CLINICAL DECISION MAKING BY SOUTH AFRICAN PARAMEDICS IN THE MANAGEMENT OF ACUTE TRAUMATIC PAIN

A dissertation submitted in fulfillment of the requirements for the degree of Master of Technology: Emergency Medical Care in the Faculty of Health Sciences at the Durban University of Technology

Richard Kevin Mulder

Student No. 21032856

Master of Technology: Emergency Medical Care

January 2012

Department of Emergency Medical Care & Rescue

Durban University of Technology

SUPERVISOR: Dr MN Sibiya

CO-SUPERVISOR: Mr. Y Pillay

Declaration

This is to certify that the work is entirely my own and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources). The work has not previously been submitted in any form to the Durban University of Technology or to any other institution for assessment or for any other purpose.

_____

Signature of student

_____

Date

Approved for final submission

_____

Dr MN Sibiya (Supervisor)
RN, RM, D Tech: Nursing

_____

Date

_____

Mr. Y Pillay (Co-supervisor)
M Tech: Emergency Medical Care

_____

Date

Abstract

Background

In the emergency setting, the onus is on the individual practitioner's ability to make critical decisions at critical moments in order to provide the best level of care to their patient. In order to ensure that these decisions fall in line with the best interests of the patient, the South African paramedic requires a better understanding of how to arrive at such a decision; they need to understand the clinical decision making process. This study focused on South African paramedic clinical decision making with specific reference to acute traumatic pain management, with the aim of determining the factors which influence South African paramedic clinical decision making by revealing the current method of pain management employed by South African paramedics, how they view the priority of pain management in the continuum of care and if there were any context specific factors influencing their clinical decision making.

Methods

A mixed method design was used to determine the factors contributing to the clinical decision making process of South African paramedics in the acute pain management of patients with acute traumatic pain. A mixture of qualitative and quantitative approaches was utilized by means of a research questionnaire as well as in-depth interviews. The questionnaires were targeted at all South African paramedics while the in-depth interviews were conducted with five participants who had been purposefully selected from the questionnaire respondents. The data analysis was conducted in a descriptive manner in order to inform the explanatory nature of the answers to the research questions and objective.

Results

The results provided insight into the current methods and clinical decision making processes employed by South African paramedics in the management of patients' experiencing acute traumatic pain. The study determined that the South African paramedic's clinical decision making process involves three key phases in the acute traumatic pain management setting, the assessment phase, the initiation/pain management phase and the conclusion/re-evaluation phase, with each phase utilizing different decision making models, the intuitive/humanist model, the hypothetico-deductive model and a model which combined both of the aforementioned models.

In addition to this, numerous factors such as the provision of care in order to facilitate further management and transportation to an appropriate facility, which influenced clinical decision making, were identified. Amongst South African paramedics, pain management was identified as coming second only to the interventions required to manage immediately life threatening conditions in terms of the prioritization of treatment.

Recommendations

A variety of recommendations which included the need to further the development of clinical decision making and pain management through research and education as well as considerations for investigation into the potential expansion of South African paramedic scope of practice in the pain management environment were made.

Dedication

This dissertation is dedicated to my father, Kevin John Mulder 10/03/1955 - 24/01/2011.

Acknowledgements

First and foremost I must thank my family and loved ones for their limitless support and encouragement during this long and at times difficult journey. To my mother, father and Mia, I would not have been able to achieve this without you.

I must also thank my supervisors, Dr Sibiya and Mr. Pillay, for the numerous meetings filled with patient suggestions and many long hours spent reading, advising and motivating. Your faith, support and good advice was instrumental in the success of this dissertation.

Table of Contents

Chapter 2: Literature Review

Chapter 3: Research Methodology

Chapter 4: Presentation and Discussion of the Results

Chapter 5: Conclusion and Recommendations

List of Tables

List of Figures

Glossary of Terms

Paramedic

Globally, the term ‘Paramedic’ is accepted as indicating any pre-hospital emergency care provider. For the purposes of this document/research the term “paramedic” will be used to refer to the Critical Care Assistant, National Diploma Emergency Medical Care and BTech Emergency Medical Care graduates, as these are the scopes which allow for autonomy of practice within a pain management setting in South Africa.

Practitioner

The term ‘Practitioner’ in the context of this study refers to all health care providers. These would predominantly include nurses, doctors and paramedics, but do not exclude other allied health care providers.

Advanced Life Support (ALS)

In the context of the study, ALS refers to the South African Paramedic qualified as either a Critical Care Assistant (CCA) or an Undergraduate (National) Diploma Paramedic (NDip). These paramedics are qualified and licensed to perform a variety of advanced patient care interventions such as advanced airway, breathing and circulatory management and may administer a variety of pharmacological agents. A further qualification has been added to the ALS register, though with a difference in scope, the Emergency Care Technician’s (ECT) scope of practices has similarities with the CCA and NDip scope. However there are a few key areas which require them to consult ECP prior to proceeding with an intervention.

Emergency Care Practitioner (ECP)

The Emergency Care Practitioner is a provider that has completed a professional degree (BTech) and is qualified and licensed to, in addition to the scope of the ALS provider; administer further pharmacological agents, most notably induction, paralytic and fibrinolytic agents.

Clinical Decision Making (CDM)

Clinical Decision Making is the cognitive process which is followed in the clinical setting in order to decide on one particular course of action over another. It is the key concept under investigation in this study.

Traumatic Pain

For the purpose of this study, traumatic pain will refer to pain resulting from an external insult to the musculoskeletal system in the acute setting.

Analgesia

The inability to feel pain while still conscious.

Analgesic agents

A drug/medicine that provides analgesia. In the context of this study, these agents include:

- *Entonox (Nitrous Oxide and Oxygen) Gas*: Entonox is a schedule 4 analgesic gas
- *Morphine*: Morphine Sulphate is a schedule 6 narcotic/opioid analgesic
- *Ketamine*: Ketamine is a schedule 5 non-barbiturate anaesthetic agent

(HPCSA, 2006)

Health Professions Council of South Africa (HPCSA): Professional Board of Emergency Care (PBEC)

The Health Professions Council of South Africa (HPCSA) Professional Board of Emergency Care (PBEC) is the regulatory body governing all pre-hospital care.

List of Acronyms

Acronym	Full Term
AHA	American Heart Association
ALS	Advanced Life Support
BTech	Bachelors Degree of Technology in Emergency Medical Care
BLS	Basic Life Support
CCA	Critical Care Assistant
CDM	Clinical Decision Making
EC	Eastern Cape
ECP	Emergency Care Practitioner
FS	Free State
GP	Gauteng Province
HPCSA	Health Professions Council of South Africa
ICSI	Institute for Clinical Systems Improvement
ILCOR	International Liaison Committee on Resuscitation
ILS	Intermediate Life Support
KZN	KwaZulu-Natal
MP	Mpumalanga
NC	Northern Cape
NDip	National Diploma in Emergency Medical Care
NHMRC	National Health and Medical Research Council (Australia)
NRS	Numerical Rating Scale
NW	North West Province
PBEC	Professional Board of Emergency Care
RNAO	Registered Nurses Association of Ontario
SA	South Africa(n)
VAS	Visual Analog Scale
VRS	Visual Rating Scale
WC	Western Cape

Annexures

CHAPTER 1

OVERVIEW OF THE STUDY

1.1 INTRODUCTION AND BACKGROUND OF THE STUDY

Pre-hospital care in South Africa is provided by both private and state operated services located throughout South Africa's nine provinces. The structures and staff utilized by both private and state pre-hospital emergency services are of a similar nature in model and qualification respectively with a combination of rapid response vehicles and ambulances utilized to provide land-based pre-hospital care to the people of South Africa. The staffing of these vehicle follows a three-tiered structure were Basic Life Support (BLS) and Intermediate Life Support (ILS) practitioners operate on ambulances while Advanced Life Support (ALS) practitioners generally operate alone on rapid response vehicles. These ground-based structures provide the vast majority of care in the pre-hospital environment while a limited number of rotor and fixed wing services also operate in South Africa. As with various industries in South Africa, the pre-hospital environment suffers from a resource and skills shortage. This is particularly evident in the public sector (Wallis, Garach and Kropman, 2008).

The ALS band of qualification is made up of a number of different qualifications, the Critical Care Assistant (CCA) and National Diploma in Emergency Medical Care (NDip) qualification share the identical scope of practice, while the Bachelors Degree in Emergency Medical Care (BTech) also referred to as Emergency Care Practitioners (ECP), though still part of the ALS band of qualifications, operate under their own specific scope of practice. In South Africa the practitioners registered under the ALS band are identified exclusively by the term 'paramedic', with neither the BLS nor ILS qualifications being implied when the term 'paramedic' is used (HPCSA, 2006; HPCSA, 2009; HPCSA, 2010).

South African paramedics function within a scope of practice set by their governing body, known as the Health Professions Council of South Africa (HPCSA) Professional Board for Emergency Care (PBEC) (HPCSA, 2006; HPCSA, 2009). The HPCSA PBEC has included in their scope of practice the use of Entonox, Morphine Sulphate (Opioid Analgesic) and more recently Ketamine (only ECP) for the purpose of providing pain relief to the patients that require it.

In the pre-hospital emergency care context, a risk versus benefit scenario exists (Chambers and Guly, 1993; Thomas and Shewakramani, 2008) where analgesic agent administration is weighed against potentially detrimental outcomes and the ultimate decision on patient care comes down to the clinical judgement of the individual Advanced Life Support (ALS) paramedic.

Clinical judgement is an incredibly subjective phenomenon (Sandhu and Carpenter, 2006), which in the pre-hospital emergency care context is very poorly understood. Within other healthcare professions, in particular nursing and medicine, greater efforts have been made to understand and to a degree predict clinical judgement and decision making (Benner, Tanner and Chesla, 2009).

While clinical judgement has been deemed very difficult to define, it has been discussed as a means to interpret or draw conclusions about the patient's condition or their requirements in terms of healthcare management (Tanner, 2006). Further, the decision to initiate treatment or to defer treatment in the individual or review, revise or challenge existing standards have all been seen to have with clinical judgment at their core (Tanner, 2006; Elstein and Schwartz, 2006; Duchscher, 1999).

Lipman, M (2006) observed that clinical judgment is synonymous with professionalism and delivering the highest quality of care and such is a concept which is inseparable from any attempt to improve one's individual ability or the clinical capacity or a department or profession.

In line with furthering the profession of emergency medical care, it is imperative to improve on the understanding of how these critical decisions are made, and how the decision making process occurs in the mind of the ALS paramedic in order for one to improve upon the implementation of an intervention as important as pain management in order to provide a better level of care to all patients

While the key focus of the study is clinical decision making (CDM) in acute pain management, there is the additional possibility of extrapolating the evidence gathered in the study to inform current and future paramedics, policy makers and educators about ALS paramedic CDM skills. This understanding of the South African (SA) paramedics' CDM could potentially influence other aspects of the pre-hospital emergency medical care profession with regards to best practice.

1.2 PROBLEM STATEMENT

At present, there is no literature specifically focusing on the SA paramedic CDM skills in acute traumatic pain. While it may be convenient to rely on a document such as the SA paramedic protocol (HPCSA, 2006; HPCSA, 2009), it is understood that no prescribed document or even algorithm can be applied to every patient in every circumstance (Croskerry, 2009).

In the emergency setting, the onus is on the individual paramedic's ability to make critical decisions at critical moments to provide the best level of care to their patient. This situation is exacerbated by the fact that, both due to a dearth of resources in South Africa in the pre-hospital environment and the structures currently employed within both the private and public sectors (Wallis, Garach and Kropman, 2008), the SA paramedic is usually required to make vital decisions under significant time pressure and in isolation. To make these decisions fall in line with the best interests of the patient, the SA paramedic requires a better understanding of how to arrive at such a decision which means they need to understand the CDM process.

