around. When you explain, or describe the pain to them, they seem to understand it better and they show more concern and they try to adopt other methods like changing the pain medication to help or maybe giving an extra dose of the pain medication to help with the pain" (PT3).*

According to the patients, some of the nurses explain the procedures they are going to do compared to earlier reports that procedures are not explained before they are done.

> *"Some of them (nurses) are very nice. Some of the nurses do explain what they are coming to do (giving pain medication) ... (PT1).*

4.4.4 Pain Assessment and Management

This theme comprises the assessment and management of pain. The theme has five sub-themes and includes assessment of pain, measures to improve pain assessment, pharmacological management, pre-emptive analgesia, non-pharmacological interventions and measures that will improve pain management.

4.4.4.1 Assessment of pain

Patients described the pain assessment practices of nurses and doctors and stated how their pain was assessed.

> *"...Some of them (nurses and doctors) come around and say, how are you? So, the reply of course is l am okay. But some of them do ask how the pain is or where I am feeling the pain and l tell them" (PT1).*

Another patient stated that doctors most often assess pain, but the nurses do not always do it. He said:

> *"... most often, a few of the nurses will ask you about the pain but most of the time they will just come and ask you how you are doing but the most people that ask are the doctors. Most of the time when the doctors come around, they want to know whether you are in pain, whether the pain you are feeling at present is reducing as compared to the previous day and show a lot of concern about the pain than the nurses do" (PT3).*

- *Assessment of Severity* – Patients, as well as nurses and doctors in earlier interviews, confirmed there is no routine assessment of severity of pain in the ICU. The patients stated that most health professionals, especially nurses, did not ask "*how severe"* their pain was.

  > *"...Most of the time no, they (health professionals) did not ask how severe the pain was" (PT1).*

"…the doctors will ask you trying to relate the pain you are feeling as at the time they are asking you to the one you felt previously, maybe a day before or maybe a couple of hours before and they want to know whether you have been given any medication that sort of thing…. They ask you, are you in pain? How is the pain like now compared to how it was 6 hours ago? Are the nurses giving you any medication for the pain? Those are the questions they ask. But the nurse normally will come and ask you …Oh how are you doing? Have you eaten something? I mean those are the only questions they ask you" (PT3).

A plan for a systematic assessment should be foremost in the approach to pain (Pasero & McCaffery, 2011. Randen, Lardal and Bjork (2013) found that patient's pain reports do not correlate with the nurse's assessment. The perceptions nurses have of patient's pain are underestimated compared with pain experiences. A similar finding, by Bargeron, Leduc, Marchand and Bourgault (2011), stated a lack of correlation between post-operative patients, and their nurses' documentation of pain intensity.

- *Informing Nurses About Pain* - Patients stated how they informed nurses when they were in pain, either by "*try to call" or "raise their hand"* to alert the nurses.

  "I try to call them but sometimes when I raise my voice a little, it gets painful so I try to call them but without shouting… "(PT1).

  "Most often l try to raise my hand to alert them of the pain …. And because you cannot even shout and call them…" (PT3).

One patient however attempted to stand up to call the nurses when they were not "*around,*' which can be dangerous as it could lead to falls and injury. She also used her hand to call.

"Sometimes, I try to stand ... if l don't see any of them around …Sometimes l used my hand, to call them…So, l raise my hand to call them" (PT2).

- *Cultural Influence on Reporting Pain* - As stated earlier, culture and socialisation seems to have an influence on how patients report pain. Patients believe that if they *complain* of pain, they will be accused of "*exaggerating."* In Ghanaian culture, as

stated earlier, adults especially are expected to be stoic. Patients are thus afraid of being accused of exaggeration when they complain of pain.

> *"You know in our Ghanaian culture as an adult, you don't have to complain too much otherwise you would be accused of exaggerating so l try as much as possible to keep calm and bear the pain…"* (*PT1).*

4.4.4.2 Measures that will improve pain assessment

The patients also suggested ways they believed pain assessment could be improved based on their experience in the CT-ICU. Their suggestions included "*grading pain,*" since it is "*difficult to describe* pain."

> *"… I think of is that it is difficult to describe pain. I don't know when you asked me I was only able to describe the pain to you when you asked me to grade it on a scale of 0 – 10 and l think it will be good if we have a way of grading pain in the ICU so that the health professionals will understand the level of pain the patients are in because you can't describe the pain but if you are able to grade it, we have a system of grading the pain, maybe you can provide 1 or 2 questionnaire which will help the health professionals grade your pain as severe or excruciating or something like that. That will also help a lot so that the health professionals should know the level of pain you are in at each point in time to know whether to increase the dosage of pain medication or not…" (PT3).*

Makic (2013) found that accurately and consistently assessing pain is an important priority for nurses. It is important to obtain measures of pain severity and relief reported by patients regularly and there is a need for nurses to avoid making assumptions about comfort level solely based on how patients appear or if they are sleeping (Dunwoody, Krenzischek, Pasero *et al.,* 2008).

4.4.4.3 Pharmacological management of pain

The patients also commented on the pain management strategies of the health professions in the ICU. When asked about the pharmacological methods nurses employ, one patient said:

> *"The nurses, they can't do anything (about her pain) unless the doctor asks them to…" (PT2).*

> *"Well (pause) normally when I start feeling pain, I try to draw their attention and they give me pain medication to help with the pain, most of the time they give me pain medication...*" (*PT3).*

The patients also reported that most nurses informed them when they were giving them drugs for pain.

> *"Yes, most of them (nurses) will tell me when they are going to give me pain medication but a few will not say anything…" (PT3).*

- *Effects of Analgesics* - The effects of analgesics were described by patients as helping relieve their pain but it "*wears*" off before another dose is given. Thus, pain medication seems to be given at intervals, however patients have pain in-between the medications. One patient said:

  "The pain can get very bad sometimes. When I am given the pain medication just after the pain medication, the pain goes down but wears off before the next dose is given..." (PT1).

- *Pre-emptive Analgesia* - The issue of not giving pre-emptive analgesia routinely was stated by both doctors and nurses and a similar concern was expressed by the post ICU patients. Some patients said:

  "… once they start, they finish that dressing for example after the dressing, they want to wipe me and they are going to turn, sometimes, when I complain that it is very painful, after one procedure like the dressing, they stop, not all the time but some of them stop to give some relief before they do another procedure but once they start one procedure, they don't stop to give pain medication" (PT1).

"…Some will go in for pain medication before they continue with the procedure, others want to finish before they give you pain medication" (PT3).

4.4.4.4 Non-pharmacological management of pain

The patients commented on the non-pharmacological methods they or the nurses used and the ones that "*helped."* The patients were of the opinion that non-pharmacological methods, such as keeping a pillow close, radio and TV programmes, having their loved ones around positioning and prayer, were all helpful. The patients stated:

"…it felt soothing when I held the pillow close to me and the television also helped…I think about all the nice things that l would do just when I get out of the hospital really helped a lot … Having my loved ones around helped to take my mind off the pain and … And as l said earlier, I prayed a lot and the nurses encouraged me that the pain, the severe pain will be gone and that also reassured me that …it's not going to last beyond a couple of days and this really helped" (PT1).

"…they also try to change your position a little bit or rub your back a little bit to help with the pain and then sometimes too the families come to visit. When they are with you, at least they help take your mind away from the pain so the family being around also helped and sometimes too because you are lying down, when the pain comes, soothing music also helps to manage the pain" (PT3).

When asked which non-pharmacological method helped most, the patients said:

"…The visitors helped most, when my loved ones come around to visit me, it really helped" (PT1).

"I think the positioning helped a lot" (PT3).

- *Policy on Visitation* - As stated earlier by the patients, the visits of their relatives was a non-pharmacological method that helped with their pain. They further (P1, P2, P3) explained their opinions on the visitation policy in the ICU.

"…When they come, in a short time they are gone. I don't know maybe about 20 0r 30 minutes or so then they are gone and l think if they allow them to stay a bit longer maybe I hour or 2 hours, I think it will be good…" (PT3)

"For me, they allowed only two visitors, and the visitors stayed for only a short time and even the time when the visitors are around me, if the doctor or the nurse wants to do something, they excused the visitor to go out and so on …I wish they could allow more visitors to be with me …" (PT1).

4.4.4.5 Measures that will improve pain management

Patients, from their experiences in the ICU, stated ways they thought pain management could be improved.

- *Adequate analgesia*- The patients believed giving more analgesia at regular intervals would help.
  "Hmm (sighs) with the pain medication, I wish I would be given a lot more because it really helps…" (PT1).

  "…There should be a regular time interval that medication should be given or pain medication is given so that the pain medication will not wear off for the patient to be in pain before they are given another medication. If the medications are given at regular intervals, I think it will help keep a certain threshold so that you will not be in severe pain. I think that is one thing we have to take note of and work hard towards" (PT3).

- *Explanation of procedures* - The patients also wanted procedures to be explained before commencement.

  "…If they would explain this is what they are going to do and then I am also in the know about what is happening, it will help. Because some of them just come and do things and you are left in the dark about what is happening, the explanation will really help so that you know exactly what is happening to you" (PT1).

- *Patience during procedures* -They wanted nurses to be a bit more patient and slower when doing procedures.

  The nurses could also be a little more patient and a little bit slower when they are doing their dressing and other procedures but it looks like sometimes they are in a bit of a hurry...it makes the pain bad" (PT1).

  "...it is quite an experience, I wish perhaps they will take their time and probably put themselves in our condition and understand how painful the situation is and exercise patience whenever they are carrying out these procedures" (PT3).

- *Pre-emptive analgesia* -Another patient thought that pre-emptive analgesia should be given routinely before every procedure.

  "...Above all, I wish they had every single day before any procedure, they will give me maybe some pain medication for few minutes to sort of suppress the pain before they even start which does not happen often ...So I think that it will be better if they give you some pain medication and wait for 10 minutes, 20 minutes and let the medication start working before they start any procedure they want to do. I think it will be the best thing" (PT3).

  "...If I had my own way, the pain medication would be given before the things are done so it gets less painful" (PT1).

- *Pre-operative education* - According to the patients, education is one way that pain management could be improved.

  "...I think the education of patients is so important as l mentioned earlier because the patient must also know how the pain management is supposed to go so that the patient can keep track so that the patient will not be in severe pain..." (*PT3).*

- *Availability of nurses* -The patients thought more nurses should be available and their workload reduced.

  "Now, maybe their workload should be reduced or maybe they should be more nurses attached to the ICU so that when the patient needs help, there is always

somebody available, somebody who is nice and pleasant and will help the patient recover faster" (PT1).

- *Education of health professionals* - Other patients (PT1, PT3) thought pain management could be improved when nurses are given *"more education."*

  "...the nurses should be given more education, more training about pain management so that they know what the patient is going through so they can be a bit more patient to help the patient" (PT1).

  ...there should be some form of education for all health professionals to understand the level of pain patients go through after operations because if they don't understand, they can take the pain management plan seriously (PT3).

Literature collaborates this finding. A study by Chaibou, Sanoussi, Sani *et al* (2012) found that to improve the management of analgesia for post-operative patients, systematic training of staff and the creation of frameworks that are standardised for the assessment and management of pain after surgery must be implemented.

4.4.5 Patients Education on Pain

This theme describes the patients' opinions of pre-operative education about pain and improvements that could be made. All the patients interviewed stated that although they were educated about the procedure they were to undergo, they were not given any education on pain.

4.4.5.1 Pre-operative education on post-operative pain

On pre-operative education on pain, the patients (PT1, PT2, PT3) stated:

"Well they told me about what they were going to do, the surgery and so on but they did not tell me about the pain and how they were going to make it better and so on. They did not explain that one to me" (PT1).

"They did not tell me anything about the pain. The doctors and the nurses, did not tell me anything about the pain" (PT2).

Contrary to the above finding, literature states that patients have the right to all the information (risks such as pain and benefits of all procedures) in order to make informed decisions and make an input into their comfort management in relation to the procedure being carried out (Brown & Bennet, 2010).

4.4.5.2 Methods of improving patients' education on pain

The patients also had some ideas as to how education could be improved. They said:

"…education should not just tell you that after the operation, you will go through pain. What is important is how the pain should be manage so that the patient also keeps track of pain management...if I know that this is how the pain management is supposed to go, if the pain medication is supposed to be given every two hours or every five hours, then I can also keep reminding the nurses to give the pain medication…even the positioning must also be part of the education so that at least it will help us manage the pain a little bit…(PT3)

"If the others who are coming, they should explain the ***pain*** *and the* ***suffering*** *that they will pass through before going for the operation" (PT2).*

4.4.6 Summary of Main Findings Arising from the Individual Interviews with Patients

This section discusses the main findings from the individual interviews with post CT-ICU patients. The following are the main findings:

- Patients reported pain in the CT-ICU ranging from 4 to 10 (on a scale of 0 to 10). Patients described their pain as moderate, severe and excruciating.

- Patients reacted to pain by praying, watching TV or listening to music and positive thinking to divert their attention from pain. They also groaned, moaned and frowned, but did not cry.

- Patients reported procedures that gave them the most pain, including wound dressing, bathing, turning, CVP lines, chest tubes and coughing.

- Patients reported the pain they experienced during procedures to nurses, but they either do not do anything about it, or just reassure them.

- They also reported some negative attitudes of health professionals, such as not explaining procedures to them, not being pleasant, not responding to their calls and thinking they are exaggerating their pain, thus do not take their complaints seriously.

- Positive attitudes of health professionals were also reported and included reassurance and being sympathetic

- The post ICU patients believe doctors understand their plight better, compared to nurses. Doctors always ask about their pain whereas nurses do not always ask.

- The patients also stated that health professionals do not assess the severity of their pain although doctors sometimes do.

- The patients draw nurses' attention when they are in pain by trying to call them and raising their hands to alert them.

- Culture has an influence on how pain is reported, as patients believe they can be seen as exaggerating when reporting their pain so they would rather not.

- To improve pain assessment, the patients think "grading" pain would help health professionals to appreciate the severity of their pain.

- Pain medication seems to help patients with their pain and nurses sometimes tell them they are giving pain medication and other times they do not.

- Pain medication before painful procedures (pre-emptive analgesia), according to the patients, is not routinely given. Some nurses want to complete the procedure before giving medication even if the patients complain of pain.
- Patients stated that the non-pharmacological methods that helped in managing their pain included holding a pillow close to them, watching television, listening to the radio, positive thinking, having loved ones around, prayer, reassurance from health professionals and change of position.

- All patients stated the presence of their families helped a lot and took their mind off the pain, but the time allocated for visiting was not enough and more time should be allowed for their relatives to visit.

- Patients stated that to improve pain management, pre-emptive analgesia should be given before all painful procedures, frequency of pain medication should be increased, nurses should explain procedures before they are done and should be a little more patient and slower when doing procedures. Nurses should also be given more education and training on pain management and their workload reduced, or more nurses attached to the ICU.

- Pain medication, according to the patients, should be given at regular intervals so it does not wear off before the next dose is given.

- Patients said they were educated on the procedure they were to undergo but not on the post-operative pain.

- Patients also want to be educated or told about the pain and "*suffering"* they would experience post-operatively and how it would be managed.

4.5 INDIVIDUAL INTERVIEWS WITH PATIENTS' RELATIVES

This part focuses on the individual interviews with three patients' relatives, which is included in the second part of the exploratory phase.

4.5.1 Demographic Data of Patients' Relatives

Two females and one male relatives of post ICU patients were individually interviewed. Two relatives had tertiary education and one secondary. One was a teacher, another a civil servant and one a trader. They were all Christians and had visited their relatives in the ICU on more than two occasions. Table 4.9 summarises the relatives' demographic data.

Table 4.9 Demographic Data of Patients Relatives

Code	Gender	Age	Level of Education	Ethnicity	Occupation	Religion	Relationship to Patient	No of Visits to the ICU
F1	Male	18-36	Tertiary	Ewe	Teacher	Christianity	Brother	5
F2	Female	37-57	Tertiary	Ewe	Civil Servant	Christianity	Mother	More than 20
F3	Female	37-57	Secondary	Akan	Trader	Christianity	Wife	About 6 times

4.5.2 Contextual Findings and Discussion

This section of the analysis presents the findings of the individual face-to-face interviews with post ICU patients' family. The findings of the interview are discussed in detail and supported by verbatim excerpts and relevant literature. Main themes are discussed and supported by sub-themes for clarity. An interview guide was used to elicit responses from the patients *(Appendix C).* Three main themes were identified in the analysis of the interviews with nine sub-themes. A summary of themes and sub-themes are presented in Table 4.10 first for clarity, then discussed.

Table 4.10 Themes Arising from Individual Interviews with Patients Relatives

Main Themes	Sub-themes
4.5.3 Relatives experience of them families post -operative pain	4.5.3.1 Severity of pain 4.5.3.2 Procedures that gave the most pain 4.5.3.3 Attitude of health professional towards pain
4.5.4 Pain assessment and management	4.5.4.1 Assessment of Pain 4.5.4.2 Relatives satisfaction with pharmacological management 4.5.4.3 Non-pharmacological interventions 4.5.4.4 Measures that will improve pain management
4.5.5 Education on pain	4.5.5.1 Pre-operative education on post-operative pain 4.5.5.2 Methods of improving patients' education on pain

4.5.3 Relatives Experience of Their Families Post -Operative Pain

This theme discusses the experiences of patients' relatives and their thoughts of the pain experienced by their relatives. The theme had three sub-themes, including severity of pain, procedures that gave the most pain and the attitude of health professional towards pain.

4.5.3.1 Severity of pain

Relatives interviewed stated their observation and experiences of their family members post-operative pain during the period of their visits in the CT-ICU.

> *"She experienced a lot of pain, anytime she tries to move, she complains about pain in the chest area, at her sides, generally she has been going through a lot of pain …" (*F1).

Relatives seem to be quite involved in the care of their family members. Culturally, care of a sick relative is more the duty of his or her family and not so much the health professional. It has been determined by researchers that patients benefit when healthcare professionals and patients' family members work together (Grondin, Bourgault & Bolduc, 2014).

4.5.3.2 Procedures that caused the most pain

The patients' relatives determined, according to their observation and what their families told them, what procedures caused them the most pain. The relatives said:

"...She feels the most pain according to her when she has to move... hmmm (sighs) yes and also when she is talking she has to pause occasionally because she claims that the talking causes her some pain so she does not look forward to the nurses coming to attend to her often because it causes her pain" (F1).

"... He complained that during the procedures like dressing, turning him and so on, bathing him and those kinds of things gave him a lot of pain and the tube in his neck and his side, they gave him a lot of pain..." (F3).

4.5.3.3 Attitude of health professionals towards pain

This theme describes the attitude of health professions towards their relatives' pain from their observation and interaction with the health professionals. The sub-theme describes what the relatives described as a "*mixed bag"* of attitude and "positive" attitude.

- *"Mixed Bag" of Attitudes* – One relative (F1) stated that nurses have a "mixed bag" of attitude, as some of them are nice and others are not, but the doctors are generally jovial. He said:

  ".... the few times that I met the doctors, they were very jovial and you see that they try their best to make the conversation easier for the patient to bring out her feelings but with the nurses, it's a mixed bag because l noticed that some of them are very nice, others are not nice but generally, I realized the younger ones are more patient and more polite and more gentle than the older ones" (F1)

The doctors were also seen by the relatives as *"nice"* but *"impatient".* She said:

"Oh the doctors on the whole were pleasant, they were nice but it gave me the impression that they didn't have too much time so when you are with them, they would do whatever they were doing and dismiss you very fast so that they will get on with their work so the doctors are friendly but, they seem to be inpatient and you couldn't talk to them as much as you wanted because maybe you wanted more explanation but sometimes they were just not available. Even when they were available, they seem to be in a hurry..." (F3).

- *Positive Attitude of Nurses Towards Pain Management* - The patients' family (FI, F2) described the attitude of nurses towards pain and their help in relieving pain as being positive. The relatives said:

  "…I think the nurses did fairly well. Anytime my sister complained of pain, nurses come and attend to her……I think the nurses are not doing badly when it comes to managing her pain when she was in the ICU" (F1).

Researchers have found that a good attitude and communication are important. This involves listening to concerns or anxieties of the patient about the procedures being performed (Ahlers *et al.*, 2013).

4.5.4 Pain Assessment and Management

This theme deals with the assessment and management of patients' post-operative pain. The sub-themes under this theme include *assessment of pain, non-pharmacological interventions and measures that will improve pain management.*

4.5.4.1 Assessment of pain

This sub-theme describes pain assessment according to patients' relatives and their involvement in the assessment of the patient's pain. They also described their observation of how the nurses assessed their relative's pain.

- *Relatives Involvement in Pain Assessment* - The family members described their involvement in the care of their relatives when they were in the ICU. They (FI, F2) said:

  *"…hmm (sighs) anytime I am around and she complains of pain, I try to call the attention of the nurses and after visiting hours, I still try to talk to the nurses and encourage them to pay more attention to her because she is always in pain…" (*F1).

  "…but when I was around, he could ask me call them for him to come and give him some relief from his pain" (F3).

It has been found that a surrogate who knows the patient, such as the patient's parents, spouse or caregiver, may be able to give information about underlying painful procedures and behaviours that are specific to the patient and may mark or signal pain (Pasero & McCaffery, 2005). It is important for health professionals to pay particular attention to what the family reports about the patient's pain (Herr, Coyne, McCaffery *et al.,* 2011).

- *Nurses Assessment of Pain*- The relatives described how nurses assessed pain according to their experience and observation. They said:

  "Hmm (sighs)…I am sure that the nurses are around and they were around and they are observing her so if they notice the slight ***behaviour****, they go there themselves. I don't think she was capable of drawing the attention of the nurses themselves especially during the first few days of the surgery" (F1)*

4.5.4.2 Relatives satisfaction with pharmacological management

Relatives expressed their satisfaction with the pharmacological management of the patient's pain. This was an interesting finding because relatives reported patients were in a lot of pain.

"Well I think pain is well managed in the ICU with pain medications and the procedures… so, I am satisfied with the pain management in the ICU" (F3)

4.5.4.3 Non-pharmacological interventions

Relatives described the non-pharmacological options they adopt during the hospitalisation of their loved ones. The non-pharmacological methods they employ include *encouragement, prayer, distraction, scriptures from the bible, television, music, foot massage and their visits.* Ghanaians are religious people and almost all belong to one faith or another, as stated earlier. Prayer is therefore an important part of the Ghanaians life, which is demonstrated in the number of family members who said they prayed for their relatives in the ICU. The relatives (FI, F2, F3) said:

*"…we are God fearing people so, I encourage her, I **pray** with her, I quote scriptures and tell her that once we believe in God, everything will be okay…my sister watches TV a lot, she is an ardent fun of movie, local movies (laughing)…there is a TV in the ICU so, I tell them to be showing more local movies so that can distract her attention from the pain a little" (F1).*

*"Well, I **pray** and after prayers, I talk to her that it will last but for a while so she should not worry. At times, I pamper her, touch her, make some funny things that will allow her forget the pain as a mother" (F2).*

*"… I talk to him, encourage him, **pray** with him, massage his feet and try very much, try to make him laugh if possible, telling him a lot of things but generally, praying with him helped a lot" (F3).*

Music also seems to help, according to the relatives. Relatives said:

"…she likes music, there is a radio so occasionally, when she is not sleeping, the radio in the ICU is played for her to feel better…" (F1).

"There was a central radio that he could listen to and most of the time they played soft music or they preached or things like that so listening to it relaxed him and made him feel better" (F3).

Another non-pharmacological method mentioned by the relatives is the relationship patients have with health professionals. Aslan *et al* (2010) found nurses showing interest in patients, among other things, decreased their pain.

"Hmm (sighs) the way the nurses and the doctors relate to them, also assists in the healing process" (F2).

According to the family members, their presence and visits also helped distract their relatives from the pain they were feeling.

"The presence of relations, also does the magic" (F2).

"…spending time with him…. It helped him take his mind off the pain so the time I was in the ICU with him …it relaxed him and generally when he was able to talk, we could talk…" (F3).

- *Impressions About Visitation Policy* - As mentioned earlier, the relatives believed their visits helped distract patients from the pain. They believed the number of visits and time allowed was inadequate. The relatives said:

"Yes, I don't like the short nature of the visiting period and they only allow two (2) visitors at a time and we have a big family and so many people want to come and see how she was doing especially when she was in the ICU but because of the policy of two visitors at a time, it was very difficult" (F1).

"…twice a day I think it is okay but the minutes or the hours spent should be at least increased so that at least you can have ample time with them …" (F2).

One relative (F3) suggested the visiting hour should be extended to at least one hour if possible**.** She said:

"Apart from the drugs, visitors, loved ones helped the patient very much relax but the visitors are allowed only 30 minutes, two (2) visitors at a time and they are allowed only 30 minutes so I wish they would give us more time with our loved ones. Maybe an hour at least that will do…" (F3).

4.5.4.4 Measures that will improve pain management

Relatives expressed their opinions on how pain management in the ICU could be improved. According to the relatives, pain management could be improved if noise and movement were reduced to help the patients relax and recuperate, making the ICU friendlier, giving them more pain medication and reassurance.

- *Reducing Noise and movement in the ICU* – The relatives believed that reducing noise and movement would be of benefit to the patient and having cubicles instead of open floor plans would help to individualise pain management.

"…I think there is too much noise in the ICU that could be worked on for them (patients) to feel better. The machines and the tubes are scary; I think they scare them…" (F2).

"I think having cubicles for individual patients will help especially reduce the noise and activities in the ICU...if they can get cubicles or separate wards for each patient and maybe they can take the history and the likes and dislikes of the person before the surgery and maybe if the person likes music or movies or any of those things that can distract her from the pain, they get those things so that the patients in the ICU ***will be managed individually or they will be personalized care rathe****r than putting all the patients in one ward and treating them kind of together…" (FI).*

- *Giving more analgesia*- Relatives also thought giving pain medication more often would help.

  "…the medication for pain, it should be readily available because they go through a lot of pain ….and even stronger medication for pain can be acquired so that …. anytime the patient needs the medication for pain, they will get it very quickly. So, I mean medication should be more often…" (F1).

  "The pain medication is given at certain intervals and sometimes after the pain medication has been given, the pain goes down and after sometime, the pain comes up again before the pain medication is given again but I wish they would be more pain medication…" (F3).

- *Reassurance* -Patients also need to be reassured, according to relatives.

  "…always encourage the patient that you are going to be in this condition for a few days and you will be fine" (F3).

Families of patients who lost their life during cardiac surgery suggested improvements in adequate pain control (Ivarsson, Larsson, Johnson *et al.*, 2008). Another study by Grondin *et a*l (2014) found that patients and their families believed educational interventions, the promotion of non-pharmacological interventions and the use of multimodal analgesia should be routinely used to improve the management of pain.

4.5.5 Education on Pain

This theme describes the pre-operative education patients and their relatives received and if they were educated on post-operative pain. The theme has two sub-themes and includes *pre-operative education on post-operative pain* and *methods of improving pre-operative pain education.*

4.5.5.1 Pre-operative education on post-operative pain

The relatives described the education they were given pre-operatively. All family members (F1, F2, F3) interviewed stated they were not given any education concerning post-operative pain, or how it would be managed, by the doctors or the nurses; they were however educated on the procedure. They said:

> *"Not at all, the doctor hardly mentioned how they were going to manage the pain or even talked much about pain. There was general education about how the surgery will be done and the procedure. In fact, he talked as if there will be no pain at all so I was surprised that after the surgery, my sister was in so much pain but I think maybe he didn't want to scare us…" (F1).*

> *"No, no education on pain at all. Actually, we were told what they will do for her… (F2).*

4.5.5.2 Methods of improving pre-operative pain education

The relatives suggested ways they thought pain education could be improved in the cardiothoracic centre pre-operatively. All the participants interviewed (FI, F2, F3) thought education on pain should be given pre-operatively and health professions should not be reluctant to tell them what they needed to know. They said:

> *"I think the doctors should not only talk about the surgery in general but they should also talk about the kind of pain that will after the surgery and how the pain will be managed and especially what the relatives can do…they usually concentrate on the*

things that will happen before the surgery and during the surgery itself but what will happen after the surgery especially in terms of pain, very little information…" (F1)

"Yes, I think from the onset before the surgery, the patient and the close relatives that are going to be around the patient should be educated on the pain…It's like a topic they are avoiding but I think it should be done that way so that the person knows exactly what to expect and how long it is going to go on …" (F3).

One patient thought a unit should be created for pain management in the hospital so that patients can be educated on what to expect post-operatively. She said:

"… while in the ward, you will have a unit for the management of the pain. They should create a unit for that, they should take you through, then you know what you will be going through then you will get yourself prepared…" (F2).

Meyer (2006) found that family involvement in education before surgery was unsatisfactory and that there was a lack of family involvement in the education of patients before undergoing cardiac surgery.

4.5.6 Summary of Main Findings Arising from the Individual Interviews with Patients' Family

This section discusses the main findings from the individual interviews with patients' family members who visited them during their admission in the ICU.

- According to relatives, their family members experienced a lot of pain whilst in the CT-ICU.
- Relatives are quite involved in the care of their family members admitted to the hospital.
- According to the relatives, their family members report pain when they are moved, talking, turning, wound dressing, bathing the tubes in their neck and side.

- Some relatives thought the attitude of the nurses was a "mixed bag" as some are nice and others are not. Some also thought the nurses and doctors did their best in the care of their relatives.

- Families help their relatives by informing nurses and doctors when they are in pain, thus assisting in getting their pain assessed and treated.

- According to the relatives, their family members normally draw the nurses' attention by raising their hands.

- Family members are generally satisfied with the pain management their relatives receive, but complain that the pain medication wears off sometimes and the pain returns.

- Non-pharmacological interventions employed by the relatives to help relieve their family members pain included reassurance, prayer, singing, distraction, reading scriptures from the Bible, movies, music and visitation.

- According to the relatives, the number of visitors allowed is too limited and the duration of visits too short and should be extended if possible. Visitation, according to the family members, helps take their sick member's mind off the pain.

- To improve pain management, the relatives suggested that movement and noise should be reduced and cubicles provided in the ICU for patients to relax. Pain medication should also be made more available and frequency increased.

- The participants reported that although they were educated on the procedure they were to undergo, no education was given by doctors or nurses on how pain would be managed post-operatively. They suggested that health professionals include education on pain in the pre-operative education and patients and their relatives should be educated on pain before surgery. A unit should be created for education on pain pre-operatively, and post-operative expectations.

4.6 SUMMARY

Chapter four described the results of data generated from focus groups and individual interviews with nurses, doctors, post CT-ICU patients and their families. The chapter described how data was collected and analysed and discussed the results. The next chapter will discuss Phase 2 of the study, which is the development and validation phase and also presents the triangulation of the data in Phase 1 of the study in tables 5.1 and 5.2.

CHAPTER FIVE

DEVELOPMENT AND VALIDATION PHASE

5.1 INTRODUCTION

This chapter forms Phase 2 of the study and completes the first objective by developing the guideline. The chapter is made up two parts: Part 1 describes the draft guideline and Part 2 elaborates on the validation phase. The guideline is based on Phase 1 of the study, which consists of the systematic review of literature and interviews with nurses, doctors, patients and their relatives.

5.2 PART 1- DEVELOPMENT OF THE DRAFT GUIDELINE

The draft guideline was developed based on the systematic review of literature, expert interviews with nurses and doctors and interviews with patients and relatives. Barr *et al* (2013) suggest that clinical practice guidelines be adapted to local practice patterns and resource availability. This guideline seeks to improve acute pain management in the CT-ICU in Ghana and its validation will further test its appropriateness for the Ghanaian environment. This guideline does not intend to repeat all that is contained in international guidelines, but to state what is relevant and appropriate for the Ghanaian environment with the expert opinion of ICU nurses, doctors, patients and their relatives to put it in context.

5.2.1 Framework for the draft guideline

A framework for the clinical guideline has four anchors based on the findings from the systematic review of literature and interviews. The framework holds the view that the inability to effectively integrate an anchor in pain management will lead to ineffective acute pain management in the CT-ICU. Thus, it is important that all anchors be fully integrated to achieve comprehensive and effective acute pain management in the CT-ICU. The framework believes that giving pain in critically ill patients the priority that it deserves, adequate assessment of verbal and non-verbal critically ill patients pain, adequate pharmacological and non-pharmacological treatment of pain and patient and family education on pain will

lead to effective and comprehensive management of acute pain in the CT-ICU. Figure 5.1 describes the framework of the clinical guideline.

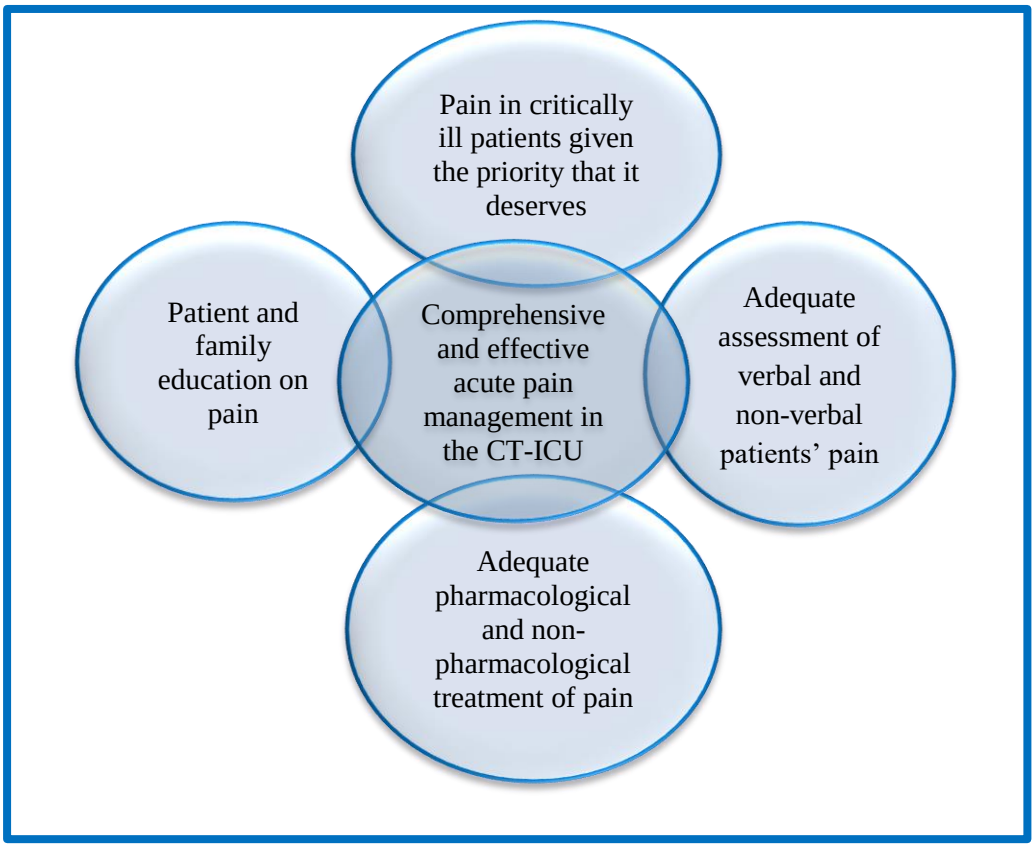

Figure 5.1 Framework for the clinical guideline

To ensure trustworthiness and reliability the page numbers from the interviews and systematic review of literature, where the statements and recommendations were deduced from, are listed in tables for easy cross referencing. Table 5.1 lists conclusions drawn from participants' data on their views and opinions on pain and how it is managed in the CT-ICU and Table 5.2 lists the findings from the systematic review of literature and participant's opinions on how pain management can be improved in the CT-ICU. These conclusions informed the guideline and its recommendation.

Table 5.1 Summary of Findings from Participants

INTENSIVE CARE NURSES	ICU DOCTORS	POST ICU PATIENTS	PATIENTS FAMILY
Pain management is not always adequate and patients have pain. **Page – 119, 120**	Pain in the ICU is not well controlled. Thoracic patients pain could be better managed. **Page- 160-161**	Patients described their pain as moderate, severe and excruciating. **Page-189**	Relatives experienced a lot of pain while in the CT-ICU. **Page- 206**
ICU procedures that cause patients the most pain include bed bath, turning, wound dressing, positioning, suctioning, male catheterisation, physiotherapy, ambulation, types of plasters used and removal of stitches. Medical procedures (done by doctors) that cause pain also include procedures done under local anaesthesia, taking samples, chest tube insertion, intubation and removal of intercostal tubes. **Page- 124-126**	Many surgical procedures cause pain and include thoracotomies, stenotomies, abdominal surgeries, as well as insertion of chest tubes. **Page-164-165**	Procedures that gave them the most pain include wound dressing, bathing, turning, CVP lines in the neck, chest tubes and coughing. **Page-191**	They complain of pain when they are moved, talking, during turning wound dressing and bathing. The "tubes in their neck and side" also cause pain. **Page-207**
Patient's fear reporting their pain to doctors and sometimes do not report their pain at all to health care providers though they may be in pain. **Page -114-115**	Patients do not report their pain although they may be in pain. **Page- 158**	Culture has an influence on how pain is reported as patients believe that they can be seen as exaggerating when they report their pain so they will rather not. **Page- 196, 192 (*respectively)***	
Nurses fear patients may get addicted to pain drugs. **Page - 117**	Doctors worry about overdose and sedation when giving pain medication. **Page -158**		

INTENSIVE CARE NURSES	ICU DOCTORS	POST ICU PATIENTS	PATIENTS FAMILY
Patients complain about pain because of their low pain threshold. Nurses believe that pain is a psychological experience and patients need to be psyched up to endure pain. **Page-116-117** Nurses believe that patients can exaggerate their pain to get attention from health professionals. **Page - 118** Patients do not tell the truth about their pain because they do not know how to describe their pain and some patients misbehave when they are in pain. **Page- 118**	Patients are always sedated because they are in pain. **Page - 160**	Patients reacted to pain by praying, watching TV or listening to music and positive thinking to divert their attention from pain They also groaned, moaned and frowned but did not cry. **Page – 190-191**	Families help their relatives by informing nurses and doctors when they are in pain thus assisting in getting their pain assessed and treated. **Page – 208-209**
Inadequate pain management is experienced by extubated and sedated/unconscious patients because they are perceived not to be in pain. **Page -119**	Patients experience more pain when extubated because it is assumed that they are not in pain after extubation. **Page -160-161** Misconceptions about pain exit especially in children and sedated patients. **Page-158**		
	Cardiac patients in the ICU seem to get more attention than do thoracic patients. **Page- 163**		
Some nurses have a negative or bad attitude towards pain management. **Page- 119**	Some nurses have a negative attitude towards pain management and need to pay attention to that. **Page -161-162**	Health professionals have some negative attitudes such as not explaining procedures to patients, not being pleasant, not responding to their calls and thinking that they are exaggerating their pain and thus do not take their complaints seriously. **Page-192-193**	Some relatives think that the attitude of the nurses is a “mixed bag” as some are nice and others are not. **Page- 207-209**
Analgesics and anaesthetics given during invasive procedures are not always adequate and not enough to treat the patients’ pain. **Page-120**		Patients reported the pain they experience during procedures to nurses but they either do not do anything about it or just reassure them. **Page -191-192**	

INTENSIVE CARE NURSES	ICU DOCTORS	POST ICU PATIENTS	PATIENTS FAMILY
Culturally men are not supposed to express pain and women in labour are not to express pain as pain during labour makes them mothers or women. This influences patients' expressions of pain and how, in turn, nurses relate to patients' pain. Nurses are influenced by the cultural perception that patients are supposed to tolerate pain. **Page -123**	Cultural factors negatively affect pain management, as it is believed in Ghana that men should not have pain and are to bear pain, thus they do not complain when they are in pain. **Page – 164**	Culture has an influence on how pain is reported as patients believe that they can be seen as exaggerating when they report their pain so they will rather not. **Page – 196, 190-191**	
Doctors will have to be convinced before increasing analgesics although nurses are the ones by the patients. **Page - 121**	Nurses need to consult doctors when they are not comfortable with prescriptions to ensure effective pain management instead of assuming that patients are not in pain. **Page - 161**		
Nurses also have a challenge with prn prescriptions as they worry that if any adverse effect occurs, they will be held responsible. **Page – 121**	Lack of collaboration and teamwork is also a factor that negatively influences pain management. Some doctors also believe that assessing pain is a nursing role. **Page – 159**		
		The post CT-ICU patients believe doctors understand their plight and pain better, compared to nurses. **Page - 193**	
Assessment of pain intensity is not done routinely in the ICU. **Page - 129**	There is also no assessment of the severity of the pain. **Page - 169**	The patients also stated that health professionals do not assess the severity of their pain although doctors sometimes do. Doctors always ask about their pain but nurses do not always ask. **Page 194-195**	
Nurses assess verbal patients' pain by asking them "*are you in pain?*" **Page – 128- 130**	Pain assessment in verbal patients is normally done by asking the patients and thus their verbal report. **Page – 168-169**	Sometimes they ask you if you are in pain especially the doctors. **Page -194**	

INTENSIVE CARE NURSES	ICU DOCTORS	POST ICU PATIENTS	PATIENTS FAMILY
No assessment tool is used in verbal patients and a nurse mentioned that they do not really do any assessment. **Page – 129-130**	No pain assessment tool is used in verbal patients. **Page – 168-169**		
In non-verbal patients, pain is assessed using vital signs and sometimes, facial expressions, to assess pain. **Page - 131**	Pain is assessed in non-verbal patients mostly by using vital signs and sometimes their facial expressions to assess pain. **Page – 170-171**		
No assessment tool is used in assessing non-verbal patients' pain. **Page -131-133**	No assessment tools are used in non-verbal patients, thus there is no assessment of the intensity of the patients' pain. **Page -170**		
Nurses presume or assume that patients are in pain, use their own discretion and initiative to manage the non-verbal patients' pain. **Page – 132-133**	Some doctors do not assess pain at all because they give routine pain relieve. **Page - 169**		
Nurses do not seem to have much knowledge about pain assessment tools that can be used to assess the critically ill patients' pain. **Page - 133**			
		The patients draw nurses' attention when they are in pain by trying to call them and raising their hands to alert them. **Page-195**	Relatives are quite involved in the care of their family members admitted to the hospital and help in drawing the health professionals' attention if possible. **Page – 208-209**
		Most nurses tell patients when they are going to give them pain medication but a few do not say anything **Page -197**	

INTENSIVE CARE NURSES	ICU DOCTORS	POST ICU PATIENTS	PATIENTS FAMILY
Nurses consider the type of surgery, diagnosis and type of admission in the management of pain therefore individualising pain. **Page – 126-127**	Doctors also individualise pain management depending on the patient's condition and type of surgery. **Page – 167-168**		
		Pain medication seems to help patients with their pain but wears off before another dose is given. **Page - 197**	Relatives are generally satisfied with the care including pain management their families receive but complain that the pain medication wears off sometimes and the pain returns. **Page -209/212-213**
Opioids especially morphine and fentanyl. Non-opioids such as paracetamol and NSAIDs are also used for pain management. **Page – 136 -138**	According to the doctors, the pharmacological methods employed in the research setting include the use of opioids, especially morphine and fentanyl. Non-opioids such as paracetamol and NSAIDs are also used. Epidural methods of administration of pain medication are sometimes used as well. **Page 173-175**		
Morphine mixed with midazolam is sometimes given according to some of the nurses and sometimes analgesia to calm the patient is given before sedation. Drugs are normally calculated according to the patients' weight. **Page - 138**	The stepladder approach is applied when analgesics are given from higher to lower in the ICU and from lower to higher in the ward. **Page -174** Drugs are also normally calculated according to the patient's weight. **Page – 174-175**		

INTENSIVE CARE NURSES	ICU DOCTORS	POST ICU PATIENTS	PATIENTS FAMILY
	Multimodal analgesia is employed. **Page -175**		
	Nurses do not adhere to the prescriptions that doctors give. **Page - 161**		
Lack of protocols to direct the management of pain is a challenge in the CTI-CU. **Page - 122**	Lack of protocols, the fact that different doctors have different ways of treating patients and there is no uniformity negatively affects pain management in the CT-ICU. **Page - 162**		
Pre-emptive analgesia is sometimes given but it is not routine. Some mentioned that they give it before or after procedures, thus it is not routinely given before procedures. **Page – 139-140**	Pre-emptive analgesia is also sometimes given. **Page – 175**	Pain medication before painful procedures (pre-emptive analgesia), according to the patients, is not routinely given. Some nurses will want to complete the procedure before giving medication even if the patients complain of pain. **Page -197**	
.	Nursing supervisors positively influence care in the ICU. **Page - 165**		
The time allowed for relatives to visit patients is also inadequate as the patients' relatives visiting can divert the patients' attention from the pain. **Page – 122**		The presence of their families helped to take their minds off the pain but the time allocated for the families to visit them is not enough and more time should be allowed for their relatives to visit. **Page – 198-199**	According to the relatives, the number of visitors allowed is too limited and the duration of visits too short and should be extended if possible. **Page – 211-212**
Education on post-operative pain is not given routinely before surgery. **Page -149-150**	Patients do not get education on post-operative pre-operatively. **Page -182-183**	According to the patients they were educated on the procedure they are to undergo but not on the post-operative pain. **Page – 201-202** Patients also want to be educated on pain and its management post-operatively. **Page - 202**	Education about the procedure was given but no education was given on post-operative pain. **Page – 213-214**

Table 5.2 Summary of Findings from Literature and Participants (How Pain Management Can Be Improved in the ICU)

SYSTEMATIC REVIEW OF LITERATURE	INTENSIVE CARE NURSES	ICU DOCTORS	POST ICU PATIENTS	PATIENTS FAMILY
	Nurses must believe the patient's self-report of pain and not use their own discretion in pain assessment. **Page - 134**	Pain is a subjective experience **Page - 168**		
Standardising pain assessment and treatment and the use of pain assessment tools improves pain management. Providing nurses with pain assessment tools. Making assessment tools available and accessible to them especially by the bedside improves pain assessment and therefore management. **Page – 86, 87**	The use of pain assessment tools will improve pain assessment. **Page – 134**	Introduction of pain assessment tools will improve management. **Page- 171**	To improve pain assessment, the patients think "grading" pain will help health professionals to appreciate the severity of their pain. **Page -196**	
Educating nurses on pain assessment and treatment especially on the use of assessment tools improves pain management. **Page – 86, 87, 98, 99**	Nurses need knowledge on pain drugs to improve pain management. **Page - 148**	Educating health professionals on the effects of pain will improve pain management. **Page - 181**	Nurses should be given more education and training on pain management. **Page -201**	
Making protocol and pocket size guidelines available and accessible to health professions improves pain management. **Page – 90, 94**	The use of pain management guidelines will improve pain management. **Page- 144**			

SYSTEMATIC REVIEW OF LITERATURE	INTENSIVE CARE NURSES	ICU DOCTORS	POST ICU PATIENTS	PATIENTS FAMILY
Regular audits, monitoring compliance and feedback on pain management will improve pain management. **Page -94**				
NRS and VAS are tools that have been extensively validated in verbal ICU patients and can be used to assess pain. **Page- 91, 92, 93, 98**				
The CPOT, BPS and NVPS have also been validated in non-verbal patients, but most studies recommend the use of the CPOT. **Page- 86, 87, 88, 95, 98**				
Providing support and monitoring compliance in the use of the assessment tools was also recommended by literature. **Page – 86, 92**				
Providing pocket size tools improves pain assessment **Page - 94**				
Posting reminders of pain assessment and treatment in the ICU improves pain management. **Page - 86**				
Assessing pain at least 4 hourly. **Page -92**	Pain must be assessed before treatment. **Page -146**	Pain must be assessed when assessing vital signs. **Page - 172**	Pain should be graded **Page -196**	

SYSTEMATIC REVIEW OF LITERATURE	INTENSIVE CARE NURSES	ICU DOCTORS	POST ICU PATIENTS	PATIENTS FAMILY
Pain intensity evaluation improves the management of pain. **Page - 92**	Assessment of pain intensity must be carried out to improve pain management. **Page -146**			
	Nurses must also employ the skills of observation and continuous assessment to improve pain assessment. **Page -135, 136**	Critical observation of ICU patients to determine pain. **Page – 172**		
Administration of analgesics and re-evaluation until patient has only mild pain. **Page -92**				
Implementing quality improvement programmes and protocols will improve pain management. **Page – 92, 94**	The use of protocols will also improve pain assessment and management. **Page – 135, 145**	Use of protocols will improve the management of pain. **Page -179**		
Providing a section for doctors to document their pain scores during the patients assessment. Documentation of pain assessment. **Page - 92**	Pain assessment must also be documented to improve pain assessment and communicate pain assessment to other health professionals. **Page – 135** Some doctors however think that pain assessment is a nursing role. Page - 159	Documentation of pain assessment will improve management. **Page - 171**		
Removal of chest tubes as soon as they are no longer needed. **Page -88**				

SYSTEMATIC REVIEW OF LITERATURE	INTENSIVE CARE NURSES	ICU DOCTORS	POST ICU PATIENTS	PATIENTS FAMILY
Nurses showing interest in the care of their patients improves pain management. **Page - 88**				
Moving patients only when necessary will reduce their pain and enhance pain management. **Page - 88**				
	Nurses must advocate for their patients for improved pain management based on their assessment of the patient's pain. **Page – 135**			
			Workload nurses should be reduced or more nurses attached to the ICU to improve pain management. **Page -200-201**	
Giving prescribed analgesics improves the management of pain. **Page- 88**	Analgesics should be given as prescribed and breakthrough pain should be treated. **Page-144**	Giving analgesics as prescribed and regularly will improve pain management **Page – 178-179**	Pain medication according to the patients should be given at regular intervals so it does not wear off before the next dose is given. **Page - 199** Frequency of pain medication should be increased to improve pain management. **Page -199**	Pain medication should also be made more available and frequency increased to improve management. **Page -212-213**

SYSTEMATIC REVIEW OF LITERATURE	INTENSIVE CARE NURSES	ICU DOCTORS	POST ICU PATIENTS	PATIENTS FAMILY
	Patients should be educated on analgesics before they are given. **Page -148**		Nurses should explain procedures before they are done and should be a little more patient and slower when doing procedures. **Page – 199-200**	
Multimodal analgesia instead of monotherapy will improve pain management. **Page - 97**	Multimodal analgesia must be given and on time. **Page - 147**	Multimodal analgesia instead of monotherapy in pain management. **Page - 175**		
Giving of pre-emptive analgesia improves the management of pain. **Page – 95, 96**	Pre-emptive analgesia must be routinely given. **Page - 147**	Routinely giving pre-emptive analgesics. **Page -179**	Pain medication should be given a few minutes before any procedure **Page - 200**	
	Pain management according to the nurses must be individualised to improve management. **Page -145**	Individualising pain assessment and assessment of breakthrough pain are all measures that can improve the assessment and management of the patient's pain. **Page – 172-173**		
	Analgesics alternated and not all given at the same time will improve pain management. **Page - 147**			
		Employing dedicated pumps for analgesics and the use of PCA will improve pain management. **Page -179-180**		

SYSTEMATIC REVIEW OF LITERATURE	INTENSIVE CARE NURSES	ICU DOCTORS	POST ICU PATIENTS	PATIENTS FAMILY
Employing non-pharmacological management measures which include: • Deep-breathing relaxation exercises. • Application of cold compress before chest tube removal. • Music and music therapy. • Hand massage. • Simple body massage. • Distraction. • Family visit facilitation. • Explanation of procedure • Nurses showing interest in patients when in pain • Removal of chest tubes • Staying immobile • Therapeutic massage **Page – 87, 91, 89, 101,100, 101, 100, 101, 101, 89, 88, 88, 88, 89 *(respectively*)**	Non-pharmacological methods are employed by ICU nurses and they find them effective in complementing pharmacological management of pain. The non-pharmacological methods employed include: • Explanation of the patient's condition to the patient. • Reassurance. • Massaging. • Tender loving care, positioning. • Chest splinting during coughing. • Use of hot water bottles and hot fomentation. • Diversional therapy which includes music, television and talking to the patient. • They also use physiotherapy. • Doing procedures slowly. **Page – 141-143, 148**	Most doctors do not routinely employ non-pharmacological methods in the management of the patient's pain. Some consider it as more appropriate for chronic than for acute pain. Some of the doctors however use: • Positioning. • Physiotherapy. • Reassurance. • Explanation of procedures. • Psychotherapy. • Prayer in the management of the patients' pain. **Page – 176-178**	Patients stated that the non-pharmacological methods that helped in managing their pain include: • Holding the pillow close to them. • Watching television. • Listening to the radio. • Positive thinking. • Having loved one's around. • Prayer. • Reassurance from health professions. • Change of position. • **Page - 198- 199**	Non-pharmacological interventions employed by the relatives to help relieve their family members pain include: • Reassurance . • Prayer. • Singing. • Distraction. • Reading scriptures from the Bible. • Movies. • Music. • Visitation. **Page- 210- 211**
Pre-operative education of patients on post-operative pain improves pain management. **Page -96, 97**	Pre-operative education on post-operative pain is not routinely done, but they believe that it will benefit patients and reduce their anxiety and promote co-operation. Pre-operative education can be done better if also given by ICU nurses. Patients need education on drugs and positions they will lie in and non-	Pre-operative education is not routinely given by most doctors, but they think it will be helpful in the management of pain in the ICU. Doctors also stated that pre-operative education has many benefits including the reduction in anxiety,	Patients also want to be educated or told about the pain and *suffering* they will experience post-operatively. According to the patients, this education will be helpful. Patients also want to be educated on pain and its	A unit according to the relatives should be created for the pre-operative education about pain, management of pain and expectations post-operatively. They

SYSTEMATIC REVIEW OF LITERATURE	INTENSIVE CARE NURSES	ICU DOCTORS	POST ICU PATIENTS	PATIENTS FAMILY
	pharmacological methods that can help with pain management. **Page – 149-151**	reduction in how much analgesics patients need and improved patient outcomes in morbidity and mortality. Pre-operative education can be improved according to the doctors if nurses get more contact with the patient pre-operatively and if patients are told about the analgesics they will be given, their side effects and how the side effects will be treated. **Page – 182-183**	management post-operatively. **Page - 202**	suggested that health professionals include education on pain in the pre-operative education and patients and their relatives should be educated on pain before surgery. **Page - 214**
		.	The presence of families was beneficial and helped to take their mind off the pain, but the time allocated for the families to visit them is not enough and more time should be allowed. **Page-198-199**	Visitation, according to the family members, helps their sick relatives take their mind off the pain and it is very helpful. **Page – 211-212**
				To improve pain management, the relatives suggest that movement and noise should be reduced in the ICU as it makes the patients restless and unable to relax. **Page - 212**

SYSTEMATIC REVIEW OF LITERATURE	INTENSIVE CARE NURSES	ICU DOCTORS	POST ICU PATIENTS	PATIENTS FAMILY
				The ICU must also be made friendlier and cubicles provided if possible to reduce the effect of noise and activities in the ICU. **Page - 212**

Based on the framework for the clinical guideline, the following major headings and statements, discussed under the headings, were derived for the guideline statements and recommendations. Since the study sought to develop a clinical guideline for the comprehensive management of acute pain in the CT-ICU in Ghana, all aspects of pain management from the systematic literature review and interviews were incorporated into the guideline to ensure it covers all the explored issues of pain.

1. Pain in critically ill patients
    i. Procedures that cause pain in the ICU.
    ii. Need for education of health professionals to improve pain management.
    iii. Team approach to pain management to improve pain outcomes in patients.
    iv. Use of protocols.
    v. Documentation of pain management.
2. Assessment of pain in critically ill patients
    i. Pain assessment in verbal patients.
    ii. Pain assessment in non-verbal patients.
3. Treatment of pain in the ICU
    i. Pharmacological treatment.
    ii. Non-pharmacological treatment.
4. Patient and family education on pain
    i. Education on pain assessment.
    ii. Education on the treatment of pain.

The draft guideline in Table 5.4 was therefore based on these focus areas and levels of evidence from JBI (2014) in Table 5.3.

Table 5.3 JBI Levels of Evidence

Levels of Evidence – Effectiveness	
"Level 1 – Experimental Designs"	"Level 1.a – Systematic review of Randomised Controlled Trials (RCTs)"
	"Level 1.b – Systematic review of RCTs and other study designs"
	"Level 1.c – RCT"
	"Level 1.d – Pseudo-RCTs"
"Level 2 – Quasi-experimental Designs"	"Level 2.a – Systematic review of quasi-experimental studies"
	"Level 2.b – Systematic review of quasi-experimental and other lower study designs"
	"Level 2.c – Quasi-experimental prospectively controlled study"
	"Level 2.d – Pre-test – post-test or historic/retrospective control group study"
"Level 3 – Observational – Analytic Designs"	"Level 3.a – Systematic review of comparable cohort studies"
	"Level 3.b – Systematic review of comparable cohort and other lower study designs"
	"Level 3.c – Cohort study with control group"
	"Level 3.d – Case – controlled study"
	"Level 3.e – Observational study without a control group"
"Level 4 – Observational – Descriptive Studies"	"Level 4.a – Systematic review of descriptive studies"
	"Level 4.b – Cross-sectional study"
	"Level 4.c – Case series"
	"Level 4.d – Case study"
"Level 5 – Expert Opinion and Bench Research"	"Level 5.a – Systematic review of expert opinion"
	"Level 5.b – Expert consensus"
	"Level 5.c – Bench research/ single expert opinion"

Source: **http://joannabriggs.org/jbi-approach.htm//tabbed-nav=levels-of-Evidence**

Table 5.4 Draft Guideline

PAIN IN CRITICALLY ILL PATIENTS	LEVEL OF EVIDENCE
Many procedures in the ICU cause acute pain and need special attention. The ICU patient has many sources of pain and they must be identified and treated.	2A
1. Turning and moving patients for procedures in the ICU is very painful and must be done with caution and bed accessories employed if available.	2D
2. Chest tubes cause patients a lot of pain and should be removed the moment they are no longer necessary.	4A
3. Patients also experience pain during change of dressing and endotracheal tube suctioning.	4A
4. Bed bath, positioning, male catheterisation, physiotherapy, ambulation, types of plasters used and removal of stitches, medical procedures done under local anaesthesia, taking samples, chest tube insertion, intubation and removal of intercostal tubes all cause patients pain.	5B
5. Thoracotomies and sternotomies are the surgical procedures that cause the most pain and need extra attention and effort in pain management.	5B
6. Nurses showing interest in how patients feel, especially when in pain, helps decrease their pain.	4A
7. Patients have different pain thresholds and must be treat as individuals.	1B
8. Pain is subjective and it is whatever the experiencing person says it is. The perception that patients exaggerate their pain is not accurate.	1B
ICU nurses need to improve their knowledge on pain and its management especially the negative consequences of untreated pain. Education will improve nurses' attitude towards and management of pain.	2D
1. Inadequate analgesia and untreated pain have numerous negative consequences that influence the patients' recovery and quality of life. Health professionals' education on pain assessment and treatment improves outcomes.	2D
2. Education and feedback strategies when implemented, improves the assessment and reassessment of pain.	1B
3. Nurses need to advocate for their patients for improved pain management especially to make doctors aware of the need to review analgesics to avoid the adverse effects of inadequate pain management. Nurses must also encourage patients to speak up about their pain.	5B
4. Supervision improves adherence to analgesic prescriptions and should be done routinely and meticulously by nurses in charge of the shift/ICU. Audits and feedbacks are important for improving knowledge.	2C

PAIN IN CRITICALLY ILL PATIENTS	LEVEL OF EVIDENCE
5. A lot of effort must be put into prevention of pain and not only treatment by promoting educational programmes and elaboration of protocols and guidelines in the ICU.	3C
Team approach to pain management will improve pain outcomes in patients.	2C
1. Collaboration and improved communication between doctors and nurses in terms of informing each other about the patients' pain reports, assessment and treatment will assist in improving pain management.	4A
2. Nurses must hand over assessments and treatments given to the patient for pain to colleagues.	4A
3. A cordial relation between senior and junior colleagues will be of benefit to patients in terms of pain management.	5B
There is a need for a protocol to standardise pain assessment and management in the ICU and act as a universal guide for ICU nurses and doctors in their management of the patients pain.	IC
1. A multidisciplinary protocol must be developed for pain management in the ICU. Using protocols to manage pain reduced the duration of ventilatory support, length of ICU stay and mortality rates.	IC
2. Making guidelines and protocols easily accessible and available to all health professionals especially nurses and doctors in the ICU will improve their management of pain.	2C
3. Posting guidelines on ICU walls and making pocket guidelines available to the ICU team, regular audits and feedback was seen as beneficial in ensuring adherence to pain management protocols.	2C
Documentation of pain assessment and treatment on ICU charts will improve pain management.	2D
1. Nurses must document pain assessment and treatment to ensure follow-up and monitor effects of analgesics.	2D
2. Doctors must also document their assessment of the patient's pain in their notes to enhance follow up and assess effectiveness of analgesics. Creating a place for doctors to document their pain scores, among other measures, improved pain scores.	2D

ASSESSMENT OF PAIN IN CRITICALLY ILL PATIENTS	LEVEL OF EVIDENCE
Pain assessment must be done routinely with validated assessment tools to improve pain management.	2D
1. Nurses and doctors must encourage patients to report their pain since patients own report is the gold standard and some patients fear the negative reaction they will get from nurses/doctors if they should report their pain too often.	2C
2. The Ghanaian culture influences patients report of pain, so just admitting pain is not enough but a further assessment of the severity of the pain should be established.	5B
3. Special attention should be paid to pain in men, as culturally they are not supposed to report their pain but to 'bear' pain.	5B
4. Validated tools for pain assessment in the ICU must be used to assess the severity of the verbal patient's pain. The recommended tool for pain assessment in verbal patients are the NRS and the VAS.	1C
5. Assessment of pain must be carried out routinely at least (3-4 hourly) and before and after the administration of analgesics. Pain must be reassessed after analgesia/non-pharmacological treatment is given to assess the effectiveness of the treatment.	2C
6. Validated tools for pain assessment in the ICU must be used to assess pain and its severity in the non-verbal patient. The most validated tools for ICU patients are the CPOT and the BPS.	1B (CPOT) 3C (BPS and CPOT)
7. Vital signs must not be used exclusively to assess pain in non-verbal patients but serve as a cue for further assessment and appropriate assessment done if pain is suspected.	3E
8. Observation of patients should constitute a critical part of pre-analgesia assessment.	5B

PHARMACOLOGICAL TREATMENT OF PAIN IN THE ICU	LEVEL OF EVIDENCE
Pain treatment must effectively address the needs of the patient and keep the patient pain free while minimising adverse effects.	1C
1. Giving smaller doses of analgesia (IV titration/IM) more frequently is more effective than large doses less frequently.	1C
2. Analgesia must be given until the patient is comfortable and calm, then sedation. Analgesia is not sedation and mixing analgesia and sedation might get the patient sedated but not pain free.	3E
3. Pre-emptive analgesia must be routine for many of the procedures in the ICU, such as chest tube removal, dressing, turning, bed bath, CVP line insertion, Chest tube insertion and so on.	1C
4. Nurses must ensure strict adherence to prescribed analgesics and inform doctors if there is a need to review the order.	2C
5. Patients in acute pain will not get addicted to pain medications and should therefore be given medication as prescribed, and when needed. They rather report pain and request for analgesia because their pain is not relieved.	5B

PHARMACOLOGICAL TREATMENT OF PAIN IN THE ICU	LEVEL OF EVIDENCE
6. Nurses and doctors should watch out for breakthrough pain, which occurs in between doses of analgesics and manage it appropriately.	5B
7. Nurses should alternate pain drugs as prescribed and not give all drugs at the same time.	5B
8. Patients should be made aware that they are given analgesics to reassure them that their pain is being treated.	4B
9. Multimodal (using more than one analgesia) should be encouraged, instead of monotherapy.	3C
10. Stool softeners should be prescribed for patients on morphine to prevent constipation.	5B
11. Care must be taken to ensure that pain medications are procured from reliable sources to ensure their efficacy. There must therefore be collaboration between the hospital and the importers and drug companies to ensure only drugs from reliable sources are administered to patients.	5B
12. Pain must be treated when the cut-off scores for the presence of pain for the NRS ≥ to 3, CPOT (>2). BPS (>5) are reached.	1C
13. Patient controlled analgesia provided better pain control and greater patient satisfaction than conventional PRN analgesia.	1A

NON-PHARMACOLOGICAL TREATMENT OF PAIN	LEVEL OF EVIDENCE
Many non-pharmacological methods can be employed by ICU nurses and doctors to reduce pain in critically ill patients.	4A
1. Slow deep-breathing relaxation exercise during chest tube removal, as an adjunct to pharmacological treatment, will significantly decrease pain ratings.	2D
2. Application of cold packs to the site before the removal of chest tubes significantly reduces the intensity of pain caused by chest tube removal.	1C
3. Hand massage and simple body massage reduces the pain of ICU patient.	4A
4. Reassurance helps patients to be encouraged that their pain will be relieved.	5B
5. Listening to music was found to be effective in reducing pain scores in cardiac surgery patients.	1B
6. Other forms distraction, such as of television, newspapers or other reading materials, will distract patients and reduce their pain and anxiety scores.	4A
7. Ghanaians are faith-based people and should be allowed to pray and religious leaders allowed to have supervised visits to the ICU. This can serve as encouragement and hope for recovery.	5B
8. Relatives may help divert the attention of patients from the pain they are feeling and must be allowed more supervised time to visit them while in the ICU.	4A

NON-PHARMACOLOGICAL TREATMENT OF PAIN	LEVEL OF EVIDENCE
9. Placing patients in the right position according to their needs and requests helps to reduce pain that may be due to uncomfortable positioning,	5B

PATIENT AND FAMILY EDUCATION ON PAIN	LEVEL OF EVIDENCE
ICU nurses and doctors need to give patients education on post-operative pain and its assessment, and pharmacological and non-pharmacological methods of pain management.	1B
1. Patients need education from the ICU nurses and doctors on how they can draw their attention or signal them when they are in pain and cannot communicate verbally (either by nodding to questions or raising their hands).	5B
2. Patients must be educated on pain assessment tools that will be used to assess their post-operative pain.	4B
3. Pre–operative education on pain may reduce anxiety of patients and their relatives and ensure co-operation.	1C
4. Patients relatives need to be educated on post-operative pain as well to allay their anxiety and ensure co-operation.	5B
5. Patients and relatives need to be educated on the fact that non-pharmacological methods can complement drugs to reduce their pain so they can accept them post-operatively.	5B
6. Patients and relatives should be educated on the types of pain medications, their effects and side effects.	4B

5.2.2 Evidence Supporting Guideline Statements

This section discusses the evidence supporting the guideline statements based on the four focus areas of the guideline.

5.2.2.1 Pain in critically ill patients

Pain remains a major problem for critically ill patients and the ICU has many sources of pain (Aslan *et al.*, 2010; Jong *et al.*, 2013). Pain after surgery in the ICU is not well controlled and all the post-operative patients (n=553) surveyed in a surgical ICU in Niamey reported persistent pain after surgery (Chaibou *et al.*, 2012). Adult ICU patients experience pain both at rest and with routine ICU procedures (Barr *et al,* 2013). According to de Jong *et al.* (2013), severe pain and serious adverse effects are common in the ICU and strongly associated with moving ICU patients for nursing procedures. Cade (2008) identified turning as a major cause

of cardiothoracic patients' pain; others include catheter insertion, turning, sheath removal (Cade, 2008). Chest tubes, ET tubes and dressing change caused ICU patients pain (Aslan *et al.*, 2010) and positioning was also found to be a major cause of pain (de Jong *et al*., 2013). Nurses need to recognise that certain procedures, though routine, can cause pain and should therefore plan the ICU patients care with this in mind (Siffleet *et al.*, 2007). Procedure related pain is the most common type of health-induced pain, of which ICU patients have vivid memories (van der Leur *et al.*, 2004; Jones *et al.*, 2007). According to Siffleet *et al.* (2007), routine ICU procedures cause pain including, drain removal, deep breathing and coughing exercises, suctioning, positional change and line removal. Patients in a study by Aslan *et al.* (2010) reported that the presence of chest tubes, endotracheal tube suctioning, dressing change and the use of air mattress caused them considerable pain. In a large multicentre (28 countries) study of 3851 ICU patients', chest tube removal, wound drain removal and arterial line insertion were the three most painful procedures for critically ill patients (Puntillo *et al.*, 2014).

Patients after thoracotomy also suffered moderate to severe pain and experienced extremely high interference with daily activities (Yin *et al.*, 2012). The researchers also found that there was inadequate treatment of post thoracotomy patients' pain. Turning was the most frequent source of pain for cardiac surgery patients and this pain was located in the thorax (Gelinas, 2007).

Patients prepared for procedures adopt responses that will assist with attenuating the degree of fear and anxiety they experience (Oka *et al.*, 2010). Breiner (2009) found that developing an individualised plan of care for procedural comfort could enhance the physical and psychosocial outcome of the patient. Researchers however identified analgesic medications, removal of chest tubes, staying immobile and nurses showing interest in the patients as factors that decreased ICU patients' pain (Jong *et al*, 2013).

Patients also have different pain thresholds. This variability in pain sensitivity may partly be explained by environmental factors, age, sex or anxiety (Rudin *et al.*, 2008; Ip *et al.*, 2009; Sommer *et al.*, 2010) and some genes have also been associated with differential pain sensitivity (Allegri *et al.*, 2010; Young *et al.*, 2012). It must be noted that pain is one of the most common symptoms in critically ill patients and is experienced by each patient in a unique manner (Puntillo *et al.*, 2008).

Studies have shown that pain has a lot of negative sequela. Ineffective pain management can lead to hormone fluctuation, electrolyte and glucose imbalance, hypertension, tachycardia, increased oxygen consumption, impaired intake and output, fatigue, depressed immune response, reduced cognitive function, insomnia, anxiety, depression, hopelessness and thoughts of suicide (American Pain Society, 2007; CPM Resource Center, 2010d). Failure to relieve acute pain may result in increasing anxiety, inability to sleep, demoralisation, a feeling of helplessness, loss of control, inability to think and interact with others in extreme situations, where patients can no longer communicate; effectively they have lost their autonomy (Cousins *et al.,* 2004). Unreasonable failure to treat the patient's pain is viewed internationally as poor medicine, an unethical practice and an abrogation of a fundamental human right of the patient (Breman *et al.,* 2007). Effective pain and symptom management is an ethical obligation for all healthcare providers, health institutions or organisations (Mosenthal, 2005). One of the enablers to effective pain management includes prioritisation of pain by ICU nurses. Adequate pain management improves tolerance of the endotracheal tube, mechanical ventilation, tracheal suctioning and other distressing procedures. It also produces larger tidal volumes, better gas exchange, improved sputum clearance and co-operation with physiotherapy during weaning and after extubation.

Adequate pain management also reduces the stress response and less disturbing memories of therapy in the ICU (IASP, 2010). A patient without pain after surgery implies increased well-being and shorter hospitalisation for the patient (Linderberg & Engstrom, 2011). Effects of untreated pain include an increase in cardiac work and oxygen consumption, increased stress hormone response, which results in catabolism with sodium and water retention and hyperglycaemia, which leads to immunosuppression and delay in wound healing and ineffective cough and retention of secretions, which leads to reduced oxygenation and infection. Pain also leads to delayed weaning from ventilation, increased risk of chest infection among patients, prolonged ICU stay and poor-quality sleep (IASP, 2010).

Education and quality improvement programmes and interventions done to improve nurses' knowledge, introduction of objective pain assessment tools, programmes and protocols for pain management, standardising pain assessment and treatment and monitoring were factors that positively influenced nurses' management of the patient's pain (Diby *et al.,* 2008; van Gulik *et al.,* 2010; Porhomayon *et al.,* 2013; Jong *et al.,* 2013 Mansouri *et al.,* 2013). The researchers believe that careful documentation of pain management during mobilisation for

nursing procedures could influence pain management (Jong *et al.*, 2013). van Gulik *et al.* (2010) also stated that improvement of pain management should focus on the prevention of pain. Training of staff, providing pocket guidelines, regular audits and feedback also improved pain management (Diby *et al.*, 2008). There is an urgent need to strengthen pain education of ICU nurses by targeting knowledge deficits and barriers to changing pain management approaches in the ICU (Wang & Tsai, 2010).

As in quality improvement programmes, the development and implementation of protocols also seem to influence pain management positively (Porhomayon *et al.*, 2013; Mansouri *et al.*, 2013). Protocols decreased the duration of mechanical ventilation and length of stay in the hospital and reduced the use of fentanyl, midazolam and mean mechanical ventilations days, reduction in mortality rate and reduction of agitation and delirium. A professionally directed small group discussion on critical care nurses' knowledge and biases related to pain management, by Lewis *et al.* (2015), also increased the nurse's knowledge and influenced their management of the ICU patient's pain. Nurses perceived four main challenges in managing pain, namely lack of clinical guidelines, lack of structured pain assessment tool, limited autonomy in decision making and the patient's condition (Subramanian *et al*, 2011). Many studies have however demonstrated the effectiveness of protocols for pain management in improving ICU patients' outcomes (Skrobic *et al.*, 2010; Mansouri *et al.*, 2013). Biases may be prominent in health professionals' decision-making about pain but they have minimal awareness or lack the willingness to acknowledge this bias (Hirsh, Jensen, Robinson *et al.*, 2010). Lewis *et al.* (2015) found that biases exist towards treating unconscious and mechanically ventilated patients and this bias decreased after education on pain assessment and treatment in these patient populations.

The American Society for Pain Management Nursing (ASPMN) stated that nurses and other health professionals should advocate and intervene for patients based on their needs, settings and their current situation (Czarnecki *et al.*, 2011).

According to findings from a study by Batiha (2014), the physicians' lack of trust in the ICU nurses' assessment of pain in the patient is a barrier to effective pain management. An effective collaboration between nurses and doctors was found to be a factor that facilitated post-operative pain management (Rejeh *et al.* (2008). Subramanian *et al.* (2011) found that limited autonomy was a challenge in the management of pain. Teamwork that creates a

positive environment for every healthcare professional could lead to improved management of pain, which will lead to patient satisfaction (Materko, Mohr, Young., 2004). There is also a need for an enhanced commitment to provide a more effective pain management after surgery (Aziato & Adejumo, 2013). A multidisciplinary and patient-centred continuous quality improvement process is essential to identifying barriers and in implementing evidence based solutions to the problem of undertreated pain in critically ill patients (Pasero *et al.*, 2009).

Erdek and Pronovost (2004) found that doctors assessing patients pain and reforming their clinical forms to include sections for patients' pain scores greatly improved pain scores of ICU patients. The need to document pain assessment was suggested by researchers (Gelinas *et al.*, 2004; Ayasrah *et al.*, 2014). Pain documentation for assessment, management and reassessment, according to Ayasrah *et al.* (2014), was lacking and required improvement. Pain documentation in progress notes was inadequate and incomplete, thus protocols should be implemented to provide structural format for documentation to link nurses and doctors' decision making to pain (Gelinas *et al.*, 2004). Gelinas *et al.* (2004) recommends a supportive multidisciplinary approach to quality improvement and providing education that emphasises written documentation to record actual practice.