Having determined the need for SA paramedics to understand the CDM process, the following chapter will review the available literature. However, baring one recent South African study (Pillay, 2008), and one international study (Croskerry, 2005), no other research regarding pre-hospital emergency medical care CDM skills exists.

In light of the paucity of knowledge and research in paramedic CDM skills in the pre-hospital emergency medical care context, this study is, therefore, of paramount importance for the advancement of the pre-hospital care profession.

1.3 PURPOSE OF THE STUDY

The purpose of this study was to determine the factors contributing to the CDM process made by South African paramedics in their management of patients with acute traumatic pain.

1.4 PRIMARY RESEARCH QUESTION AND OBJECTIVES

1.4.1 Primary Research Question

What are the factors that influence South African paramedics in their clinical decision making process when managing patients experiencing acute traumatic pain?

1.4.2 Objectives

The objectives of this study were as follows:

Objective One

To determine how South African paramedics currently manage patients experiencing acute traumatic pain.

Objective Two

To explore the prioritization of pain management during the continuum of care of the patient with traumatic pain.

Objective Three

To determine if there are context-specific factors that affect the decision making processes of South African paramedics in acute pain management.

1.5 SIGNIFICANCE OF THE STUDY

1.5.1 The Importance of CDM

The HPCSA in association with guidelines provided by various international organizations, such as the American Heart Association (AHA) and the International Liaison Committee on Resuscitation (ILCOR), has developed algorithms and broad recommendations for the management of specific conditions such as cardiac arrest and choking.

These algorithms are set in place to guide the management of practitioners to keep to standards of best practice. However, the risk of such a system is that practitioners may, in their attempts to keep to the algorithms, forego CDM based on the patients presenting symptoms and proceed to follow a generically applicable algorithm rather than manage a specific patient (Kassirer, 1976).

This is the 'trap' that many paramedics risk falling into when it becomes 'easier' to follow an algorithm than to apply CDM to patient care-reference. Thus, it is vital that SA paramedics gain a better understanding of the CDM process so as to apply it consistently. This consistent decision making process may provide a better, more balanced level of care to each patient, as an individual, rather than being treated within a broad disease category.

It is due to this 'trap' that the true significance of the study comes to light. By exploring the intricacies of CDM, it will become clear where disparities between current decision making processes and the accepted best practice in terms of patient care lie. The result of this may be of benefit to all practitioners so that they may be made cognizant of their thought processes and best practice. A positive outcome may enable them to implement steps to mitigate risk to their patients.

1.5.2 Importance of Pre-hospital Pain Management

The importance of pain management in any setting is well documented and can be broadly separated into two key areas: physiological and clinical.

Physiological benefit of pain management

Physiological responses to pain may manifest predominantly as increased heart rate, however, the associated negative effects of this elevation include, increase blood pressure and myocardial workload, both deleterious when viewed in association with raised intracranial pressure in closed head injury patients, or association with myocardial ischaemia or infarction. Additionally, the agitation associated with the experience of pain may mask other clinically significant signs and symptoms during patient assessment (Thomas and Shewakramani, 2008).

Clinical benefit of pain management

Vassiliadis, Hitos and Hill (2002) indicated that patients who receive pain management in the pre-hospital environment are viewed as “more serious” upon arrival in an emergency department regardless of the ‘true’ severity of their condition and as a result receive additional analgesia sooner after arrival than patients who had not received analgesia in the pre-hospital environment, thus limiting their suffering through the unnecessary experience of pain to a minimum. This was determined as being significant in one study, with the average injury to analgesia time by pre-hospital care providers being 23 minutes compared to 113 minutes for emergency departments (Abbuhl and Reed, 2003).

Clinical Decision Making in Pain Management

As the benefits of pre-hospital pain management include a decrease in suffering, this should be in the forefront of the mind of paramedic during his/her course of duty (Porter, 2004). The full extent of the benefit of pain management may only be realized if the assessment of the patients’ pain, as well as the management strategy to control such pain is adequately understood and implemented. This can only be achieved if a robust

clinical decision making process is adhered to (Institute for Clinical Systems Improvement, 2008).

1.5.3 Advances in the South African Pre-hospital Profession

With specific reference to the SA pre-hospital environment, the most significant changes in the past five years have been in areas other than pain management. The most recent of these changes have included the introduction of pharmacological agents to aid in the management of respiratory complaints, advanced airway management and highly specialized cardiac care.

While these represent areas of significant importance within the pre-hospital and medical care, other aspects of the pre-hospital environment also are in need of advancement even though these advancements, while not immediately critical to the survival of the patient, have profound effects on their further well-being. .

1.6 ASSUMPTIONS

The need to make the following assumptions regarding the actions of the study participants exists primarily so that the interview questions as well as ultimately the research questions may be answered as clearly as possible:

- All paramedics in this study treated their patients in a manner that was consistent with ensuring their best interests in terms of care, dignity and benefit.

- The answers provided by the various paramedics in the questionnaires as well as in the interviews were both honest and true.

1.7 CONCLUSION

This chapter provided the background of the study, clarified the concept related to clinical decision making and acute traumatic pain management. This chapter has highlighted the problem statement and clarified the purpose of the study. Chapter Two is a review of the relevant literature so to gain more insight and understanding and to support the relevance of the study.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

This chapter focuses on the literature available on CDM so to provide a fundamental understanding of the topic and also its position within the emergency medical context. Whilst every effort was made to ensure that the most thorough of searches were performed of both electronic and non-electronic resources, it quickly became evident that there was limited literature available on the topic of CDM.

As a secondary function of this chapter, acute traumatic pain management, specifically in the pre-hospital environment, was also investigated in order to provide a degree of understanding of the specific environment to which CDM was applied in the study.

A comprehensive search of the relevant literature was conducted by means of utilizing various online databases in conjunction with specific key words specific to the study. This process was supplemented by the pursuit of articles cited within the literature identified in the initial search. This approach ensured that a well grounded understanding of the focus of the research was formed as well as identifying existing studies, literature and currently accepted knowledge in the both the international and South African pre-hospital and general healthcare environments.

The databases utilized for these searches were:

- MEDLINE
- PubMed
- Google Scholar
- Elsevir
- ProQuest
- EBSCOhost
- Biometacluster
- Google

The databases were all searched using similar search phrases which were either the key terms or specific titles depending on the nature of the search. The specific searches based on the pursuit of literature are too many to list, however the key terms used in the various databases during the literature searches were:

- Clinical Decision Making
- Clinical Decision Making AND Pre-Hospital Care
- Clinical Decision Making AND Emergency Care
- Clinical Decision Making OR Clinical Judgment OR Clinical Reasoning AND Healthcare
- Clinical Decision Making OR Clinical Judgment OR Clinical Reasoning AND Pre-Hospital Care
- Clinical Decision Making OR Clinical Judgment OR Clinical Reasoning AND Emergency Care
- Clinical Decision Making OR Clinical Judgment OR Clinical Reasoning AND Paramedic OR Advanced Life Support
- Clinical Decision Making OR Clinical Judgment OR Clinical Reasoning AND South Africa
- Clinical Decision Making OR Clinical Judgment OR Clinical Reasoning AND Africa
- Clinical Decision Making OR Clinical Judgment OR Clinical Reasoning AND Models AND/OR Structures AND/OR Theories
- Pain Management
- Pain Management AND Acute AND/OR Trauma
- Pain Management AND Pre-Hospital OR Emergency
- Pain Management AND Techniques OR Strategies OR Methods
- Pain Management AND Pharmacology
- Pain Management AND Morphine AND/OR Entonox AND/OR Ketamine
- Pre-Hospital Care
- Clinical Decision Making OR Clinical Judgment OR Clinical Reasoning AND Pain Management AND/OR Trauma AND/OR Acute Pain

2.2 THE PRE-HOSPITAL ENVIRONMENT IN SOUTH AFRICA

There has been rapid development in the pre-hospital care environment in South Africa over the past 25 years, particularly after the end of the politically imposed, racially based, inequalities. What was once an element of the health care industry exclusively focused on rapid transportation to hospital with little more than a rudimentary focus on patient care has grown into an industry which, in many cases, represents the first interaction that patients, in their time of injury or illness, have with the South African healthcare system. As such the pre-hospital industry forms an integral part of the overall healthcare system in South Africa (Meents and Boyles 2010; Wallis, 2008; MacFarlane, Loggerenberg and Kloek, 2005).

Pre-hospital care in South Africa is provided by both private and state operated services located throughout South Africa's nine provinces. The structures and staff utilized by both private and state pre-hospital emergency services are of a similar nature in model and qualification respectively with a combination of rapid response vehicles and ambulances utilized to provide land-based pre-hospital care to the people of South Africa. The staffing of these vehicle follows a three-tiered structure were Basic Life Support (BLS) and Intermediate Life Support (ILS) practitioners operate on ambulances while Advanced Life Support (ALS) practitioners generally operate alone on rapid response vehicles. These ground-based structures provide the vast majority of care in the pre-hospital environment while a limited number of rotor and fixed wing services also operate in South Africa. As with various industries in South Africa, the pre-hospital environment suffers from a resource and skills shortage. This is particularly evident in the public sector (Wallis, Garach and Kropman, 2008).

The ALS band of qualification is made up of a number of different qualifications, the Critical Care Assistant (CCA) and National Diploma in Emergency Medical Care (NDip) qualification share the identical scope of practice, while the Bachelors Degree in Emergency Medical Care (BTech) also referred to as Emergency Care Practitioners (ECP), though still part of the ALS band of qualifications, operate under their own specific scope of practice. In South Africa the practitioners registered under the ALS band are identified exclusively by the term 'paramedic', with neither the BLS nor ILS qualifications being implied when the term 'paramedic' is used (HPCSA, 2006; HPCSA, 2009; HPCSA, 2010).

While most international pre-hospital care organizations also provide specific scopes and algorithms for use in the pre-hospital environment, these are usually drafted from the perspective of well-resourced and to a large degree integrated health-care systems most commonly seen in the developed world (MacFarlane and Benn, 2003). Despite the high level of education and training of South African paramedics (Wallis, Garach and Kropman, 2008), a fragmented system does not always allow for the pursuit of the algorithms and/or targets provided as the benchmarks for optimal pre-hospital care in international literature (MacFarlane and Benn, 2003).

As a result of this as well as the varied environments that South African paramedics are required to function in, their judgement and decision making is called upon in order to achieve the best possible clinical outcomes.

2.3 CLINICAL DECISION MAKING

"Clinical Decision Making is an integral part of health care today" (Hardy and Smith, 2008)

"Clinical judgement is a critical aspect of physician performance in medicine. It is essential in the formulation of a diagnosis and key to the effective and safe management of patients" (Croskerry, 2009).

A topic given as significant a title as the one by Hardy and Smith (2008) and Croskerry (2009), may well be expected to be a carefully defined and clearly understood topic, however, as explained by Kearney, Richardson and Di Giulio (2000), no clear definition of CDM exists, with a wide variety of terms used to denote it. These include clinical thinking; clinical judgment; clinical inference; diagnostic reasoning; and medical problem-solving (Norman, 2005). Norman (2005) also indicated that while the importance of CDM is undeniable and that it is an agreed upon fact by educators that it is a key element in paramedic competence; there is limited specific literature in place to guide its development.

While attempts, and to some degree progress, in the understanding of CDM has been made since the early 1970's, the results have been little more than basic theories and assumptions with researchers changing tack rather than immersing themselves in the CDM process (Norman, 2005).