A South African study found that one of the barriers to pain assessment was the lack of a designated area for documenting such assessment (Onwong, 2014). Kizza (2012) found that poor documentation of pain assessment and management was a barrier to management of pain amongst 77% of Ugandan ICU nurse participants. Poor communication of pain assessment was also a barrier to the management of pain in 74.7% of the nurses. Gelinas *et al.* (2004) concluded that documentation is incomplete and inadequate in many medical situations. Progress notes have been seen to provide the most scope for open expression of clinical judgement about pain assessment, interventions to relief patients pain and reassessment of pain, compared to other forms of documentation (Gelinas *et al.*, 2004). Pain needs to be routinely assessed, reassessed and documented to facilitate treatment and communication among healthcare providers (Gordon *et al*., 2005). According to the Joint Commission on Accreditation of Healthcare Organization (JCACHO), pain should be added as the "fifth vital sign" and should be diligently monitored along with blood pressure, respiration, heart rate and temperature (JCACHO, 2004). Therefore, documenting pain assessment on the ICU chart and assessing it often will improve assessment.

Instituting a pain titration protocol resulted in lower incidence of unacceptable pain (NRS ≥ 4) (Ahlers, *et al.*, 2012). Nurses in another study identified the lack of protocols and guidelines on pain assessment and management as a barrier to pain management (Kizza, 2012).

5.2.2.2 Assessment of pain in critically ill patients

Cultural factors influence and directly relate to the experience of pain. These include the expression of pain and language, cultural meaning of suffering, traditional healers and remedies for pain, social views and the healthcare system (Lasch, 2000). The researcher concluded that pain should be considered in the perspective of its psychological, social and spiritual significance in each culture. The pain experience should be understood by health professionals within the context of beliefs, values, coping mechanisms and life experiences of each patient (Callister, 2003). According to Lovering (2006), social and cultural backgrounds of the patient influence his or her response to pain. The influence of one's culture may affect the way in which the individual behaves while having pain. Individuals from different cultures and even within cultures may vary in the degree of pain they report (Walsh, Davidovitch & Egol, 2011).

Self-report remains the 'gold standard' for pain assessment in conscious patients (Merskey, 1994) and therefore the need to get the patients report of pain. Ahlers *et al.* (2008) also stated that pain scores should be obtained by self-report of patients as much as possible. Aslan *et al.* (2010) found that 39.6% of ICU nurses did not know how to evaluate pain symptoms in ICU patients suffering from complicated problems; they also did not know how to evaluate pain in patients having communication problems.

Fear is a factor negatively affecting pain management, as some patients are afraid of reporting their pain to the doctor (IASP, 2010). Fifty percent of ICU patients communicated their pain to nurses (Yorke *et al.*, 2004). Conversely, Batiha (2014) found that ICU patients did not want to bother nurses with their complaints. The patients reported their pain to doctors and not ICU nurses. The patients therefore generally seem to have a challenge in reporting their pain to health professionals.

The tool extensively validated and recommended for use in verbal and or conscious ICU patients is the numerical rating scale pain (Ahlers *et a*l., 2008; Chanques *et al.*, 2010). Chanques *et al.* (2010) found that the visually enlarged horizontal numeric rating scale was the most valid and feasible pain tool tested in over 100 critically ill patients for pain intensity. A study in Ghana amongst surgical patients also validated the numerical rating scale and other tools for use in the socio-cultural context and found it to be sensitive to change in the intensity or level of pain experienced before and after analgesia (Aziato *et al*, 2015). According to Ahlers *et al.* (2010), scores of greater than 3 on the numeric scale are unacceptable. Diby *et al.* (2008), in their attempt to improve pain management, introduced a pain management programme that entreats nurses to assess pain using the VAS, give analgesia and re-evaluate until patients had mild pain, and this must be done at least 4 hourly and after administering morphine. This was found to decrease pain intensity and improve patients' sleep. Nurses education on the use of the tools, assessing pain 3 to 4 hourly, treating pain scores of 3 and above and making the pain tools available and accessible were all ways of ensuring effective pain management. They also have to audit, monitor and give feedback (Woien *et al.*, 2012; Woien and Bjork, 2013).

Van Gulik *et al.* (2010) quantified the effect of a pain management programme, involving training of all staff in assessing pain, providing adequate analgesia, a system that obliged nurses to ask patients for their pain score three times a day and the preferred analgesic treatment optimised, and an NRS score of at least 4 was considered unacceptable. The protocol reduced the occurrence of unacceptable pain significantly and the amount of morphine given to patients. They also stated that improvement of pain management should focus on the prevention of pain.

Priority should be given to regular assessment of the intensity of patient's post-operative pain and evaluation of the effects of analgesic therapy (Milutinovic *et al.*, 2009). According to researchers, pain assessment in the ICU should be performed regularly and consistently, not only to assess the initial onset and severity of a patient's pain, but also to assess a patient's response to treatment (Slonim, 2004; Mosenthal, 2005). Makic (2013) found that accurately and consistently assessing pain is an important priority for nurses. It is important to obtain measures of pain severity and relief reported by patients regularly and there is a need for nurses to avoid making assumptions about comfort level solely based on how patients appear or if they are sleeping (Dunwoody *et al.*, 2008). Systematic pain assessment

improves pain management (Erdek and Pronovost 2004; Cade, 2008; Diby *et al.*, 2008; Payen *et al.*, 2009; Topolevec- Vranic *et al*., 2010; Gelinas *et a*l., 2011; Vazquez *et al.*, 2011; Rose *et al.*, 2013; Linde, Badger, Machan. *et al*., 2013; Gelinas *et al.*, 2014; Georgiou *et al.*, 2015).

According to researchers, the inability to describe pain does not mean a patient is not experiencing pain. Pain assessment in patients unable to express pain is critical to appropriate care (Herr, Coyne, McCaffery 2011; IASP 2012b). Rose *et al* (2013) found that pain assessment intervals decreased, pain assessment documented, administration of opioid analgesics and benzodiazepines increased after the implementation of the CPOT tool. Before the implementation of the CPOT, all nurses had attended educational sessions and CPOT scoring guides, posters and educational materials made available in the ICUs' and senior nursing team providing education during implementation and monitoring compliance. Cade (2008) supported the findings of Rose *et al.* (2013) that implementation of the BPS and CPOT can be recommended in ICU and may improve the management of pain amongst sedated patients by providing a systematic and consistent approach to pain assessment to guide interventions.

Gelinas *et al.* (2011) also found that after nurses attended standardised training sessions on the use of the CPOT and the tool implemented, reports of pain assessments were more frequently documented and fewer analgesic and sedative agents were administered. In another study by Gelinas *et al.* (2014), the CPOT was found to be quick to use, simple to understand and easy to use by nurses trained to use it. ICU nurses also acknowledged the CPOT had influenced their practice, and promoted communication among nurses. ICU nurses were satisfied with its daily use and concluded the CPOT use was feasible and relevant in daily practice. A comparison of the behavioural responses to pain, measured on the CPOT scale, and the physiological responses prior to, during and after the positioning procedure, in mechanically ventilated patients, concluded that the observation of the patient's behaviour during turning and the physiological changes produced allowed professionals to objectify pain in critical patients with verbal communication difficulties. Linde *et al.* (2013) found that mean scores of the CPOT did not increase significantly during dressing changes but did so during turning**.** The researchers concluded the CPOT is a valid and reliable tool for evaluating pain in intubated, critically ill adults. Nurses also reported that pain assessment was accomplished quickly, within a few seconds.

A strong relationship exists between procedural pain and behavioural responses. Clinicians can therefore use behavioural responses of verbal and non-verbal patients to plan for, implement and evaluate analgesic interventions (Puntillo *et al.*, 2004). According to Haslam *et al.* (2012), using valid and reliable pain assessment measures in addition to developing a lexicon of pain descriptors in non-verbal ICU patients may improve documentation, which would facilitate appropriate analgesic management.

Many assessment tools have been created for non-verbal ICU patients, but according to Barr *et al.* (2013:264), The Critical-Care Pain Observation Tool (CPOT) and the Behavioural Pain Scale (BPS) are the most valid and reliable behavioural pain scales for monitoring pain in medical, post-operative or trauma (except for brain injury) adult ICU patients who are unable to self-report and in whom motor function is intact and behaviours are observable.

Aziato and Adejumo, (2014a) found that Ghanaian surgical nurses were influenced in their response to patients' pain by individual factors, including using their discretion. Literature, as stated above, suggests that objective methods, such as the use of tools, be used for the assessment of pain when patients cannot report their pain as that improves patient's outcomes (Puntillo *et al.*, 2004; Woien *et al.*, 2012; Haslam *et al.*, 2012).

A systematic review by (Georgiou *et al.*, 2015) concluded that implementation of systematic approaches to pain assessment appears to be associated with more frequent documented reports of pain and more efficient decisions for pain management. There was evidence of favourable effects on pain intensity, duration of mechanical ventilation, length of ICU stay, mortality, adverse events, and ICU complications, which demonstrates a link between systematic pain assessment and outcome in critical illness. Payen *et al.* (2009) confirmed the effectiveness of pain assessment tools by concluding that pain assessment in mechanically ventilated patients is independently associated with a reduction in the duration of ventilator support and of duration of ICU stay. This might be related to higher rates of sedation assessments and a restricted use of hypnotic drugs when pain is assessed.

Vital signs are only to serve as a cue for further pain assessment and not an accurate measure for the assessment of pain in ICU patients. More objective pain assessment measures are required (Young *et al.*, 2006). Literature however suggests that vital signs should only serve as a cue for pain assessment in non-verbal patients (Young *et al.*, 2006; Siffleet *et al.*, 2007;

Arbour & Gelinas, 2010; Chen & Chen, 2015). According to Siffleet *et al* (2007), haemodynamic (heart rate, systolic and diastolic blood pressure) measures are not suitable indicators for the presence of pain. Vital signs should only be used as a cue when behavioural indicators are no longer available in ventilated or unconscious patients (Arbour & Gelinas, 2010). Haemodynamic parameters are not an accurate measure of the assessment of pain in the critically ill unconscious patients, they require a more objective pain assessment (Young *et al.*, 2006).

Literature suggests that pain should be routinely assessed, reassessed and documented to facilitate the treatment of pain and communication among healthcare professionals (Gordon *et al.*, 2005). Behavioural tools, which are strongly recommended for non-verbal or intubated patients (Herr et al., 2011), are hardly used by nurses because they are new or unavailable in many units of hospitals (Rose, Smith, Gelinas *et al.*, 2012). A plan for a systematic assessment should be foremost to the approach to pain (Pasero & McCaffery, 2011).

It has been found that a surrogate who knows the patient, such as the patient's parents, spouse or caregiver, may be able to give information about underlying painful procedures and behaviours that are specific to the patient and may mark or signal pain (Pasero & McCaffery, 2005). It is important for health professionals to pay particular attention to what the family reports about the patients' pain (Herr *et al.*, 2011).

Use of pain assessment tools helps nurses to focus on significant signs and symptoms and contributes to a systematic approach to the assessment and treatment of pain and sedation in the ICU (Woien *et al.*, 2012). Gelinas *et al.* (2011) stated that the implementation of the CPOT had positive effects on pain assessment and management nursing practices in the ICU. Reports of pain assessment were more frequently charted after the implementation of the tool. Pain assessment in mechanically ventilated patients is independently associated with reduction in the duration of ventilator support and duration of the patients stay in the ICU. It is also related to a restricted use of hypnotics and higher concomitant rates of sedation (Payen, *et al.*, 2009). Without a pain metric for pain, it is difficult to evaluate and to improve performance (Erdek & Pronovost, 2004).

Inability to provide a reliable report of pain leaves the patient vulnerable to under recognition and under or over-treatment of pain. Nurses are integral to ensuring assessment and

treatment of these vulnerable populations (Herr *et al.*, 2011). Nurses are directed by their code of ethics to advocate for humane and appropriate care for their patients (American Nurses Association, 2001).

It must however be noted that the observation of the patient must also be carried out by doctors, since pain management is a team effort. Effective pain assessment of an unconscious patient relies heavily on the clinicians' observation and evaluations (Young *et al.*, 2006). The need for all staff to be competent in the assessment of pain has been identified in many fields of healthcare as reportedly, too many patients still suffer from poor pain management due to poor assessment (Department of Health, 2001 & 2002).

5.2.2.3 Treatment of pain in the ICU

This has two sections and includes pharmacological and non-pharmacological management of pain.

Pharmacological treatment of pain in the ICU

No single medication is ideal for all patients, and clinicians need to carefully select, monitor and titrate the doses of any agent selected (Elliot *et al*, 2006). According to the Spinal Gate Theory (Melzack & Wall, 1965), small doses of analgesia when administered frequently are more effective than large doses at long intervals, as small doses frequently maintain a peak level of analgesia in the blood.

Pharmacologic treatment was always the first choice for pain relief among nurses (Linderg & Engstrom, 2011). Morphine is the preferred analgesic for acute (moderate and severe) pain management in the ICU (Jacobi *et al.*, 2002; Spijkstra *et al.*, 2010), as it may provide some cardio-protection and anti-inflammatory response when compared to a drug such as fentanyl in post cardiac surgery patients (Murphy *et al*, 2007; Abdel-Wahab *et al.*, 2008). This is in line with Barr *et al.* (2013), who recommended that the IV opioids be the first-line drugs to be considered in the treatment of non-neuropathic pain in ICU patients. IV morphine is followed closely by IV paracetamol in the management of pain in the CT-ICU. Paracetamol combined with morphine was found to induce a significant morphine sparing effect (Remy, 2005; Maund, *et al.*, 2011). The researchers concluded that paracetamol could

be used as a supplementary analgesic agent for adult patients undergoing cardiac surgery. Ahlers *et al.* (2010) concluded there is no reason not to administer paracetamol in critically ill post cardiac surgery patients, except in liver pathology. However, non-steroidal anti-inflammatory drugs (NSAIDS) may be disadvantageous in post-operative cardiac patients as they carry the risk of cardiovascular side effects (Ahlers *et a*l, 2013). Changes that can be made in pain management practices in an ICU can best be achieved by the multidisciplinary team with nurses, doctors and pharmacists as core members (Mularski & Osborne, 2006).

Literature states that patients should be given analgesics first followed by sedatives. Sedation is not analgesia, thus protocols and/or unit guidelines that prioritise a trial of analgesia before administration of sedatives may decrease decisional uncertainty when critically ill patients exhibit ambiguous behaviours such as restlessness and agitation (Haslam *et al.,* 2012). Contrary to what the nurses said, research found that giving patients bolus of analgesia alone, with no sedation unless deemed clinically necessary, has been associated with reduction in ICU and hospital lengths of stay (Strom *et al.*, 2010). Literature prescribes giving analgesics until patients calm down and then sedation (Haslam *et al*., 2012).

The use of multimodal analgesia (Payen *et al.*, 2013) and pre-emptive analgesia (Kol *et al.*, 2014; Ong, *et al.*, 2005) are concepts associated with effective pain management. Payen *et al.* (2013) found that patients' given multimodal analgesia (one opioid with a non-opioid) were more likely to have fewer organ failures and receive fewer hypnotics compared with patients who received opioids only. These patients also reported their pain level to health professionals more frequently and the researchers recommended that the concept of multimodal analgesia be promoted in the ICU (Payen *et al.*, 2013). Puntillo *et al.* (2002) noted that when used, analgesic amounts were low during painful procedures and multimodal therapy was infrequent.

Pre-emptive analgesia was also associated with effective pain management, after comparing two groups, Kol *et al.* (2014) determined that pre-operative thoracic pain management education and analgesics administered post-operatively, before the onset of pain, reduced the amount of analgesics used in the first 48 hours following surgery. Pre-emptive analgesics improved analgesic consumption and time to first rescue analgesic request. The results also highlight the need to administer additional analgesia before painful procedures, particularly in post-surgical patients (Vazquez *et al.*, 2011). Literature advocates for a routine

administration of analgesics before procedures deemed to be painful (Puntillo *et al.*, 2002; Payen *et al.*, 2007). Most ICU patients were not intentionally given analgesics, even though pain intensity increased during painful procedures, but when used analgesic amounts were low (Puntillo *et al.*, 2002). Giving pre-emptive analgesics improved analgesic consumption and time to first rescue analgesic request (Ong *et al.*, 2005). Pre-emptive analgesia before the onset of pain improved pain outcomes of ICU patients (Kol *et al*, 2014). The American Society for Pain Management Nursing (ASPMN) stated procedures should not be performed without implementation of planned comfort assessment and management (Czarnecki *et al.*, 2011). Patients of all ages, according to ASPMN, are entitled to optimal comfort management before, during and after procedures. It is the responsibility of health professionals to advocate and intervene in order to support the best interest of patients. This includes the ability to stop a procedure, temporarily, to provide additional comfort measures, if necessary (Czarnecki *et al.*, 2011). Recent practice guidelines have recommended pre-emptive analgesia with intravenous opioids as the first line treatment for acute pain (Barr *et al.*, 2013). It has been recommended that nurses should try administering analgesia if they have reason to believe the patient may be in pain (Herr *et al.*, 2011). Herr *et al.* (2006) suggest that when pain is suspected, a trial of analgesia, which requires the administration of analgesia, should be given. The purpose of an analgesic trial, according to the authors, should be to confirm the presence of pain and provide a foundation for the development of a plan of care.

Diby *et al.* (2008) found that quality improvement programmes that emphasise the administration of analgesics as prescribed, among other measures, decreased the pain intensity in critically ill patients and improved the quality of sleep.

Fear of addiction is frequently reported as both a provider and a patient barrier to effective pain management (Sullivan & Ferrell, 2005). A study by Aziato and Adejumo (2014a) found that Ghanaian surgical nurses fear their patients will be addicted to opioids and therefore do not administer adequate analgesics, especially opioids. One of the ICU nurse-related barriers to pain management identified by Batiha (2014) was ICU nurses' fear of the side effects of pain drugs. American Pain Society (2007) concluded there are still many myths and misbeliefs about the use of opioids and addiction, which can lead to under-treatment of pain.

Pain intensity should be evaluated often and re-evaluated to determine patients who still have pain after prescribed analgesics are given. Assessing the patient's pain 30 to 60 minutes for the need for rescue doses of analgesia for breakthrough pain is appropriate (Pasero, 2003). Breakthrough doses of analgesia should be prescribed as needed (Wong *et al.,* 2004).

Efficiency of pain management increased due to the information and psychological preparation of patients about post-operative pain and methods that would be used for assessment of pain intensity and pain relief therapies (Strode *et al.,* 2012). Pain must be treated when the cut-off scores for the presence of pain are established by the behavioural tools and include the BPS (>5) and the CPOT (>2). A CPOT cut-off score >2 yielded sensitivity of 86% and specificity of 78% (Gelinas, 2009); cut off point for NRS is ≥ 3 (Ahlers *et al.,* 2010).

Researchers have found that PCA provided better pain control and greater patient satisfaction than the conventional parenteral PRN analgesia (Hudcova *et al*, 2006).
Health financing in Ghana, as a developing country, remains a barrier to effective pain management. The IASP (2011) found that acute pain is not well managed in the developing world. Poor opioid availability, shortage of clinicians and lack of knowledge were some of the barriers to achieving optimal pain management.

Pain management can be improved by individualising pain management (Strobik *et al.,* 2010; Ahlers *et al.,* 2012). Individualised titration of analgesia in the ICU is associated with shorter ICU and hospital length of stay and lower mortality (Strobik *et al*, 2010). Another study also found that individualised dosing regimen of analgesics by implementing pain titration protocol will lead to lower incidence of unacceptable pain at rest (Ahlers *et al.,* 2012).

Non –Pharmacological treatment of pain in the ICU

Non-pharmacological methods have been identified to enhance effective pain management in critically ill patients (Friesner *et al.,* 2006; Gelinas *et al.,* 2012; Chlan & Halm 2013; Ozer *et al.,* 2013)**.** According to Friesner *et al.* (2006), there is a significant difference in pain ratings immediately after chest tube removal and after 15 minutes for the group receiving relaxation exercise as an adjunct to opioid analgesic, compared to the group that had

analgesics only. The researchers therefore support slow deep-breathing relaxation exercise as an adjunct to the use of opioids for pain management during chest tube removal among patients who have undergone coronary bypass surgery. Demir and Khorshid (2010) also found that applying cold compress before removal of chest tubes in post cardiac surgery patients in the ICU reduced patients' intensity of pain and prolonged time to first rescue analgesic.

Other non-pharmacological methods advocated included deep-breathing relaxation exercise, music and music therapy, hand massage, simple massage, distraction and family presence facilitation. Much has been documented on the complementary and analgesic sparing effect of non-pharmacological methods of pain management (Friesner *et al.,* 2006; Gelinas *et al.*, 2012; Chlan & Halm, 2013; Cole & LoBiondo-Wood, 2014; Martorella *et al,* 2014). Music was found to be a safe intervention with no side effects and an immediate benefit, which could be safely implemented as an adjunct to the usual medical plan of care. Listening to music was effective in reducing pain scores in post cardiac surgery patients with moderate levels of pain (Gelinas *et a*l., 2012; Chlan and Halm, 2013; Cole & LoBiondo-Wood, 2014). According to Gelinas *et al.* (2012), in addition to music therapy, distraction, simple massage and family presence facilitation can be used by ICU nurses to complement pharmacological treatment of pain, as they are safe and low cost. Friesner *et al.* (2006) support the use of slow breathing relaxation exercises as an adjunct to the use of opioids for management of ICU post coronary artery bypass patients during chest tube removal. ICU patients receiving hand massage perceived it as appropriate and experienced pain relief, relaxing and calming responses from the hand massage (Martorella *et al.*, 2014).

Literature confirms the usefulness of non-pharmacological methods in the management of pain (Woodrow, 2006; Puntillo, 2007; Ozer *et al.*, 2013). Non-pharmacological interventions can include explanation and reassurance, provision of information to the patient, breathing exercises, distractions (television, music), guided imagery, meditation, repositioning and massage (Woodrow, 2006). Others include endotracheal and enteral tube positioning and patient positioning (Puntillo, 2007), as well as acupuncture, a quiet environment, physical therapy, spinal cord stimulation and transcutaneous nerve stimulation (National Center for Complementary and Alternative Medicine (NCCAM), 2008). These strategies alone may not achieve a pain free experience, but they have the capacity to enhance drug therapy and humanise the ICU patients' experience (Elliot et al., 2006). Non-

pharmacological interventions could be further developed and used to enhance patient's comfort. Puntillo (2007) emphasised the importance of a multifaceted approach to the management of pain in ICU patients. Non-pharmacological strategies in addition to the aggressive approach to pharmacologic analgesia are extremely important in achieving adequate pain management.

Music as a non-pharmacological method of pain management was advocated by Chlan and Halm (2013) in their systematic review. They concluded music was a safe intervention with no adverse effects, immediate benefits and could be implemented safely as an adjunct to the usual medical plan of care. Thus, music interventions are just another way nurses can make a difference in the patient experience. ICU patients who listened to their choice of music had a significant increase in oxygen saturation and lower pain scores. There is evidence to support the use of music, and which states that music might be a simple, safe and effective method of reducing potentially harmful physiologic responses arising from pain in patients after open-heart surgery (Ozer *et al.*, 2013).

Participants who received hand massage in a study by Martorella *et al.* (2014) perceived it as appropriate for addressing pain. Increasing staff acceptance, reducing the rest period, involving families and repeating the treatment are avenues to consider. Building evidence for non-pharmacological pain management in the critical care setting is necessary. Gelinas *et al.* (2012) described the perspectives of patients, family members and nurses about the usefulness, relevance and feasibility of non-pharmacological interventions for pain management in the ICU. The researchers found that the non-pharmacological interventions found to be useful, relevant and feasible were music therapy and distraction, simple massage and family presence facilitation. According to researchers, non-pharmacological interventions are complementary to pharmacological treatments of pain as they are low cost and safe. It has been determined by researchers that patients benefit when healthcare professionals and patients' family members work together (Grondin *et al,* 2014).

According to the participants in the study, diversional therapy and physiotherapy, amongst other things, were methods of non-pharmacological management that were effective in pain management. Psychotherapy and prayer have all been very helpful as non-pharmacological methods of pain management. Aziato and Adejumo (2015a) found that Ghanaians are faith

people and families of post-operative patients are influenced by faith and fear when their relatives are in the hospital.

Non-pharmacological methods, such are music therapy, distraction and family presence facilitation, are some of the methods that can be employed by nurses as complementary interventions to the pharmacological management of pain. These interventions are quite safe and cost effective (Gelinas *et al.,* 2012). Other researchers have found that non-pharmacological interventions used alone or with pharmacological interventions have the potential to reduce pain, especially pain associated with procedures (Freisner *et al.,* 2006; Windich-Brermeier, Sjoberg, Dale *et al.,* 2007). Family presence facilitation is a safe non-pharmacological method that can be employed by nurses as a complementary intervention to the pharmacological management of pain. (Gelinas *et al.,* 2012).

5.2.2.4 Patient and family education on pain

Pre-operative pain education was found to be effective in improving ICU patient's pain outcomes. Incorporating pre-operative pain education into routine pre-operative care of ICU patients would improve patients' pain outcome (Guo *et al.*, 2012; O'Brien *et al.*, 2013; Kol *et al.*, 2014). In a study by O'Brien *et al.* (2013), cardiac surgery patients recalled receiving and reading the multidisciplinary prepared pre-surgery information booklet, and this was significantly correlated with feeling prepared for the post-operative experience and adherence to precautions. Pre-operative thoracic pain management education and analgesics administered post-operatively, before the onset of pain, reduced the amount of analgesics used in the first 48 hours after surgery (Kol *et al.*, 2014).

Participants who received pre-operative education experienced a greater decrease in anxiety score and in depression compared with those who did not. Patients also reported less interference from pain in sleeping. Based upon existing evidence and international practice, pre-operative education should be incorporated into routine practice to prepare cardiac patients for surgery Guo *et al.* (2012). This was confirmed by O'Brien *et al.* (2013) with the finding that education helps reduce anxiety in patients undergoing surgery.

More researchers stated the role of pre-operative education on better patient outcomes (Sethares *et al.*, 2013; Kol *et al.*, 2013; Sugai *et al.*, 2013). CT-ICU patients also expressed

the need for more education about activity and pain management strategies (Sethares *et al.*, 2013). Pre-operative thoracic pain management education and analgesics administered before the onset of pain reduced the amount of analgesics used in the first 48 hours after surgery (Kol *et al.,* 2013). Pre-operative education on pain, and its management, reduced pain scores after surgery and decreased patients duration of pain. Education was also found to minimise narcotic analgesics after surgery (Sugai *et al.*, 2013) and reduce anxiety and depression in cardiac surgery patients (Guo *et al.,* 2012)

Patients should be provided with information and involved in pain treatment decisions to the degree they desire (Schwenkglenks *et al.,* 2014). There is a need for patient education by Ghanaian health professionals and it is important that healthcare professionals understand context-specific factors that influence the management of post-operative pain (Aziato & Adejumo, 2015). Kastanias, Denny, Robinson *et al.* (2009) found that of most importance to patients was to receive information about pain, what to do about it and its side effects, especially after discharge. Patients in the CT-ICU reported pain lasting much longer than they expected and expressed the need for more education about activity and pain management strategies in the ICU (Sathares et al., 2013).

All patients have the right to all the information (risks such as pain and benefits of all procedures) to make informed decisions and make an input into their comfort management in relation to the procedure being carried out (Brown & Bennet, 2010).

Pre-operative education was found to be beneficial for the adult surgical patients (Oshodi, 2007). A Ghanaian study by Aziato and Adejumo (2014) concluded there is a need for healthcare professionals to provide effective education to patients and the public to curb the negative perceptions they have about surgery. According to researchers, the most important aspect of care for patients was information on pain, what to do about pain and side effects after they are discharged from the hospital. Healthcare professionals must focus their pain management on counselling on the pain experience, pain management, plan after discharge and side effects of the management they receive at the hospital (Kastanias *et al*, 2009).

Meyer (2006) found that family involvement in education before surgery was unsatisfactory and there is a lack of family involvement in the education of patients before they go for cardiac surgery. It was also found that education on pain assessment and adequate

management successfully reduced the occurrence of unacceptable pain among patients (van Gulik *et al.*, 2010). Another study by Grondin *et al.* (2014) found that patients and their family-centred educational interventions, the promotion of non-pharmacological interventions and the use of multimodal analgesia should be routinely used in the ICU to improve the management of pain. The researchers further found that the combination of these interventions improved the management of pain, lowered anxiety and facilitated the use of positive coping strategies after surgery.

5.3 PART TWO - VALIDATION PHASE

Part two of this phase validates the draft guideline by presenting it to Intensive Care nurse experts, CT-ICU doctors, post CT-ICU patients and patients' relatives who participated in the interviews for validation and changes effected where necessary. The guideline was ready for the intervention after this phase. To be objective and avoid bias that the levels of evidence may cause, they were removed so as not to influence the judgement of participants (*Appendix R)* but were included in the final guideline.

Eight (n=8) CT-ICU nurse experts, eight (n=8) ICU doctors, three (n=3) post ICU patients and three (n=3) ICU patients' relatives validated the guideline on a Likert scale and were allowed to make comments. All the comments were considered in refining the post-validation guideline statements.

The scores the participants assigned to the guideline were analysed using simple statistics and percentages rounded up to the nearest decimal. Simple percentages were used to determine how many participants agreed, were uncertain or disagreed with the guideline statements.

5.3.1 Results of Guideline Validation

Participants largely agreed with most guideline statements with comments. A few of the participants disagreed with some of the statements with suggestions for modification. The comments also showed that many participants were uncertain of some of the statements and went with what others said. Most participants were not familiar with the pain assessment

tools and most research findings included in the guideline from the systematic review of literature. No guideline statement was deleted as those who disagreed made comments for modification which were considered in the final guideline. Percentages were assigned to determine how many participants agreed, disagreed or where uncertain with the guideline statements. This helped the researcher to determine whether the guideline statements met the needs and concerns of the participants or not.

The data collected from nurses (n=8), doctors (n=8), patients (n=3) and their relatives (n=3) showed that all (100%) in each participant group agreed that:

- many procedures cause pain in the ICU.
- patients have different pain thresholds and must be treated as individuals and that pain is subjective and it is whatever the experiencing person says it is,
- the perception that patients exaggerate their pain is not accurate,
- ICU nurses need to improve their knowledge on pain and its management especially the negative consequences of untreated pain
- education will improve nurses' attitude towards the management of pain**,**
- inadequate analgesia and untreated pain has many negative consequences that influences the patients' recovery and quality of life.
- nurses need to advocate for their patients for improved pain management specially to make doctors aware of the need to review analgesics to avoid the adverse effects of inadequate pain management
- nurses must also encourage patients to speak up about their pain
- team approach to pain management will improve pain outcomes in patients.
- Making guidelines and protocols easily accessible and available to all health professionals especially nurses and doctors in the ICU will improve their management of pain.
- Nurses must document pain assessment and treatment to ensure follow-up and monitor effects of analgesics
- pain assessment must be done routinely with validated assessment tools to improve pain management
- nurses and doctors must encourage patients to report their pain since patients own report is the gold standard and some patients fear the negative reaction they will get from nurses/doctors if they report their pain too often

- nurses and doctors should watch out for breakthrough pain, which occurs in between doses of analgesics and manage them appropriately
- observation of patients should constitute a critical part of pre-analgesia assessment
- patients should be made aware that they are given analgesics to reassure them that their pain is being treated
- relatives may help divert the attention of patients from the pain they are feeling and must be allowed more supervised time to visit them while in the ICU
- listening to music and other non-pharmacological methods are effective ways of reducing pain scores in cardiac surgery patients
- education of patients before and after surgery is important.

Participants were mostly uncertain about research findings that included:

- the use of validated pain assessment tools (NRS and CPOT) in the ICU. They include 25% (n=2) of nurses, 25% (n=2) of doctors, 100% (n=3) of patients and 100% (n=3) of relatives were all uncertain with this statement.
- the use of ice packs to minimise pain during chest tube removal. Of the participants, 50% (n=4) of nurses were uncertain, 75% (n=6) doctors, 100% (n=3) of patients and 100% (n=3) of relatives were uncertain of this statement and will go by others statements.
- slow deep-breathing relaxation exercise during chest tube removal as an adjunct to pharmacological treatment. The participants include 25% (n=2) of nurses, 62.5% (n=5), 66.7 of patients (n=2) of patients and 100% (n=3) of relatives.
- education and feedback strategies when implemented, improve the assessment and reassessment of pain. Of the 3 patients 33% (n=1) and 100% (n=3) of relatives were uncertain of this statement.
- the need for a protocol to standardise pain assessment and management in the ICU and act as a universal guide for ICU nurses and doctors in their management of the patients pain 33% (n=1) and 100% (n=3) relatives said they were uncertain and will go by others statements.
- treating pain when the cut-off scores for the presence of pain for the NRS ≥ to 3, CPOT (>2). BPS (>5) are reached. The participants that were uncertain and will go by others statements included 37% (n=3) nurses, 50% (n=4) doctors, 100% (n=3) of patients and 66.7% (n=2) of relatives.

Modifications were suggested for the following statements and are stated in table 4.5. They include the fact that:

- thoracotomies and sternotomies are the surgical procedures that cause the most pain and need extra attention and effort in pain management. Of the eight nurse participants 75% (n=6) and 75% (n=6) disagreed and want the statement modified.
- supervision improves adherence to analgesic prescriptions and should be done routinely and meticulously by nurses in charge of the shift/ICU. Audits and feedbacks are important for improving knowledge. A nurse (12.5; n=1) suggested modification to this statement.
- documentation of pain assessment and treatment on ICU charts will improve pain management. An ICU nurse (12.5%; n=1) made a suggestion for modification.
- validated tools for pain assessment in the ICU must be used to assess pain and its severity in the verbal patient. The recommended tools for pain assessment in verbal patients are the NRS and VAS. Of the participants, 25% (n=2) and 25% of doctors suggested explaining the abbreviations since they don't know the tools.
- Validated tools for pain assessment in the ICU must be used to assess pain and its severity in the non-verbal patient. The most validated tools for ICU patients are the CPOT and the BPS. Out of the eight doctors, 50% (n=4) and 25% (n=2) of nurses again suggested that the abbreviations be explained.
- Pain treatment must effectively address the needs of the patient and keep the patient pain free while minimising adverse effects. A nurse (12.5%; n=1) gave a suggestion to modify the statement.
- Stool softeners should be prescribed for patients on morphine to prevent constipation. Two nurses (25%; n=2) suggested a change in this statement.

5.3.2 Post-Validation Draft Guideline

The comments made by doctors, nurses, patients and their relatives in the comment box provided during the validation *(Appendix R)* were considered in revising the guideline statements. The comments mostly included suggestions for revising the guideline statements. Many comments were made and all were considered. The statements did not change in entity but corrections were made to them as suggested. The guideline statements

revised due to the comments of stakeholders are *in italics*. Table 5.5 presents the guideline after the revision with their levels of evidence. The modifications are underlined for easy identification.

Table 5.5 Post-Validation Draft Guideline

PAIN IN CRITICALLY ILL PATIENTS	**LEVEL OF EVIDENCE**
Many procedures in the ICU cause acute pain and need special attention. The ICU patient has many sources of pain and they must be identified and treated.	2A
1. Turning and moving patients for procedures are very painful for ICU patients and must be done with caution and bed accessories employed if available.	2D
2. Chest tubes cause patients a lot of pain and should be removed the moment there are no longer necessary.	4A
3. Patients also experience pain during change of dressing and endotracheal tube suctioning.	4A
4. Bed bath, positioning, male catheterisation, physiotherapy, ambulation, types of plasters used and removal of stitches, medical procedures done under local anaesthesia, taking samples, chest tube insertion, intubation and removal of intercostal tubes all cause patients pain.	5B
5. Thoracotomies and sternotomies are some of the cardiothoracic procedures that cause a lot of pain and need extra attention and effort in pain management.	5B
6. Nurses showing interest in how patients feel, especially when in pain, helps decrease their pain.	4A
7. Patients have different pain thresholds and must be treat as individuals.	1B
8. Pain is subjective and it is whatever the experiencing person says it is. The perception that patients exaggerate their pain is not accurate.	1B
ICU nurses need to improve their knowledge on pain and its management especially the negative consequences of untreated pain. Education will improve nurses' attitude towards and management of pain.	2D
1. Inadequate analgesia and untreated pain many negative consequences that influence the patients' recovery and quality of life. Health professionals' education on pain assessment and treatment improves outcomes.	2D
2. Education and feedback strategies when implemented, improves the assessment and reassessment of pain.	1B
3. Nurses need to advocate for their patients for improved pain management, especially to make doctors aware of the need to review analgesics to avoid the adverse effects of inadequate pain management. Nurses must also encourage patients to speak up about their pain.	5B
4. Supervision improves adherence to analgesic prescriptions and should be done routinely and meticulously by nurses in charge of the shift/ICU. Audits and feedbacks are important for improving knowledge of ICU nurses	2C
5. A lot of effort must be put into prevention of pain and not only treatment by promoting educational programmes and elaboration of protocols and guidelines in the ICU.	3C

PAIN IN CRITICALLY ILL PATIENTS	LEVEL OF EVIDENCE
Team approach to pain management will improve pain outcomes in patients	2C
1. Collaboration and improved communication between doctors and nurses in terms of informing each other about the patients' pain reports, assessment and treatment will assist in improving pain management.	4A
Nurses must hand over assessments and treatments given to the patient for pain to colleague nurses to maintain consistency in effective drugs and doses.	4A
2. A cordial relation between senior and junior colleagues will improve pain management in the ICU, which will benefit ICU patients.	5B
There is a need for a protocol to standardise pain assessment and management in the ICU and act as a universal guide for ICU nurses and doctors in their management of the patients' pain.	IC
1. A multidisciplinary protocol must be developed for pain management in the ICU. Using protocols to manage pain reduced the duration of ventilatory support, length of ICU stay and mortality rates.	IC
2. Making guidelines and protocols easily accessible and available to all health professionals, especially nurses and doctors in the ICU, will improve their management of pain.	2C
3. Posting guidelines on ICU walls and making pocket guidelines available to the ICU team, regular audits and feedback was seen as beneficial in ensuring adherence to pain management protocols.	2C
Consistent documentation of pain assessment and treatment on ICU charts will improve pain management.	2D
1. Nurses must document pain assessment and treatment to ensure follow-up and monitor effects of analgesics.	2D
2. Doctors must also document their assessment of the patient's pain in their notes to enhance follow up and assess effectiveness of analgesics. Creating a place for doctors to document their pain scores among other measures improved pain scores.	2D

ASSESSMENT OF PAIN IN CRITICALLY ILL PATIENTS	LEVEL OF EVIDENCE
Pain assessment must be done routinely with validated assessment tools to improve pain management.	2D
1. Nurses and doctors must encourage patients to report their pain since patients own report is the gold standard and some patients fear the negative reaction they will get from nurses/doctors if they should report their pain too often.	2C
2. The Ghanaian culture influences patients report of pain so just admitting pain is not enough but a further assessment of the severity of the pain should be established.	5B
3. Special attention should be paid to pain in men since culturally they are not supposed to report their pain but expected to 'bear' pain.	5B
4. Validated tools for pain assessment in the ICU must be used to assess pain and its severity in the verbal patient. The recommended tools for pain assessment in verbal patients are the numerical rating scale (NRS) and the visual analogue scale (VAS).	1C
5. Assessment of pain must be carried out routinely, at least 3 to 4 hourly, and before and after the administration of analgesics. Pain must be reassessed after analgesia/non-pharmacological treatment is given to assess the effectiveness of the treatment.	2C
*6. Validated tools for pain assessment in the ICU must be used to assess pain and its severity in the **non-verbal** patient. The most validated tools for ICU patients are the critical pain observation tool (CPOT) and the behavioural pain scale (BPS).*	1B (CPOT) 3C (BPS and CPOT)
7. Vital signs must not be used exclusively to assess pain in non-verbal patients but serve as a cue for further assessment and appropriate assessment done if pain is suspected.	3E
8. Observation of patients should constitute a critical part of pre-analgesia assessment.	5B

PHARMACOLOGICAL TREATMENT OF PAIN IN THE ICU	LEVEL OF EVIDENCE
Pain treatment must effectively address the needs of the patient and keep the patient pain free or in tolerable pain while minimising adverse effects.	1C
1. Giving smaller doses of analgesia (IV titration/IM) more frequently is more effective than large doses less frequently.	1C
2. Analgesia must be given until patient is comfortable and calm then sedation. Analgesia is not sedation and mixing analgesia and sedation might get the patient sedated but not pain free.	3E
3. Pre-emptive analgesia must be routine for many of the procedures in the ICU, such as chest tube removal, dressing, turning, bed bath, CVP line insertion, Chest tube insertion and so on.	1C
4. Nurses must ensure strict adherence to prescribed analgesics and inform doctors if there is a need to review the order.	2C
5. Patients in acute pain will not get addicted to pain medications and should therefore be given them as prescribed and when needed. They should rather report pain and request for analgesia because their pain is not relieved.	5B

PHARMACOLOGICAL TREATMENT OF PAIN IN THE ICU	LEVEL OF EVIDENCE
6. Nurses and doctors should watch out for breakthrough pain, which occurs in between doses of analgesics and manage them appropriately.	5B
7. Nurses should alternate pain drugs as prescribed and not give all drugs at the same time.	5B
8. Patients should be made aware that they are given analgesics to reassure them that their pain is being treated.	4B
9. Multimodal (using more than one analgesia) should be encouraged instead of monotherapy.	3C
10. Stool softeners should be prescribed for patients on opioid analgesics to prevent constipation.	5B
11. Care must be taken to ensure that pain medications are procured from reliable sources to ensure their efficacy. There must therefore be collaboration between the hospital and the importers and drug companies to ensure only drugs from reliable sources are administered to patients.	5B
12. Pain must be treated when the cut-off scores for the presence of pain for the NRS ≥ to 3, CPOT (>2), BPS (>5) are reached.	1C
13. Patient-controlled analgesia provided a better pain control and greater patient satisfaction than conventional PRN analgesia.	1A

NON-PHARMACOLOGICAL TREATMENT OF PAIN	LEVEL OF EVIDENCE
Many non-pharmacological methods can be employed by ICU nurses and doctors to reduce pain in critically ill patients.	4A
1. Slow deep-breathing relaxation exercise during chest tube removal as an adjunct to pharmacological treatment will significantly decrease pain ratings.	2D
2. Application of cold packs to the site before the removal of chest tubes significantly reduces the intensity of pain caused by chest tube removal.	1C
3. Hand massage and simple body massage reduces the pain of ICU patient.	4A
4. Reassurance helps patients to be encouraged that their pain will be relieved.	5B
5. Listening to music was found to be effective in reducing pain scores in cardiac surgery patients.	1B
6. Other forms distraction, such as of television, newspapers or other reading materials, will distract patients and reduce their pain and anxiety scores.	4A
7. Ghanaians are faith-based people and should be allowed to pray and religious leaders allowed to have supervised visits to the ICU. This can serve as encouragement and hope for recovery.	5B
8. Relatives may help divert the attention of patients from the pain they are feeling and must be allowed more supervised time to visit them while in the ICU.	4A
9. Placing patients in the right position according to their needs and requests helps to reduce pain that may be due to uncomfortable positioning.	5B

PATIENT AND FAMILY EDUCATION ON PAIN	LEVEL OF EVIDENCE
ICU nurses and doctors need to give patients education on post-operative pain, its assessment and pharmacological and non-pharmacological methods of pain management.	1B
1. Patients need education from the ICU nurses and doctors on how they can draw their attention or signal them when they are in pain and cannot communicate verbally (either by nodding to questions or raising their hands).	5B
2. Patients must be educated on pain assessment tools that will be used to assess their pain post-operative pain.	4B
3. Pre –operative education on pain may reduce anxiety of patients and their relatives and ensure co-operation.	1C
4. Patients relatives need to be educated on post-operative pain to allay their anxiety and ensure co-operation.	5B
5. Patients and relatives need to be educated on the fact that non-pharmacological methods can complement drugs to reduce their pain so they can accept them post-operatively.	5B
6. Patients and relatives should be educated on the types of pain medications, their effects and side effects.	4B

5.4 UPDATING THE GUIDELINE, DISSEMINATION AND IMPLEMENTATION

This section elaborates the plan for updating the clinical guideline, how it will be disseminated and implemented. This section was essential to ensure the guideline meets the requirements for appraisal by AGREE II, which was used for the appraisal. International guideline development organisations entreat guideline developers to clearly outline their review process and provide plans for dissemination and implementation of their guidelines (SIGN, 2004; AGREE II, 2010; NICE, 2011).

5.4.1 Updating the Guideline

The clinical guideline for the comprehensive management of acute pain in the adult CT-ICU was developed in collaboration with and adopted by the Critical Care Nurses Group of Ghana. It will therefore be updated with the input of the group to ensure their involvement, further collaboration and commitment to enhance the successful implementation of the guideline. As new evidence is generated, it is recommended that guidelines be reassessed for their relevance, validity and effectiveness every three to five years to avoid obsolescence (Polit & Beck, 2008; Voisin, de la Varre, Whitener, *et al.,* 2008). This guideline will

therefore be updated in collaboration with the CCNGG every five years**.** The proposed process for the review/update of the clinical guideline for the comprehensive management of acute pain in adult ICU patients is discussed below. The researcher with the input of the CCNGG will:

- Undertake a systematic search of literature within the context of the guideline to identify new evidence that can enhance the guideline and its recommendations, such as new assessment tools or new approaches to pain management in the adult ICU.
- Interview nurses already using the guideline for evidence based recommendations to enhance the guideline and barriers encountered during its implementation.
- Put together the evidence and the contextual findings to inform revision of the guideline.
- Identify a team of reviewers, which will be made up of clinical experts and researchers especially researchers with prior experience in guideline development and involve local and international stakeholders and experts for input on revised statements.
- Disseminate and publish the up-dated or revised guideline.

5.4.2 Guideline Dissemination

The successful educational intervention done during the intervention phase of this study in collaboration with the Critical Care Nurses Group of Ghana initiated the dissemination of the evidence-based findings that can enhance pain management in the adult ICUs in Ghana. More interventions that are educational will be undertaken in collaboration with CCNGG, hospital and ICU managers and in-service educators of various hospitals.

As stated during the intervention phase, pain assessment tools and pocket size guidelines will be given to ICU nurses in all hospitals where the guideline will be implemented. Packages, such as the recommendations on pain assessment, pharmacological, non-pharmacological and pre-operative education on pain, will be printed, laminated and posted in the ICUs and break rooms of nurses and doctors. The following dissemination process is proposed in collaboration with the CCNGG: -

- Presentation of the new clinical guidelines at specially organised fora for all health professionals – the presentation could be for different professionals, such as ICU

nurses, doctors and nursing students, at convenient times to ensure maximum participation.

- Interactive seminars or workshops organised for professional bodies, such as the Critical Care Nurses Group of Ghana, West African College of Nursing, Ghana College of Nurses and Midwives and so on.
- Distributing the summarised guideline booklets and the study in part or whole to all hospitals and ICUs interested in implementing the study.
- Publication of the clinical guideline in peer-reviewed nursing journals with online versions to enhance accessibility to other resource limited facilities.
- Presentation at both local and international nursing and relevant research conferences.
- Distributing the compact or summarised guideline to individual stakeholders, such as nurse educators and managers, to help in disseminating its findings guideline to ICU nurses.

5.4.3 Guideline Implementation

Since the guideline is intended for ICU nurses and has been adopted by the CCNGG, it will be implemented and applied in consultation with the Critical Care Nurses Group of Ghana. It will be disseminated to participating ICUs in collaboration with CCNGG in the form of a summary document for its implementation and efforts made to provide the pain assessment tools needed to all participating ICUs with the help of CCNGG. Barriers encountered, potential resource implications, recommendations for use deduced during the pilot testing of the guideline have been made in Chapter 5 to help ICU nurses and nurse managers to facilitate application of these guidelines in the clinical settings.

The guideline will be piloted on a larger scale in ICUs throughout Ghana with the consent of management and all the barriers and enhancers encountered during the intervention will be brought to bear during the implementation. Pain assessment tools will be printed and distributed to the participating ICUs and they will be educated on their use. This will be done in collaboration with hospital management and CCNGG. The pain assessment tools will also be attached to each ICU patient's bed and nurses encouraged to use them. The following detailed programme is proposed for implementing the guideline:

- Educational interventions, workshops and in-service training in collaboration with the hospital management and CCNGG will be organised on pain management for the health professionals, which emphasises the current recommendations for the management of pain in adult ICU patients as shown in the guideline.
- Nurses and doctors will be encouraged to document pain assessment and management on ICU charts and clinical notes.
- Pre-operative pain education by both doctors and nurses must be documented in clinical notes and ICU charts.
- ICU doctors will be entreated to follow current recommendations for the management of pain, such as multimodal analgesics instead of monotherapy, and encourage the use of non-pharmacological management when appropriate. Treatment modalities and expected outcome should be discussed with nurses, especially the nurse in charge, and nurse managers encouraged to supervise ICU nurses to ensure adherence to treatment regimen.
- Weekly meetings to evaluate the effectiveness of the guideline will be held and successes and challenges with the implementation discussed and steps to correct their deficiencies taken to enhance the effectiveness of the guideline.
- Post ICU patient surveys or interviews will be conducted on transfer from the ICU to identify their level of pain and any improvements or concerns about their pain management so that further actions can be taken to address the barriers identified.
- The researcher will be available during the initial stages of the implementation to assist and address any misunderstandings and provide support during and subsequently hold periodic clinical meetings with management to assess the progress of the implementation and inform the guideline review.

5.5 SUMMARY

This chapter focused on the development of the clinical guideline and its validation. The next chapter will describe the pilot testing phase of the guideline development.

CHAPTER SIX

PILOT TESTING PHASE

6.1 INTRODUCTION

This chapter presents the results of the pre- and post-intervention tests of the study, designed and developed to pilot test the implementation of the developed clinical guideline for the comprehensive management of acute pain in the CT-ICU, which was the main purpose of the third phase of the study. The primary outcome of this pre- and post-test was to determine the patient's level of comfort as ascertained by the pain scores. The secondary outcomes were to determine the patient's level of satisfaction with pain management in the CT-ICU, length of stay in the CT-ICU and cost of care. The research objective used in this phase of the study was to:

- Pilot test the clinical guideline developed for the comprehensive management of acute pain in the adult CT-ICU in Ghana.

In order to achieve this objective, the results are presented in three separate parts, namely the pre-intervention test and the post-intervention test and thereafter, comparisons will be drawn between the data of the pre- and post-intervention groups in order to determine the extent of the effect of the implementation of the clinical guideline for the comprehensive management of acute pain in the adult CT-ICU. The sample size for the pre- and post-intervention tests was 65 (n=65) for each test. A convenience sampling method was utilised. The study collected demographic data from the patients, clinical data from the ICU charts or records and patients self-rating of levels of comfort and satisfaction with pain management. Descriptive and comparative statistical tests were utilised to analyse the data. Statistical tests included the Fisher's Exact Test and two-sample t-tests. Testing was done on the 0.05 ($p<0.05$) level of significance. The statistical software package STATA© version 14 was used to analyse the data.

In addition, this chapter will also discuss the implementation process of the clinical guidelines for the comprehensive management of acute pain in the adult Cardiothoracic Intensive Care Unit in Ghana.

6.2 PRE-INTERVENTION TEST RESULTS

6.2.1 Demographic Data

The first section of the data collection instrument (*Appendix S*) was related to respondent's demographic information, which comprised of six (6) items: gender, age, height, weight, medical diagnosis and surgical operative procedure. Results of the process are summarised in Table 6.1.

Table 6.1 Demographic data obtained from the respondents for the pre-intervention test

Variables	Frequency	Percentage
Gender		
- Male	34	52.3%
- Female	31	47.7%
Age		
- 18 to 36 years	25	38.5%
- 37 to 57 years	30	46.1%
- 58 to 78 years	8	12.3%
- >79 years	2	3.1%
Weight		
- 45 to 50 kg	13	20.0%
- 51 to 60 kg	13	20.0%
- 61 to 70 kg	21	32.3%
- 71 to 80 kg	6	9.2%
- >81 kg	12	3.1%
Height		
- Not recorded	3	4.6%
- 110 to 130 cm	4	6.2%
- 131 to 160 cm	20	30.8%
- 161 to 180 cm	32	49.2%
- >181 cm	3	4.6%

Of the total sample (n=65), males accounted for 52.3% (n = 34) and females, 47.7% (n = 31). In terms of age categories, the largest (46.1%, n = 30) number of respondents were in the age category between 37 to 57 years.

Approximately one third (32.3 n = 21) of the respondents were in the weight categories of between 61 to 70 kg and the largest (49.2%, n = 32) number of respondents were in the height categories of 161 to 180 cm.

The medical diagnosis of respondents in the pre-intervention group is presented in Table 6.2.

Table 6.2 Admission diagnosis for respondents in the pre-intervention group (n=65)

Diagnosis	Frequency	Percentage
Aortic valve defect	3	4.6%
Atrial septal defect	12	18.5
Coronary Artery disease	9	13.8
Large Patent Ductus Arteriosis + atrial regurgitation	1	1.5%
Left lower lobe mass	3	4.6%
Mitral valve defect	2	3.1%
Mitral valve regurgitation + stenosis	2	3.1%
Oesophageal stricture	2	3.15
Posterior thoracic mass	1	1.5%
Posterior mediastinal mass	5	7.8%
Retrosternal Goitre-Non-toxic	4	6.2%
Right lower lobe mass	4	6.2%
Right upper lobe mass secondary to bulla	1	1.5%
Several mitral valve incompetence	1	1.5%
Severe Mitral Regurgitation	5	7.8%
TOF Modified BT Shunt	6	9.2%
Tricuspid regurgitation	1	1.5%
Ventricular septal defect	3	4.6%

Of the total sample (n = 65), a large number (18.5%, n = 12) of the respondents had an admission diagnosis of atrial septal defect, followed by 13.8% (n = 9) with coronary artery disease.

The surgical operative procedures obtained from the respondents' records are presented in Table 6.3.

Table 6.3 Nature of surgical operative procedures obtained for respondents in the pre-intervention group (n=65)

Diagnosis	Frequency	Percentage
Aortic valve repair	3	4.6%
ARV +PDA litigation and repair	1	1.5%
Atrial Septal Repair	12	18.5
Coronary artery bypass graft	9	13.8
Left lower lobe lobectomy	1	1.5%
Left lower lobectomy	2	3.1%
Left posterior lobectomy + excision	2	3.1%
Left posterior thoracotomy + excision	2	3.1%
Left upper lobectomy	1	1.5%
Lobectomy	1	1.5%
Mitral valve replacement	9	13.8%
MVR + Modified vagal annuloplasty	1	1.5%
Oesophagectomy	1	1.5%
Post total correction TOF with modified BT shunt	6	9.2%
Posterior thoracotomy + excision	6	9.2%
Right lower lobectomy, Sternotomy + Excision	1	1.5%
Right upper lobectomy	1	1.5%
Sternotomy + Excision	3	4.6%
Tricuspid valve replacement	1	1.5%
Ventricular septal repair	2	3.1%
Ventricular septal repair/closure	1	1.5%

Of the total sample (n = 65), a large number (18.5%, n = 12) of the respondents had a surgical operative procedure of atrial septal repair, followed by 13.8% (n = 9) as mitral valve replacement and coronary artery bypass graft, respectively.

6.2.2 Prescribed and Administered Analgesia

This section related to use of analgesia in the CT-ICU, which included medically prescribed drugs administered by registered nurses. Results of this process are summarised in Table 6.4.

Table 6.4 Summary data for prescribed and administered analgesia

Variables	Frequency	Percentage
Analgesia prescribed		
- Morphine 4mg/4hrly	61	93.8%
- Morphine 3 mg/4hrly	4	6.2%
- Panado 1g/6hrly	41	63.1%
Total administered dosage for Morphine		
- 6 to 16 mg	13	20.0%
- 17 to 24 mg	35	**53.8%**
- 25 to 32 mg	14	21.5%
- 33 mg to 53 mg	3	4.6%
Total administered dosages for Panado		
- 0	25	38.6%
- 1 to 6 g	8	12.3%
- 7 to 12 g	29	44.6%
- 14 to 16 g	3	4.6%

Of the total sample (n = 65), an overwhelming (93.8%, n = 61) number of respondents received a medical prescription of morphine at a rate and dosage of 4 mg / 4 hourly, whilst a marginal number 4 (n = 4, 6.2%) were prescribed 3 mg / 4 hourly. In addition, more than half (63.1%, n = 41) of the respondents also received a medical prescription of Panado at a rate and dosage of 1g/ 6 hourly. It was noted that both analgesics (morphine and Panado) had a PRN medical instruction attached to the prescribed frequency.

In terms of total morphine dosage administered to these respondents, more than half (53.8%, n = 35) of the respondents received between 17 to 24 mg over the period of admission in the CT-ICU. Most (44.6%, n = 29) of the respondents received between 7 to 12 g of Panado, however it was noted that more than one third (38.6%, n =25) received no administration of Panado.

6.2.3 Clinical Data

The next section of the data collection instrument related to respondents' clinical data, which comprised four items. Included were severity of illness score, as determined by the SAPS II, CT-ICU length of stay, total costs for care and total costs for analgesia used. Results of this process are summarised in Table 6.5.

Table 6.5 Clinical data obtained from the respondents for the pre-intervention test

Variables	Frequency	Percentage
Illness severity on admission (SAPS II score)		
- 20 to 30 points	13	20.0%
- 31 to 40 points	27	**41.5%**
- 41 to 50 points	23	35.4%
- >51 points	2	3.1%
Length of CTI-CU stay		
- 1 day	3	4.6%
- 2 days	40	**61.5%**
- 3 days	22	33.9%
Total Costs in CT-ICU (Ghanaian Cedis)*		
- 980 to 1380	3	4.6%
- 1840 to 2300	29	**44.6%**
- 2760 to 3680	20	30.7%
- 4140 to 4600	13	20.0%
Total costs of analgesia used in CT-ICU (Ghanaian Cedis)*	24	**36.9%**
- 11 to 100	16	24.6%
- 101 to 200	21	32.3%
- 201 to 281	4	6.2%
- 331 to 376		

Key: * = 4.7 Ghanaian Cedis is equivalent of US $1.00

Of the total sample (n = 65), the largest number (41.5%, n = 27) of respondents had severity of illness scores (SAPS II) in the categories of between 31 to 40 points.

On average, close to two thirds (61.5%, n = 40) of the respondents received treatment in the CT-ICU for a period of 2 days, followed by one third (33.9%, n = 22) who were admitted for a duration of 3 days; only a marginal number of respondents were in the CT-ICU for one day duration (4.6%, n = 3). In terms of the total costs in the CT-ICU, most (44.6%, n = 29) of the respondents were in the costing category of 1840 to 2300 Ghanaian Cedis.

Related to total costs for analgesia (morphine and Panado) used in the CT-ICU, more than one third (36.9%, n = 24) of the respondents were in the costing category of between 11 to 100 Ghanaian Cedis.

6.2.4 Level of Pain and Satisfaction with Pain Management

The last section of the data collection instrument (*Appendix S*) related to the patient respondent's self-rating of pain (comfort measure) and satisfaction with pain management in the CT-ICU, which included four items. Results of this process are presented in Figures 6.1 to 6.4.

Patient respondent's ratings of level of general pain experienced in the CT-ICU during their stay were ascertained using a universal pain assessment tool (*Appendix S).* In this study, responses ranged from 2 (mild pain) to 10 (worst pain possible) with a **Median score of 6.0** (M = 5.68, SD = 1.99), indicating **patients perceived their level as moderate** with regard to pain in the CT-ICU. Figure 6.1 presents these results.

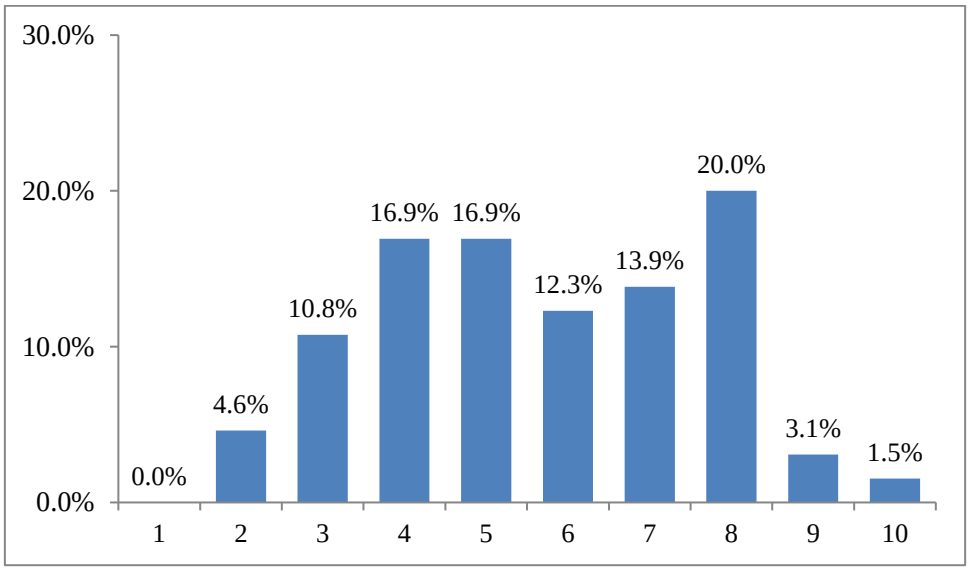

Figure 6.1 Respondents rating of level of pain in the CT-ICU

Similarly, patient respondents rating of level of satisfaction for nurse's administration of pain medication as needed were ascertained using a numerical rating scale (*Appendix S*). Responses ranged from 0 (not satisfied) to 10 (satisfied), with a **Median score of 5.00** (Mean = 5.65, SD = 2.26), indicating **patients rated their level as fairly satisfied** with regard to nurses' administration of pain medication. Figure 6.2 displays these results.

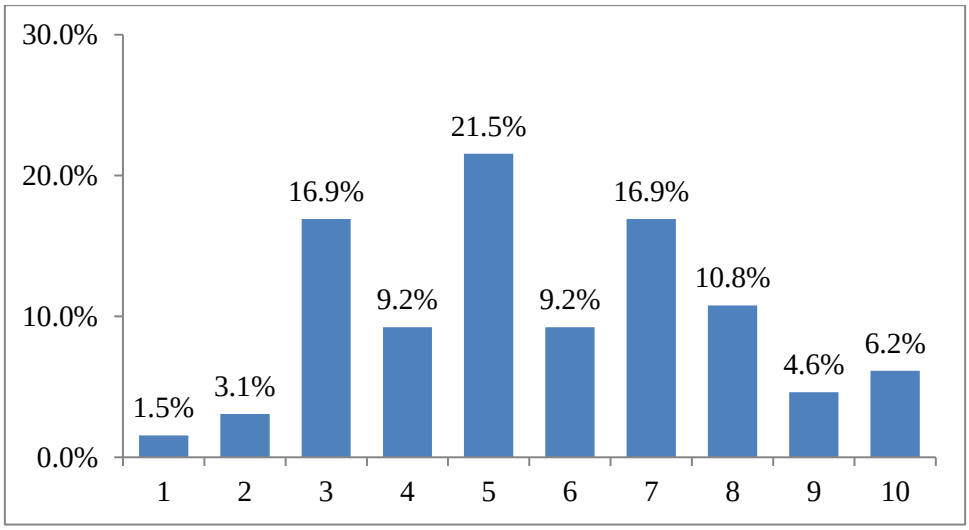

Figure 6.2 Respondents rating of nurse's administration of pain medication

Patient respondents' rating of level of satisfaction for nurse's responsiveness to their complaints of pain were ascertained using a numerical rating scale. Responses ranged from 0 (not satisfied) to 10 (fully satisfied), with a **Median score of 6.00** (Mean = 5.92, SD = 2.35), indicating **patients rated their level as fairly satisfied** with regard to nurses' responsiveness to patients' complaints of pain. Figure 6.3 displays these results.

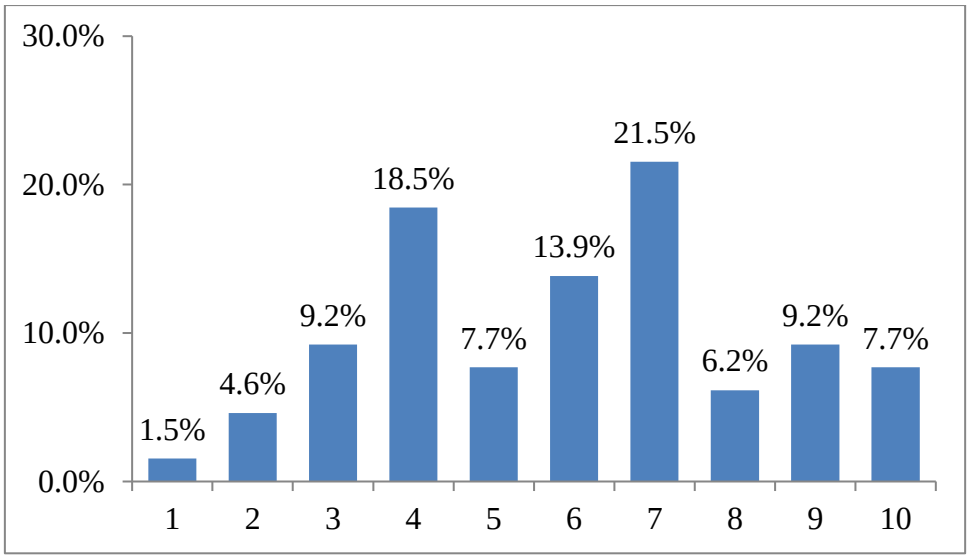

Figure 6.3 Respondents rating of nurse's responsiveness to complaints of pain

Patient respondents' rating of level of satisfaction of education about pain, and how it was managed post-operatively were ascertained using a numerical rating scale. Responses ranged from 0 (not satisfied) to 10 (fully satisfied), with a **Median score of 7.00** (Mean = 6.12, SD = 3.66), indicating **patients rated their level as fairly satisfied** with regard to pre-operative education and management of pain post-operatively. Figure 6.4 displays these results.

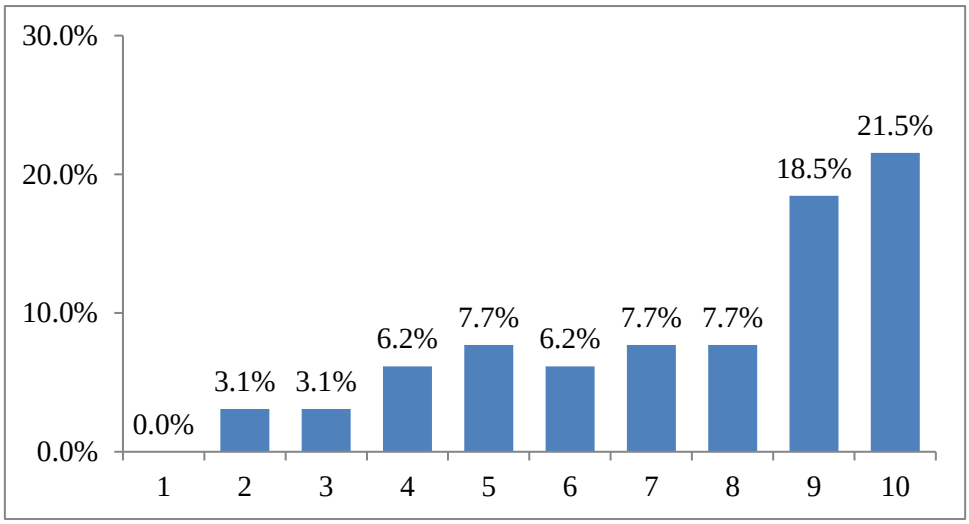

Figure 6.4 Respondents rating of education on pain management post-operatively

In summary, the results indicated that males formed the highest number (52.3%) of patients in the pre-intervention phase and the age group 18 to 36 years formed 38.5%, with > 79 years forming only 3.1%. Cardiac diagnosis formed the largest of patients' diagnosis and atrial septal defect formed 18.5%, thus atrial septal repair 18.5%. Morphine was the most prescribed analgesic (93.8%) with 17 to 25mg being the amount most given (53.8%). Three days was the maximum number of days' patients stayed in the ICU (61.5%). ICU stay cost most patients between 1840 and 2300 Ghanaian cedis (44.6%). Pain scores were between 2 and10, on a scale of 1to10, with 10 being the worse pain possible with a median score of 6.00. Patients were fairly satisfied with nurses' administration of pain medications (median score of 5.00), their response to their complaints of pain (median score of 5.00) and pre-operative education on post-operative pain (median score of 7.00).

6.3 PAIN MANAGEMENT INTERVENTION PROCESS

6.3.1 Introduction

This section describes the intervention process based on the developed clinical guidelines derived from the interviews with nurses, doctors, patients and their relatives. This educational intervention was implemented in various ways, which included a PowerPoint presentation for Critical Care Nurses Group of Ghana, including nurses from the CT-ICU, and individual (one to-one) discussions and group discussions with nurses and doctors. Many studies have successfully used educational interventions for improving pain management practices amongst ICU nurses (Edek & Pronovost, 2004; van Gulik *et al.,* 2010; Gelinas *et al.,* 2011; Rose *et al.,* 2013; Gelinas *et al.,* 2014).

Pain assessment tools for both verbal and non-verbal patients (*Appendix U*) were also attached to each bedside and pocket copies given to nurses to assist them in assessing pain as part of the intervention (Rose *et al.,* 2013). These tools (numerical rating scale and CPOT) were identified during the guideline development as the most validated tools for pain assessment in verbal patients and non-verbal patients respectively. The tool identified as having been extensively validated and recommended for use in verbal and or conscious adult ICU patients is the numerical rating scale (Ahlers, 2008; Chanques, *et al.,* 2010). Many studies over the years have found the CPOT and the BPS to be valid and reliable for use in the non-verbal ICU patients (Yorke *et al.,* 2004; Gelinas *et al.,* 2006; Young, 2006; Gelinas & Johnson, 2007; Gelinas *et al.,* 2009; Vazquez *et al.,* 2011; Gelinas *et al.,* 2011; Rijkenberg *et al.,* 2015). Stites (2013) however stated that the CPOT was **superior** to other tools in reliably detecting pain after a comprehensive search on the reliability and validity of observational pain scales.

Introduction of tools after the education of nurses has also been another successful intervention found in literature (Gelinas *et al.,* 2011; Woien *et al.,* 2012; Rose *et al.,* 2013; Gelinas *et al.,* 2014). A form (*Appendix V*) was also attached to the ICU chart for documentation of pain assessment, management and reassessment. Edek and Pronovost (2004) found that in-service education for nurses and doctors, providing pain assessment tools, protocols and forms by the bedside to enhance documentation improved pain management in the ICU. In this study, the intervention process was conducted between the

5th and 26th of August 2016, and included all practicing registered nurses and doctors in the CT-ICU.

6.3.2 Small Group Discussions

Four group discussions with two nurses in three groups and three nurses in one group were carried out during the intervention. Lewis *et al.* (2015) used the small group (two to six nurses) discussion method among critical care nurses to improve their knowledge on pain management in critically ill patients. In this intervention, two discussions were carried out in the empty high care unit of the ICU and one discussion in the conference room. The group discussions were based on the findings included in the guideline; different topics were discussed and nurses were shown the assessment tools and told how they should be scored. Each group discussion lasted for about 45 minutes (Lewis *et al.,* 2015). Each nurse was given pocket assessment tools (NRS and CPOT). The programme outline was based on the guideline statement of recommendations. The same outline of the programme content was used throughout the intervention process and this outline is provided in Table 6.6.

Table 6.6 Outline of the programme content

TOPIC: Improving Pain Management in the ICU: The Role of The Nurse/Doctor.

OBJECTIVES*: *At the end of this educational programme, the healthcare professional should be better informed about:

1. Pain in ICU patients

2. Pain assessment in verbal/non-verbal ICU patients

3. Pain assessment tools used in the adult ICU

3. Pharmacological/non-pharmacological management of pain

4. Pre-operative patient education on pain

.

5. Findings from the interviews with stakeholders.

The following main guideline statements and recommendations served as a guide for the discussions and all post validation guideline statements discussed under these main statements.

1. **Many procedures in the ICU cause acute pain and need special attention. The ICU patient has many sources of pain and they must be identified and treated.**
2. **ICU nurses need to improve their knowledge on pain and its management, especially the negative consequences of untreated pain. Education will improve nurses' attitude towards and management of pain.**
3. **Team approach to pain management will improve pain outcomes in patients**
4. **There is a need for a protocol to standardise pain assessment and management in the ICU and act as a universal guide for ICU nurses and doctors in their management of the patients' pain.**
5. **Consistent documentation of pain assessment and treatment on ICU charts will improve pain management.**
6. **Pain assessment must be done routinely with validated assessment tools to improve pain management.**
7. **Pain treatment must effectively address the needs of the patient and keep the patient pain free or in tolerable pain while minimising adverse effects.**
8. **Many non-pharmacological methods can be employed by ICU nurses and doctors to reduce pain in critically ill patients.**
9. **ICU nurses and doctors need to give patients education on post-operative pain, its assessment and pharmacological and non-pharmacological methods management**.

6.3.3 Education of Nurses

A PowerPoint presentation was organised by the researcher, supported by the Critical Care Nurses Group of Ghana, in the Critical Care Nurses School of the research centre. Invitation cards were sent two weeks before the presentation and certificates of participation were awarded at the end of the workshop. The presentation was attended by 120 nurses and of these, 35 were ICU trained nurses from different ICUs including medical, surgical, burns and even paediatric and neonatal ICUs. Ten of the nurses were from the CT-ICU, which is the study centre. Some of the nurses who were present at the group discussions also attended the PowerPoint presentation, which focused on the statements and recommendations of the clinical guideline. The findings from the interviews with stakeholders were also discussed. The pain assessment tools numerical scale for verbal and CPOT for non-verbal patients, as stated in literature, were discussed with nurses and each participant was given both pain assessment tools (*Appendix U*). The Wong Baker Scale was also given to nurses to assist in assessing pain in children, although this was not the focus of the study.

Figure 6.5 Facilitation of the intervention process

Figure 6.6 Facilitation of the intervention process

6.3.4 Individual Discussions

Individual discussions were held with nurses (n=4) and doctors (n=10) who were not present in the group discussions and PowerPoint presentations. Two discussions with the ICU nurses were held at the high care unit of the ICU and two in the nurse manager's office; the discussions with the doctors were held in the doctor's offices. All discussions followed the findings of the clinical guideline. The pain assessment tools and their scoring were also discussed. Each nurse and doctor was given a laminated copy of the pain assessment tools (NRS/CPOT) which was discussed with them, and the nurses and doctors were encouraged to use them to assess patients' pain and to document accordingly. The Wong Baker Scale was also given to assist in assessing pain in children.

6.3.5 Provision of Pain Assessment Tools

As stated earlier, the pain assessment tools were given to all nurses and doctors involved in the study. The laminated pain assessment tools (CPOT and NRS) were attached to each CT-

ICU bed (n=6). As the ICU also admits paediatric patients, the Wong Baker Faces Scale (*Appendix U)* was also laminated and attached to all the beds in the CT-ICU to assist with the children, since there are no assessment tools for them.

6.3.6 Documentation of Pain Assessment

The documentation of pain assessment was encouraged. The charts currently used in the CT-ICU do not have a place for the documentation of pain assessment. Nurses and doctors were asked to document their pain assessment and reassessment depending on the half-life of the analgesic. Doctors were also encouraged to document their pain assessment and scores in their chart/progress notes. Since there is no place for documentation of pain assessment on the ICU chart, a form was created (*Appendix V*) and attached to the CT-ICU chart to enhance documentation and follow-up. It was realised during the intervention that there was a space available for documenting chest pain and it was agreed, with the nurses and doctors, that if the patient was not admitted with chest pain, that part of the chart could be labelled and used for documenting pain assessment.