CDM has been defined simply as merely the choosing between alternatives (Thompson and Dowding, 2002) or from a much older study by Baumann and Deber (1989), CDM represents the process of making a choice from a number of possible alternatives which often result in differing outcomes.

As such, there is still a vast amount of knowledge to be gained in order to fully appreciate CDM and the benefits that can be derived from its on-going exploration (Banning, 2008). In addition, Banning (2008) states that CDM may well improve with both personal and collective experience, where collective experience is understood to be any exposure to CDM, either as part of a team or by observation of CDM as a part of a group.

Considering that there is a 20%-40% discrepancy rate between ante-mortem diagnosis and post-mortem findings (Nuland, 1994; Gawande, 2002), a fact directly attributed to the lack of understanding and application of CDM resulting in misdiagnosis (Gawande, 2002), the importance of the advancement of CDM is further emphasised.

Although an accepted definition of CDM has not finalised (Hardy and Smith, 2008; Kearney et al., 2000; Banning, 2008; Norman, 2005), this study will interpret it as a systematic approach to analyze and interpret information in order to reach a conclusion as to what course of action should be followed to achieve best patient outcomes.
According to Banning (2008), there are three distinct categories of CDM:

- Information Processing Model (Analytical Model)
- Intuitive Humanist Model
- Hybrid (Clinical Decision Making) Model

2.3.1 Information Processing Model

The information Processing Model or Analytical Model is referred to as the scientific or hypothetico-deductive branch of CDM (Graber, 2003;Gordon and Franklin, 2003).
This method relies specifically on a structured step-by-step approach to the understanding of clinical presentations and diagnosis (Tanner, Padrick, Westfall, Putzier, 1987). Tanner et al. (1987) further explain that the steps of the process progress as follows:

2.3.1.1 Cue Recognition

Cue recognition is the identification of generally accepted/taught signs and symptoms which allude to underlying conditions or pathogenesis which trigger a response in terms of actions by the relevant party. This stage leads to the formation of ideas and/or concepts as to possible underlying causes or situations.

2.3.1.2 Hypothesis Generation

The hypothesis generation begins either by purposeful thought or subconsciously, as the moment that an individual begins to associate identified cues with potential outcomes/required interventions, the hypothesis generation begins. All of the scientific evidence that is available, either at the time, or through further investigation, is combined into a set of possibilities referred to as a hypothesis.

2.3.1.3 Cue Interpretation

The cue interpretation phase takes place when the signs and symptoms begin to paint a clearer picture as further information/test results become available.

2.3.1.4 Hypothesis Evaluation

As the cue interpretation phase gives rise to a new understanding of the available information, it is evaluated against the previously generated hypothesis or hypotheses to determine a course of action.

These steps are the essence of the hypothetico-deductive model, which relies on a vast number of relevant pieces of information to generate and test hypotheses in order to conclude the most appropriate course of action (Tanner et al., 1987).

This approach (the hypothetico-deductive model), is termed one of the analytical decision making models equated to one of CDM's other names, diagnostic reasoning (Klein and Calderwood, 1991). This method demonstrates a strong association with the literature and classroom doctrine and as such is often relied upon by individuals who lack experience and/or are recent graduates into a particular health care environment and wish to fall back on their academic knowledge (Manias et al., 2004).

Opponents to this model highlight the fact that for this model to be accurately applied, all relevant information must be known. However, according to Orme and Maggs (1993) this is not always the case. In addition, Buckingham and Adams (2000) highlight that any hypothesis by its very nature may be incorrect and as a result may negatively affect outcomes.

2.3.2 Intuitive Humanist Model

According to Banning (2008), intuition and experience in a particular environment which is also referred to as 'professional trajectory' is a widely accepted component of the decision making process, in particular within the nursing profession. The key concepts of decision making in this model are the paramedic's thought processes, the structuring of their ideas and past experiences which come together so they are able to reach coherent and logical conclusions (Banning, 2008).

A further distinction can be made between the inexperienced practitioner and the experienced practitioner and the ways in which they approach the decision making process (Banning, 2008; Gordon, 1987).

2.3.2.1 Inexperienced

The processes followed by inexperienced practitioners are generally associated with the algorithmic models of decision making, whereby the practitioner follows procedures or guidelines set out by their organization or regulatory body as they pertain to particular patients, conditions or situations rather than following a more involved reasoning or CDM process (Banning, 2008).

2.3.2.2 Experienced

The CDM process employed by the experienced practitioner is most often referred to as an intuitive model of decision making.

Based largely on knowledge, past experience and identifying commonalities, or pattern recognition (Gordon, 1987), between current and previous experiences, the intuitive decision making model is used to determine the most appropriate course of action (Banning, 2008). This can take the form of signs and symptoms or a set of results that spark a memory within the clinician/paramedic (Gordon, 1987).

The intuitive process itself is associated with three documented forms of the solution focussed, experience-based learning process known as heuristics:

- Availability Heuristics
- Representational Heuristics
- Adjustment Heuristics (also known as ‘anchoring’)

2.3.2.3 Availability Heuristics

Availability heuristics refers to the ability of a person to recall a situation to determine the process that follows it. In the clinical setting this would pertain to the ability of a practitioner to recall a previous patient/condition and draw conclusions as to the current condition/situation and course of action required for a current patient, in other words, because that patient had similar signs and symptoms as a previous patient they must automatically have the same condition (Buckingham and Adams, 2000; Croskerry, 2002).

2.3.2.4 Representational Heuristics

Similar in nature to availability heuristics, representational heuristics focuses on the frequency of similar events or available data to those that have occurred in the past.

In the specific context of the clinical setting, this would pertain to the reoccurrence of similar signs and symptoms or test results rather than a condition in its entirety, which would allude to the course of action that would be most effective in terms of previous experience (Buckingham and Adams, 2000; Croskerry, 2002).

2.3.2.5 Adjustment Heuristics

Adjustment heuristics, also referred to as ‘anchoring’, pertains to the practice of identifying one aspect of a process and using that focal point and experience thereof to draw conclusions of a current situation. This process can have significant consequences in the clinical setting as the possibility exists for the focal point to cloud other inputs about a condition or situation which may, thus, ultimately lead to an incorrect diagnosis being identified, or an incorrect course of action being selected (Cioffi and Markham, 1997; Croskerry, 2002).

2.3.3 Comparison of Intuitive and Analytical Approaches to CDM

As described by the process involved in 2.2.1 and 2.2.2, significant differences exist in the way in which decisions are made between the analytical and intuitive approached to CDM.

Table 1 highlights a brief overview of the various decision making models that exist under these two broad categories.

Table 1: Comparison of intuitive and analytical approaches

Intuitive approach	Analytical approach
Experiential-Inductive	Hypothetico-Deductive
Bounded Rationality	Unbounded Rationality
Heuristic	Normative Reasoning
Pattern Recognition	Robust Decision Making
Modular Responsivity	Acquired, critical, logical thought
Recognition Primed	Multiple branching
Unconcious Thinking Theory	Deliberate, purposeful thinking

Adapted from Croskerry (2009)

2.3.4 Hybrid Clinical Decision Making Model

Hammond (1996) identified value in both methods highlighting that different aspects of each of the major decision making models, intuitive/humanist and analytical, are critical to deriving the most accurate and beneficial decision for the patient. Hammond termed it the “complimentary” theory of decision making, as it is essentially a combination of the two major decision making models combined in whichever way that best suits the individual practitioner-paramedic. This implies that while some paramedics may favour one of the major models which models are major, there will always be an inescapable element of the other model involved in their clinical decision making (Hammond, 1996).

2.4 CLINICAL DECISION MAKING IN THE PRE-HOSPITAL ENVIRONMENT

The research on pre-hospital CDM is exceptionally limited, with the research coming from individual researchers (Norman, 2005). While it quickly becomes evident that there is significant lack of pre-hospital care, in the field of CDM, some studies have gone as far as to advise on the importance of pre-hospital CDM research and development taking place. However, Norman (2005) points out that very little in the way of this type of research or development has occurred.

In the emergency setting, the onus is on the individual practitioner’s ability to make critical decisions at critical moments to provide the best level of care to their patient. In order to make these decisions fall in line with the best interests of the patient, paramedics requires a better understanding of how to arrive at such a decision; they need to understand the CDM process (Jensen, Croskerry and Travers, 2009).

According the environment most similar in nature to the pre-hospital one is the emergency department. As a result, much of what is applied to the pre-hospital environment actually stems from the emergency department environment (Jensen, Croskerry and Travers, 2009).

While the research into CDM in the emergency department has been similarly limited as in the pre-hospital environment, a few studies have been conducted, and the findings have been very valuable to the field of clinical decision making

Practitioners in the emergency environment often attempt to force themselves into a specific type of CDM, particularly when faced with time critical scenarios. While this may not always be a conscious decision, the fact that the CDM process forms part of an unconscious rather than specifically thought through process is associated with an increase in emergency department decision making errors (Kovacs and Croskerry, 1999).

There is a higher potential for paramedics to make errors in the emergency environment because it is fraught with interruptions. The emergency environment is notes for its potential for errors to develop in the decision making practices of practitioners due to the unstable nature of the working environment, fraught with interruptions and various other disruptions (Laxmisan, Hakimzada, Sayan, Green, Zhang and Patel, 2007).

Ghafouri, Shokraneh, Saidi and Jokar (2011), further agree with Laxmisan et al. (2007) in that the emergency environment is fraught with barriers to effective and accurate CDM. However, they continue to state that any number of factors may be the cause of such disruptions and that in-depth study into CDM and the factors which influence it may bring about a far better understanding as to what factors influences the CDM process. These factors could greatly aid in overcoming the CDM making challenges and inaccuracies which would improve the care that patients receive in the emergency environment (Ghafouri et al., 2011).

2.5 SOUTH AFRICAN PRE-HOSPITAL CLINICAL DECISION MAKING

At present, there is no literature specifically focusing on clinical decision making by the SA paramedic, in acute pain management. Further, there is a paucity of information available describing the process by which the SA paramedic makes clinical decisions. While it may be convenient to rely on a document such as the 'SA Paramedic Protocol' (HPCSA, 2006; HPCSA, 2009), it is understood that no prescribed document or even algorithm can be applied to every patient in every circumstance.

Bar one recent study (Pillay, 2008), no research regarding pre-hospital clinical decision making in the South African context exists. Even when broadened to an international search of the topic, the research on pre-hospital clinical decision making is exceptionally limited, with the research coming from individual researchers rather than collective efforts. This has given rise to a few opinions which are not backed by strong academic enquiry and as such are not viewed as substantiated concepts (Norman, 2005).

In light of the paucity of research in paramedic clinical decision making in the pre-hospital context, this study is therefore of paramount importance for the advancement of the profession and the improvement of patient care in South Africa.

2.6 THE MAGNITUDE OF NON-FATAL TRAUMA IN SOUTH AFRICA

With injury related, both intentional and unintentional, mortality accounting for 31,700 deaths in South Africa annually (WHO, 2008), and very many more non-fatal injuries being reported, the magnitude of trauma in South Africa is considerable. It is estimated that South African hospitals treat 2.5 million non-fatal trauma related injuries per year, accounting for 40% of all patients presenting to the emergency department (Matzopoulus, Prinsloo, Bopape, Butchart, Peden and Lombard, 1999). As a result of the non-fatal nature of these cases, most required some degree of pain management.

2.7 PAIN MANAGEMENT

With up to 70% of patients presenting to American emergency departments complaining of some degree of pain, Cordell, Keen and Giles (2002) extrapolate that similar percentages to these may present to pre-hospital providers prior to their arrival in the emergency department. Coupled with this, Lord (2003) asserts that “Freedom from pain is a fundamental human right and clinicians have a moral obligation to relieve the patient’s pain”. This indicates the importance of understanding the process involved in CDM in the management of acute traumatic pain.

With such a significant prevalence of pain, the consideration to adequate pain management should be paramount amongst hospital and pre-hospital emergency care practitioners. However, for a variety of reasons, the vast majority of patients treated in the emergency setting receive inadequate pain management and as a result suffer needlessly (Rupp and Delaney, 2004; Lord, 2003).

According to Rupp and Delaney (2004), factors which influence the methods and extent to which pain is managed range from ethnicity and gender (Weisse, Sorum and Dominguez, 2003; Mills, Shofer, Boulis, Holena and Abbuhl, 2010) to the patients age and social situation (Hamers, Abu-Saad, van den Hout, Halfens and Kester, 1996) influencing the methods and extent to which pain is managed, as a result, much improvement is required before an ideal situation is recognized (Rupp and Delaney, 2004).

A particular challenge of pain and pain management is accurately assessing the patients’ pain and determining the requirement for pain management (ICSI, 2008). Another challenging element of this process is that pain is ultimately a very subjective experience and often the word of the patient must be considered as the guiding factor as to the severity of their pain (Hennes and Kim, 2006). Some researchers have even suggested that assessing and managing pain objectively is impossible (Breivik, Borchgrevink, Allen, Rosseland, Romundstad, Breivik-Hals, Kvarstein and Stubhaug, 2008).

Numerous scales and scores are used to measure pain objectively, most notably the numerical rating scale (NRS, the visual rating scale (VRS) and the visual analog scale (VAS), which according to Alonso-Serra and Wesley (2003) are equally reliable, however none of these have been proven to be any more effective than the other (Alonso-Serra and Wesley, 2003).

In the unconscious patient, other indications that the patient is experiencing pain have been postulated such as: changes in their physiological indicators such as blood pressures, heart rate and respiration rate (Gélinas, Fortier, Viens, Fillion and Puntillo, 2004) or expressions (Hamers, et al., 1996), but even these may not always be accurate as they may be the result of underlying conditions.

The process of managing the patient's pain is equally challenging as both the benchmark for initiation as well as the ability to assess efficacy of management are very subjective and as such, patient specific (Jones and Machen, 2003).

As a result of the challenges in adequately assessing the patient's pain, findings from the ICSI (2008) indicates that the clinical decision making process is perhaps more relevant in acute traumatic pain management than in any other facet of emergency medicine.

2.8 CLINICAL DECISION MAKING IN PAIN MANAGEMENT

Jones and Machen (2003) identified that pre-hospital CDM in pain management is largely patient-led. In essence, their study identified their patients' perception of pain as the key influencing factor for CDM. This is expanded upon to include Clinical Decision Making as a key element in the appropriate identification and management of pain (ICSI, 2008)

Further factors which are relevant to clinical decision making in pain management are also the paramedics' perception of their patient's pain and their request for analgesia (Jones and Machen, 2003).

The assessment and management of pain is arguably the most difficult of all clinical processes. As no two pain management scenarios are the same, the ability to apply an accurate, correct clinical decision making process in pain management is of the utmost importance to achieve quality care and is the indicator of the success or failure in desired patient outcomes (Brockoppa, Downeyb, Powersc, Vanderveerc, Wardena, Ryana and Saleh, 2004).

2.9 CONCLUSION

This chapter presented literature on CDM as well as pain management both generally as well as specifically to the emergency environment. The following chapter will discuss the research methodology used to obtain and analyze the findings of this study.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter will explain the research methodology employed during the course of this study and give insight into the specific techniques utilized by the researcher.

3.2 RESEARCH DESIGN

A mixed method design was used to determine the factors contributing to the CDM process South African paramedics use in the management of patients with acute traumatic pain. Cresswell and Plano-Clark (2011) define mixed method research as a design that consists of a mixture of qualitative and quantitative approaches in many phases of the research process. These authors argue that mixed method research provides more evidence for studying a research problem than either quantitative or qualitative research in isolation. The objectives of the study, as outlined in Chapter One, may only be accurately answered by gaining a deeper understanding of the thought processes of individual paramedics and the analysis of potential correlations between the thought processes of the individuals.

Despite the benefits, a mixed method design does also have certain disadvantages as noted by Cresswell and Plano-Clark (2011), these include the requirement of a sound understanding of both qualitative and quantitative studies in isolation prior to embarking on, the resource (time, effort, man-power) intense nature of and the need to convince others of the benefits of mixed method studies. In this study the researcher had a prior understanding of qualitative research and coupled with a strong mixed method understanding and experience provided by the supervisors; felt that the first concern was suitably mitigated. The resource intense nature of the study was noted and time suitably planned in order to ensure that these challenges could be accommodated.

Cresswell and Plano-Clark (2011) recommend that researchers carefully select a design that best matches the research problem. These authors argue that by selecting a typology-based design, the researcher is provided with a framework that guides the implementation of the research methods to ensure that the resulting design is rigorous and of high quality. This study used an explanatory sequential design, consisting of two distinct two phases.

In the first phase, Phase One, the quantitative design of the study, a questionnaire was used to collect data which was analysed by using descriptive statistics. The findings of these results were used to identify the participants which were selected for the qualitative sample.
The second phase, (Phase Two), a qualitative design was used as a follow up on the quantitative results to help explain these findings. The main focus was on the qualitative phase as it provided the findings of the results of the in-depth interviews.

The quantitative and qualitative designs were connected when selecting the five participants for qualitative in-depth interviews. The results of the Phases One and Two were integrated during the outcomes of the entire study (Cresswell and Plano-Clark, 2011). See Figure 3.1.

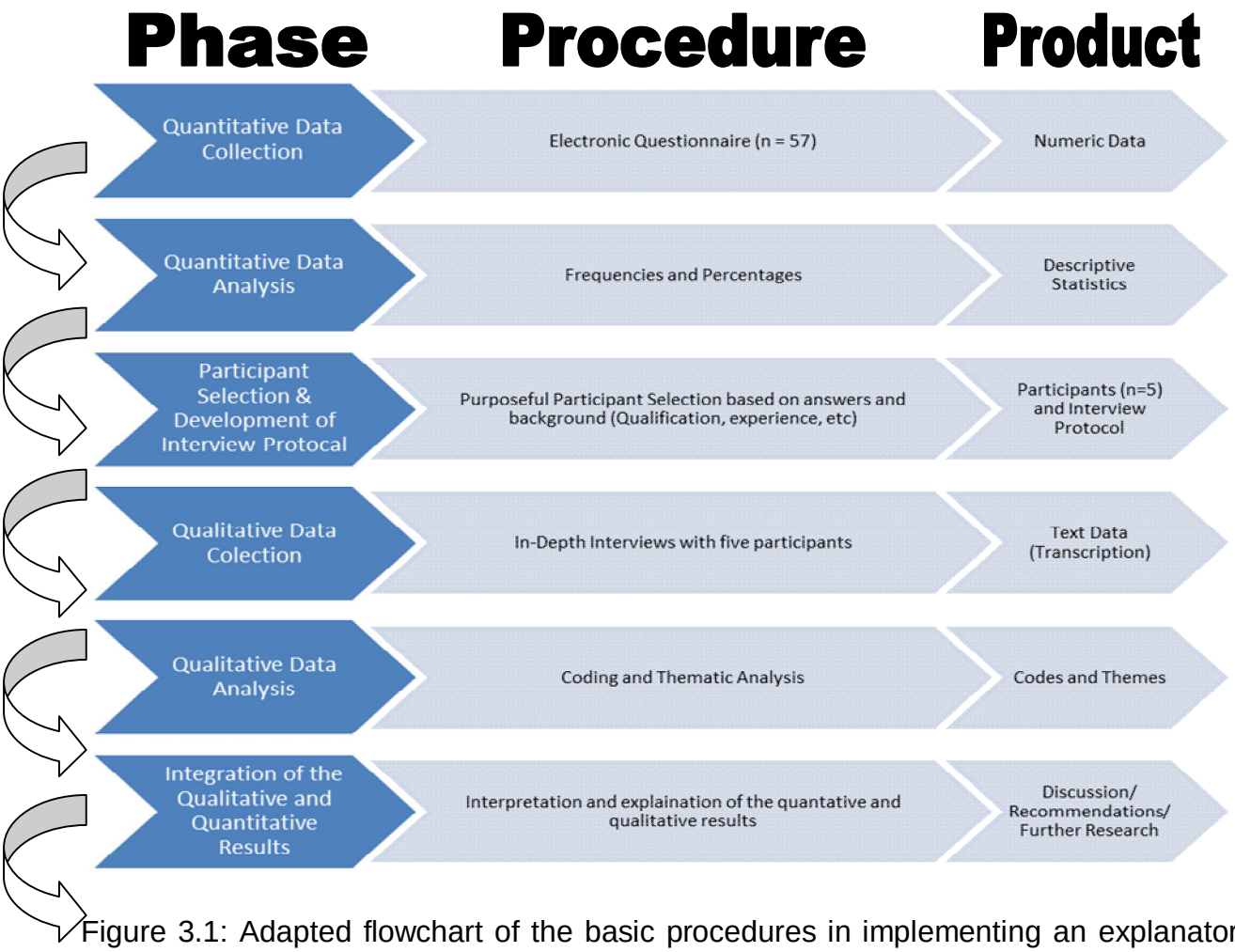


Figure 3.1: Adapted flowchart of the basic procedures in implementing an explanatory sequential design (Cresswell and Plano-Clark, 2011).

3.3 STUDY SETTING

This study was conducted in the nine provinces of South Africa. While not every individual was interviewed, the questionnaires were sent out to as many of the active paramedic population in South Africa as possible.

The responses were sufficiently geographically diverse to accept that the various provinces were included in the questionnaire process thus giving a representative understanding of the entire South African paramedic population.

South Africa is made up of the following nine provinces:

- Eastern Cape
- Free State
- Gauteng
- KwaZulu-Natal
- Limpopo
- Mpumalanga
- North West Province
- Northern Cape
- Western Cape

While the questionnaire did ascertain the specific context of the contacted individuals, no differentiation was made between private and public sector or urban and rurally operationally paramedics in terms of the later purposive selection. The rationale that was applied was that all South African Paramedics have had to be proven competent over the course of a range of theoretical and practical assessments and regardless of ultimate qualification (CCA/Ndip/BTech), are registered with the HPCSA and as such are answerable to the same professional board. In addition, regardless of their geographic location, they would be met with “similar” disease/injury, for example, there is no physiological difference between a lower extremity fractures in the Western Cape when compared to a lower extremity fracture in Gauteng or anywhere else in South Africa.

3.4 SAMPLING PROCESS

This study consisted of two distinct sampling strategies. The initial strategy was for identifying potential recipients of the questionnaire, and the second strategy when selecting participants for the interview process. To gain the highest number of replies, the questionnaire was distributed by email to as many South African paramedics as possible. The study participants for the interview process were then selected by means of purposive sampling. Purposive sampling relies on the concept that the researcher is sufficiently knowledgeable about the study population in order to specifically select the most appropriate candidates to become study participants (Polit and Beck, 2008). The questionnaire process provided this level of knowledge and understanding and allowed for identification of trends and key themes amongst all of the respondents, ultimately leading to purposive selection of the study participants.

3.5 QUANTITATIVE PHASE

The sampling strategy used for the questionnaire distribution process encompassed the whole study population as it was attempted to distribute the questionnaire to every active (currently practicing) and registered member of the South African paramedic community. This was not entirely achieved as the questionnaire was conducted electronically and there is currently no complete database of contact details for South African paramedics at present.

3.6 QUALITATIVE PHASE

Due to the nature of the study design, the most appropriate sampling strategy for the in-depth interviews was a purposive sampling strategy. The purposive selection tool was the questionnaire, and the interview participants were selected in a fashion which gave the most comprehensive spread and balance between years of experience, operational environment, prevalence of injury profile and approach/mindset to pain management.