6.3.7 Recommendations for Improvement

The following suggestions were made to improve the implementation of the guideline based on the experience acquired and challenges encountered during the pilot testing.

- During the intervention, it was realised that the most important need in applying the guideline would be resources (monetary and personnel). The implications of applying the recommendations would be a need for extra support persons in the ICUs/other team members and a need for continuous staff training/education/workshops on pain management in the ICU. Based on this, there is a need for the management to put this into consideration in their long-term plans of resource allocation to help in enhancing the implementation of the guideline.
- To enhance successful educational interventions, workshops and in-service trainings there is a need for hospital management to provide dedicated venues for education that can accommodate the number of nurses who wish to attend the programmes. Finding an appropriate venue to accommodate all the nurses attending the educational intervention was challenging and it took the intervention of the executives of CCNGG to find a venue.

- They will be a need for supervision and encouragement to ensure that nurses and doctors document pain assessment and management on CT- ICU charts and clinical notes. Supervision was seen to be lacking during the introduction of the pain assessment tools and documentation form.
- There is the need for management to ensure that education on post-operative pain by both doctors and nurses becomes a routine part of pre-operative care and the same must be documented in clinical notes and on CT-ICU charts. Although most nurses and doctors pledged to improve pre-operative education on pain during the intervention, it was realised that making it a routine part of pre-operative care would make it more effective.
- Doctors in charge of ICUs need to entreat fellow doctors to follow current recommendations for the management of pain, such as multimodal analgesics instead of mono-therapy, and encourage the use of non-pharmacological management when appropriate. Treatment modalities and expected outcome should be discussed with nurses, especially the nurse in charge, and nurse managers should be encouraged to supervise ICU nurses to ensure adherence to treatment regimen.
- There is a need to encourage weekly meetings to evaluate the effectiveness of the guideline so that successes and challenges with the implementation can be discussed and steps to correct their deficiencies taken to enhance the effectiveness of the guideline. Time should be allocated during meetings of health professionals case management meetings for this. It was determined during the intervention that getting time allocated to meetings during the weekly meetings was a challenge.
- It will be helpful to perform post CT-ICU patient surveys or interviews on transfer to identify their level of pain in the CT-ICU and any improvements or concerns about their pain management so that further actions can be taken to address the barriers identified and this information relayed to the researcher to improve and update the guideline.
- It will be helpful to contact and keep in touch with the researcher during the initial stages of the implementation to assist and address any misunderstandings and provide support during the implementation and hold periodic clinical meetings with management to assess the progress of the implementation and inform the guideline review.

This section discussed the implementation of the guideline or the pilot study phase. In the following section, the post intervention test will be discussed.

6.4 POST INTERVENTION RESULTS

6.4.1 Demographic Data

The first section of the data collection instrument (*Appendix S*) related to the respondents' demographics, which comprised of six items. Results are summarised in Table 6.7.

Table 6.7 Demographic data obtained from respondents for the post-intervention test

Variables	Frequency	Percentage
Gender		
- Male	32	49.2%
- Female	33	**50.8%**
Age		
- 18 to 36 years	24	36.9%
- 37 to 57 years	31	**47.7%**
- 58 to 78 years	9	13.9%
- >79 years	1	1.5%
Weight		
- 45 to 50 kg	16	24.6%
- 51 to 60 kg	10	13.8%
- 61 to 70 kg	17	**26.2%**
- 71 to 80 kg	13	20.0%
- >81 kg	9	15.3%
Height		
- Not recorded	3	4.6%
- 110 to 130 cm	5	7.7%
- 131 to 160 cm	37	**56.9%**
- 161 to 180 cm	19	29.2%
- >181 cm	1	1.5%

Of the total sample (n = 65), females accounted for 50.8% (n = 33) and males 49.2% (n = 32). In terms of age categories, the largest number (47.7%, n = 31) of respondents were in the age categories of between 37 to 57 years, followed by 36.9% (n = 24) and 13.9% (n = 9) between the ages of 18 to 36 years and 58 to 78 years, respectively.

Most (26.2%, n = 17) of the respondents were in the category of between 61 to 70 kg body weight, followed by 24.6% (n = 16) and 15.3% (n = 10) between 45 and 50 and 51 to 60 kg body weight categories, respectively. The largest (56.9%, n = 37) number of respondents were in the category of 131 to 160 cm height, followed by a lower 29.2% (n = 19) and 7.7% (n = 5) between 161 to 130 and 110 to 130 cm height categories. The medical diagnosis of the respondents in the post-intervention population group is presented in Table 6.8.

Table 6.8 Admission diagnosis obtained for respondents in the post-intervention test (n=65)

Diagnosis	Frequency	Percentage
Aortic stenosis + Mitral regurgitation	1	1.5%
Aortic Valve disease	1	1.5%
Ascending Aortic Aneurysm	2	3.1%
Ascending aortic aneurysm + moderate MR+TR	1	1.5%
Ascending aortic defect	1	1.5%
Atrial septal defect	8	**12.3%**
Chest pain + empyema	1	1.5%
Chest pain + shortness of breath 2 to empyema	1	1.5%
Coronary artery disease	**5**	**7.6%**
Double outlet right ventricle +Block-Taussing shunt	1	1.5%
Large PDA+ Arterial regurgitation + severe PHT	1	1.5%
Left lower lobe mass	2	3.1%
Mediastinal mass	1	1.5%
Mitral valve disease	**5**	**7.7%**
Mitral valve displacement	1	1.5%
Mitral Valve Regurgitation	1	1.5%
Mixed mitral valve disease	2	3.1%
Non-Restrictive VSD-PA	1	1.5%
Non-Restrictive VSD-PA-Binding	1	1.5%
Non-toxic goitre	1	1.5%
Oesophageal Stricture	1	1.5%
Posterior mediastinal mass	1	1.5%
Retrosternal goitre (Non-toxic)	1	1.5%
Right Posterior mass	1	1.5%
Right upper lobe mass	3	4.6%
Right upper lobe mass 2 to Bulla	1	1.5%
Severe mitral incompetence 2 to RHD	1	1.5%
Severe mitral valve regurgitation	1	1.5%
Shortness of breath 2 to pneumonia	1	1.5%
Tetralogy of Fallot	5	7.7%
TOF + Modified Blalock Tausing Shunt	1	1.5%
Tricuspid Regurgitation	1	1.5%
Ventricular septal defect	**8**	**12.3%**
Ventricular septal disease	1	1.5%

Of the total sample (n = 65), the largest (18.5%, n = 12) number of respondents had an admission diagnosis of mitral valve disease, followed by atrial septal defect (12.3% n=8) and 12.3% (n = 8) ventricular septal defect on the admission diagnosis. A marginal (7.7%, n = 5) number of respondents had coronary artery disease as their admission diagnosis.

The surgical operative procedures obtained from the respondents' records are presented in Table 6.9.

Table 6.9 Nature of surgical operative procedures obtained for respondents in the post-intervention test (n=65)

Diagnosis	Frequency	Percentage
Aortic valve repair	5	7.7%
Aortic valve replacement + Alfieri stich to Mitral Valve	1	1.5%
Atrial septal Defect repair	8	12.3%
AV repair + PDA Ligation + repair	1	1.5%
Bentall procedure + MV ring annuloplasty + modified devega	1	1.5%
Bentall Procedure, Ascending and Hemi Replacement with AVR	1	1.5%
Coronary artery bypass graft	5	7.6%
DORV + RMBTS Total Repair	1	1.5%
Left Lower Lobectomy	2	3.1%
Left Thoracotomy and decortication	2	3.1%
Left Thoracotomy and Excision	1	1.5%
Mitral valve repair	**6**	**9.2%**
Mitral valve replacement	**2**	**3.1%**
Mitral valve replacement + Re-exploratory	**1**	**1.5%**
Mitral valve ring annuloplasty	**1**	**1.5%**
Modified devega annuloplasty	1	1.5%
Oesophagectomy + Colon interposition	1	1.5%
Right Thoracotomy and decortication	1	1.5%
Right Upper Lobectomy	3	4.6%
Right Upper Lobectomy 2 to Right Lung Mass	1	1.5%
Stenotomy + Excision	3	4.6%
Tetralogy of Fallot (TOF) Total Repair	5	7.8%
Thoracotomy and right posterior excision	1	1.5%
TOF + Modified Blalock Tausing Shunt Total Repair	1	1.5%
Tricuspid Valve replacement (Biological valve)	1	1.5%
Ventricular Septal Defect Repair	1	1.5%
Ventricular septal repair	**8**	12.3%

Of the total sample (n = 65), the largest (15.4%, n = 10) number of respondents had a surgical operative procedure of mitral valve repair/replacement, followed by a lower 13.9% (n = 9) and 12.3% (n = 8) in the categories of atrial septal defect repair and ventricular septal repair respectively. Only a small (9.3%, n = 6) number of respondents had thoracic surgical procedures, and four (6.2%) had a coronary artery bypass graft surgery.

6.4.2 Prescribed and Administered Analgesia

This section related to use of analgesia in the CT-ICU, which included medically prescribed drugs administered by registered nurses. Results of this process are summarised in Table 6.10.

Table 6.10 Summary for frequencies of prescribed and administered analgesics by post-intervention test

Variables	Frequency	Percentage
Prescribed analgesia		
- Morphine 4mg/4hrly	65	**100.0%**
- Morphine 3 mg/4hrly	-	-
- Panado 1g/6hrly	64	**98.5%**
Total administration of Morphine		
- 6 to 16 mg	44	**67.7%**
- 17 to 24 mg	16	24.6%
- 25 to 32 mg	4	6.2%
- 33 mg to 53 mg	1	1.5%
Total administration of Panado		
- 0	1	1.5%
- 1 to 6 g	47	**72.3%**
- 7 to 12 g	17	26.2%
- 14 to 16 g	-	-

Of the total sample (n = 65), an overwhelming (100.0% n = 65) number of respondents received a medical prescription of morphine at a rate and dosage of 4 mg/4 hourly. Similarly, a large (98.5%, n = 64) number of respondents also received a medical prescription for Panado at a rate and dosage of 1g/6 hourly.

In terms of total morphine dosage administered, more than two thirds (67.7%, n = 44) of the respondents were in the category of having received between 6 to 16 mg total dosage of morphine, followed by a lower 24.6% (n = 16) and 6.2% (n = 4) between 17 to 24 mg and 25 to 32 mg categories respectively. In addition, three quarters (72.0%, n = 47) of the respondents were in the category of having received between 1 to 6 g/6 hourly dosage of Panado.

6.4.3 Clinical Data

This section related to the respondents' clinical data, which comprised of four items. Results of this process are summarised in Table 6.11.

Table 6.11 Clinical data obtained for respondents for the post-intervention test

Variables	Frequency	Percentage
Illness severity on admission (SAPS II score)		
- 20 to 30 points	14	21.5%
- 31 to 40 points	34	**52.3%**
- 41 to 50 points	15	23.1%
- >51 points	2	3.1%
Length of CTICU stay		
- 1 day	13	20.0%
- 2 days	36	**55.4%**
- 3 days	14	21.5%
- 4 days	2	3.1%
Total Costs in CTICU (Ghanaian Cedis)*		
- 980 to 1380	11	16.9%
- 1840 to 2300	38	**58.5%**
- 2760 to 3680	14	21.5%
- 4140 to 4600	2	3.1%
Total costs of analgesia used in CTICU (Ghanaian Cedis)*		18.5%
- 11 to 100	12	**72.3%**
- 101 to 200	47	9.2%
- 201 to 281	6	-
- 331 to 376	-	

Key: * = 4.7 Ghanaian Cedis is equivalent of US $1

Of the total sample (n = 65), most (52.3%, n = 34) respondents were in the category related to illness severity (SAPS II) of between 31 to 40 points, followed by a lower 23.1% (n = 15) and 21.5% (n = 14) of respondents between 41 to 50 and 20 to 30 points categories, respectively.

On average, most of the respondents were admitted to the CT-ICU for a duration of 2 days, followed by lower 21.5% (n = 14) and 20.0% (n = 13) in the categories of 3 days and 1-day duration, respectively.

In terms of the total costs in the CT-ICU, more than half (58.5%, n = 34) of the respondents were in the category of between 1840 to 2300 Ghanaian Cedis, followed by lower 21.5% (n = 14) and 16.9% (n = 11) of respondents between 2760 to 3680 and 980 to 1380 Ghanaian Cedis categories, respectively.

Related to total costs for analgesia (morphine and Panado) used in the CT-ICU, a close three quarters (72.3%; n = 47) of respondents were costed in the category of 101 to 281 Ghanaian Cedis, followed by lower 18.5% (n = 12) and 9.2% (n =6) between 11 to 100 and 201 to 281 categories of Ghanaian Cedis, respectively.

6.4.4 Level of Pain and Satisfaction with Pain Management in the CT-ICU

This section of the data collection instrument (*Appendix S*) was related to the respondent's rating of pain and satisfaction with pain management in the CT-ICU, which included four items. Results of this process are summarised in Figure 6.7.

Patient respondent's ratings of level of general pain experienced in the CT-ICU during their stay were ascertained using the universal pain assessment tool. In this study, responses ranged from 1 (mild pain) to 8 (severe pain), with a **Median score of 4.00** (Mean = 4.26, SD = 1.87), indicating that patients rated their **level as moderate** with regard to pain in the CT-ICU. Figure 6.7 displays these results.

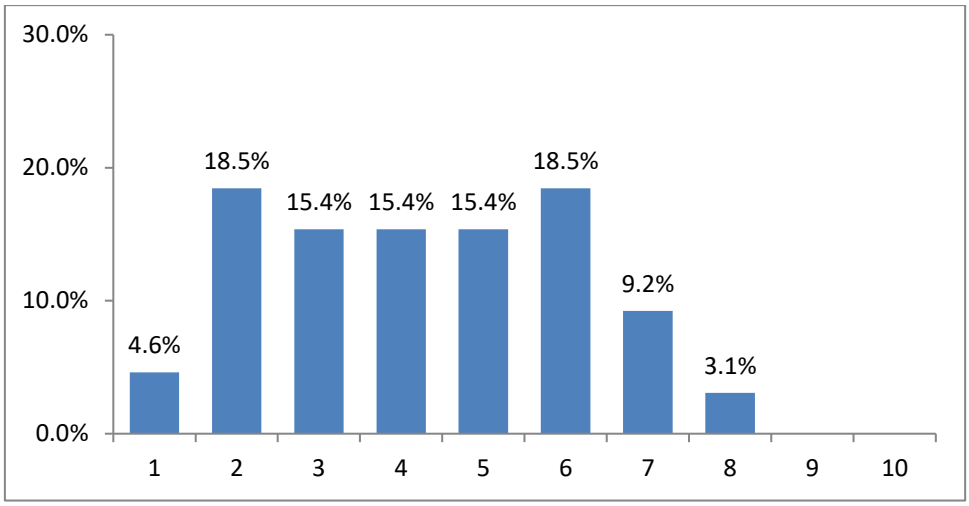

Figure 6.7 Respondents rating of level of pain in the CTI-CU

Similarly, patient respondent's rating level of satisfaction with nurse's administration of pain medication as needed were ascertained using a numerical rating scale (*Appendix S).* Responses ranged from 3 (not satisfied) to 10 (satisfied), with a **Median score of 7.00** (Mean = 6.85, SD = 1.62), indicating patients rated their **level as fairly satisfied** with regard to pain in the CT-ICU. Figure 6.8 displays these results.

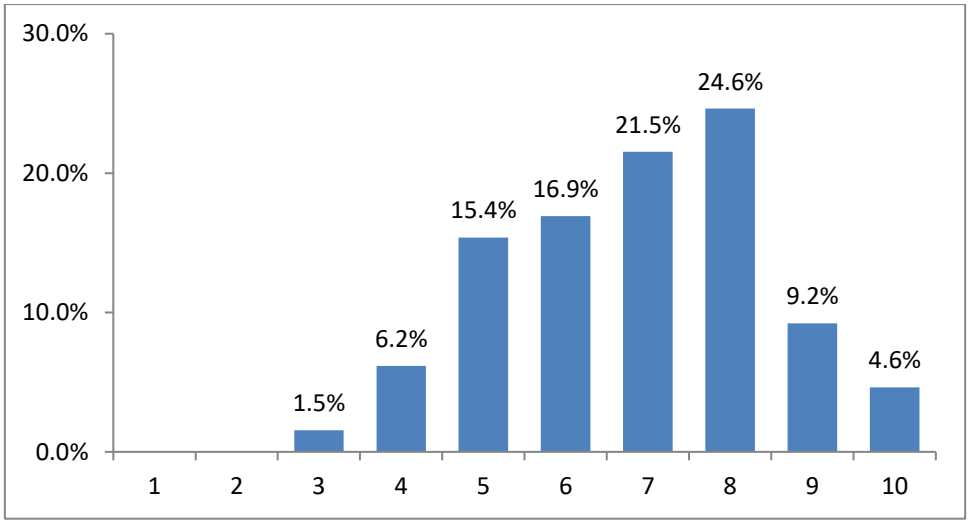

Figure 6.8 Respondents rating of nurse's administration of pain medication

Patient respondent's rating level of satisfaction with nurse's responsiveness to patient's complaints of pain were ascertained using a numerical rating scale. Responses ranged from 3 (not satisfied) to 10 (satisfied), with a **Median score of 8.00** (Mean = 7.29, SD = 1.74),

indicating patients rated their **level as satisfied** with regard to pain in the CT-ICU. Figure 6.9 displays these results.

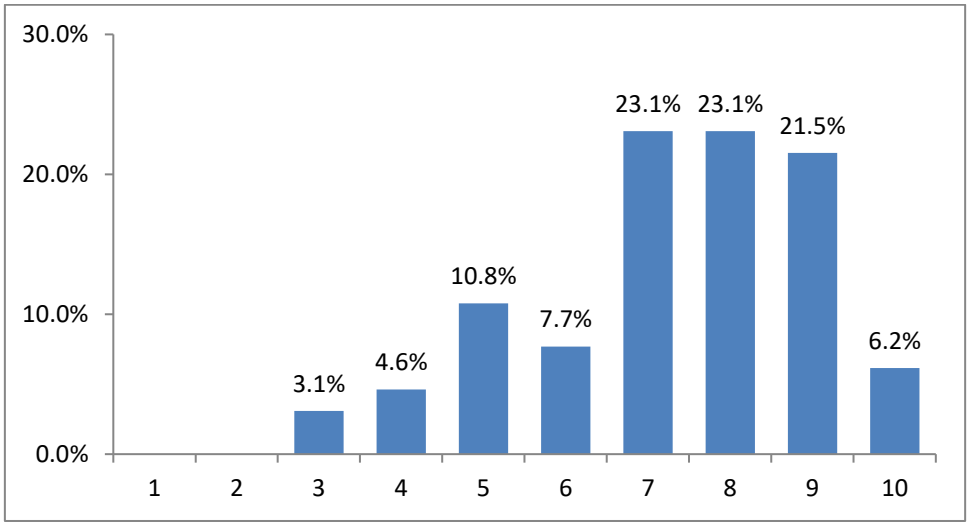

Figure 6.9 Respondents rating of nurse's responsiveness to complaints of pain

In addition, patient respondent's rating level of satisfaction for education about pain management post-operatively were ascertained using a numerical rating scale. Responses ranged from 3 (not satisfied) to 10 (satisfied), with a **Median score of 9.00** (Mean = 8.20, SD = 1.91), indicating patients rated their **level as fairly satisfied** with regard to pain in the CT-ICU. Figure 6.10 displays these results.

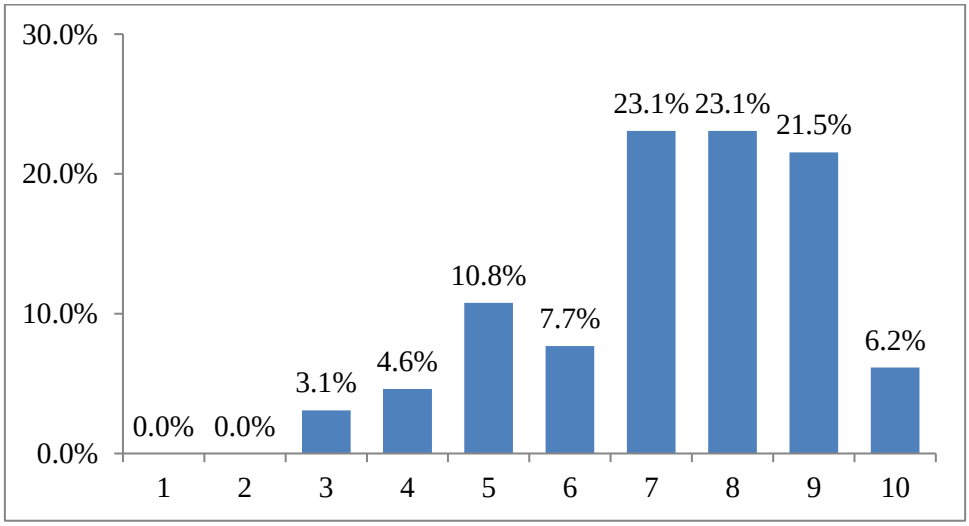

Figure 6.10 Respondents rating of education about pain management post-operatively

It can there be seen from the results above that females formed the highest number (50.8%) of patients in the post-intervention phase, while the age group 37 to 57 years formed 47.7% and > 79 formed 1.5%. Cardiac diagnosis formed the largest of patients' diagnosis in the post-intervention test as well. Morphine was prescribed for all patients (100%) and 6 to16mg was the amount most given (67.7%). Two days was the maximum number of days' patients stayed in the ICU (55.4%). ICU stay cost most patients between 1840 and 2300 Ghanaian cedis and analgesia cost 101 to 200 (58.5%). Pain scores were between 1 and 8, on a scale of 1 to10, with 10 being the worse pain possible, with a median score of 4.00. Patients were fairly satisfied with nurses' administration of pain medications (median score of 7.00), their response to their complaints of pain (median score of 8.00) and pre-operative education on post-operative pain (median score of 9.00).

6.5 COMPARISONS BETWEEN PRE- AND POST- INTERVENTION TESTS

This section is related to specifically selected variables of interest for further investigation. Results of the process are summarised in Table 6.12.

Table 6.12 Summary of frequencies for demographic and clinical variables for comparison between pre- and post-intervention tests

Variables	Pre-intervention test		Post-intervention test	
	n	%	n	%
Gender				
- Male	34	52.3%	32	49.2%
- Female	31	47.7%	33	50.8%
Age				
- 18 to 36 years	25	38.5%	24	36.9%
- 37 to 57 years	30	46.1%	31	**47.7%**
- 58 to 78 years	8	12.3%	9	13.9%
- >79 years	2	3.1%	1	1.5%
Operative procedure				
- Cardiac	47	72.3%	50	**76.9%**
- Thoracic	18	27.7%	15	23.1%
Illness severity on admission (SAPS II score)				
- 20 to 30 points	13	20.0%	14	21.5%
- 31 to 40 points	27	41.5%	34	**52.3%**
- 41 to 50 points	23	35.4%	15	23.1%
- >51 points	2	3.1%	2	3.1%
Length of CTICU stay				
- 1 day	3	4.6%	13	**20.0%**
- 2 days	40	**61.5%**	36	55.4%
- 3 days	22	**33.9%**	14	21.5%
- 4 days	-	-	2	3.1%
Total costs in CTICU (Ghanaian Cedis)*				
- 980 to 1380	3	4.6%	11	16.9%
- 1840 to 2300	29	44.6%	38	**58.5%**
- 2760 to 3680	20	**30.7%**	14	21.5%
- 4140 to 4600	13	20.0%	2	3.1%
Total costs of analgesia used in CTICU (Ghanaian Cedis)*				
- 11 to 100	24	36.9%	12	18.5%
- 101 to 200	16	24.6%	47	**72.3%**
- 201 to 281	21	32.3%	6	9.2%
- 331 to 376	4	6.2%	-	-

Key: * = 4.7 Ghanaian Cedis is equivalent of US $1.00

In this study, the largest (41.1%, n = 30) number of respondents were in the age categories of 37 to 57 years for the pre-intervention group and similarly, the largest (47.7%, n = 31) number of respondents were in the category of 37 to 57 years for the post-intervention test.

Males accounted for the majority (52.3%, n = 34) of respondents in the pre-intervention test, whilst females accounted for the majority (50.8%, n = 33) in the post-intervention test.

The largest (72.3%, n = 47) number of respondents in the pre-intervention test were in the surgical operative category related to cardiac surgery and similarly, the largest (76.9%, n = 50) number of respondents were in the category of cardiac surgery in the post-intervention test. In terms of illness severity (SAPS II score) on admission to CT-ICU, the largest (41.5%, n = 27) group of respondents in the pre-intervention test were in the categories of 31 to 40 points, compared to a higher 52.3% (n = 34) number between 31 to 40 points in the post-intervention test. On average, the largest (61.5%, n = 40) number of respondents in the pre-intervention test were admitted to the CT-ICU for duration of two days, compared to a slightly lower number (55.4%, n = 36) for duration of two days in the CT-ICU for the post-intervention test.

In this study, the largest (30.7%, n = 20) number of respondents in the pre-intervention group were costed for total CT-ICU care between 2760 to 3680 Ghanaian Cedis, compared to a lower (21.5%, n = 14) between 2760 to 3680 Ghanaian Cedis in the post-intervention test. Related to total analgesic costs, the largest (36.9%, n = 24) number of respondents were in the category of 11 to 100 Ghanaian Cedis, compared to a lower 18.5% (n = 12) of respondents in the post-intervention test between 11 to 100 Ghanaian Cedis. It is noted that the largest (72.3%, n = 47) number of the respondents in the post-intervention test were in the category of between 101 to 200 Ghanaian Cedis for analgesic costs, compared to a lower 24.6% (n = 16) between 101 to 200 Ghanaian Cedis for analgesic costs in the pre-intervention test. Overall there is a general consistency between the demographic and clinical data in the pre-intervention (n=65) and post-intervention (n = 65) sample populations.

Based on observed differences in the frequencies in the sub-groups for gender and surgical operative procedures (Table 6.12), the pre- and post-intervention test scores were then tested to determine whether they were significant or not. The Fisher's Exact Test was employed to proportionate the data by categorical variables. An overview of the process is provided in Table 6.13.

- Gender and surgical operative procedures

Table 6.13 Summary for Fishers Exact Tests for comparison of gender and surgical operative procedures by pre- and post-intervention tests

Category	Sub-categories	Pre-intervention test		Post-intervention test		Fishers Exact p-value
		n	%	n	%	
Gender	Male	34	52.3%	32	49.2%	0.861
	Female	31	47.7%	33	50.8%	
Surgical operative procedures	Cardiac	47	72.3%	50	76.9%	0.687
	Thoracic	18	27.7%	15	23.1%	

Table 6.13 presented the summary of results of Fisher's Exact Tests for selected categorical variables for gender and surgical operative procedures. Results indicated that no significant difference was observed in the categories for gender (p=0.861) and surgical operative procedures (p=0.687), implying that the proportions of data for the pre-intervention and post-intervention groups in these categories were more likely to be similar.

A two-sample t-test was employed to determine whether the two group (pre-intervention and post-intervention) mean scores for comparison of demographic variables (SAPS II score, age, CT-ICU length of stay, total cost and analgesic costs) had a greater difference than would be expected. The two-sample t-test was used to compute the t-test statistic, confidence interval and significance. A p-value of 0.05 (p=0.05) was used to determine significance. Results of this process are provided in **Tables 6.14 to 6.18**.

- SAPS II score

Table 6.14 Summary for two-sample t-tests for comparison of SAPS II score by pre- and post-intervention tests

Group	n	Mean	SD	95% CI
Pre-intervention test	65	37.90	7.76	35.98-39.83
Post-intervention test	65	35.66	7.32	33.84-37.47
Total	130	36.78	7.60	35.46-38.10
Difference		2.24		

Two-sample t-test = 1.69 (p=0.0922)

Table 6.14 presents the summary of results of the two-sample t-test for comparison of SAPS II score by pre- and post-intervention tests. These results indicated there was no statistical significant difference for mean total scores between the pre-intervention and post-intervention groups (p = 0.0922, t =1.69, 95% CI 35.46 – 38.10; n = 65). In other words, the pre-intervention group (M = 37.90, 95% CI 35.98 – 39.83, n = 65) does not have a statistically significantly higher mean than the intervention sample (M = 35.66, 95% CI 33.84 – 37.47, n = 65), implying that in terms of severity of illness (SAPS II) of respondents, these study groups are likely to be similar.

- Age

Table 6.15 Summary for two-sample t-tests for comparison of age by pre- and post-intervention tests

Group	n	Mean	SD	95% CI
Pre-intervention test	65	43.49	15.63	-
Post-intervention test	65	43.17	14.87	-
Total	130	-	15.25	-
Difference		0.32		

Two-sample t-test = 0.119 (p=0.904)

Table 6.15 presents the summary of results for the two-sample t-test for comparison of age by pre- and post-intervention tests. These results indicated there was no statistical significant difference for mean total scores between the pre-intervention and post-intervention groups (p = 0.904, t =0.119, n = 65). In other words, the pre-intervention group (M = 43.49, n = 65) does not have a statistically significantly higher mean than the intervention sample (M = 43.17, n = 65), implying that in terms of age of respondents, these study groups are likely to be similar.

- CT-ICU length of stay

Table 6.16 Summary for two-sample t-tests for comparison of CT-ICU length of stay by pre- and post-intervention tests

Group	n	Mean	SD	95% CI
Pre-intervention test	65	2.29	0.55	2.15 – 2.42
Post-intervention test	65	2.12	0.71	1.94 – 2.30
Total	130	2.20	0.64	2.09 – 2.31
Difference		0.16		

Two sample t-test = 1.50 (p=0.134)

Table 6.16 presents the summary of results for the two-sample t-tests for comparison of length of CT-ICU stay by pre- and post-intervention tests. These results indicated there was no statistical significant difference for mean total scores between the pre-intervention and post-intervention groups (p = 0.134, t =1.50, 95% CI 2.09 – 2.31). In other words, the pre-intervention group (M = 2.29, 95% CI 2.15 – 2.42, n = 65) does not have a statistically significantly higher mean than the intervention sample (M = 2.12, 95% CI 1.94 – 2.30, n = 65), implying that in terms of length of stay in CT-ICU of the respondents, these study groups are likely to be similar.

- CT-ICU total costs

Table 6.17 Summary for two-sample t-tests for comparison of CTI-CU total costs by pre- and post-intervention tests

Group	n	Mean	SD	95% CI
Pre-intervention test	65	2561.84	905.39	2337.49 – 2786.19
Post-intervention test	65	2046.83	818.47	1844.02 – 2249.63
Total	130	2304.33	896.70	2148.56 – 2460.11
Difference		515.01		

Two sample t-test = 3.40 **(p=0.001) ***

Table 6.17 presents the summary of significant findings of two-sample t-tests for comparison of total CT-ICU costs by pre- and post-intervention tests. These results indicated that there is a statistical difference for mean total scores between the pre-intervention and post-intervention groups (p = 0.001, t = -3.40, 95% CI 2148.56 – 2460.11).

In other words, **the pre-intervention group (M = 2561.84, 95% CI 2337-49-2786.19, n = 65) has a statistically significant higher mean score than the post-intervention sample (M = 2046.83, 95% CI 1844.02 - 2249.63, n = 65),** implying that **in terms of mean total costs in CT-ICU** the pre-intervention group had a higher total cost in CT-ICU than the post-intervention sample.

- Cost of Analgesia

Table 6.18 Summary of two-sample t-tests for comparison of cost of analgesia by pre- and post-intervention tests

Group	n	Mean	SD	95% CI
Pre-intervention test	65	144.69	110.86	117.22 – 172.16
Post-intervention test	65	134.63	58.15	120.22 – 149.04
Total	130	139.66	88.32	124.34 – 154.99
Difference		10.06		

Two sample t-test = 0.64 (p=0.518)

Table 6.18 presents the summary of results of two-sample t-tests for comparison of cost of analgesia by pre- and post-intervention tests. These results indicated there was no statistical difference for mean total score between the pre-intervention and post-intervention groups (p = 0.518, t = 0.64, 95% CI 124.34-154.99). In other words, the pre-intervention group (M = 144.69, 95% CI 117.22-172.16, n = 65) does not have a statistically significant higher mean score than the post-intervention sample (M = 134.63, 95% CI 120.22-149.04, n = 65), implying that in terms mean scores for total costs of analgesia in CT-ICU, these study groups are more likely to be similar.

- Level of pain and satisfaction

When comparing the difference in the two groups rating scale for comparison of levels of pain and satisfaction for pain management between pre- and post-intervention tests, the data was first categorised into three groups: where 0 to 3 points = mild pain, 4 to 7 points = moderate pain and 8 to 10 points = severe pain and for satisfaction; 0 to 3 points = not satisfied, 4 to 7 points = fairly satisfied and 8 to 10 points = satisfied. Results of the process for comparison of the pre- and post-intervention tests are provided in Table 6.19.

Table 6.19 Summary of frequencies for comparison of pain rating and satisfaction between pre-and post-intervention tests

Variables	Pre-intervention test		Post-intervention test	
	n	%	n	%
Patient rating of level of pain in CTICU				
- Mild pain (0 to 3 points)	10	15.4%	25	38.5%
- Moderate pain (4 to 7 points)	39	**60.0%**	38	**58.5%**
- Severe pain (8 to 10 points)	16	**24.6%**	2	**3.1**%
Satisfaction with nurses' administration of analgesia				
- not satisfied (0 to 3 points)	14	21.5%	1	1.5%
- fairly satisfied (4 to 7 points)	37	**56.9%**	39	**60.0%**
- satisfied (8 to 10 points)	14	21.5%	33	38.5%
Satisfaction with nurses' response on patient's complaint of pain				
- not satisfied (0 to 3 points)	10	15.4%	3	4.6%
- fairly satisfied (4 to 7 points)	40	**61.6%**	29	44.6%
- satisfied (8 to 10 points)	15	23.1%	33	50.8%
Satisfaction with pre-operative education on postoperative pain management				
- not satisfied (0 to 3 points)	16	24.6%	2	3.1%
- fairly satisfied (4 to 7 points)	18	27.7%	18	27.7%
- satisfied (8 to 10 points)	31	47.7%	46	**70.8%**

According to Table 6.19, when considering the level of pain rating scores, the largest (60.0%, n = 39) number of respondents were self-rated in moderate pain category (4 to 7 points) in the pre-intervention test and similarly, the largest (58.5%, n = 38) number of respondents in the post-intervention test were in the moderate pain (4 to 7 points) category.

In terms of satisfaction with nurses' administration of analgesia, the largest (56.9%, n = 37) number of respondents were self-rated in the category of fairly satisfied (4 to 7 points) and similarly, the largest (60.0%, n = 39) number of respondent were fairly satisfied (4 to 7 points) in the post-intervention test. When considering the level of satisfaction with nurse's responsiveness to patient's complaints of pain, the largest (61.6%, n = 40) number of respondents were self-rated in the category of fairly satisfied, which contrasted with the

largest (50.8%, n = 33) number of respondents in the category of satisfied (8 to 10 points) in the post-intervention test.

Related to level of satisfaction with education on post-operative pain management, the largest (47.7%, n = 31) number of respondents were self-rated in the category of satisfied (8 to 10 points) in the pre-intervention group and similarly, the largest (70.8%, n = 46) number of respondents were self-rated in the category of satisfied (8 to 10 points) in the post-intervention group.

Based on the observed differences in the frequencies (Table 6.19), a two-group t-test was employed to determine whether the two group mean scores for continuous variables (level of pain and satisfaction with pain management) had a greater difference than expected. The two-sample t-test was used to compute the t-statistic, confidence interval (CI) and significance. Results of this process are provided in Tables 6.20 to 6.23.

- Pain

Table 6.20 Summary of two-sample t-tests for comparison of level of pain by pre- and post-intervention tests

Group	n	Mean	SD	95% CI
Pre-intervention test	65	5.67	1.99	5.18 – 6.17
Post-intervention test	65	4.26	1.87	3.79 – 4.75
Total	130	4.96	2.05	4.61 – 5.32
Difference		1.41		

Two-sample t-test = 4.17 **(p=0.000) ***

Table 6.20 presents the summary of significant findings of two-sample t-tests for comparison of level of pain by pre- and post-intervention tests. These results indicated a statistical difference for level of pain score in CT-ICU mean total scores between the pre-intervention and post-intervention groups (p = 0.000, t-test 4.17, 95% CI 4.61 – 5.32). In other words, **the pre-intervention group (M = 5.67, 95% CI 5.18 – 6.17, n = 65) has a higher statistically significant mean score than the post-intervention sample (M = 4.26, 95% CI 3.79 – 4.75, n = 65)**, implying that in terms of level of pain in the CT-ICU, the

respondents in the pre-intervention group had a higher pain score than the post-intervention sample.

- Nurse's administration of analgesia

Table 6.21 Summary of two-sample t-tests for comparison of level of satisfaction with nurse's administration of analgesia by pre- and post-intervention tests

Group	n	Mean	SD	95% CI
Pre-intervention test	65	5.64	2.25	5.08 – 6.20
Post-intervention test	65	6.84	1.62	6.44 – 7.28
Total	130	6.24	2.05	5.89 – 6.60
Difference		-1.2		

Two sample t-test = -3.47 **(p=0.001) ***

Table 6.21 presents the summary of significant findings of two-sample t-tests for comparison of level of satisfaction with nurse's administration of analgesia by pre- and post-intervention tests. These results indicated a statistical difference for mean total scores between the pre-intervention and post-intervention groups (p = 0.001, t-test = -3.47, 95% CI 5.89 – 6.60). In other words, the **post-intervention group (M = 6.84, 95% CI 6.44 – 7.28, n = 65) had a statistically significant higher mean than the pre-intervention sample (M = 5.64, 95% CI 5.08 – 6.20, n = 65),** implying that **in terms of mean total satisfaction with pain management,** the post-intervention group had a higher level of satisfaction than the pre-intervention group.