3.7 DATA COLLECTION

3.7.1 Phase One: Questionnaires

Self-administered questionnaires are a form of a self-reporting, which eliminates any level of researcher bias or influence. This aspect in association with the logistical ease and financial consideration of distributing a large number of questionnaires to a vast geographical area are the key strengths of the questionnaire in the data collection process (Polit and Beck, 2008). The questionnaire was designed using a free-ware programme accessible on the internet called “SureveyBob” (www.surveybob.com) – Annexure 6.

The questionnaire was made up of open and closed questions; the decision to pursue this methodology was two-fold. One of the primary reasons for poor response to any form of questionnaire is the “inconvenience” to the respondent of needing to take the time to complete it (Polit and Beck, 2008), in order to combat this, closed questions were used wherever possible in order to make the questionnaire simpler and, most importantly, quicker to complete. The questions which were asked in the closed format were also specifically descriptive in nature in that they identified the type of environment, qualification, duration of experience and geographical location of the respondent. The possible answers to these questions were limited to a specific number and as such, closed questions could be used. The second reason for the use of closed questions was specifically for an ease of coding during that phase of the study.

The open questions used were associated with preceding closed questions based on current South African paramedic protocols and guidelines, this allowed for succinct yet valuable insight into some of the thought processes of the respondents.

This questionnaire was reviewed by supervisors and it was decided to pilot test the questionnaire prior to large scale distribution.

3.7.1.1 Pilot Test

A pilot study was conducted between the 14th and the 20th of June 2010. Five emails containing the link to the questionnaire was sent to five paramedics operating in the Western Cape. The decision to use these five paramedics was largely based on the geographical proximity to the residence of the researcher as it was easier to contact and as a result better understand the feedback provided by the pilot test group.

The email invited the five paramedics to reply to the email and return it electronically to the researcher detailing if they had any their difficulties, problems with the questions or found the questions to be ambiguous or confusing. The feedback was positive and all of the pilot-test participants reported that they found the layout and format easy to use and did not experience difficulties in accessing or completing the questionnaire electronically. The mean completion time of the questionnaire was six minutes (Min. four minutes; Max. ten minutes).

However, the pilot-test participants did report some confusion regarding the options in question 10 & 13 which were corrected (as can be seen in 3.5.1.2). Furthermore, when reviewing the results, the researcher noticed that by allowing multiple selections on certain questions, the percentage calculations lost their accuracy and therefore validity; this was also corrected (as can be seen in 3.5.1.2).

None of the information provided by the five pilot test respondents was included in the results of the actual research and was used purely to enhance the functionality of the questionnaire used as the quantitative research tool.

3.7.1.2 Changes to the Questionnaire based on Pilot-Test Feedback

Question 10 and 13, pertaining to when to initiate management of pain and when to terminate management of pain, were expanded to include explanations of the answers given in the tick box section of the questions, this allowed for a far greater understanding of the individuals thoughts on the topic than by simply having them choose from predetermined options. The researcher decided to remove the option to make multiple selections on the remainder of the questions as it made the results exceptionally difficult to interpret accurately. Instead, further options were added to the existing questions to counter the need for multiple selections.

3.7.1.3 Formal Questionnaire Process

Ethical approval for the study was granted on the 7th of June 2010 by the Durban University of Technology Faculty Research Council (Annexure 1). The official study questionnaire distribution commenced on the 21st of June 2010, the questionnaire with changes as per 3.5.1.2 was emailed to the email addresses of all paramedics that the researcher had been able to gather. This first stage of data collection was concluded on the 30th of September 2010.

To capture the entire South African paramedic population for questionnaire distribution, the researcher began compiling a database of South African paramedics email addresses. This was accomplished through various mediums: by contacting the academic institutions throughout South Africa and attempting to gain the contact details of previous graduates, by contacting the various emergency medical services (both private and public) in South Africa and asking for their employee's contact details; and by utilizing the social networking site "Facebook" to create an academically focused group whereby the questionnaire link was accessible and paramedics could invite their colleagues to join and participate as well.

3.7.1.4 Challenges in the Questionnaire Process

The key challenge was gaining access to the SA paramedics contact details as there is currently no database with such information. As a result, it became a necessary to seek the information from the various emergency medical service providers in both the private and public sectors throughout South Africa.

The challenges that existed when contacting the paramedics from the public sector were predominantly difficulties in determining the correct individuals who could approve or facilitate such a request. .

The private sector required the researcher to operate through the various human resources departments with some of the organizations indicating that it was contrary to their policy to give out staff contact details. After many discussions, approval was granted and though this process was lengthy, it did yield good results in terms of accessing the South African paramedic population.

By far the most effective means of gaining paramedic email addresses and questionnaire distribution was through the internet-based social networking site “Facebook”, which accounted for almost half of the respondents to the questionnaire.

The total population of registered paramedics in South Africa was determined to be in the region of 430 (HPCSA, 2010) and of these, the contact details for 256 paramedics could be obtained and as a result, a total of 256 questionnaires were emailed to the South African Paramedic population. Of the distributed questionnaires, 57 responses were received, yielding a 22% return rate on distributed emails.

3.7.2 Phase Two: In-depth Interviews

In qualitative research, the researcher conducts face-to-face interviews with participants. The interviews involve unstructured and generally open-ended questions that are intended to elicit views from the participants (Cresswell, 2009). To gain a full understanding of the participants views on CDM, in-depth semi structured interviews were conducted.

3.7.2.1 Demographic Profile of the Interview Participants

The study participants for the interviews were selected after the data collection phase of the research questionnaires had been concluded. The five respondents to the questionnaires were chosen to represent the diversity of the population in so far as their geographic environment, experience, training/academic background and current thought processes/mindsets were concerned. See Table 2.

Table 2: Demographic Profile of the Interview Participants

Interview Participant	Province	Sector	Setting	Qualification	Years of Experience
P1	**Gauteng**	**Private**	**Urban**	**BTech**	**5-10**
	The position he held at the time of interview was one that spoke directly to maintaining a high level of clinical knowledge and academic focus, this contributed to his selection and positioning as first interview participant as the level of information was expected to be relatively high and of good quality				
P2	**North West**	**Public**	**Rural**	**NDip**	**5-10**
	This participant's similar years of experience as participant 1 and associate high level of traumatic pain patient count in an environment as contrasting to participant 1's as his was, led participant 2 to be selected for the interview process				
P3	**Gauteng**	**Private**	**Urban**	**CCA**	**1-3**
	This participant was chosen in order to determine the mindset/thought processes of a more recently qualified paramedic in a similar environment to interview participant 1				
P4	**KwaZulu-Natal**	**Private**	**Urban**	**NDip**	**1-3**
	Participant 4 was chosen to explore geographical similarities/differences between participants with similar experience and environments				
P5	**Western Cape**	**Private**	**Urban / Rural**	**CCA**	**10+**
	The vast years of experience and high patient workload led to this individual being selected for the interview process				

3.7.2.2 Interview Process

The interview questions were generated by taking into account the answers to the research questions, as well as trends determined during the literature review. To maintain focus and active participation from the interview participants, the interviews were scheduled to be no longer than one hour (60 minutes) each, excluding a 15 minute period just prior to the commencement of the interview, in which time the researcher reviewed the five cases of pain management in acute traumatic long-bone injury that the interview participants had gathered prior to the interview. During this time, the researcher highlighted points of interest on the case notes pertaining to the type and quantity of pharmacological agent used, time of initiation in comparison to time of arrival and any other facts deemed pertinent, to the study, for discussion.

To gain the required degree of depth of information in the 60 minute time period, the structured interview questions were limited to five questions which allowed for sufficient investigation and discussion surrounding the answers provided by the research participants.

The appropriate degree of depth of information was further obtained by following numerous processes such as ensuring participant comfort and ensuring that they felt that their input was interesting and valued (Boyce and Neale, 2006). This process was supplemented by careful self-checks conducted by the researcher to ensure that no leading questions were asked and that whose the body language, facial expressions and commentary remained neutral so as not to influence the line of thinking or answers provided by the interview participants (Boyce and Neale, 2006).

As scripted in Annexure 8, the interview questions were kept identical for each participant, with only slight differences existing due to the need to pursue certain elements specific to the answers of the individual study participants.

The structure of the interviews was identical with all five participants, the interviews were conducted at a location in which the participants felt comfortable and where they could be assured of the confidentiality of the interview, by the interview participants selection, this setting was either their home or office/place of work. Having assured the participants comfort, a brief introduction to the research comprising of a reiteration of the confidentiality clauses, an overview of the purpose of the study and a brief description of the course of the interview that was about to begin. Subsequent to this, all efforts were made to ensure that the participants felt comfortable and at ease.

The participants were then shown the results to the research questionnaire in graphical format (as represented in Chapter 4 – Results), with any questions they had regarding the data and how to read it being answered by the researcher. Subsequent to this, the recording device was turned on, and the questions began. A guide was used to conduct the interviews. See Annexure 8.

3.8 DATA ANALYSIS

The data analysis which is ultimately descriptive in nature was carried out in the five-phased cycle method (Yin, 2011). These phases of the data analysis process, in order, are:

1. Compiling
2. Disassembling
3. Reassembling
4. Interpreting
5. Concluding

According to Yin (2011), there is a definite degree of interrelation between the five phases, with direct backwards and forwards relationships between compiling data and disassembling, compiling data and interpreting, disassembling and reassembling, reassembling and interpreting as well as between concluding and interpreting. These relationships indicate that a large degree of reviewing of previous stages occurs in order to achieve the highest level of accuracy in the ultimate findings (Yin, 2011).

3.8.1 Compiling

Yin (2011) advises that this phase of the data analysis process should be one of familiarising the researcher with the data that they have collected, marked by continuous re-reading of the data and ensuring that it is all captured in the same format/manner.

Specific to this study, this stage of data analysis was made up of the collection and sorting of the data gathered during the interviews. The interviews which were digitally recorded where then transcribed by the researcher and stored until the interviews with all five of the study participants had been concluded. This allowed for a three-fold review of each interview, the initial interview which was recorded, the transcription of each interview and then the re-reading and editing of the transcription in line with

triangulation. This allowed for great insight and understanding of the responses of each participant in the interview phase.

3.8.2 Disassembling of Data

While there is no fixed routine to data disassembly, the coding of data is one of the more popular processes within the qualitative paradigm (Yin, 2011). The coding process sees a variety of different levels of coding being applied to specific elements of the data collected in the interview process.

For the purposes of this study, level 1 (open codes) and level 2 (category codes) were used to identify the study participants' direction of their thought processes and decision making strategies (Hahn, 2008). The answers provided by the study participants in the interviews were initially coded based on their general meaning (Level 1 codes) in order to present a more focused approach than the lengthy responses themselves. Following this, the various level 1 codes were categorized into specific categories to determine the specific area of relevance to which they applied (level 2 codes). The areas of relevance and as such the vast majority of level 2 codes were directly linked to the research questions. In addition to the coding process, certain statements of specific relevance were also used verbatim to illustrate a point of view or thought process and indicate aspects that did not fall within the realm of the coding process.

3.8.3 Re-assembling of Data

The re-assembly phase which discusses the high level of theories and concepts within the data and specifically the relevance that they have between one another (Yin, 2011). While the formal coding method can be pursued further in the reassembly phase, with level 3 and 4 codes which are more specific to areas of greater relevance (Hahn, 2008), however, as per Yin (2011) this is not strictly speaking necessary. For the purposes of this study, a departure was made from the formal coding process in order to pursue the interrelations between the various level 2 codes as well as the specific points of view expressed by the study participants. Level 3 and level 4 codes went beyond the degree

of detail which is required for the exploratory nature of this study and would only have clouded the overall relevance of the commentary provided by the interview participants. This process was followed in order to specifically channel the evidence towards answering the study questions and objectives.