- Nurses responsiveness to patient's complaints of pain

Table 6.22 Summary of two-sample t-tests for comparison of level of satisfaction with nurses' responses to complaints of pain by pre- and post-intervention tests

Group	n	Mean	SD	95% CI
Pre-intervention test	65	5.92	2.35	5.33 – 6.50
Post-intervention test	65	7.29	1.73	6.86 – 7.72
Total	130	6.60	2.17	6.23 – 6.98
Difference		1.36		

Two sample t-test = -3.77 **(p=0.000) ***

Table 6.22 presents the summary of significant findings of two-sample t-tests for comparison of level of satisfaction with nurse's responses to patient's complaints of pain by pre- and post-intervention tests. These results indicated a statistical difference for mean total scores between the post-intervention and pre-intervention groups (p=0.000, t=-3.77, 95% CI 6.23 – 6.98). In other words, **the post-intervention group (M = 7.29, 95% CI 6.86 – 7.72, n = 65) had a statistically significant higher mean than the pre-intervention sample (M = 5.92, 95% CI 5.33 – 6.50, n = 65)**, implying that **in terms of mean total satisfaction with nurses' responses to patients' complaints of pain,** the respondents in the post-intervention group had a higher level of satisfaction than the pre-intervention sample.

- Pre-operative education on post-operative pain

Table 6.23 Summary for two-sample t-tests for comparison of level of satisfaction with pre-operative education on post-operative pain between pre- and post-intervention tests

Group	n	Mean	SD	95% CI
Pre-intervention test	65	6.12	3.66	5.21 – 7.03
Post-intervention test	65	8.20	1.90	7.72 – 8.67
Total	130	7.16	3.08	6.69 – 7.69
Difference		2.07		

Two sample t-test = -4.05 **(p=0.001) ***

Table 6.23 presents the summary of significant findings of two-sample t-tests for comparison of level of satisfaction for pre-operative education on post-operative pain by pre- and post-intervention tests. These results indicated a statistical difference for mean total scores between the post-intervention and pre-intervention groups (p = 0.001, t = -4.05, 95% CI 6.69 - 7.69). In other words, the **post-intervention group (M = 8.20, 95% CI 7.72 – 8.67, n = 65) has a statistically significant higher mean than the pre-intervention sample (M = 6.12, 95% CI 5.21 – 7.09, n = 65)**, implying that **in terms of mean total satisfaction with pre-operative education on post-operative pain,** the post-intervention group had a higher level of satisfaction when compared with the pre-intervention sample.

In summary, the comparison of pre-and post-tests indicated that the intervention significantly reduced cost of ICU care (p=0.001), reduced pain scores (p=0.000), significantly increased satisfaction with nurses' administration of analgesia (p=0.001),

increased satisfaction with nurses' responsiveness to complaints of pain (p=0.000) and increased satisfaction with pre-operative education on post- operative pain (p=0.001).

The intervention however did not significantly reduce the length of ICU stay (p=0.134) or cost of analgesia (p=0.518).

6.6 DISCUSSION OF MAIN FINDINGS

The demographic result in the study indicated that males formed the highest number (52.3%) of patients in the pre-intervention test and females formed the highest number (50.8%) of patients in the post-intervention test. It can therefore be said that one sex did not dominate in the study. An intervention study in the CT-ICU in the Netherlands however had 67% of males and 33% of females in their intervention group and 68% males and 32% of females in the control group, thus males formed the majority (van Gulik et al., 2010). Similarly, the majority of patients in a study in the CT-ICU in Turkey were male (68.7%) and 31.3% female (Aslan et al., 2009).

In this study, the majority of patients in the pre-intervention test were 18 to 36 years and formed 38.5% and 37 to 57 years formed 47.7% in the post-intervention test. The age gaps can be explained by the varied nature of the patients' conditions. The doctors in the CT-ICU at the study centre explained that most patients had some of the heart conditions as children, but only sought help as they got older, as the conditions became severe with age. Some also had some repairs done at younger ages, but needed further surgical intervention. The mean age in an intervention study by van Gulik *et al* (2010), to improve pain management in ICU patients after cardiac surgery in Canada, found that patients ages were between 27 and 86 years in the pre-intervention test, with a mean age of 65 years, and 37 to 83 years in the post-intervention test, with a mean age of 67 years. Aslan et al (2009), in a CT-ICU in Turkey, however found patients in a 60-bedded unit to be between 18 and 75 years, so the age for cardio-thoracic surgery patients varied.

Cardiac diagnosis formed the largest of patients' diagnosis in both the pre- and post-intervention tests in this study; similarly, cardiac diagnosis with CABG (91.3%) formed the largest diagnosis in a study in Turkey (Aslan *et al*., 2009). Gulik *et al* (2010), also found CABG or valve surgery to be the largest surgery done (62%) in their intervention group and

66% in the control group, CABG and valve surgery 14% in the intervention group and 26% in the post intervention phase and aorta surgery (valve surgery) formed 7% in the control group and 12 % in post intervention phase. Others that were not specific formed 2% and 5% in the in intervention and control groups respectively. Cardiac surgery therefore dominates internationally in surgeries done in CT-ICUs, as is the case in Ghana.

In this study, morphine was found to be the most prescribed analgesic (93.8%) and 17 to 25mg was the amount most given (53.8%) in the pre-intervention test and same prescribed for all patients (100%) in the post-intervention group, with 6 to 16mg the amount most given (67.7%) in the post-intervention test. Similarly, morphine was found to be the preferred analgesic for moderate and severe acute pain management in the ICU in a study by Spijkstra, *et al.* (2010). This is in line with Barr *et al.* (2013), who recommended that the IV opioids be the first-line drugs to be considered in the treatment of non-neuropathic pain in patients in the ICU. van Gulik *et al* (2010) found that ICU patients in their intervention group received significantly more morphine than in the control group (mean 29.3 vs. 22.6mg per day, $P<0.01$). It can also be seen in this study that more morphine was prescribed in the post-intervention phase compared to the pre-intervention (100% vs 93.8%).

Three days was the maximum number of days patients stayed in the ICU (61.5%) in the pre-intervention test and two days in the CT-ICU (55.4%) in the post-intervention test. However, the CT- ICU length of stay in an intervention study by van Gulik *et al* (2010) was a median of 38 hours for the intervention group and 42 hours (2days) for the control group. Many things could account for the number of days patients stay in the CT-ICU post-surgery, therefore the number of days will vary on a case-to-case basis. ICU stay in Ghana cost between 1,840 and 2,300 Ghanaian Cedis (391-489 US dollars) for most patients (44.6%) in the post-intervention and (58.5%) in the pre-intervention tests. Analgesia cost the majority (36.9%) of patients 11 to 100 Ghanaian Cedis (2.3-21.3 US dollars) and 101 to 200 (21.5-42.6 US dollars) (72.3%) in the pre-and post-intervention tests respectively**.** The average cost of ICU stay seems higher in more developed countries with an average ICU cost in India being 1,897 US dollars (Peter, Thomas, Jeyaseelan *et al*., 2016) and in Germany, Italy, the Netherlands and the United Kingdom ranging from 1,168 to 2,025 GB Pounds (Tan, Baker, Hoogendoorn *et al.,* 2012). The difference could be because Ghana is a developing country and the countries mentioned above are developed, with sophisticated equipment and ICU care.

Pain scores were between 2 and10 on a scale of 1-10, with 10 being the worse pain possible with a median score of 6.00 during the pre-intervention test, and pain scores were between 1 and 8 with a median score of 4.00 in the post-intervention test. A study in Niamey reported that all post-operative patients (n=553) surveyed in a surgical ICU reported persistent pain after cardiac surgery (Chaibou *et al.,* 2012). A Canadian study by Gelinas (2007) found that pain was mild for 16 patients, moderate for 21 and severe for 25 cardiac surgery patients. Strohbueker *et al.* (2005) also found that out of 561 patients in their study, 58% suffered moderate to severe pain. Pain therefore seems to be a problem for ICU patients internationally, as discussed in previous chapters. Patients in the pre-intervention test in this study were fairly satisfied with nurses' administration of pain medication (median score of 5.00), their response to their complaints of pain (median score of 5.00) and pre-operative education on post-operative pain (median score of 7.00). Similarly, patients were fairly satisfied with nurses' administration of pain medication (median score of 7.00), their response to their complaints of pain (median score of 8.00) and pre-operative education on post-operative pain (median score of 9.00) in the post-intervention test. Studies by van Gulik *et al.* (2010) and Erdek and Pronovost (2004) found significant improvements in pain assessment and treatment, without an increase in adverse events related to pain therapy, after their pain management interventions. As discussed in the systematic review of literature, pain management interventions generally improved pain outcomes and must be encouraged to improve pain management in ICUs.

The comparison of the pre-and post-tests indicated the intervention significantly reduced cost of ICU care, reduced pain scores, increased satisfaction with nurses' administration of analgesia, increased satisfaction with nurses' responsiveness to complaints of pain and increased satisfaction with pre-operative education on post-operative pain. There was however, no reduction in the length of ICU stay or cost of analgesia. This study's results are similar to other international studies, as Diby *et al.* (2008), after their intervention in the cardiac surgical ICU. found that pain intensity at rest decreased and quality of sleep improved. van Gulik *et al.* (2010) also found that occurrence of unacceptable pain (NRS 4) was significantly lower in the intervention group (P=0.01) compared to the control group (P=0.66), but they also found no significant difference in length of stay in the ICU or in ventilation time.

6.7 SUMMARY

Using STATA version 14 for statistical analysis of the results of the pre-intervention and post-intervention tests were presented. The sample comprised of 65 (n=65) respondents in both the pre-and post-intervention tests. The intervention was assessed in terms of a primary outcome of patients' comfort and secondary outcomes of patients' satisfaction with the pain management, length of stay of patients in the CT-ICU and cost of ICU care. The results indicated that the intervention significantly reduced pain scores, significantly increased satisfaction with nurses' administration of analgesia, increased satisfaction with nurses' responsiveness to complaints of pain and increased satisfaction with pre-operative education on post-operative pain. It also significantly reduced cost of ICU care, but did not reduce the length of ICU stay or cost of analgesia.

The next chapter will discuss the appraisal of the guideline.

CHAPTER SEVEN

APPRAISAL OF THE CLINICAL GUIDELINE

7.1 INTRODUCTION

The AGREE II instrument, developed by Brouwers *et al.* (2010) for the AGREE trust *(Appendix W),* was used to appraise the guideline for the comprehensive management of pain in the adult CT-ICU for Ghana. The verification was meant to present the guideline to an ICU expert panel to validate if it met all the steps set up by the AGREE trust to appraise guidelines to ensure that they meet international standards. Four ICU experts were purposively sampled for this stage of the study. The guideline was ready for use at the end this phase, thus completing the second objective of the study. The method for the appraisal was discussed in detail in Chapter Two. The appraisal procedure and results are discussed below.

7.2 APPRAISAL PROCEDURE

Expert ICU participants, from different disciplines, who had experience in the nursing care of adult ICU patients in acute pain formed the target population of this part of the study and included an ICU nurse manager from an academic hospital, an ICU nurse educator and an executive of the Critical Care Nurses Group of Ghana (a member of the World Federation of Critical Care Nursing), ICU nurse educator/lecturer with an advanced nursing degree in Critical Care Nursing and an American ICU nurse researcher/lecturer, who had previously researched into pain in adult cardiothoracic ICU patients.

The experts chosen to appraise the guideline were informed about their selection and verbal consent was obtained. The researcher gave the appraisers a package containing documents, including an information letter, *(Appendix X),* a synopsis of the findings from Phase 1 of the study, the guideline development process, verified guideline (Table 5.5), a consent form *(Appendix Y)* and an AGREE II instrument users guide Brouwers *et al.* (2010) attached to the AGREE II instrument *(Appendix W).* They were informed that the appraisal process was meant

to assess the quality of the guideline, to further refine and ensure that the guideline was valid and rigour maintained in its development.

The clinical guideline was rated on a 7-point Likert scale, with 7 being 'strongly agree', 1 for 'strongly disagree' and a score between 2 and 6 was assigned when the AGREE II item did not meet the full criteria being considered. The expert appraisers were requested to comment as to whether they would recommend the guideline for use, recommend it but with modifications or would not recommend the guideline for use at all. They were asked to rate the overall quality of the guideline, with 1 being the 'lowest possible quality' and 7 being the 'highest possible quality.' This overall assessment was used to make a judgement of the quality of the clinical guideline and to determine whether the guideline met international standards or otherwise.

7.2.1 Calculating Domain Scores

The AGREE II instrument consists of 23 key items organised into six main domains, as discussed in Chapter Two. A quality score was calculated for each of the six AGREE II domains. The six scores are independent and should not be aggregated into a single quality score (Brouwers *et al.*, 2010:12) Domain scores were calculated by summing up all the scores of the individual items in a domain and by scaling the total as percentage of the maximum possible score for that domain (Brouwers et al., 2010:12). Although the domain scores are useful for comparing guidelines and inform whether a guideline should be recommended for use, the consortium has not set minimum domain scores or patterns of scores across domains to differentiate between high quality and poor-quality guidelines (Brouwers et al., 2010:113). These decisions according to the AGREE research trust, should be made by the user and guided by the context in which the AGREE II is being used.

Since no score has been suggested by the AGREE trust, a score of 70% was considered by the researcher and her supervisor as an acceptable quality score to ensure adequate reliability. Based on this, the decisions on whether a guideline should be recommended for use was made by the appraisers, guided by score set by the researcher. All the feedback, suggestions,

recommendations, criticisms were considered and incorporated into the final clinical guidelines by the researcher.

7.3 RESULT OF CLINICAL GUIDELINE APPRAISAL

The appraisers all agreed unanimously that the guideline could be used without any restructuring, as they were satisfied with the procedure used to arrive at the recommendations. Their comments on each of the six domains were discussed and their final comments and recommendations deliberated.

7.3.1 Scope and purpose

Scope and purpose (items 1-3) were the first domain for appraising the clinical guideline. This concerned the overall objective of the guidelines, the specific health questions and the target population. Table 7.1 gives details of the reviewers' assessment of the scope and purpose of the clinical guidelines.

Table 7.1 Appraisers' assessment of the scope and purpose

Appraiser	Item 1	Item 2	Item 3	**Total**
1	7	7	7	21
2	7	7	7	21
3	7	7	7	21
4	7	7	7	21
Total	28	28	28	84

An example on how to calculate each of the six domain scores is provided using the four appraisers for domain one. AGREE II instrument consists of 23 key items organised into six domains. The guideline was appraised on a 7-point scale, from 7 for strongly agree to 1 for strongly disagree. Domain scores were calculated by summing up all the scores of the individual items in a domain and by scaling the total as percentage of the maximum possible score for that

domain (Brouwers et al., 2010:12). For clarity, an illustration using the first domain is calculated below:

• Maximum possible score = 7(strongly agree) x 3(items) x 4(appraisers) = 84

• Minimum possible score = 1(strongly disagree) x 3(items) x 4(appraisers) = 12

The scaled domain score will be:

$$\frac{\text{Obtained score} - \text{Minimum possible score}}{\text{Maximum possible score} - \text{Minimum possible score}}$$

$$= \frac{84 - 12}{84 - 12} = \frac{72}{72} = 1 \times 100 = 100\%$$

A score of 100% was obtained for the scope and purpose domain of the clinical guideline. The appraisers were satisfied with this domain and no comments or suggestions for change were made. This implies that the scope and purpose of the guideline has been adequately addressed.

7.3.2 Stakeholder involvement

The second domain dealt with stakeholder involvement and focused on the extent to which the guideline was developed with the involvement of relevant stakeholders from different professional groups. It also sought to determine whether the preferences of the target population had been sought and target users clearly defined. Table 7.2 presents the results of the appraisers' assessment of the stakeholder involvement.

Table 7.2 Appraisers' assessment of the stakeholder involvement

Appraiser	Item 4	Item 5	Item 6	**Total**
1	7	7	7	21
2	7	7	7	21
3	7	7	7	21
4	7	7	7	21
Total	28	28	28	84

• Maximum possible score = 7(strongly agree) x 3(items) x 4(appraisers) = 84

• Minimum possible score = 1(strongly disagree) x 3(items) x 4(appraisers) = 12

The scaled domain score will be:

$$\frac{\text{Obtained score} - \text{Minimum possible score}}{\text{Maximum possible score} - \text{Minimum possible score}}$$

$$= \frac{84 - 12}{84 - 12} = \frac{72}{72} = 1 \times 100 = 100\%$$

A score of 100% was obtained for the scope and purpose domain of the clinical guideline. The appraisers were satisfied that the views of ICU nurses, doctors, patients and their relatives were considered in the development of the guideline thus stakeholder involvement was adequate so no comments or suggestions were to be changed in the guideline.

7.3.3 Rigour of development

The third domain in the AGREE II domain deals with rigour of development of the clinical guideline. This is related to the process used to search for evidence, the strength and limitations of the body of evidence, clearly defining the methods for formulating the recommendations, the health benefits, side effects and risks were all considered in formulating the recommendations, the link between recommendations and supporting evidence was established, the guideline had been externally reviewed by experts before publication and the procedure for updating it stated (items 7-14). Table 7.3 presents the results of the assessment of rigour of development.

Table 7.3 Appraisers assessment of rigour of development

Appraiser	**Item 7**	**Item 8**	**Item 9**	**Item 10**	**Item 11**	**Item 12**	**Item 13**	**Item 14**	**Total**
1	7	7	7	7	7	7	7	7	56
2	7	7	7	7	7	7	7	7	56
3	7	7	7	7	4	7	4	7	50
4	7	7	7	7	7	7	7	7	56
Total	**28**	**28**	**28**	**28**	**25**	**28**	**25**	**28**	**218**

The scaled domain score = $\frac{\text{Obtained score – Minimum possible score}}{\text{Maximum possible score – Minimum possible score}}$

$$= \frac{218 - 32}{224 - 32} = \frac{186}{192} = 0.9688 \times 100 = 97\%$$

A score of 97% was obtained for rigour of development domain of the clinical guideline.

The appraisers approved the guideline with no suggestions for change, but made the following comments:

• Under item 11, appraiser 3 thinks the statement is more appropriate for drug trials thus decided to stay neutral with a score of 4.

• Under item 13, appraiser 3 stayed neutral with a score of 4 because the guideline is not yet being published thus could not comment on whether it was externally reviewed or not until it's published.

It was thus established that the guideline met the standards established by the AGREE trust.

7.3.4 Clarity of presentation

The fourth domain on the AGREE II instrument was clarity of presentation of the clinical guideline. This part of the appraisal dealt with the language, structure and format of the guideline (items 15-17). Table 7.4 presents the appraisers' assessment of the clarity of presentation.

Table 7.4 Appraisers' assessment of the clarity of presentation

Appraiser	Item 15	Item 16	Item 17	Total
1	7	7	7	21
2	7	7	7	21
3	7	7	7	21
4	7	7	7	21
Total	**28**	**28**	**28**	**84**

The scaled domain score

$$= \frac{\text{Obtained score – Minimum possible score}}{\text{Maximum possible score – Minimum possible score}}$$

$$= \frac{84 - 12}{84 - 12} = \frac{72}{72} = 1 \times 100 = 100\%$$

A score of 100% was obtained for clarity of presentation domain of the clinical guideline. The guideline thus met the standard set by the AGREE trust for clarity of presentation. The appraisers were satisfied with this domain; thus, no changes were made to the clinical guideline.

7.3.5 Applicability

The fifth domain of the AGREE II instrument was applicability of the clinical guideline. This described the likely facilitators and barriers to the application of the guideline, advice and tools on how recommendations could be put into practice, potential resource implications and guideline for monitoring and/or auditing (items 18-21). Table 7.5 presents the appraisers' assessment of the applicability.

Table 7.5 Appraisals' assessment of applicability

Appraiser	Item 18	Item 19	Item 20	Item 21	Total
1	7	7	7	7	**28**
2	7	7	7	7	**28**
3	7	7	7	7	**28**
4	7	7	7	7	**28**
Total	**28**	**28**	**28**	**28**	**112**

The scaled domain score

$$= \frac{\text{Obtained score – Minimum possible score}}{\text{Maximum possible score – Minimum possible score}}$$

$$= \frac{112 - 16}{112 - 16} = \frac{96}{96} = 1 \times 100 = 100\%$$

A score of 100% was obtained for applicability domain of the clinical guideline. The guideline is therefore applicable according to the standards established by the AGREE Trust. The appraisers were satisfied; thus, no recommendations or suggestions were made for change in the clinical guideline.

7.3.6 Editorial independence

The last or the sixth domain was editorial independence of the clinical guideline. This dealt with whether the views of the funding body influenced the guideline statements and the recommendations were not unduly biased with competing interests of others in the guideline development group (items 22-23). Refer to Table 7.6 for the appraisers' assessment of the editorial independence.

Table 7.6 Appraisers' assessment of the editorial independence

Appraiser	Item 22	Item 23	Total
1	7	7	14
2	7	7	14
3	4	4	8
4	4	4	8
Total	**22**	**22**	**44**

The scaled domain score

$$= \frac{\text{Obtained score} - \text{Minimum possible score}}{\text{Maximum possible score} - \text{Minimum possible score}}$$

$$= \frac{44 - 8}{56 - 8} = \frac{36}{48} = 0.75 \times 100 = 75\%$$

A score of 75% was obtained for the editorial independence domain of the clinical guideline. Appraisers made the following comment:

- Two (2) appraisers (3 and 4) stayed neutral and scored 4 because the researcher had no external funding that could influence the content of the guideline, and the researcher

developed the guideline alone and therefore there were no competing interests of other guideline development group members.

Editorial independence was thus established using the AGREE II instrument. No changes were made to the guideline, as the appraisers were satisfied with this domain.

7.4 OVERALL GUIDELINE ASSESSMENT AND RECOMMENDATION

The concluding parts of the AGREE II instrument asked appraisers to make a final judgement or to rate the overall quality of the guideline on a 7-point Likert scale, with 7 being the highest possible quality and 1 being the lowest possible quality. The quality of the guidelines was highly rated by all the appraisers with the highest possible score being 7 from all four appraisers.

In addition to rating the overall quality of the guidelines, the appraisers were also asked to recommend the guidelines for use. All four (n=4) appraisers unanimously recommended the clinical guideline for use without modifications. The final clinical guideline is presented in Table 7.7.

7.5 FINAL COMMENTS

The appraisers made the following final comments in the notes section after recommending the guideline for use:

Appraiser 1 – Phenomenal work. Ghana is lucky to have someone who is so motivated to improve the clinical practice of its caregivers and lives of patients.

Appraiser 2 – Great work, l hope this guideline will be beneficial in improving the care given to our patients.

Appraiser 3 – The guideline was well-structured and showed diligent evidence of research. I feel this tool will be extremely helpful in this population.

Appraiser 4 – Excellent and thorough review of literature and incorporation of multidisciplinary team. Very comprehensive. Highly anticipate implementation and periodic review.

The appraisers assessed mostly the method employed for the guideline development thus no changes were made to the guideline statements and recommendations. The final guideline after appraisal is presented in Table 7.7.

Table 7.7 Final Guideline After Appraisal

PAIN IN THE ICU	**LEVEL OF EVIDENCE**
Many procedures in the ICU cause acute pain and need special attention. The ICU patient has many sources of pain and they must be identified and treated.	2A
1. Turning and moving patients for procedures in the ICU are very painful for ICU patients and must be done with caution and bed accessories employed if available.	2D
2. Chest tubes cause patients a lot of pain and should be removed the moment they are no longer necessary.	4A
3. Patients also experience pain during change of dressing and endotracheal tube suctioning.	4A
4. Bed bath, positioning, male catheterisation, physiotherapy, ambulation, types of plasters used and removal of stitches, medical procedures done under local anaesthesia, taking samples, chest tube insertion, intubation and removal of intercostal tubes all cause patients pain.	5B
5. Thoracotomies and sternotomies are some of the cardiothoracic procedures that cause a lot of pain and need extra attention and effort in pain management.	5B
6. Nurses showing interest in how patients feel, especially when in pain, helps decrease their pain.	4A
7. Patients have different pain thresholds and must be treat as individuals.	1B

PAIN IN THE ICU	LEVEL OF EVIDENCE
8. Pain is subjective and it is whatever the experiencing person says it is. The perception that patients exaggerate their pain is not accurate.	1B
ICU nurses need to improve their knowledge on pain and its management especially the negative consequences of untreated pain. Education will improve nurses' attitude towards and management of pain.	2D
1. Inadequate analgesia and untreated pain have many negative consequences that influences the patients' recovery and quality of life. Health professionals' education on pain assessment and treatment improves outcomes.	2D
2. Education and feedback strategies, when implemented, improves the assessment and reassessment of pain.	1B
3. Nurses need to advocate for their patients for improved pain management especially to make doctors aware of the need to review analgesics to avoid the adverse effects of inadequate pain management. Nurses must also encourage patients to speak up about their pain.	5B
4. Supervision improves adherence to analgesic prescriptions and should be done routinely and meticulously by nurses in charge of the shift / ICU. Audits and feedbacks are important for improving knowledge of ICU nurses.	2C
5. A lot of effort must be put into prevention of pain and not only treatment by promoting educational programmes and elaboration of protocols and guidelines in the ICU.	3C
Team approach to pain management will improve pain outcomes in patients.	2C
1. Collaboration and improved communication between doctors and nurses in terms of informing each other about the patients' pain	4A

PAIN IN THE ICU	LEVEL OF EVIDENCE
reports, assessment and treatment will assist in improving pain management.	
2. Nurses must hand over assessments and treatments given to the patient for pain to colleague nurses to maintain consistency in effective drugs and doses.	4A
3. A cordial relation between senior and junior colleagues will improve pain management in the ICU, which will benefit ICU patients/	5B
There is a need for a protocol to standardise pain assessment and management in the ICU and act as a universal guide for ICU nurses and doctors in their management of the patients' pain.	IC
1. A multidisciplinary protocol must be developed for pain management in the ICU. Using protocols to manage pain reduced the duration of ventilatory support, length of ICU stay and mortality rates.	IC
2. Making guidelines and protocols easily accessible and available to all health professionals especially nurses and doctors in the ICU will improve their management of pain.	2C
3. Posting guidelines on ICU walls and making pocket guidelines available to the ICU team, regular audits and feedback was seen as beneficial in ensuring adherence to pain management protocols.	2C
Consistent documentation of pain assessment and treatment on ICU charts will improve pain management.	2D
1. Nurses must document pain assessment and treatment to ensure follow-up and monitor effects of analgesics.	2D
2. Doctors must also document their assessment of the patient's pain in their notes to enhance follow-up and assess effectiveness of analgesics. Creating a place for doctors to document their pain scores, among other measures, improved pain scores.	2D

ASSESSMENT OF PAIN IN CRITICALLY ILL PATIENTS	LEVEL OF EVIDENCE
Pain assessment must be done routinely with validated assessment tools to improve pain management.	2D
1. Nurses and doctors must encourage patients to report their pain since patients own report is the gold standard, but some patients fear the negative reaction they will get from nurses/doctors if they should report their pain too often.	2C
2. The Ghanaian culture influences patients report of pain so just admitting pain is not enough but a further assessment of the severity of the pain should be established.	5B
3. Special attention should be paid to pain in men, as culturally they are not supposed to report their pain but expected to 'bear' pain.	5B
4. Validated tools for pain assessment in the ICU must be used to assess the severity of the verbal patient's pain. The recommended tool for pain assessment in verbal patients are the numerical rating scale (NRS) and the visual analogue scale (VAS).	1C
5. Assessment of pain must be carried out routinely, at least 3 to 4 hourly, and before and after the administration of analgesics. Pain must be reassessed after analgesia/non-pharmacological treatment is given to assess the effectiveness of the treatment.	2C
6. Validated tools for pain assessment in the ICU must be used to assess pain and its severity in the **non-verbal** patient. The most validated tools for ICU patients are the critical pain observation tool (CPOT) and the behavioural pain scale (BPS),	1B (CPOT) 3C (BPS and CPOT)
7. Vital signs must not be used exclusively to assess pain in non-verbal patients but serve as a cue for further assessment and appropriate assessment done if pain is suspected.	3E
8. Observation of patients should constitute a critical part of pre-analgesia assessment.	5B

PHARMACOLOGICAL TREATMENT OF PAIN IN THE ICU	LEVEL OF EVIDENCE
Pain treatment must effectively address the needs of the patient and keep the patient pain free/tolerable pain while minimising adverse effects.	1C
1. Giving smaller doses of analgesia (IV titration/IM) more frequently is more effective than large doses less frequently.	1C
2. Analgesia must be given until patient is comfortable and calm then sedation. Analgesia is not sedation and mixing analgesia and sedation might get the patient sedated but not pain free.	3E
3. Pre-emptive analgesia must be routine for many of the procedures in the ICU, such as chest tube removal, dressing, turning, bed bath, CVP line insertion, Chest tube insertion and so on.	1C
4. Nurses must ensure strict adherence to prescribed analgesics and inform doctors if there is a need to review the order.	2C
5. Patients in acute pain will not get addicted to pain medications and should therefore be given them as prescribed and when needed. They rather report pain and request for analgesia because their pain is not relieved.	5B
6. Nurses and doctors should watch out for breakthrough pain, which occurs in between doses of analgesics, and manage them appropriately.	5B
7. Nurses should alternate pain drugs as prescribed and not give all drugs at the same time.	5B
8. Patients should be made aware they are given analgesics to reassure them that their pain is being treated.	4B
9. Multimodal (using more than one analgesia) should be encouraged instead of monotherapy.	3C
10. Stool softeners should be prescribed for patients on opioid analgesics to prevent constipation.	5B

PHARMACOLOGICAL TREATMENT OF PAIN IN THE ICU	LEVEL OF EVIDENCE
11. Care must be taken to ensure pain medications are procured from reliable sources to ensure their efficacy. There must therefore be collaboration between the hospital, the importers and drug companies to ensure only drugs from reliable sources are administered to patients.	5B
12. Pain must be treated when the cut-off scores for the presence of pain, for the NRS ≥ to 3, CPOT (>2). BPS (>5), are reached.	1C
13. Patient controlled analgesia provided a better pain control and greater patient satisfaction than conventional PRN analgesia.	1A

NON-PHARMACOLOGICAL MANAGEMENT OF PAIN	LEVEL OF EVIDENCE
Many non-pharmacological methods can be employed by ICU nurses and doctors to reduce pain in critically ill patients.	4A
1. Slow deep-breathing relaxation exercise during chest tube removal as an adjunct to pharmacological treatment will significantly decrease pain ratings.	2D
2. Application of cold packs to the site before the removal of chest tubes significantly reduces the intensity of pain caused by chest tube removal.	1C
3. Hand massage and simple body massage reduces the pain of ICU patient.	4A
4. Reassurance helps patients to be encouraged that their pain will be relieved.	5B
5. Listening to music was found to be effective in reducing pain scores in cardiac surgery patients.	1B

NON-PHARMACOLOGICAL MANAGEMENT OF PAIN	LEVEL OF EVIDENCE
6. Other forms distraction, such as of television, newspapers or other reading materials, will distract patients and reduce their pain and anxiety scores.	4A
7. Ghanaians are faith-based people and should be allowed to pray and religious leaders allowed to have supervised visits to the ICU. This can serve as encouragement and hope for recovery.	5B
8. Relatives may help divert the attention of patients from the pain they are feeling and must be allowed more supervised time to visit them while in the ICU.	4A
9. Placing patients in the right position according to their needs and request helps to reduce pain that may be due to uncomfortable positioning.	5B

PATIENT AND FAMILY EDUCATION ON PAIN	LEVEL OF EVIDENCE
ICU nurses and doctors need to give patients education on post-operative pain, its assessment and pharmacological and non-pharmacological methods of pain management.	1B
1. Patients need education from the ICU nurses and doctors on how they can draw their attention or signal them when they are in pain and cannot communicate verbally (either by nodding to questions or raising their hands).	5B
2. Patients must be educated on pain assessment tools that will be used to assess their pain post-operative pain.	4B
3. Pre–operative education on pain may reduce anxiety of patients and their relatives and ensure co-operation.	1C
4. Patients relatives need to be educated on post-operative pain as well to allay their anxiety and ensure co-operation.	5B

PATIENT AND FAMILY EDUCATION ON PAIN	LEVEL OF EVIDENCE
5. Patients and relatives need to be educated on the fact that non-pharmacological methods can complement drugs to reduce their pain so they can accept them post-operatively.	5B
6. Patients and relatives should be educated on the types of pain medications, their effects and side effects.	4B

7.6 SUMMARY

Chapter Seven presented the appraisal of the guideline using the AGREE II instrument by the AGREE trust. Four appraisers took part in the appraisal and unanimously approved the guideline. The final chapter (Chapter Eight) will present the conclusion, recommendations and limitations of the study.

CHAPTER EIGHT

SUMMARY, LIMITATIONS, RECOMMENDATIONS AND CONCLUSION

8.1 INTRODUCTION

This final chapter presents the summary of the study, main findings, limitations and recommendations for clinical practice, Intensive Care nursing education and further research.

8.2 SUMMARY OF THE STUDY

The purpose of the study was to develop and pilot test a clinical guideline for the comprehensive management of pain in the adult Cardiothoracic Intensive Care Unit in Ghana.

The objectives of the study were to:

- Develop a clinical guideline for the comprehensive management of acute pain in adult patients admitted to the CT-ICU post cardiothoracic surgery.
- Pilot test the clinical guideline developed for the comprehensive management of acute pain in the CT-ICU.

The study sought to answer the following question - Will a clinical guideline for the comprehensive management of acute pain in the CT-ICU, developed with the input of ICU nurses, doctors, patients and their families, improve the management of pain in the post cardiothoracic surgery patient in the adult Cardiothoracic Intensive Care Unit?

The intervention was assessed in terms of a primary outcome of patients' comfort and secondary outcomes of patients' satisfaction with the pain management, length of stay of patients in the CT-ICU and cost of CT-ICU care. To meet the objectives of the study, it was conducted in three phases. These included:

Phase 1 = Exploratory phase

Phase 2 = Development and validation phase

Phase 3 = Pilot testing phase

8.2.1 Systematic Review of Literature

Phase 1 - Part 1 The Exploratory Phase of the study dealt with both a systematic review of literature and interviews with nurses, doctors, patients and relatives. The objective of the systematic review was to determine the measures that would ensure effective pain management amongst critically ill adult patients. The review was carried out on studies published from 2004 to 2015, as the first part of Phase 1. The JBI reviewers' manual (2014) served as a guide for the review and included both quantitative and qualitative studies in adult (18 years and above) critical care patient population and focused on acute pain in the critical care setting. Data was collected by repeatedly searching the selected databases with the key words.

Quantitative data was extracted using the JBI – MAStARI and qualitative data from the studies included in the review using the standardised data extraction tool, JBI-QARI (*Appendix A*). Quantitative studies selected for retrieval were assessed by two independent reviewers for methodological validity prior to inclusion in the review using standardised critical appraisal instruments JBI-MAStARI *(Appendix B).* Systematic reviews were appraised using the JBI, and Godfrey and Harrison appraisal tools for systematic reviews. Qualitative studies selected for retrieval were assessed by two independent reviewers for methodological validity prior to inclusion in the review using the JBI-QARI.

Because of heterogeneity in strategies, samples, outcomes and settings, evidence from the studies was synthesised using a narrative approach and no meta-analysis was done. Data was drawn from the included studies to answer the research question. Quantitative studies (n=26) and qualitative studies (n=4) were included in the review.

From the review, it can be determined that implementing quality improvement programmes and protocols that educate nurses on pain assessment and treatment, standardising pain assessment and treatment, making pocket size guidelines and protocols available with regular audits, monitoring compliance and feedback can all positively influence pain management. Nurse's education, especially on the use of assessment tools, providing nurses with pain assessment tools and making them available and accessible to them, especially by the bedside, and

providing pocket size tools and posting reminders of pain assessment and treatment in the ICU will all ensure effective pain management. The studies also found that pain intensity evaluation, administration of analgesics and re-evaluation until patient has only mild pain was also helpful. The CPOT, BPS, NVPS, NRS and VAS were the tools assessed in the studies reviewed with positive outcomes. Providing support and monitoring compliance in the use of these tools could improve pain management in the ICU. In addition, documentation of pain assessment, removal of chest tubes as soon as they are no longer needed, nurses showing interest in the care of their patients and only moving them when necessary, giving analgesics on time and as prescribed and teamwork are also factors that can positively influence pain management of the patient. Effective pain management can also be achieved, according to the studies reviewed, by employing non-pharmacological management measures, which include deep-breathing relaxation exercises and application of cold compresses before chest tube removal, music and music therapy, hand massage, simple massage, distraction and family visit facilitation. Giving of pre-emptive and multimodal therapy instead of monotherapy could be effective measures in improving pain outcomes. Pre-operative pain education was also helpful in improving ICU patient's pain outcomes in the studies reviewed.

8.2.2 Qualitative Interviews

Phase 1- Part 2 Exploratory Phase - The second part of Phase 1 of the study partly addressed the first objective by interviewing CT-ICU nurse experts, doctors, patients and their relatives. The focus group interview method was used to collect data from 12 (n=12) CT-ICU nurse experts, who practiced in the CT-ICU of the research setting, in two groups of six (n=6). The demographic data of the ICU nurse experts were analysed descriptively and the focus group interviews analysed using the six steps of qualitative analysis by Creswell (2014:197) and coding using the eight steps of Tesch (1990 in Creswell, 2014:198).