3.8.4 Interpretation of Data

“Interpreting may be considered the craft of giving your own meaning to your reassembled data” – Yin, 2011.

This statement by Yin (2011) sums up the essence and goals of the interpretation of data phase. Having identified the various trends within the data during the re-assembly phase, the interpretation phase requires the researcher to understand the meaning of the commonalities or disparities between the data collected and the review of the literature. This enables the researcher to merge the information to answer the problem statement and objectives (Yin, 2011).

For the purpose of this study, this was carried out in the descriptive vein in order to answer the primary research question as well as the three objectives as the nature of these questions sought answers or thoughts that were descriptive in nature. The interpretation thus followed the pattern laid out in the primary research question which required elements of the answer to cover the objectives thus informing the overall research question.

3.8.5 Conclusion

While the conclusion usually signifies a summary of the entire research process and interpretation, Yin (2011) points out that this is not its only function and actually still forms a part of the analytical process, hence the inclusion in the five phase-cycle method. The conclusion allows the researcher the greatest amount of freedom with regards to inference from the data collected, but must still remain relevant and accurate to the objectives of the study (Yin, 2011).

Depending on the specific outcome of the Data Analysis described process in section 3.8, the conclusion will either consist of generalization to a broader set of situations, conclusion by making substantive propositions, conclusions with new concepts/theories about behaviour, conclusions by calling for new research, or a combination of some or all of these.

3.9 ACCURACY OF METHODS AND FINDINGS

Described as the “gold standard” of accuracy within qualitative data analysis, the four aspects highlighted by Lincoln and Guba (1985) are credibility, transferability, dependability and confirmability. These four concepts are advocated as a necessary function for evaluating and interpreting data and ultimately concluding the concepts that have been formed (Polit and Beck, 2008).

Along a similar vein, almost all researchers call for soundness of method and accuracy of the findings with research. While this is addressed by the method set out by Guba and Lincoln (1985), a growing number of qualitative researchers are striving to achieve the desired accuracy of results by following a strategy for ensuring reliability, validity and rigour (Long and Johnson, 2000; Yin, 2011; Rolfe, 2006) despite the roots of this technique being in quantitative research (Polit and Beck, 2008).

As a result of this study being conducted as a mixed-method study, all seven aspects of both quantitative and qualitative accuracy were considered, even though many of them overlapped in certain regards. This process is sought to ensure that all aspects of the study were appropriately aligned to achieve the best possible accuracy.

3.9.1 Credibility

The credibility of the study discusses the truthfulness of the collected data and the interpretation of the data itself (Polit and Beck, 2008). Of the various techniques suggested by Lincoln and Guba (1985) to ensure credibility within a study, method triangulation was employed.

To answer the study question and objectives, data was first gathered by the quantitative method of a questionnaire, followed by semi-structured interviews and literature based discussion and review of the data subsequent to the data collection process. To confirm credibility of the findings, member checking was used to assess whether the participants recognised the findings of the study. Each participant was asked whether the researcher's interpretation reflected their views on pain management.

3.9.2 Transferability

This process is advocated by Lincoln and Guba (1985) to determine the degree to which the results of the study may be of value to other settings.

In this study, the researcher enhanced the transferability of this research by providing thick descriptions of the phenomenon under scrutiny. Thick description refers to a rich and thorough description of the research setting. The purposive selection of research participants subsequent to the questionnaire phase specifically targeted a diverse and representative segment of the study population, covering all qualifications, categories of experience and exposure as well as the geographical location. As a result, the researcher felt that the results of the study would ultimately be universally applicable to the study population of all Advanced Life Support paramedics in South Africa. The topic was covered in depth to ensure that the data obtained supported the provision of thick descriptions. By recording the data on a digital audio-recorder the researcher ensured that the participants' narratives were captured completely and in their original format.

3.9.3 Dependability

Dependability of qualitative data refers to the stability of data over time and over various conditions (Polit and Beck, 2008). Failure to ensure dependability directly translates to an inability to ensure credibility (Polit and Beck, 2008; Rolfe, 2006). As a result, the dependability of the study was of significant value and thus was ultimately the reason for a mixed method study being employed.

The quantitative process (the questionnaire) was utilized to gather general data identifying certain perceptions and thoughts within the study population. At the onset of the interview process, the participants were presented with the findings of the questionnaires and asked to comment on their reaction to them. This was viewed as a form of inquiry audit as well as an information gathering method.

3.9.4 Confirmability

Confirmability specifically relates to the accuracy, neutrality and objectivity- not only of the data- but also the data collection process (Polit and Beck, 2008). To ensure that the data used in the study is both neutral and collected in an objective manner and, as such, classified as accurate by an independent person, a process flow which lent itself to ease of audit was utilized. This audit or process flow was achieved by the researcher keeping a record, outlining dates and timelines of interactions and processes, electronic databases of questionnaire responses and full transcriptions of every interview conducted as a part of the study. This would allow anyone to follow, and if so inclined, to replicate the processes followed by this researcher, thus ensuring the accuracy and objectivity of the data and in so doing promoting confirmability.

A challenge to confirmability in qualitative study is the inherent threat of pre-conceived ideas or emotions pertaining to the subject matter, influencing the researcher and their investigations. To mitigate this risk, the process of bracketing was applied to the study. Bracketing is a process by which the researcher identifies and acknowledges their

beliefs and opinions and then attempts to control and remove them from the study as best as possible (Polit and Beck, 2008).

As the researcher is a paramedic within South Africa, many of the scenarios and thought processes expressed by the research participants would inherently involve a degree of familiarity and the risk was that the researcher might apply his own clinical decision making to the scenario. To account for and prevent this, the questionnaire and interview protocols were created before the process began thus preventing any manipulation within the data collection process as it was guided by said protocols.

3.9.5 Reliability

Reliability, which is often used interchangeably with the term trustworthiness (Rolfe, 2006), is very closely linked with credibility (Yin, 2011) and validity (Polit and Beck, 2008). Accordingly it is very much a general term used to discuss the overall accuracy of the data, its collection and its interpretation (Yin, 2011). The various processes such as triangulation and the fact that the study utilized both a questionnaire of the quantitative paradigm as well as the interviews of the qualitative paradigm sought to demonstrate the reliability of the data.

Emphasised by some as the key quality control element in all research and encompassing some of the other elements listed here, the reliability or validity of a study speaks to the degree to which the data has been accurately collected and interpreted in order to provide a true representation of the content which was studied within the relevant setting (Yin, 2011).

Yin (2011), cites Maxwell (2009) in identifying seven strategies for combating threats to validity in qualitative research, these are:

I. Intensive long-term (field) involvement
II. “Rich” Data
III. Respondent Validation
IV. Search for discrepant evidence and negative cases
V. Triangulation
VI. Quasi-statistical
VII. Comparison

For the purpose of this study, respondent validation, a form of triangulation and comparison were employed to strengthen the reliability or validity of the study. The respondent validation which is characterised by the aim of reducing misinterpretation of reported processes was achieved by exploring the answers provided in the interview by asking specific questions to the answers that were provided rather than utilizing a purely generic set of questions. The literature review coupled with the answers to the questions and then interviews may be interpreted as a form of triangulation with the comparison aspect being an inherent component of the study as comparisons between different settings and groups formed the basis of an aspect of the study.

3.9.6 Rigour

The requirement for rigour in qualitative research is to avoid falling into the trap of merely recanting anecdotal evidence emanating from the experiences or opinions of individuals (Long and Johnson, 2000). Failure to apply an adequate degree of rigour to the results of qualitative research leaves a study open to the danger that no substantial knowledge can be gained or theories created from it.

To avoid this pitfall, an extensive discussion, which included an additional literature review, was carried out subsequent to the data coding process to determine the links or lack thereof, which existed between the existing literature and the specific data gathered from the questionnaire and interview processes.

3.10 ETHICAL CONSIDERATIONS

Ethical considerations in qualitative research are of particular importance as there is direct interaction and exploration of human perceptions, feelings, thoughts and emotive processes (Yin, 2011). To safeguard the study population, ethical approval needed to be sought, both from the academic institution facilitating this study as well as approval from the study participants themselves.

Academic clearance was received from the Durban University of Technology's Faculty Research Council on the 11th June 2010 (Annexure 1). Informed consent was gained by utilizing a cover letter for the questionnaire (Annexure 2) and interview by means of an information (Annexure 3) request and consent form (Annexure 4) which explained the process to potential participants and emphasised the aspects of confidentiality as well as the right to withdraw from the study at any time for any reason. As there was some information which would be seen by the researcher which was the property of the organization which employed the participants, (Annexure 5) was utilized as a request for access to both staff and some records. A similar process was reiterated prior to the start of the interviews with the relevant participants, specific to the fact that recording and transcription would take place (Annexure 7). These confirmations upheld the requirements of the ethical approval and of good practice with regards to research of this nature.

3.11 CONCLUSION

This chapter provided the insight into the methodology utilized in this study. The overall nature of the studying was mixed-method and thus covered elements of both the quantitative and qualitative paradigms. From the selection of study populations and participants, to the specific data collection tools of the quantitative questionnaire and the qualitative interviews, the analytical processes employed and ultimately the safeguards utilized to ensure overall objectivity and accuracy the setting for the following results chapter should be well set.

CHAPTER 4

PRESENTATION AND DISCUSSION OF THE RESULTS

4.1. INTRODUCTION

This chapter aims to highlight the results of the study. As this study was mixed method in nature, the reporting and discussion of the results will follow in two separate formats. In the first part, focusing on the results of the quantitative questionnaire and the second on the qualitative in-depth interviews.

The participants for the interviews were selected based on the answers provided to the questionnaire to achieve a balance between their years of experience, operational environment, the prevalence of injury profile, approach/mindset to pain management and geographical distribution to provide the best overall picture of clinical decision making in acute traumatic long-bone pain by the South African Paramedic.

At total of 256 questionnaires were distributed with 57 being returned completed. This equated to a response rate of 22,23%. Of the 57 respondents, five consenting participants were purposively selected for the in-depth interviews.

The questionnaire results will be reported in a graphical format for ease of overview with a few key points highlighted for each section. These results are what aided in designing the interview questions/structure and served as a baseline to work from and one of the initiating factors in engaging the practitioners in discussion.

The interview results were analysed by means of coding and are represented as such with the significant commonalities and disparities identified and further discussed.