Individual interviews were carried out with eight ICU doctors to explore their views and opinions about pain management in the CT-CIU. Data analysis was done by employing the six steps of qualitative analysis by Creswell (2014) and coding using the eight steps of Tesch (1990

in Creswell, 2014). Individual interviews were carried out with three patients who were treated in the CT-ICU, exploring their views and opinions about their experiences of pain and its management in the CT-ICU. Patients were recruited into the study 48 hours after transfer from the CT- ICU into the CT ward, which is a step-down unit of the hospital. Data saturation was achieved after three individual interviews, as it was realised they were talking about the same issues. Data analysis was done by employing the six steps of qualitative analysis by Creswell (2014) and coding using the eight steps of Tesch (1990 in Creswell, 2014).

Individual interviews were carried out with three relatives of post ICU patients, who had visited the patients more than twice, to explore their views and opinions about their experiences of pain management in the CT-CIU when their relatives were admitted. The relatives must have visited for more than twice to have enough experience about the care to share in the interview. Data analysis was done by employing the six steps of qualitative analysis by Creswell (2014) and coding using the eight steps of Tesch (1990 in Creswell, 2014).

After all the interviews, the findings were then presented as a narrative, with all the themes and sub-themes supported by quotations from what the nurses, doctors, patients and their relatives actually said about pain and its management in the CT-ICU.

8.2.3 Development and Validation Phase

This phase also addressed objective one by coming up with the clinical guideline, which was based on Phase 1. It is in two parts, Part 1 addressed the development of the guideline and Part 2, the validation of the guideline.

Phase 2: Part I Development Phase -The guideline was developed based on evidence from the systematic literature review and findings of the interviews. A framework was developed and guideline statements deduced from the systematic review of literature and interviews with key stakeholders. Recommendations in the guideline were based on evidence from published studies, between 2004 and 2015, on measures that could improve pain management in adult ICUs and the interviews put into the Ghanaian context. The level of evidence for the guideline

statements and recommendations were categorised according to quality of evidence and definitions from the Joanna Briggs Institute levels of evidence.

Phase 2: Part 2 Validation Phase -This formed the final part that addressed the first objective. The guideline was ready after this phase to be pilot tested. The guideline was validated by 22 (n=22) stakeholders who were purposively sampled and included eight CT-ICU nurses, eight CT-ICU doctors, three post CT-ICU patients and three CT-ICU patient relatives. The guideline was presented to these stakeholders and they were asked to state their views and impressions. The questions were in a Likert scale format and they could agree (maintain statement), be uncertain (go by others decision) or disagree (remove statement). They were also given a chance to express their opinions about the guideline by making comments on the recommendations after agreeing or disagreeing with the statement. This gave nurses, doctors, patients and relatives, who are stakeholders in the development of the guideline, the opportunity to be involved in its development, ensure it met their needs and would be possible to implement in the CT-ICU in Ghana.

The stakeholders' opinions on whether they agree or disagree with the recommendations based on their experiences in the CT-ICU was considered in the formulation of the final recommendation for pilot testing.

8.2.4 Pilot Testing Phase

This phase of the study addressed the second objective of the study. This phase was made up of three parts: Part 1 was the pre-intervention test, Part 2 the implementation of the guideline and Part 3 the post-intervention test.

Phase 3: Part 1 Pre-intervention Test - Before the guideline was implemented, assessment of post ICU patients' comfort and satisfaction with pain management while in the CT-ICU, cost of CT-ICU care and length of CT-ICU stay were assessed. This was done to determine if the intervention would have any effect on patients' comfort, satisfaction, cost of care and length of stay in the CT-ICU. The quantitative data was analysed descriptively to determine cost of analgesia and ICU care, length of ICU stay, patients level of pain, satisfaction with pain

management and pre-operative education on post-operative care. Forming the baseline prior to implementation of the guideline, it was compared to the post-intervention assessment to determine any improvement after the intervention.

Phase 3: Part 2 Implementation of the Guideline - Based on the findings and recommendations in the guideline, the researcher, in consultation with her supervisors, with the help of the CCNGG carried out a multifaceted intervention including an educational intervention, provision of pain assessment tools to all nurses and attaching pain assessment tools to each patient's bed, providing a form for both nurses and doctors to document pain assessment, management and follow-up. The guideline and its recommendations were shown to all CT-ICU nurses and doctors, who educated on the components of how to implement them. PowerPoint presentations and small group discussions were held to educate nurses and doctors and pain assessment tools were provided to all.

Phase 3: Part 3 Post-intervention Test (Outcome Assessment) - Patients who were nursed using the guideline were assessed. Patients' level of pain and satisfaction with pain management while in the CT-ICU, cost of CT-ICU care and length of CT-ICU stay were assessed. This was done to determine if the intervention had any effect on patients' comfort, satisfaction, cost of ICU care, and length of stay in the CT-ICU. The findings from the outcome assessment were compared to the pre-intervention test to determine the impact of the guideline on pain management in the CT-ICU.

A **comparison** was then undertaken between the pre-and post-intervention tests to determine if the intervention made any significant impact on pain management in the CT-ICU. Patients demographic data was analysed and compared in each case and it was determined there was no significant difference between the demographic data of the pre-and post-intervention group, as the level of significance or p-value in each case was less than 0.50.

- With the *P-value* of 0.861, it was determined there was no significant difference in gender of the respondents used for the study pre- and the post-interventions tests.

- There was no significant difference *(P-value* of 0.685) in diagnosis on admission between the pre- and the post-interventions. The difference between the patients

involved in the study, who reported cardiac and thoracic issues before and after the intervention, was statistically not significant.

- The SAPS II score, which determines the severity of the ICU patient's illness and mortality rate, was compared between the two phases. There was no significant difference between the two groups in terms of their SAPS 11 scores (p-value = 0.0922).

- There was no significant difference *(P-value* of 0.904) in diagnosis on admission between the pre- and the post-interventions. The difference between the patients involved in the study who reported cardiac and thoracic issues before and after the intervention was statistically not significant.

8.2.5 Outcome Criteria

The second comparative analysis done, using STATA© version 14, determined the outcome criteria of the intervention. The primary outcome was comfort, which in this study measures pain relief and secondary outcomes of patients' satisfaction with the pain management, length of stay and cost of CT-ICU care. The outcome criteria of satisfaction with pain management measures satisfaction with the administration of analgesia when the patients' need it most, satisfaction with the nurses' response to their complaints of pain and satisfaction with the education given about post-operative pain.

Primary Outcome – Comfort (Pain Score)

It was determined, by comparing the pre- and post-intervention pain scores obtained on a numerical scale of 0 being no pain and 10 the worse possible pain, that the intervention produced a significant change in the patients' level of pain (*p-value* = 0.000).

Secondary Outcomes

The secondary outcomes measured satisfaction with pain management in the ICU, length of stay in the ICU and cost of ICU stay.

Satisfaction with pain management

The outcome criteria of satisfaction with pain management measures satisfaction with the administration of analgesia when the patients' need it most, with the nurses' response to their complaints of pain and with the education given about post-operative pain. Satisfaction was also determined on a numerical scale of 0 to10, with 0 to 3 being not satisfied, 4 to 7 fairly satisfied and 8 to 10 being satisfied.

- Satisfaction with administration of analgesia by nurses - It was determined that although most of the respondents were in the fairly satisfied category (n =37 for pre-intervention and n=39 in the post intervention group), patients were generally more satisfied in the post-intervention group, compared to the pre-intervention group (*p value* =0.001).

- Patient's satisfaction with nurses' response to complaints of pain - Patients were also asked to rate how satisfied they were with how nurses responded to their complaints of pain. Though patients were more satisfied in the post-intervention group, compared to the pre-intervention group (*p-value* =0.000), there were more patients in the fairly satisfied category compared to the satisfied category.

- Satisfaction with pre-op education on post-operative pain - From the results, the p-value of the t-test was 0.001, which is less than the alpha value of 0.05, therefore, there is a significant difference between the pre-operative education about pain pre- and post-intervention. Patients were more satisfied with pre-operative education on pain during the post-intervention test, compared to the pre-intervention test.

Length of Stay, Cost of ICU stay, Cost of Analgesia

This formed part of the secondary outcomes assessed. The length of stay was determined to see if the intervention had any impact on the length of patient's stay in the ICU, the cost of ICU stay and whether the cost of analgesia decreased or increased after the intervention.

- Length of CT-ICU stay – It was determined there was no significant difference in the length of CT-ICU stay before and after the intervention (*p value* = 0.134). Thus, the intervention did not have any impact on the length of stay in the ICU after cardiac or thoracic surgery.

- Cost of ICU Stay - It was determined during the analysis that the cost of ICU stay decreased significantly (*p value* = 0.001) from the values received from the finance department of the ward management. It cannot be determined specifically what contributed to the decrease, although patients could have been ventilated for fewer days after the intervention compared to before, as ventilated patients pay more.

- Cost of Analgesia - The data analysis showed there was no significant difference between the cost of analgesia pre-and post-test (*p-value*=0.518).

8.2.6 Appraisal of clinical guideline

After the validation and ensuring that all the comments were considered in reframing the guideline statements and its recommendations and pilot testing, the guideline was appraised by an expert panel of four participants. The AGREE II instrument (2010) developed by the AGREE trust was used to verify the guideline for the comprehensive management of acute pain in the adult CT-ICU. All four appraisers, at the end of the appraisal, unanimously approved the guideline. The final guideline was presented after the appraisal.

8.2.7 Unique contribution of the study to knowledge

This study explored the views of ICU nurses, doctors, patients and relatives on pain and its management in the ICU in Ghana and these opinions informed the development of a clinical guideline for the comprehensive management of pain in the ICU. No study has been found in Ghana that explored the views of these important stakeholders on pain in the ICU. Apart from the acute pain guideline developed by the South the South African Society of Anaesthesiologists (SASA, 2009), no nursing guidelines have been found in Africa on pain in this population and

socio-economic and cultural context. No guideline was found in Africa for pain management in ICU with a special focus on CT-ICU patients with consideration to the opinions of ICU nurses, doctors, patients and their relatives.

8.3 LIMITATIONS OF THE STUDY

- A significant limitation of this study was the inclusion of different sets of patients in the pre-and-post intervention tests since pain is a subjective experience. The inability of the researcher to use the same patients for both the pre-and-post intervention was due to the fact that the patients were interviewed in the cardiothoracic ward (step down unit of the CT-ICU) to ascertain their experience and they could not be sent back to the CT-ICU to experience the effects of the intervention. It was, therefore, not possible to assess the same patients on the effect of the intervention.

- The findings of the study could be applicable to most ICUs in public hospitals in Ghana but cannot be generalised since education about pain management and translation into practice could be different in every ICU, depending also on unit protocols and prescriptions.

- Although the most significant stakeholders in the ICU team have been included in the interviews, inclusion of a wider spectrum of stakeholders (physiotherapists, pharmacists, administrators/managers, educators, The Nursing and Midwifery council of Ghana and government policy makers) could be beneficial and widen the scope of the guideline.

- The scope of the research was limited as it was for academic purposes, thus the researcher, who is a student, developed these guidelines individually. The input of a specialist team that is vital during the development of guidelines is therefore lacking in this study.

- The use of the English language could have limited the participants from fully expressing their experiences of pain in the CT-ICU, which might not have been the case if they were allowed to speak their first language. The researcher is not familiar with all the different local languages spoken in Ghana and although there is a common local language (Akan), it is not the researchers' first language, thus English was deemed the best medium to communicate with participants.

8.4 RECOMMENDATIONS ARISING FROM THE STUDY

Providing physical comfort and pain relief for the critically ill patient is a very important factor in optimising their outcome. It is thus imperative that ICU nurses are suitably skilled and educated to provide adequate pain relief for critically ill patients, which will lead to improved patient outcomes.

Specific recommendations were made in relation to the professional support and improvement of pain assessment and management in critically ill patients, and support for the implementation of the guideline.

8.4.1 Recommendations for Clinical Practice

Considering the adverse effects of inadequately managing patients' pain, it is important for Intensive Care nurses to be educated in effective pain management practices in the clinical setting. The ICU team (doctors, nurses) should consider:

- Implementing the guideline statements and recommendations and developing protocols for pain management based on the guideline findings. They must also consider performing periodic reviews of the implementation to see if the guideline is improving practice.

- Making pain the 'fifth vital sign,' thus making provision for documentation of pain assessment and management on ICU charts and continuing to use the documentation

chart used for the intervention if there is no place on the ICU charts to document pain assessment.

- That procedures performed often in ICUs, and because so many of them cause pain, clinicians who expect patients will have pain should prepare them by administering pre-emptive analgesia and non-pharmacological methods as deemed fit before painful procedures.

- That pain must be assessed and treated regularly since smaller doses of analgesia often are more effective than larger doses less often. There is also the need to reassess the patient after giving analgesia to see if it has been effective. Therefore, pain assessment and reassessment must form part of an ICU nurse's routine.

- Nurse Managers in ICUs should ensure the protocols and guidelines are adhered to by ICU nurses and are regularly supervised to make them a part of everyday assessment and management of patients, thus ensuring that adequate pain management is given the attention it deserves, especially in patients who cannot verbalise their pain.

- Making copies of the guideline available in the ICU and attaching them to notice boards and pocket copies that can be carried around for quick reference will be helpful in encouraging nurses to refer to the statements and recommendations in their practice.

- There should collaboration between the health professionals, especially nurses and doctors and between junior and senior doctors, to promote pain management.

8.4.2 Recommendations for Intensive Care Nursing Education

The fact that a significant number of ICU nurses and doctors interviewed did not know about the pain assessment tools used in the ICU and other evidence based practices to improve pain management in ICU patients raises the need for education about pain assessment and management.

- Workshops and seminars should be organised to disseminate the guideline findings and these workshops should be supported by the management of the various hospitals.

- ICU nurses and educators should work closely to ensure that the curricula for ICU training for nurses gives pain the priority it deserves. Pain should be considered as the 'fifth vital sign' and the importance of adequately assessing and managing pain emphasised during the training of ICU nurses.

- Practising ICU nurses must also be given the opportunity to go on refresher and short courses or seminars on pain assessment and management, and clinical instructors must ensure that pain assessment and management, especially in non-verbal patients, forms part of clinical skills assessment for both ICU nurses and students.

- The CCNGG should facilitate educational interventions at various hospitals, as it was seen in this study to have improved pain outcomes. The researcher will work closely with the CCNGG to implement the guideline in other hospitals and assess outcomes.

- New evidence accumulates very fast, thus the guideline should be reassessed by educators, managers and the CCNGG who have adopted the guidelines for validity every five years to avoid outdated guidelines. Professionals with the necessary expertise should be chosen to update the guideline.

8.4.3 Recommendations for Further Research

The following recommendations were made for further research:

- No guidelines were found on pain management in critically ill adult patients in Ghana, so this might be the first guideline for these patients in the country. A follow-up on this research must include a bigger population of patients and nurses so that the results could be more generalised. This research was also done in only one academic hospital so involvement of more hospitals is recommended.

- Pilot testing of the guideline in other hospitals should be done to see if similar findings will be made as that of the researcher or will be varied.

- A randomised control trial could also be used to test a few of the guideline recommendations, such as pre-operative education, pre-emptive analgesia, application of ice packs before removing chest tubes and other similar recommendations, to see if the findings will be different from those of other international studies.

- Specific guidelines should be developed for the different specialised ICUs, such as burns, trauma, paediatrics and so on.

8.5 CONCLUSION

The guideline for the CT-ICU in Ghana was developed with evidence from literature and interviews with major stakeholders. The verification, piloting and appraisal all ensured that the guideline went through much scrutiny to make it valid and reliable. The results of the post-intervention assessment were largely positive, indicating that the guideline could be implemented in other ICUs with positive effects. The fact that Critical Care Nurses Group of Ghana has decided to adopt the guideline is a positive sign, as they will facilitate its implementation and continue with educational interventions, which will be championed by the researcher to improve pain management in the adult ICUs in Ghana.

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APPENDIX A

DATA EXTRACTION TOOLS

JBI-MAStARI Data Extraction Form Experimental/Observational Studies

Reviewer _____ Date _____
Author _____ Year _____
Journal _____ Record Number _____

Study Method RCT ☐ Quasi-RCT ☐ Longitudinal ☐
Retrospective ☐ Observational ☐ Other ☐

Participants

Setting _____
Population _____
Sample size _____
Intervention 1 _____ Intervention 2 _____ Intervention 3 _____

Interventions
Intervention 1: _____
_____
Intervention 2: _____
_____
Intervention 3: _____
_____

Clinical outcome measures

Outcome Description	Scale/measure

Study results
Dichotomous data

Outcome	Intervention ( ) number/total number	Intervention ( ) number/total number

Continuous data

Outcome	Intervention ( ) mean & SD (number)	Intervention ( ) mean & SD (number)

Authors' conclusions: _____
_____
Comments: _____
_____

JBI QARI Data Extraction Template for Qualitative Evidence

Method	
Methodology	
Phenomena of interest / Interventions	
Setting	
Geographical	
Cultural	
Participants	
Data analysis	
Author's conclusions	
Reviewer's conclusions	

Extraction of Study Findings Template – for Qualitative Evidence

Finding	
Illustration from publication (including page number)	
Evidence	Unequivocal
	Plausible
	Unsupported
Category	

APPENDIX B

APPRAISAL TOOLS

JBI-MAStARI Critical Appraisal Checklist for Experimental Studies (Randomised Control and Pseudo-Randomised Control Trials)

Reviewer_____ Date _____

Author_____ Year_____ Record Number_____

	Yes	No	Unclear	Not
1. Was the assignment to treatment groups truly random?				
2. Were participants blinded to treatment allocation?				
3. Was allocation to treatment groups concealed from the allocator?				
4. Were the outcomes of people who withdrew described and included in the analysis?				
5. Were those assessing the outcomes blind to the treatment?				
6. Were control and treatment groups comparable at entry?				
7. Were groups treated identically other than for the named interventions?				
8. Were outcomes measured in the same way for all groups?				
9. Were outcomes measured in a reliable way?				
10. Was appropriate statistical analysis used?				

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Comments (including reasons for exclusion):_____

_____

_____

JBI-MAStARI Critical Appraisal Checklist for Comparable Cohort/Case Control

Reviewer_____ Date _____

Author_____ Year_____ Record Number_____

	Yes	No	Unclear	Not
1. Is sample representative of patients in the population as a whole?				
2. Are the patients at a similar point in the course of their condition/illness?				
3. Has bias been minimized in relation to selection of cases and of controls?				
4. Are confounding factors identified and strategies to deal with them stated?				
5. Are outcomes assessed using objective criteria?				
6. Was follow-up carried out over a sufficient time period?				
7. Were the outcomes of people who withdrew described and included in the analysis?				
8. Were outcomes measured in a reliable way?				
9. Was appropriate statistical analysis used?				

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Comments (including reasons for exclusion):_____

_____

_____

JBI-MAStARI Critical Appraisal Checklist for Descriptive/Case Series

Reviewer_____ Date _____

Author_____ Year_____ Record Number_____

	Yes	No	Unclear	Not
1. Was study based on a random or pseudo- random sample?				
2. Were the criteria for inclusion in the sample clearly defined?				
3. Were confounding factors identified and strategies to deal with them stated?				
4. Were outcomes assessed using objective criteria?				
5. If comparisons are being made, were there sufficient descriptions of the groups?				
6. Was follow up carried out over a sufficient time period?				
7. Were the outcomes of people who withdrew described and included in the analysis?				
8. Were outcomes measured in a reliable way?				
9. Was appropriate statistical analysis used?				

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Comments (including reasons for exclusion):_____

_____

_____

JBI Critical Appraisal Checklist for Systematic Reviews

Reviewer_____ Date _____

Author_____ Year_____ Record Number_____

	Yes	No	Unclear	Not
1. Is the review question clearly and explicitly stated?				
2. Was the search strategy appropriate?				
3. Were the sources of studies adequate?				
4. Were the inclusion criteria appropriate for the review?				
5. Were the criteria for appraising studies appropriate?				
6. Was critical appraisal conducted by two or more reviewers independently?				
7. Were there methods used to minimise error in data extraction?				
8. Were the methods used to combine studies appropriate?				
9. Were the recommendations supported by the reported data?				
10. Were the specific directives for new research appropriate?				

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Comments (including reasons for exclusion):_____

_____

_____

QUALITATIVE STUDIES

JBI QARI Critical Appraisal Checklist for Interpretive & Critical Research

Reviewer_____ Date _____

Author_____ Year_____ Record Number_____

	Yes	No	Unclear	Not
1. Is there a congruity between the stated philosophical perspective and the research methodology?				
2. Is there a congruity between the research methodology and the research question or objectives?				
3. Is there a congruity between the research methodology and the methods used to collect the data?				
4. Is there a congruity between the research methodology and the representation and analysis of data?				
5. Is there a congruity between the research methodology and the interpretation of results?				
6. Is there a statement locating the researcher culturally or theoretically?				
7. Is the influence of the researcher on the research and vice versa addressed?				
8. Are participants, and their voices, adequately represented?				
9. Is the research ethical according to current criteria or, for recent studies, is there evidence of ethical approval by an appropriate body?				
10. Do the conclusions drawn in the research report flow from the analysis, or interpretation of the data?				

Overall appraisal: Include ☐ Exclude ☐ Seek further info ☐

Comments (including reasons for exclusion):_____

APPENDIX C

LIST OF EXCLUDED STUDIES WITH REASONS

Author and Year	Design / Main Findings	Reason for Exclusion
Cooke, Chaboyer Schluter et al, (2010)	Randomised cross-over study Findings indicated that listening to music 15 minutes before and during turning did not significantly reduce discomfort or anxiety in ICU patients	Study did not report decrease in pain or improved pain outcome. Discomfort and anxiety were the focus of the study and not pain.
Ista, van Dijk van Achterberg, (2013)	Systematic Review Implementation strategies to improve nurses' adherence to pain assessment recommendations vary but generally address professional and organisational aspects. Educational and feedback strategies are used often, and are proven to be effective.	Studies reviewed include studies on children as well, thus do not meet the criteria for this review,
Young, Siffleet, Nikoletti Shaw (2005)	A prospective descriptive repeated measure design The behavioural pain scale (BPS) was found to be a valid and reliable tool in the assessment of pain in the unconscious sedated patient. Results highlighted that traditional pain indicators, such as fluctuations in haemodynamic parameters, are not always an accurate measure for the assessment of pain in unconscious patients and as such, more objective pain assessment measures are essential.	Although the study reports that the BPS is valid and reliable, it does not report any positive effect of its use on pain management on ICU patients.
Courtenay and Carey (2008)	Systematic Review Education programmes delivered by specialist nurses and the use of protocols can improve the assessment and documentation of acute and chronic pain and improve patients understanding of their condition and improve pain control. Acute pain teams, led by nurses, can reduce pain intensity and are cost effective.	Review includes studies on children and is not specific to the ICU. Findings might be different in ICU studies.
Chen, Chen and Lin (2013)	Quasi – experimental design Pre-operative health-educational intervention reduced the level of post-operative pain experienced by total knee-replacement patients, increased the regularity with which they performed rehabilitative exercises and accelerated the recovery of their physical functioning.	Study was done in the orthopaedic ward and may have different results in the ICU.

Author and Year	Design / Main Findings	Reason for Exclusion
Arroyo-Novoa, Figueroa-Ramos Puntillo *et a*l (2008)	Descriptive design Although mean pain intensity during tracheal suctioning was mild, almost half the ICU patients reported moderate-to-severe pain. Individualised pain management must be performed by healthcare providers in order to respond to patients' needs as they undergo painful procedures, such as tracheal suctioning.	Study does not report a reduction in ICU patients pain and no positive outcome on patients' pain reported.
Bédard, Purden, Sauvé-Larose *et a*l (2006)	Quasi – experimental design Addressing pain management through a variety of strategies targeted at the level of the institution, the clinician and the patient, may lead to desired changes in practice and better outcomes for patients.	Study excluded due to setting. Done in the surgical ward and the results may be different in the ICU population.
Strode, Seimane Biksāne (2012)	Quantitative research method Efficiency of pain management in post-operational stage increases due to psychological preparation and information of patients about the post-operational stage pains and methods that can be used in assessment of pain intensity and possible pain relief therapies already in pre-operational stage.	Study excluded because it does not meet the cut off score of 70% for methodological quality assessment
Saeidi, Aghadavoudi, Sadeghi and Mansouri (2011)	Randomised clinical trial Patients' pain relief by parasternal single injection of bupivacaine in early postoperative period can facilitate earlier ventilator weaning and tracheal extubation after open-heart surgery, as well as achieving lower pain scores and narcotic requirements.	Injection of bupivacaine before closing sternal wounds is not a nursing procedure.
Al-Azawy, Oterhals, Fridlund *et al* (2015)	Randomised control trial Pre-medication and pre-operative information reduces pain intensity and increases satisfaction in patients undergoing ablation for atrial fibrillation.	Study done among cardiac patients in the ward receiving RFA in the electrophysiology laboratory and not ICU patients
Ong, Lirk, Seymour and Jerkins (2005)	Meta-analysis Pre-emptive local anaesthetic wound infiltration and NSAID administration improved analgesic consumption and time to first rescue analgesic request.	Although study reports on the benefits of pre-emptive analgesia, it included studies on paediatric and other surgical patients

APPENDIX D

DATA COLLECTION SHEET

1.0 DEMOGRAPHIC DATA (ICU NURSES AND DOCTORS)

1.1	Research Code	
1.2	Gender	Male / Female
1.3	Age	20-30 / 31-40 / 41-50 / 51-60
1.4	Professional Qualification	
1.5	Years of Professional Experience	
1.6	Period Working in ICU	Years / Months
1.7	Period Working in CT ICU	Years / Months
1.8	Analgesics available in the CTICU	
1.9	Standard analgesics given to patients (According to CTICU protocol)	

2.0 FOCUS GROUP INTERVIEW GUIDE FOR HEALTH PROFESIONALS

Phase 1 – Exploratory Phase (Pre-Intervention)

(Nurses And Doctors)

What is your opinion regarding the management of pain in the CTICU? **Explain further**

Probes

- Procedure(s) that gave patients the most pain.
- Pain assessment tools for verbal and non-verbal patients.
- How pain is assessed in the CTICU.
- How pain is managed in the CTICU.
- Non-pharmacological management of pain in the CTICU.
- How pain can be assessed effectively in the CTICU.
- How pain can be managed effectively in the CTICU.
- Patient education on pain pre-operativ

APPENDIX E

Central University College,
P.O. Box DS 2310,
Accra.

The Chief Executive Officer,
Korle–bu Teaching Hospital,
P.O.Box KB77,
Korle Bu,
Accra,
Ghana.

Dear Sir / Madam,

Re: <u>Research at the Korle-bu Teaching Hospital</u>

I am an Intensive Care Nurse and a PhD (Nursing) student at the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa, and I am required to conduct a clinical research under supervision. The title of my research is '*Development and pilot testing of a clinical guideline for the comprehensive management of pain in an adult cardiothoracic Intensive Care Unit in Ghana – An intervention study'*

Pain management is of great importance in the ICU, since ICU patients are vulnerable to pain due to the severity of their condition. Inadequate pain management leads to complications, which increase the patients' stay in the ICU. Nurses therefore need to know how to manage pain effectively to prevent these complications. I want to assure you that the name of the institution, the personnel and patients involved in the study will not be divulged in the report. Informed written consent will be obtained from all the research participants. A copy of the report will be available to you if so requested.

I hereby apply for permission to undertake the research at the Cardio-thoracic Intensive Care Unit of your hospital and access patients' records once my proposed study has been approved by the Committee for Research on Human Subjects of the University of the Witwatersrand, Johannesburg, South Africa, and the Ethical Review Committee of the Ghana Health Service.

Yours sincerely,

_____

Bridget S. Ofori
(PhD Nursing Student)

APPENDIX F

Central University College,
P.O. Box DS2310,
Accra.

The Deputy Director Nursing Services
Korle–bu Teaching Hospital,
P.O.Box KB77,
Korle-Bu,
Accra,
Ghana.

Dear Madam,

Re: <u>Research at the Korle-bu Teaching Hospital</u>

I am an Intensive Care Nurse and PhD (Nursing) student at the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa, required to conduct clinical research under supervision. The title of my research is '*Development and pilot testing of a clinical guideline for the comprehensive management of pain in an adult cardiothoracic Intensive Care Unit in Ghana – An intervention study."*

Pain management is of great importance in the ICU since ICU patients are vulnerable to pain due to the severity of their condition. Inadequate pain management leads to complications, which increase the patients' stay in the ICU. Nurses therefore need to know how to manage pain effectively to prevent these complications.

I want to assure you that the name of the institution, the personnel and patients involved in the study will not be divulged in the report. Informed written consent will be obtained from all the research participants. A copy of the report will be available to you if so requested.

I hereby apply for permission to undertake the research at the Korle-bu Teaching Hospital Cardio-thoracic Intensive Care Unit, once my proposed study has been approved by the Committee for Research on Human Subjects of the University of the Witwatersrand, Johannesburg, South Africa, and the Ethical Review Committee of the Ghana Health Service.

Yours sincerely,

Bridget S. Ofori
(PhD Nursing Student)

APPENDIX G

DEVELOPMENT AND PILOT TESTING OF A CLINICAL GUIDELINE FOR THE COMPREHENSIVE MANAGEMENT OF PAIN IN AN ADULT ICU IN GHANA – AN INTERVENTION STUDY

NURSES INFORMATION LETTER

Dear Colleague,

_____

(Nurse's name)

My name is Bridget Senanu Ofori, I am an Intensive Care Nurse currently registered for a PhD (Nursing) degree at the University of the Witwatersrand, Department of Nursing Education, South Africa. I intend to look at how pain outcomes of adult patients in the ICU, can be improved through an intervention study. May I ask you to consider participating in this study? As an Intensive Care Nurse, I would be interested in your viewpoints as an experienced Intensive Care Nurse and ICU nurse expert.

Should you agree to participate, I will ask you to complete a biographical data and hold a short focus group interview with you, to explore the problem of pain further and its effective management in the CT-ICU. The focus group discussion will inform the development of a clinical pain management guideline, which will be pilot tested in the CT-ICU to see if it will improve patients' pain outcomes. I would also be grateful for your feedback after the intervention, which will take the form of a short focus group interview.

I will schedule an appointment at a date and time convenient for you. The required procedures should take approximately one hour to complete.

Participation in the study is voluntary and you may choose to participate or not, or withdraw from the study at any time. Anonymity and confidentiality is guaranteed, as research codes will be used.

I appreciate you will derive no direct benefits from participating, however, I hope the completed study will clarify the roles and responsibilities of Intensive Care Nurses in managing critically ill post-op patients' pain in the adult Intensive Care Units.

I have applied to the Faculty of Medicine Post Graduate Committee and to the Ethics Committee of the University of the Witwatersrand to conduct the study, as well as to the Ghana Health Service and the management of the Korle-bu Teaching Hospital.

Thank you for taking the time to read this information letter. Should you require any more information, you are welcome to contact me on the telephone number listed below.

Yours sincerely,

Briget Senanu Ofori
(PhD Nursing Student)
Cell Number: 0246146897
Email: 0305176T@students.wits.co.z

APPENDIX H

DEVELOPMENT AND PILOT TESTING OF A CLINICAL GUIDELINE FOR THE COMPREHENSIVE MANAGEMENT OF PAIN IN AN ADULT ICU IN GHANA – AN INTERVENTION STUDY

NURSES AND DOCTORS' CONSENT FORM

I _____(nurse/doctor's name) give permission to be included in the study.

I have read and understood the contents of the information sheet and I have been given the opportunity to ask questions I might have regarding the procedure, data collected and my consent to being included in the study.

_____ _____

Date Signature

_____ (Witness)

APPENDIX I

DEVELOPMENT AND PILOT TESTING OF A CLINICAL GUIDELINE FOR THE COMPREHENSIVE MANAGEMENT OF PAIN IN AN ADULT ICU IN GHANA – AN INTERVENTION STUDY

DOCTORS INFORMATION LETTER

Dear _____
(Doctor's name)

My name is Bridget Senanu Ofori, I am an Intensive Care Nurse currently registered for a PhD (Nursing) degree at the University of the Witwatersrand, Department of Nursing Education, South Africa. I intend to look at how pain outcomes of adult patients in the ICU can be improved through an intervention study. May I ask you to consider participating in this study? As an Intensive Care Nurse, I would be interested in your viewpoints as an experienced ICU doctor and expert.

Should you agree to participate, I will ask you to complete a biographical data and hold a short focus group interview with you to explore the problem of pain further and its effective management in the CTICU. The focus group discussion will inform the development of a clinical pain management guideline, which will be pilot tested in the CT-ICU to see if it will improve patients' pain outcomes. I would also be grateful for your feedback after the intervention, which will take the form of a short focus group interview.

I will schedule an appointment at a date and time convenient for you. The required procedures should take approximately one hour to complete.

Participation in the study is voluntary and you may choose to participate or not, or withdraw from the study at any time. Anonymity and confidentiality is guaranteed, as research codes will be used.

I appreciate you will derive no direct benefits from participating, however I hope that the completed study will clarify the roles and responsibilities of Intensive Care Nurses in managing critically ill post-op patients' pain in the adult Intensive Care Units.

I have applied to the Faculty of Medicine Post Graduate Committee and to the Ethics Committee of the University of the Witwatersrand to conduct the study, as well as to the Ghana Health Service and the management of the Korle-bu Teaching Hospital.

Thank you for taking the time to read this information letter. Should you require any further information, you are welcome to contact me on the telephone number listed below.
Yours sincerely,

Briget Senanu Ofori
(PhD Nursing Student)
Cell Number: 0246146897
Email: 0305176T@students.wits.co.za

APPENDIX J

DEVELOPMENT AND PILOT TESTING OF A CLINICAL GUIDELINE FOR THE COMPREHENSIVE MANAGEMENT OF PAIN IN AN ADULT ICU IN GHANA – AN INTERVENTION STUDY

PATIENTS INFORMATION SHEET

Dear ———————————
(Potential participant)

My name is Bridget Senanu Ofori, I am an Intensive Care Nurse currently registered for a PhD nursing degree at the University of the Witwatersrand, Department of Nursing Education, South Africa. I am hoping to conduct a research project, under supervision, and would like you to consent to being included in the sample of participants I wish to study, after discharge to the ward from the cardiothoracic Intensive Care Unit.

The aim of the study is to develop and pilot test a clinical guideline for the comprehensive management of pain in the adult CT-ICU. Should you agree to participate, I will ask you to complete a biographical data, then to rate your pain and your satisfaction with the pain management process whilst in the CT-ICU, or have a talk with you about your pain when you were in the CT-ICU. This, and the views of ICU nurses and doctors, will inform the development of a clinical pain management guideline, which will be pilot tested in the CT-ICU to see if it will improve patients' pain outcomes. I will schedule an appointment at a date and time convenient for you. The required procedures should take approximately 30 to 45 minutes to complete.

Participation in this study is voluntary. You may choose whether to participate or not, or withdraw from the study at any time, which will have no effect on the services you receive from this institution or the healthcare providers. I appreciate you will not derive any direct benefit from participating in the study, however, I hope the completed study will clarify the responsibilities of Intensive Care Nurses in managing patients' pain in the ICU. Your identity will not be revealed in any reports of this study. Results of the study will be given to you should you so wish.

The appropriate people and research committees of the University of the Witwatersrand, Ghana Health Service and Korle-bu Teaching Hospital have approved the study and its procedures.

Thank you for taking the time to read this information letter. Should you have any further questions regarding the study or your rights as a study participant, I can be reached on **0246146897**(cell) and email: 0305176T@students.wits.co.za

APPENDIX K

DEVELOPMENT AND PILOT TESTING OF A CLINICAL GUIDELINE FOR THE COMPREHENSIVE MANAGEMENT OF PAIN IN AN ADULT ICU IN GHANA – AN INTERVENTION STUDY

CONSENT FORM (PATIENT)

I, _____(patient's name) give permission to be included in the study.

I have read and understood the content of the information sheet and I have been given the opportunity to ask questions I might have regarding the procedure and my consent to being included in the study.

_____ _____

Date Signature

_____ (Witness)

APPENDIX L

DATA COLLECTION SHEET (PATIENT INDIVIDUAL INTERVIEWS)
Phase 1 – Exploratory Phase (Pre-Intervention)

1.0 PATIENT DEMOGRAPHIC DATA

1.1	Research Code			
1.2	Gender	Male		Female
1.3	Age	18 - 36	37- 57	58 – 78	>78
1.4	Educational Level	None	Primary	secondary	Tertiary
1.5	Nationality/ethnicity			
1.6	Occupation			
1.7	Marital Status			
1.8	Religion			
1.9	Type of Surgery			

2.0 INDIVIDUAL INTERVIEW GUIDE FOR PATIENTS
Phase 1 – Exploratory Phase (Pre-Intervention)

Please tell me about your experience regarding pain in the CT-ICU. **Explain further**

Probes

- Procedure(s) that gave you the most pain in the CT-ICU.
- How you alerted the nurses that you were in pain.
- Did the nurses/doctors ask you if you were in pain? Explain.
- How you reacted when you were in pain in the CT-ICU. What did you do to reduce your pain?
- How pain was managed.
- Methods apart from drugs that helped to reduce your pain.
- Education about pain management before the surgery. Explain.
- Impression about the visitation policy in the ICU. Did it have any effect on your pain? Explain.
- How pain management can be improved in the CT-ICU (Assessment and treatment).

APPENDIX M

DEVELOPMENT AND PILOT TESTING OF A CLINICAL GUIDELINE FOR THE COMPREHENSIVE MANAGEMENT OF PAIN IN AN ADULT ICU IN GHANA – AN INTERVENTION STUDY
PATIENT'S FAMILY INFORMATION SHEET

Dear ————————————
(Potential participant)

My name is Bridget Senanu Ofori, I am an Intensive Care Nurse currently registered for a PhD nursing degree at the University of the Witwatersrand, Department of Nursing Education, South Africa. I am hoping to conduct a research project, under supervision, and would like you to consent to being included in the sample of participants I hope to study after discharge to the ward from the Cardiothoracic Intensive Care Unit.