4.2. QUESTIONNAIRE RESULTS

As discussed in Chapter 3, the questionnaires were distributed nationally in an electronic format; the following graphs represent the result to the questions contained therein:

4.2.1 Geographical Distribution of Respondents

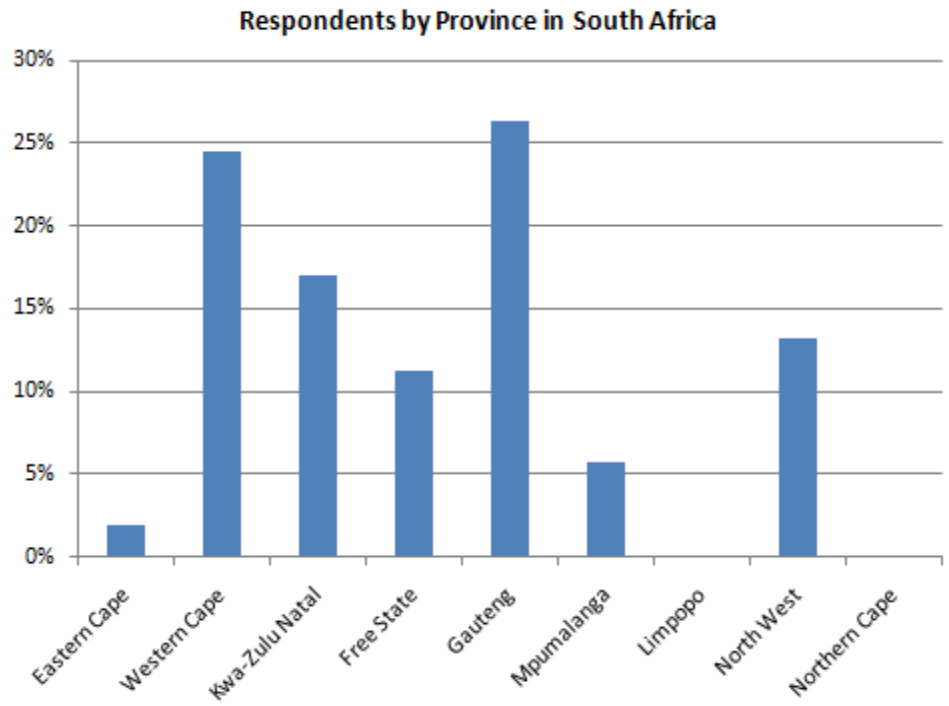


Figure 4.1: Geographical distribution of respondents

The graphical distribution graph matches expected outcomes with the major centres in South Africa (Johannesburg – Gauteng (GP), Durban – KZN and Cape Town – Western Cape (WC)) accounting for the majority of the respondents. GP accounted for 26,4% of responses, followed by WC with 24,5%, KZN with 17%, the North West with 13,2%, the Free State with 11,3%, Mpumalanga with 5,7% and the Eastern Cape with 1,9% while there were no respondents from the Northern Cape or Limpopo. This was most likely due to the higher concentration of practitioners in these areas as well as the fact that the three universities offering paramedic education in South Africa are located in these centres.

The remainder of the province's respondent percentages were satisfactory and the distribution follows both the population and paramedic distribution trends throughout South Africa with all provinces except for Limpopo and the Northern Cape being represented. The absence of any respondents from the Limpopo and Northern Cape Province may be due to the exceptionally limited paramedic resources in the provinces with all indications being that fewer than five practitioners who met the requirements (ALS – CCA, Ndip, BTech qualification/registration) were present in Limpopo and the Northern Cape.

The researcher is satisfied with the overall representativeness of the respondents, thus making the study applicable to the general South African context.

4.2.2 Arena of Practice

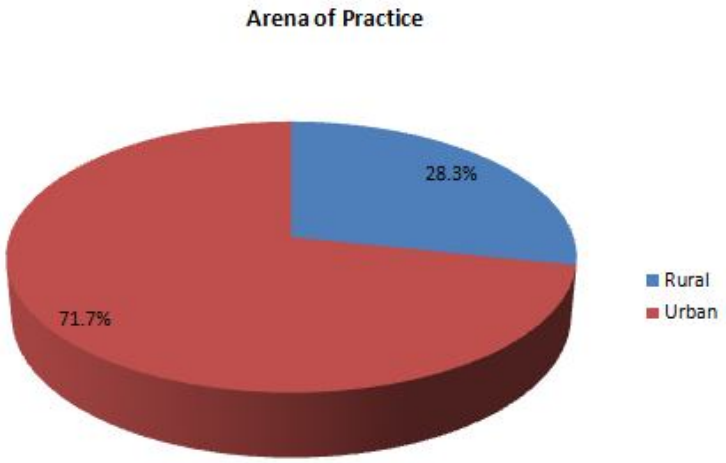


Figure 4.2: Arena of practice

Again, the question regarding “where” practitioners were operationally active yielded results that were to be expected with 71,7% of respondents operating in the urban (city centre) environments with only 28,3% of respondents operating in the rural setting. This was taken into consideration when selecting study participants, because it is believed they may have different mindsets and therefore different clinical decision making abilities because of factors such as: infrastructure, distances and cultural beliefs.

4.2.3 Sector of Service

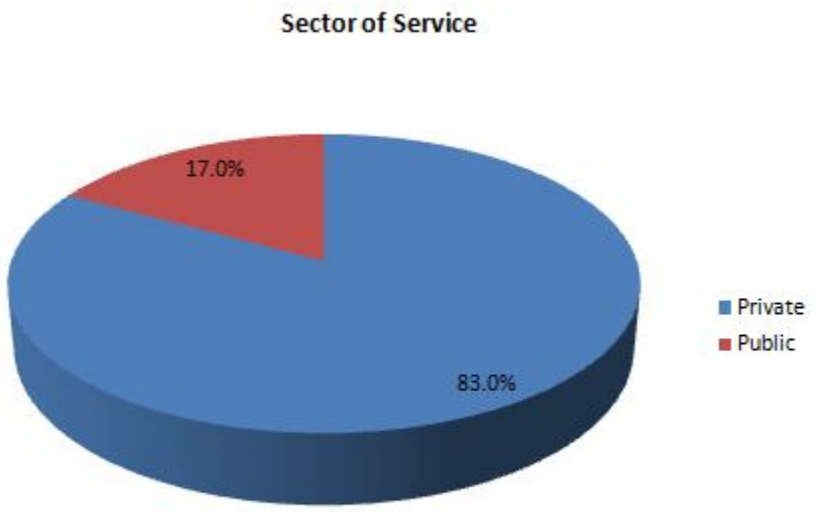


Figure 4.3: Sector of service

In the sector 83% of respondents operated in the private sector while only 17% were from the public sector.

4.2.4 Qualification

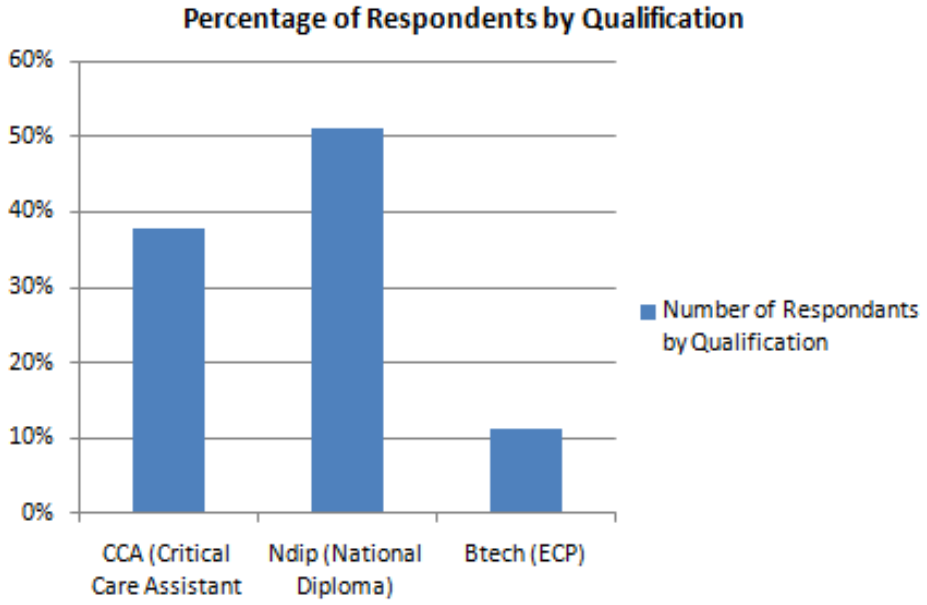


Figure 4.4: Qualification

Of the three qualifications falling into the paramedic scope with independent pain management decision making capabilities, 51% of the respondents held a National Diploma in Emergency Medical Care, 37.7% of the respondents held a Critical Care Assistant diploma, whereas only 11,3% held a BTech Emergency Medical Care degree. These percentages make good sense given the fluctuation in South Africa towards fewer CCA training facilities with increased tertiary out-put (Ndip graduates) and the still fairly new BTech qualification.

4.2.5 Years of Experience

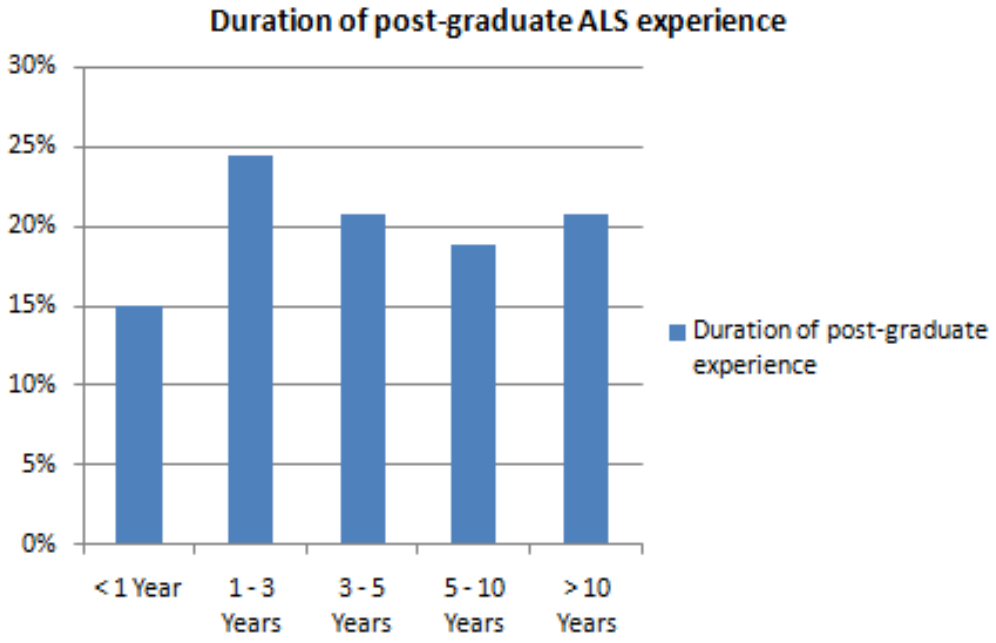


Figure 4.5: Years of experience

The respondents years of experience indicated an even distribution with the sub 1 year (newly qualified) category representing 15%, the 1-3 year category 24,5%, the 3-5 year category 20,8%, the 5-10 year category 18,9% and the above 10 years of experience category 20,8% of the respondents.

4.2.6 Number of Patients Requiring Pain Management

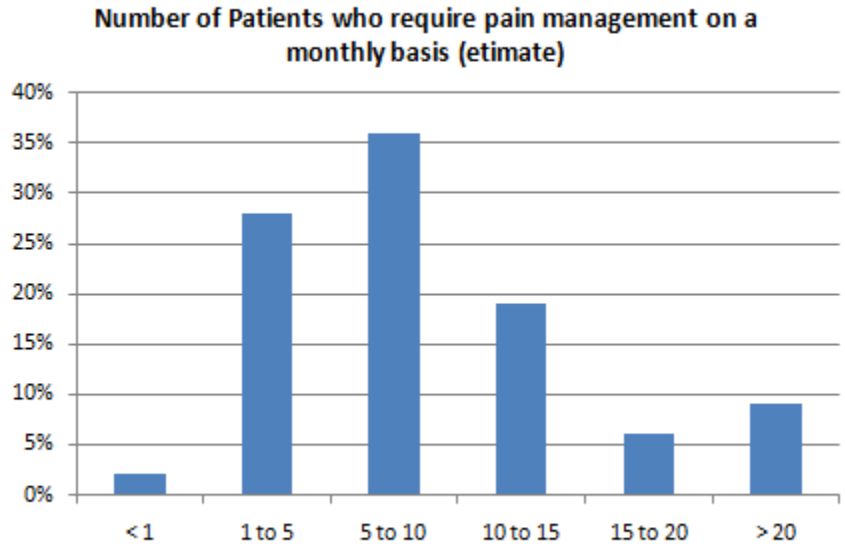


Figure 4.6: Volumes of patients requiring pain management

The average number of patients who required pain management attended to by the respondents per month were as follows, 2% of respondent attended to less than one patient requiring pain management per month, 28% attended to 1-5 patients, 36% attended to 5-10 patients, 19% attended to 10-15, 6% attended to 15-20 and 9% attended to more than 20 patients requiring pain management per month.