The aim of the study is to develop and pilot test a clinical guideline for the comprehensive management of pain in the adult CT-ICU. Should you agree to participate, I will ask you to complete a biographical data and then talk to you about your relative's care in the CT-ICU, especially the management of pain. This and the views of ICU nurses and doctors will inform the development of a clinical pain management guideline, which will be pilot tested in the CT-ICU to see if it will improve patients' pain outcomes. I will schedule an appointment at a date and time convenient for you. The required procedures should take approximately 30 to 45 minutes to complete.

Participation in this study is voluntary. You may choose whether to participate or not, or withdraw from the study at any time, which will have no effect on the services you or your relative receives from this institution or the healthcare providers. I appreciate you will not derive any direct benefit from participating in the study, however, I hope the completed study will clarify the responsibilities of Intensive Care Nurses in managing patients' pain in the ICU. Your identity will not be revealed in any reports of this study. Results of the study will be given to you should you so wish.

The appropriate people and research committees of the University of the Witwatersrand, Ghana Health Service and Korle-bu Teaching Hospital have approved the study and its procedures.

Thank you for taking the time to read this information letter. Should you have any further questions regarding the study or your rights as a study participant, I can be reached on **024 614 6897**(cell) or email: 0305176T@students.wits.co.za

APPENDIX N

DEVELOPMENT AND PILOT TESTING OF A CLINICAL GUIDELINE FOR THE COMPREHENSIVE MANAGEMENT OF PAIN IN AN ADULT ICU IN GHANA – AN INTERVENTION STUDY

CONSENT FORM (PATIENT'S FAMILY)

I, _____ (name) the _____(relationship) of the patient, give permission to be included in the study.

I have read and understood the content of the information sheet and I have been given the opportunity to ask questions I might have regarding the procedure and my consent foreing included in the study.

_____ _____

Date Signature

_____ (Witness)

APPENDIX O

DATA COLLECTION SHEET (PATIENT'S FAMILY INDIVIDUAL INTERVIEWS)

Phase 1 – Exploratory Phase (Pre-Intervention)

1.0 FAMILY DEMOGRAPHIC DATA

1.1	Research Code	
1.2	Gender	Male / Female
1.3	Age	18 - 36 / 37- 57 / 58 – 78 / >79
1.4	Level of Education	None / Primary / secondary / Tertiary
1.5	Nationality/Ethnicity	
1.6	Occupation/Religion	
1.7	Relationship to patient	
1.8	Number times you visited your relative since admission to the CT-ICU	

2.0 INDIVIDUAL INTERVIEW GUIDE FOR PATIENT'S FAMILY

Phase 1 – Exploratory Phase (Pre-Intervention)

What is your opinion regarding how pain is managed in the CT-ICU? **Explain further.**

Probes

- Please tell me about your relative's pain after the surgery.
- Involvement in the care of your relative, did you do anything to help with their pain?
- Procedure(s) that gave your relative the most pain in the CT-ICU.
- How the nurses knew your relative was in pain? Did you help to communicate his/her pain to the nurse/doctor? Explain.
- Methods, apart from drugs, you think helped to relieve your relatives pain.
- The attitude of nurses and doctors towards your relative especially when they were in pain.
- Were you told about the surgery or pain after the surgery?
- Impressions about the visitation policy in the ICU. Do you think it had any effect on your relative?
- What can be done to improve pain management in the CT-ICU?

APPENDIX P

DEVELOPMENT AND PILOT TESTING OF A CLINICAL GUIDELINE FOR THE COMPREHENSIVE MANAGEMENT OF PAIN IN AN ADULT ICU IN GHANA – AN INTERVENTION STUDY

PATICIPANTS (GUIDELINE VALIDATION) INFORMATION SHEET

Dear _____
(Potential participant)

My name is Bridget Senanu Ofori, I am an Intensive Care Nurse currently registered for a PhD nursing degree at the University of the Witwatersrand, Department of Nursing Education, South Africa. I am hoping to conduct a research project, under supervision, and would like to ask you to consent to being included in the sample of participants who will give their opinion /views on the draft guideline for pain management in CT-ICU patients.

The aim of the study is to develop and pilot test a clinical guideline for the comprehensive management of pain in the adult CT-ICU. Should you agree to participate, I will ask you to give me your views concerning the guideline and its statements. I will be grateful if you could score the guideline using the Likert scale key below the guideline and any comments you have about the guideline in the comment column. This will help me to determine if the guideline statement is appropriate for use in the CT-ICU.

Participation in the study is voluntary and you may choose to participate or not, or withdraw from the study at any time. Anonymity and confidentiality are guaranteed, as research codes will be used.

I appreciate you will not derive any direct benefit from participating in the study, however, I hope the completed study will clarify the responsibilities of Intensive Care Nurses in managing patients' pain in the ICU. Your identity will not be revealed in any reports of this study. Results of the study will be given to you should you so wish.

The appropriate people and research committees of the University of the Witwatersrand, Central University and Korle-bu Teaching Hospital have approved the study and its procedures.

Thank you for taking the time to read this information letter. Should you have any further questions regarding the study or your rights as a study participant, I can be reached on **024 614 6897**(cell) or email: 0305176T@students.wits.co.za.

APPENDIX Q

DEVELOPMENT AND PILOT TESTING OF A CLINICAL GUIDELINE FOR THE COMPREHENSIVE MANAGEMENT OF PAIN IN AN ADULT ICU IN GHANA – AN INTERVENTION STUDY

CONSENT FORM (GUIDELINE VALIDATION)

I, _____ (Participant's name) give permission to be included in the study.

I have read and understood the content of the information sheet and I have been given the opportunity to ask questions I might have regarding the procedure and my consent to being included in the study.

_____ _____

Date Signature

_____ (Witness)

APPENDIX R

DRAFT GUIDELINE

PAIN IN CRITICALLY ILL PATIENTS	SCORE	COMMENT/S
Many procedures in the ICU cause acute pain and need special attention. The ICU patient has many sources of pain and they must be identified and treated.		
Turning and moving patients for procedures in the ICU are very painful for ICU patients and must be done with caution and bed accessories employed if available.		
Chest tubes cause patients a lot of pain and should be removed the moment they are no longer necessary.		
Patients also experience pain during change of dressing and endotracheal tube suctioning.		
Bed bath, positioning, male catheterisation, physiotherapy, ambulation, types of plasters used and removal of stitches. Medical procedures done under local anaesthesia, taking samples, chest tube insertion, intubation and removal of intercostal tubes all cause patients pain.		
Thoracotomies and sternotomies are the surgical procedures that cause the most pain and need extra attention and effort in pain management.		
Nurses showing interest in how patients feel especially when in pain helps decrease their pain.		
Patients have different pain thresholds and must be treat as individuals.		
Pain is subjective and it is whatever the experiencing person says it is. The perception that patients exaggerate their pain is not accurate.		
ICU nurses need to improve their knowledge on pain and its management, especially the negative consequences of untreated pain. Education will improve nurses' attitude towards and management of pain.		
Inadequate analgesia and untreated pain have many negative consequences that influence the patients' recovery and quality of life. Health professionals' education on pain assessment and treatment improves outcomes.		
Education and feedback strategies when implemented, improves the assessment and reassessment of pain.		
Nurses need to advocate for their patients for improved pain management, especially to make doctors aware of the need to review analgesics to avoid the adverse effects of inadequate pain management. Nurses must also encourage patients to speak up about their pain.		
Supervision improves adherence to analgesic prescriptions and should be done routinely by nurses in charge of the shift/ICU, and meticulously. Audits and feedbacks are important for improving knowledge.		
A lot of effort must be put into prevention of pain and not only treatment by promoting educational programmes and elaboration of protocols and guidelines in the ICU.		

Team approach to pain management will improve pain outcomes in patients.		
Collaboration and improved communication between doctors and nurses in terms of informing each other about the patients pain reports, assessment and treatment will assist in improving pain management.		
Nurses must hand over assessments and treatments given to the patient for pain to colleague nurses.		
A cordial relation between senior and junior colleagues will inure to the benefit of patients in terms of pain management.		
There is a need for a protocol to standardise pain assessment and management in the ICU and act as a universal guide for ICU nurses and doctors in their management of the patient's pain.		
A multidisciplinary protocol must be developed for pain management in the ICU. Using protocols to manage pain reduced the duration of ventilatory support, length of ICU stay and mortality rates.		
Making guidelines and protocols easily accessible and available to all health professionals especially nurses and doctors in the ICU will improve their management of pain.		
Posting guidelines on ICU walls and making pocket guidelines available to the ICU team, regular audits and feedback was seen as beneficial in ensuring adherence to pain management protocols.		
Documentation of pain assessment and treatment on ICU charts will improve pain management.		
Nurses must document pain assessment and treatment to ensure follow-up and monitor effects of analgesics.		
Doctors must also document their assessment of the patient's pain in their notes to enhance follow-up and assess effectiveness of analgesics. Creating a place for doctors to document their pain scores among other measures improved pain scores.		

ASSESSMENT OF PAIN IN CRITICALLY ILL PATIENTS	**SCORE**	**COMMENT/S**
Pain assessment must be done routinely with validated assessment tools to improve pain management.		
Nurses and doctors must encourage patients to report their pain, as patients own report is the gold standard, but some patients fear the negative reaction they will get from nurses/doctors if they should report their pain too often.		
The Ghanaian culture influences patients' report of pain so just admitting pain is not enough, but a further assessment of the severity of the pain should be established.		
Special attention should be paid to pain in men, as culturally they are not supposed to report their pain but are expected to 'bear' pain.		
Validated tools for pain assessment in the ICU must be used to assess the severity of the verbal patient's pain. The recommended tool for pain assessment in verbal patients are the NRS and the VAS.		
Assessment of pain must be carried out routinely, at least 3 to 4 hourly, and before and after the administration of analgesics. Pain must be reassessed after analgesia/non-pharmacological treatment is given to assess the effectiveness of the treatment.		

Validated tools for pain assessment in the ICU must be used to assess pain and its severity in the **non-verbal** patient. The most validated tools for ICU patients are the CPOT and the BPS.		
Vital signs must not be used exclusively to assess pain in non-verbal patients but serve as a cue for further assessment and appropriate assessment done if pain is suspected.		
Observation of patients should constitute a critical part of pre-analgesia assessment.		

PHARMACOLOGICAL TREATMENT OF PAIN IN THE ICU	**SCORE**	**COMMENT/S**
Pain treatment must effectively address the needs of the patient and keep the patient pain free while minimising adverse effects.		
Giving smaller doses of analgesia (IV titration/IM) more frequently is more effective than large doses less frequently.		
Analgesia must be given until patient is comfortable and calm then sedation. Analgesia is not sedation and mixing analgesia and sedation might get the patient sedated but not pain free.		
Pre-emptive analgesia must be routine for many of the procedures in the ICU, such as chest tube removal, dressing, turning, bed bath, CVP line insertion, Chest tube insertion and so on.		
Nurses must ensure strict adherence to prescribed analgesics and inform doctors if there is a need to review the order.		
Patients in acute pain will not get addicted to pain medications and should therefore be given them as prescribed, and when needed. They rather report pain and request for analgesia because their pain is not relieved.		
Nurses and doctors should watch out for breakthrough pain, which occurs in between doses of analgesics and manage them appropriately.		
Nurses should alternate pain drugs as prescribed and not give all drugs at the same time.		
Patients should be made aware they are being given analgesics to reassure them that their pain is being treated.		
Multimodal (using more than one analgesia) should be encouraged instead of monotherapy.		
Stool softeners should be prescribed for patients on morphine to prevent constipation.		
Care must be taken to ensure that pain medications are procured from reliable sources to ensure their efficacy. There must therefore be collaboration between the hospital, the importers and drug companies to ensure only drugs from reliable sources are administered to patients.		
Pain must be treated when the cut-off scores for the presence of pain, for the NRS $\geq$ to 3, CPOT (>2). BPS (>5), are reached.		
Patient controlled analgesia provided a better pain control and greater patient satisfaction than conventional PRN analgesia.		

NON-PHARMACOLOGICAL TREATMENTOF PAIN	**SCORE**	**COMMENT/S**
Many non-pharmacological methods can be employed by ICU nurses and doctors to reduce pain in critically ill patients.		
Slow deep-breathing relaxation exercise during chest tube removal,		

as an adjunct to pharmacological treatment, will significantly decrease pain ratings.		
Application of cold packs to the site before the removal of chest tubes significantly reduces the intensity of pain caused by chest tube removal.		
Hand massage and simple body massage reduces the pain of ICU patient.		
Reassurance helps patients to be encouraged that their pain will be relieved.		
Listening to music was found to be effective in reducing pain scores in cardiac surgery patients.		
Other forms distraction, such as of television, newspapers or other reading materials, will distract patients and reduce their pain and anxiety scores.		
Ghanaians are faith-based people and should be allowed to pray and religious leaders allowed to have supervised visits to the ICU. This can serve as encouragement and hope for recovery.		
Relatives may help divert the attention of patients from the pain they are feeling and must be allowed more supervised time to visit them while in the ICU.		
Placing patients in the right position, according to their needs and requests, helps to reduce pain that may be due to uncomfortable positioning.		

PATIENT AND FAMILY EDUCATION ON PAIN	**SCORE**	**COMMENT/S**
ICU nurses and doctors need to give patients education on post-operative pain, its assessment and pharmacological and non-pharmacological methods of pain management.		
Patients need education from the ICU nurses and doctors on how they can draw their attention or signal them when they are in pain and cannot communicate verbally (either by nodding to questions or raising their hands).		
Patients must be educated on pain assessment tools that will be used to assess their pain post-operative pain.		
Pre –operative education on pain may reduce anxiety of patients and their relatives and ensure co-operation.		
Patients' relatives need to be educated on post-operative pain as well, to allay their anxiety and ensure co-operation.		
Patients and relatives need to be educated on the fact that non-pharmacological methods can complement drugs to reduce their pain so they can accept them post-operatively.		
Patients and relatives should be educated on the types of pain medications, their effects and side effects.		

Key:

Agree (maintain Statement) – 2

Uncertain (Go by Decision of Others) – 1

Disagree (Remove statement) – 0

APPENDIX S

DATA COLLECTION SHEET (PATIENTS)
(Pre-and Post-Intervention Assessment)

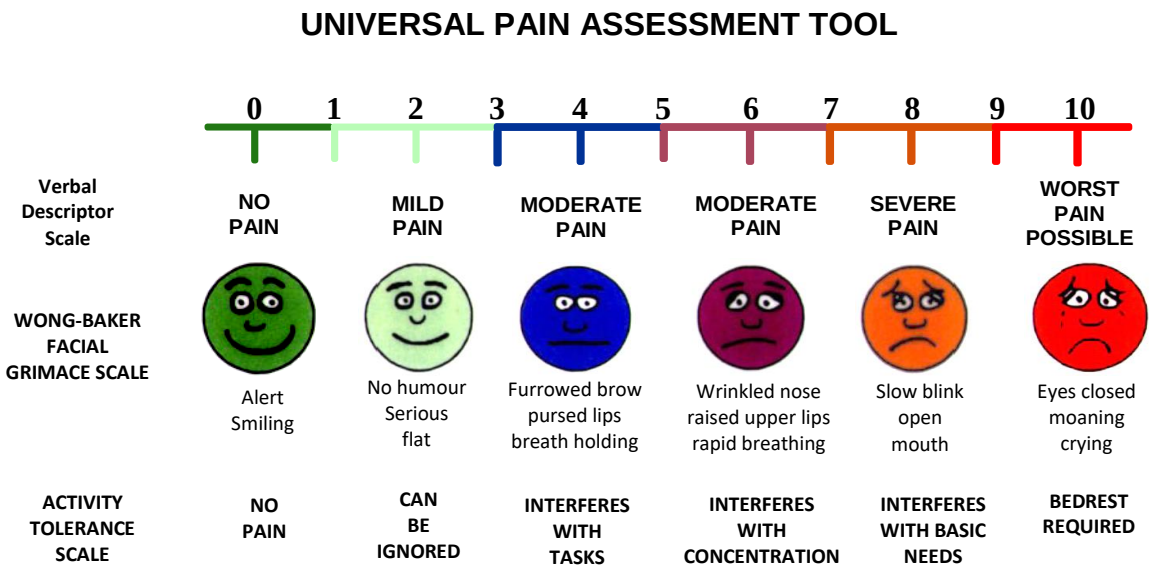
1.0 PATIENT DEMOGRAPHIC DATA

1.1	Research Code	
1.2	Date of Admission	
1.3	Gender	Male / Female
1.4	Age	18 - 36 / 37- 57 / 58 – 78 / >79
1.5	Diagnosis on Admission	
1.6	Operation done	
1.7	Glasgow Coma Scale (GCS) (At the time of study)	
1.8	Analgesic/Dose prescribed	
1.9	Analgesic/Dose given	
2.0	Weight/Height	

From Patient's Record / File

2.1	Length of stay in the CT-ICU	
2.2	Cost of CT-ICU care (In Ghanaian Cedis)	
2.3	Cost of analgesics used per Patient (in Ghanaian Cedis)	
2.4	Illness severity score while in CT-ICU (SAPS II Score)	

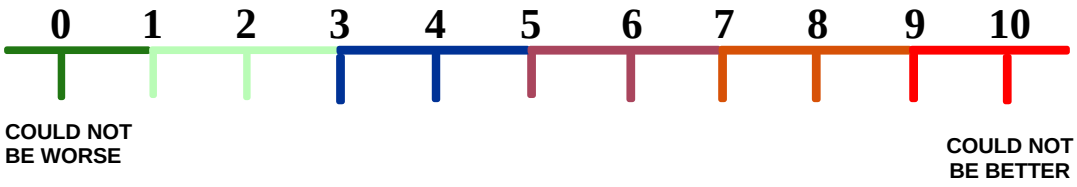
2.5 How would you rate your level of pain when you were in the CT-ICU?



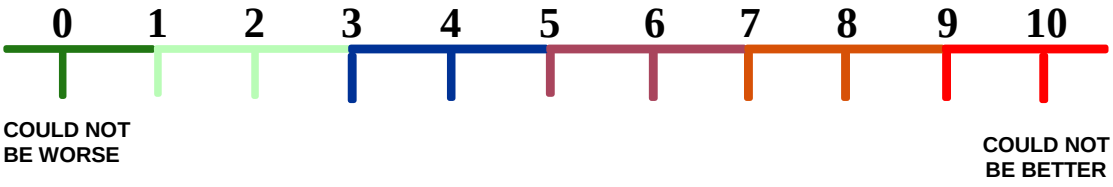
Credit: UCLA Department of Anaesthesiology, David Geffen School of Medicine at UCLA: The Wrong-Baker Faces Rating Scale Adapted from Hockenberry and Wilson, 2011.

2.6 How satisfied were you with the following in the CT-ICU?

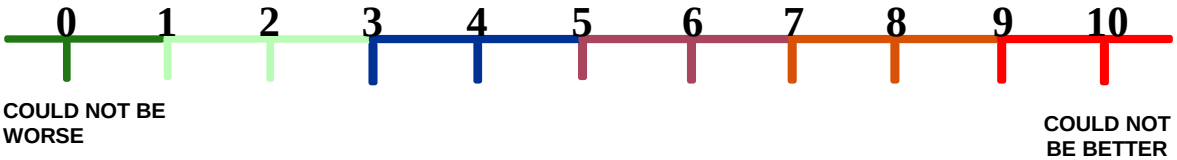
2.6.1 Administration of pain medication by nurses when you needed it



2.6.2 Response of nurses to your complaints of pain



2.6.3 Education about pain and its management post-operatively



KEY: 0 – 3 Not satisfied
4 – 7 Fairly satisfied
8 – 10 Satisfied

APPENDIX T

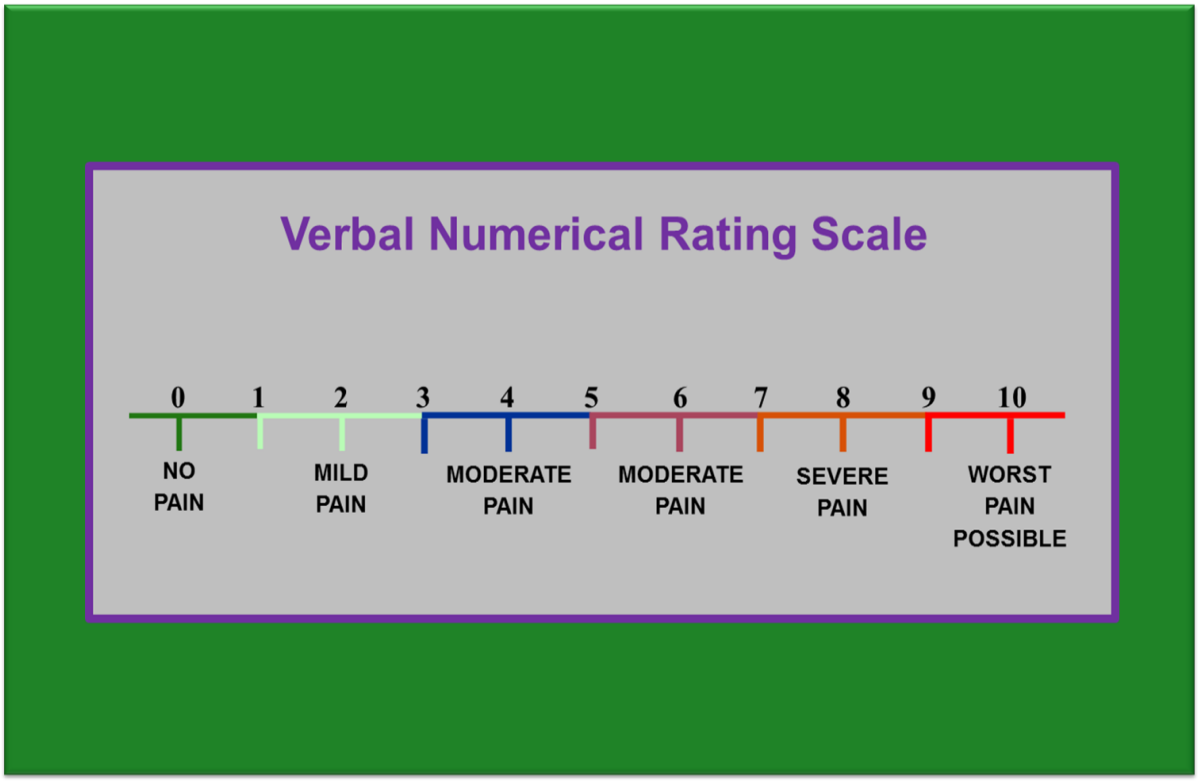
2.0 SIMPLIFIED ACUTE PHYSIOLOGICAL SCORE (SAPS II)

	Variable / Scoring Guidelines	Findings	Points	Score
2.1	Age in Years *age in years at time of last birthday*	< 40 40 - 59 60 - 69 70 - 74 75 - 79 > = 80	0 7 12 15 16 18	
2.2	Heart Rate in beats per minute *use the highest or lowest heart rate in past 24 hours whichever gives the higher number of points*	< 40 40 - 69 70 - 119 120 - 159 > = 160	11 2 0 4 7	
2.3	Systolic Blood Pressure in mmHg *use the highest or lowest blood pressure in past 24 hours whichever gives the highest number of points*	< 70 70 - 99 100 - 199 > = 200	13 5 0 2	
2.4	Body temperature *use highest temperature*	< 39 C > = 39 C	0 3	
2.5	If on ventilation or CPAP PaO2 / FiO2 *use only if on ventilation or CPAP using the lowest ratio*	< 100 100 - 199 > = 200	11 9 6	
2.6	Urinary Output in L per 24 hours *if time period less than 24 hours adjust urine output for period to 24 hours*	< 0.500 0.500 - 0.999 > = 1.000	11 4 0	
2.7	Serum Urea mmol/L *use the highest value*	< 10 10 - 29.9 > 30	0 6 10	
2.8	WBC count in 1000 per uL *use the highest or lowest WBC in past 24 hours whichever gives the higher number of points*	< 1.0 1.0 - 19.9 > = 20	12 0 3	
2.9	Serum Potassium in mmol/L *use the highest or lowest potassium in past 24 hours whichever gives the higher number of points*	< 3.0 3.0 - 4.9 > = 5.0	3 0 3	
2.10	Serum Sodium in mmol/L *use the highest or lowest sodium in past 24 hours whichever gives the higher number of points*	< 125 125 - 144 > = 145	5 0 1	
2.11	Serum Bicarbonate in mmol/L *use the lowest value*	< 15 15 - 19 > 20	6 3 0	
2.12	Serum Bilirubin in umol/L *use the highest value*	< 4.0 4.0 - 5.9 > = 6.0	0 4 9	
2.13	Glasgow Coma Scale *use the lowest value if patient sedated* *use the score before sedated*	< 6 6 - 8 9 - 10 11 - 13 14 - 15	26 13 7 5 0	
2.14	Chronic Diseases *HIV positive with AIDS defining opportunistic infection or tumor; malignant lymphoma Hodgkins disease leukemia or multiple myeloma; metastases demonstrated at surgery, radiographically or other suitable method*	none metastic carcinoma hematologic malignancy AIDS	0 9 10 17	
2.15	Type of admission *scheduled surgery if scheduled at least 24h prior to operation; unscheduled if operated on with less than 24h notice; medical if no surgery within 1 week of admission to ICU*	scheduled surgery medical unscheduled surgery	0 6 8	
			SAPS II Score	

Credit - Le Gall, Lemeshow, Saulnier (1993)

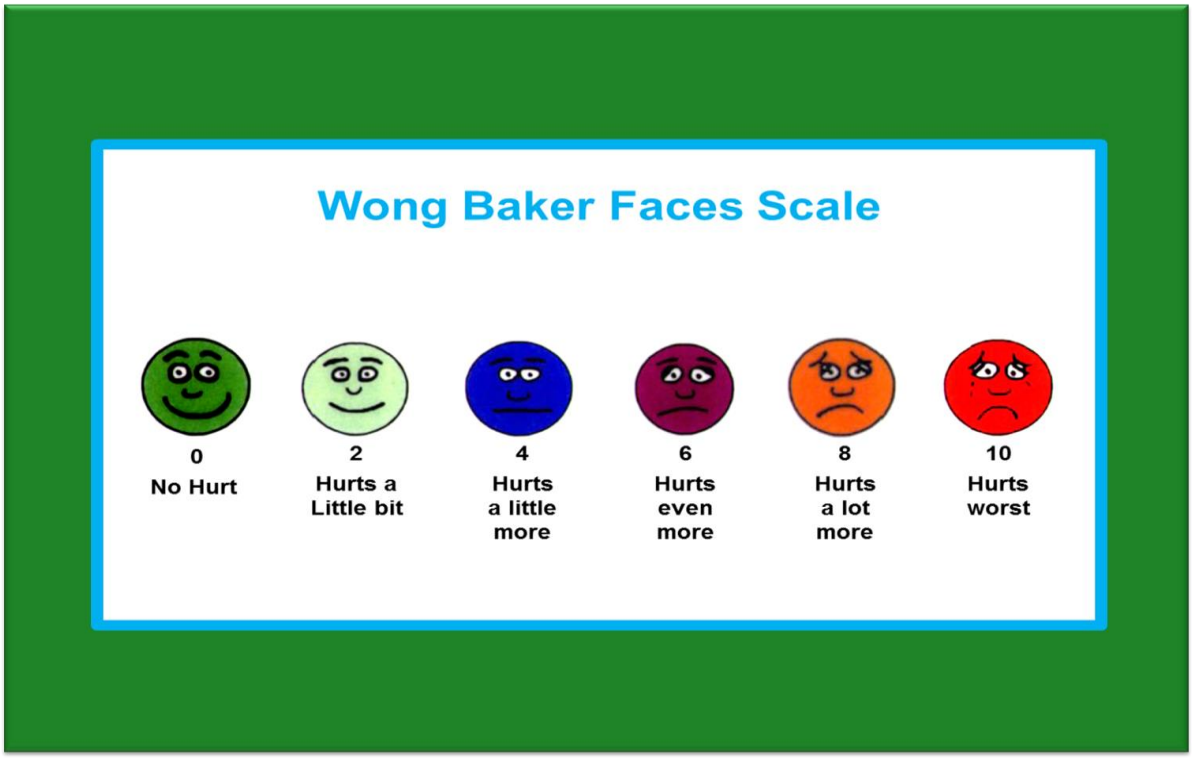
APPENDIX U

PAIN ASSESSMENT TOOLS



Critical-Care Pain Observation Tool

Indicator	Description	Score	
Facial expression	No muscular tension observed	Relaxed, neutral	0
	Presence of frowning, brow lowering, orbit tightening, and levator contraction	Tensed	1
	All of the above facial movement plus eyelid tightly closed	Grimacing	2
Body movements	Does not move at all (does not necessarily mean absence of pain)	Absence of movements	0
	Slow, cautious movements, touching or rubbing the pain site, seeking attention through movements,	Protection	1
	Pulling tube, attempting to sit up, moving limbs thrashing, not following commands, striking at staff, trying to climb out of bed	Restlessness	2
Muscle tension	No resistance to passive movements	Relaxed	0
Evaluation by passive flexion and extension of upper extremities	Resistance to passive movements	Tensed, rigid	1
	Strong resistance to passive movements, inability to complete them	Very tensed or rigid	2
Compliance with ventilator	Alarms not activated, easy ventilation	Tolerating ventilator or movement	0
(intubated patients)	Alarms stop spontaneously	Coughing but tolerating	1
	Asynchrony: blocking ventilation, alarms frequently activated	Fighting ventilator	2
Or			
Vocalization (extubated patients)	Talking in normal tone or no sound	Talking in normal tone or no sound	0
	Sighing, moaning,	Sighing, moaning,	1
	Crying out, sobbing	Crying out, sobbing	2
Total range			0-8



APPENDIX V

Documentation of Pain Assessment and Treatment

Date	Time	Pain Score	Tool Used	Treatment Given	Time	Reassessment Score	Treatment

APPENDIX W

AGREE II INSTRUMENT

DOMAIN 1. SCOPE AND PURPOSE						
1. The overall objective(s) of the guideline is (are) specifically described.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						
2. The health question(s) covered by the guideline is (are) specifically described.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						
3. The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						

DOMAIN 2. STAKEHOLDER INVOLVEMENT						
4. The guideline development group includes individuals from all relevant professional groups.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						
5. The views and preferences of the target population (patients, public, etc.) have been sought.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						
6. The target users of the guideline are clearly defined.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						

DOMAIN 3. RIGOUR OF DEVELOPMENT						
7. Systematic methods were used to search for evidence.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						
8. The criteria for selecting the evidence are clearly described.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						
9. The strengths and limitations of the body of evidence are clearly described.						

DOMAIN 3. RIGOUR OF DEVELOPMENT						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						
10. The methods for formulating the recommendations are clearly described.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						
11. The health benefits, side effects, and risks have been considered in formulating the recommendations.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						
12. There is an explicit link between the recommendations and the supporting evidence.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						
13. The guideline has been externally reviewed by experts prior to its publication.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						
14. A procedure for updating the guideline is provided.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						

DOMAIN 4. CLARITY OF PRESENTATION						
15. The recommendations are specific and unambiguous.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						
16. The different options for management of the condition or health issue are clearly presented.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						
17. Key recommendations are easily identifiable.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						

DOMAIN 5. APPLICABILITY						
18. The guideline describes facilitators and barriers to its application.						
1	2	3	4	5	6	7

DOMAIN 5. APPLICABILITY						
Strongly Disagree						Strongly Agree
Comments						
19. The guideline provides advice and/or tools on how the recommendations can be put into practice.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						
20. The potential resource implications of applying the recommendations have been considered.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						
21. The guideline presents monitoring and/or auditing criteria.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						

DOMAIN 6. EDITORIAL INDEPENDENCE						
22. The views of the funding body have not influenced the content of the guideline.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						
23. Competing interests of guideline development amongst group members have been recorded and addressed.						
1 Strongly Disagree	2	3	4	5	6	7 Strongly Agree
Comments						

OVERALL GUIDELINE ASSESSMENT

For each question, please choose the response which best characterizes the guideline assessed:

1. Rate the overall quality of this guideline.						
1 Lowest possible quality	2	3	4	5	6	7 Highest possible quality

2. I would recommend this guideline for use.	
Yes	
Yes, with modifications	
No	

NOTES

APPENDIX X

DEVELOPMENT AND PILOT TESTING OF A CLINICAL GUIDELINE FOR THE COMPREHENSIVE MANAGEMENT OF PAIN IN AN ADULT ICU IN GHANA – AN INTERVENTION STUDY

EXPERT PANEL (APPRAISERS) INFORMATION SHEET

Dear _____
(Potential participant)

My name is Bridget Ofori, an ICU nurse currently registered as a student at the University of the Witwatersrand, in the Department of Nursing Education for the degree of Doctor of Philosophy (PhD). I am conducting a research project to develop and pilot test a clinical guideline for the comprehensive management of pain in the adult Intensive Care Unit in Ghana.

I would be very grateful if you would accept this invitation to be part of an expert group in assisting me to appraise the developed clinical guideline. If you agree to participate, you will be required to review the guideline, using the AGREE II instrument, to assess if the guideline meets internationally set standards and quality. An AGREE II instrument users guide will be attached to the AGREE II instrument and sent to you. This appraisal will be used as an overall assessment to make a judgement of the quality of the guideline.
Participation in the verification process is voluntary. You may choose to withdraw from the study at any given time of your choice. I undertake to ensure that all information will be kept confidential and safe from unauthorised access to ensure your confidentiality. No identification of your personal information will be given in reporting your opinions to ensure your anonymity. If you consent to be part of the expert group, please complete the attached consent form, verify the guideline and return both your consent form and assessment recorded on the AGREE II instrument to me in the stamped addressed envelope enclosed.

I appreciate you will not derive any benefit from participation in this study, however, I hope that the results of the study will help clarify the guidelines needed to improve pain management in the ICU. The appropriate people and research ethics committees of the University of the Witwatersrand, Central University and the Korle-bu Teaching Hospital have approved the study and its procedures.

Thank you for taking the time to read this information letter. Should you require any further information regarding the study or your rights as a participant, please contact me on **024 614 6897**(cell) or email: 0305176T@students.wits.co.za

APPENDIX Y

DEVELOPMENT AND PILOT TESTING OF A CLINICAL GUIDELINE FOR THE COMPREHENSIVE MANAGEMENT OF PAIN IN AN ADULT ICU IN GHANA – AN INTERVENTION STUDY

CONSENT FORM (APPRAISERS)

I, _____(name) give permission to be included in the study.

I have read and understood the content of the information sheet and I have been given the opportunity to ask questions I may have regarding the procedure and my consent to being included in the study.

_____ _____
Date Signature

APPENDIX Z

ETHICAL CLEARANCE CERTIFICATES

M140642

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M140642

NAME: (Principal Investigator)	Ms BS Ofori
DEPARTMENT:	Nursing Education Korle-Bu Teaching Hospital, Accra-Ghana
PROJECT TITLE:	Development and Pilot Testing of a Clinical Guideline for the Comprehensive Management of Pain in the Adult Intensive Care Unit in Ghana: An Intervention Study (revised title)
DATE CONSIDERED:	27/06/2014
DECISION:	Approved unconditionally
CONDITIONS:	
SUPERVISOR:	Prof Lize Maree
APPROVED BY:	Professor PE Cleaton-Jones, Chairperson, HREC (Medical)

DATE OF APPROVAL: 29/08/2014

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Secretary in Room 10004, 10th floor, Senate House, University.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**.

Principal Investigator Signature — M140642Date 29/08/2014

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

CENTRAL UNIVERSITY
COLLEGE
FAITH | INTEGRITY | EXCELLENCE

SCHOOL OF APPLIED SCIENCES

9th February, 2016

ETHICAL CLEARANCE

CENTRAL UNIVERSITY COLLEGE
INSTITUTIONAL REVIEW BOARD
CUC-IRB 2015/16

On the 8th February, 2016 the Institutional Review Board (IRB) of Central University College at a full Board meeting reviewed and approved the renewal of the ethical clearance granted to the research project of Bridget Senanu Ofori for the 2015/16 and 2016/17 academic years.

The research project being undertaken has the details below:

Project Topic: *Development and pilot testing of a clinical guideline for the comprehensive management of pain in the adult intensive care unit in Ghana – an intervention study*

Students: *Mrs. Bridget Senanu Ofori*

Signature of Chair: .....
(CUC-IRB)

CC; Dean of Graduate Studies and Research, CUC
President, CUC
Vice President (Academic)

P. O. Box 2305, Tema, Ghana • Tel.: (233-28) 954614-5 / (233-303) 318583 • www.central.edu.gh

APPENDIX AA

POSGRADUATE COMMITTEE APPROVAL

APPENDIX AB

LANGUAGE EDITING

Gill Smithies

Proofreading & Language Editing Services

59, Lewis Drive, Amanzimtoti, 4126, Kwazulu Natal

Cell: 071 352 5410 Email: moramist@vodamail.co.za

Work Certificate

To	Dr Shelley Schmollgruber
Address	Wits Dept of Nursing Education
Date	21/04/2017
Subject	Thesis: DEVELOPMENT AND PILOT TESTING OF A CLINICAL GUIDELINE FOR THE COMPREHENSIVE MANAGEMENT OF PAIN IN AN ADULT INTENSIVE CARE UNIT IN GHANA – AN INTERVENTION STUDY, by Bridget Ofori
Ref	SS/GS/18

I, Gill Smithies, certify that I have proofed the following thesis, Forward, Chapters 1 to 7, Appendices and References: Development and pilot testing of a clinical guideline for the comprehensive management of pain in an Adult Intensive Care Unit in Ghana, by Bridget Ofori, to the standard as required by Wits Dept. of Nursing Education.

Gill Smithies
21/04/2107