4.2.7 Methods of Pain Management Commonly Employed

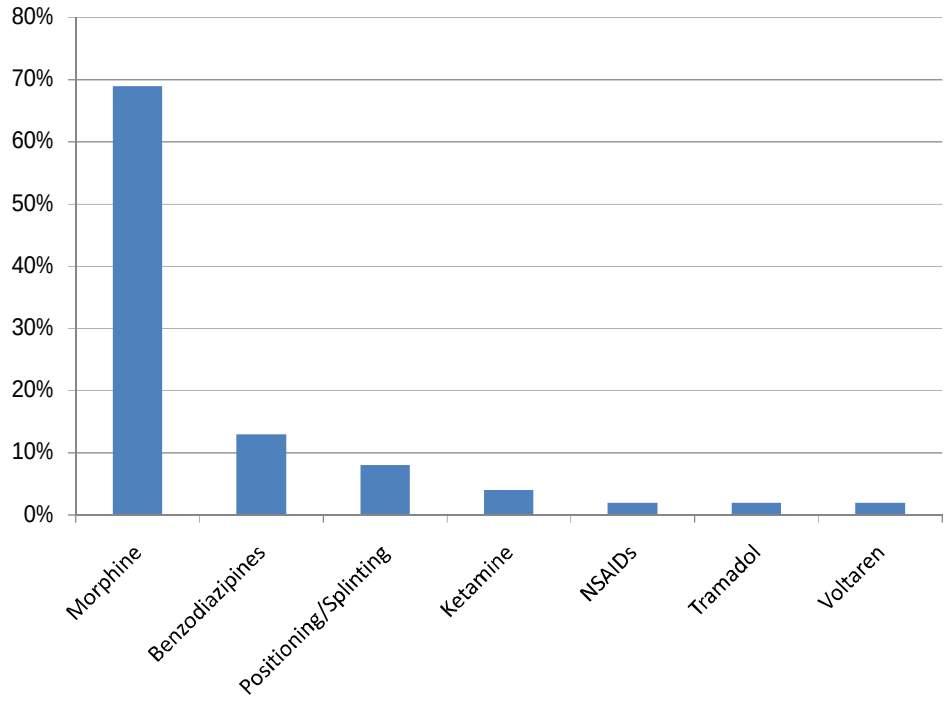


Figure 4.7: Methods of pain management commonly employed

The response, to which method of pain management was most commonly employed by the respondents, highlighted that 68% indicated that morphine was used far more than other pharmacological agents and other techniques. It must be noted that some respondents also reported a combination of the above, in particular with regards to benzodiazepines and morphine. A significant factor that must be noted is that at the time of the questionnaire distribution and completion, the BTech/ECP protocol had only just been approved and this may account for the low use of Ketemine to some degree.

4.2.8 Indicators of Initiation of Pain Management

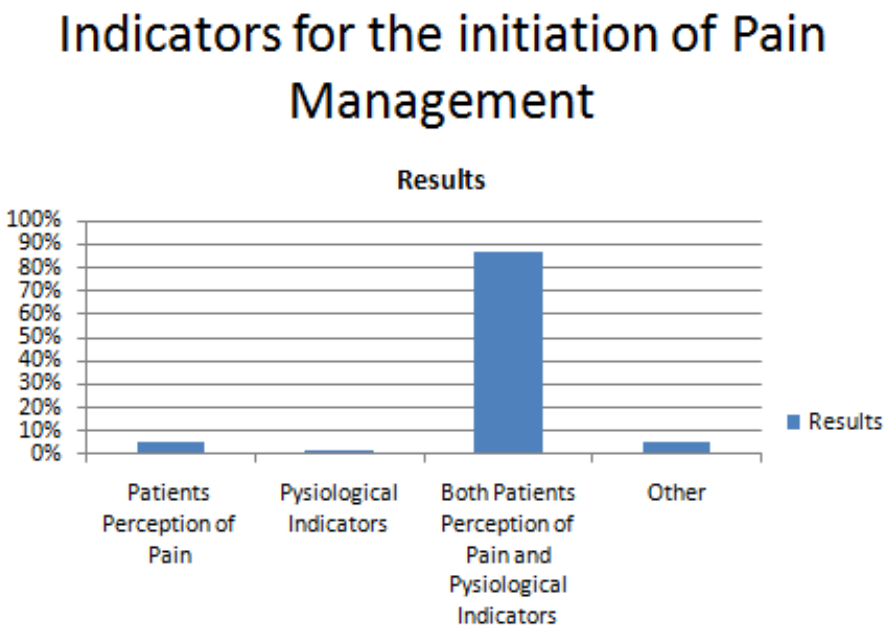


Figure 4.8: Indicators of initiation of pain management

Of all of the respondents, 87% cited that they utilized both the patient's perception of pain as well as the presenting physiological indicators in determining when to initiate pain management. However, only 6% of respondents indicated that they utilized the patients perception of pain in isolation and 2% of respondents indicated that they utilized the patient's physiological indicators in isolation, while a further 6% mentioned that they used "other" indicators.

In addition to the choices selected as represented above, the respondents were given the option to further elaborate on the reasons for initiating pain management. While not all of the respondents chose to do this, the results of the respondents that did elaborate on their reasons for initiating pain management are as follows:

Common trends were identified in the initiation of pain management. These included the evaluation of the mechanism of injury and the potential effect that pain management may have on a significantly compromised patient. The respondents expressed that the mechanism of injury, in addition to being the cause of the pain, indicated the need for pain relief. Respondents also indicated that if patient's injury "looked visibly painful", then that was another major factor in influencing their CDM process.

Other points raised which led to the decision to initiate pain management included the failure of verbal reassurance to ease the patients suffering, an absence of or contradiction between the physiological picture and what was expressed in the subjective pain score by the patient and the patient's verbal request for pain management.

Furthermore, a strong opinion was that a comprehensive picture needed to be formed and that no decision to initiate pain management could be made based purely on one factor in isolation. They indicated that this decision was because individual factors had the potential to be flawed, for example: physiological indicators may be blunted or enhanced by existing medication, intoxication or underlying injury, in particular internal haemorrhage. In addition, the pain score was seen as challenging due to its extremely subjective nature as well as potential language barriers often added to the difficulties of requesting patients to complete the pain rating score.

4.2.9 Indicators of Cessation of Pain Management

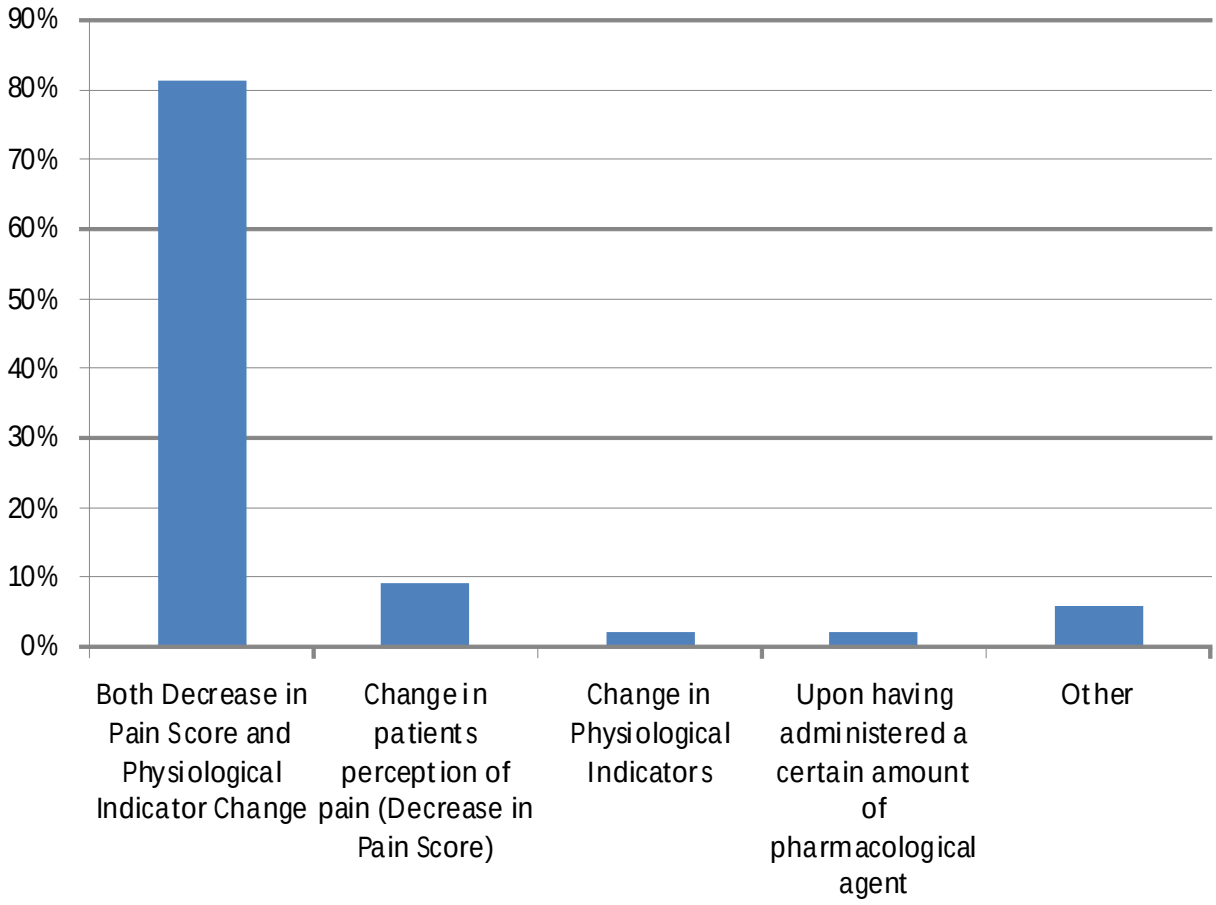


Figure 4.9: Indicators of cessation of pain management

With regards to indicators for the cessation of further pain management, there was another overwhelming response for the category relating to the pain score (patients perception) and physiological indicators. In this instance, a decrease in the patients perception of pain and physiological indicator changed with 81% of respondents cited patient perception and physiological indicators as their key factor for ceasing pain management. (9%) of respondents cited change in patients perception in isolation as their key indicator and (2%)of the respondents cited change in physiological indicators in isolation as their key reason for stopping pain management. A further 2% of respondents indicated that they would stop pain management after having administered

a certain dose of a pharmacological agents, while 6% of respondents sighted the “other” category.

As with the previous question, a space was provided for the respondents to elaborate on their reasons for ceassing pain management. The common theme of what practitioners relied upon to cease their patients’ pain managment that emerged from this was that the patients response to the pain mangement in the form of comfort and was their patient’s ability to “cope with the pain” leading to the paramedics ability to move or adequately manage the injury. Other reasons included the attainment of pharmacological “norms” either in dose or duration of action as well as a small number of respondents mentioning that there was no ceiling to morphine administration and that their goal was to achieve a completely pain free status, identified when the patient indicated ‘no pain’ or 0/10 on the pain rating score.

4.3 INTERVIEW RESULTS

As discussed in Chapter 3, the dissassembly and reassembly of the date is of vital importance. In order to achieve this, level one and two codes where employed and then descriptively and comparatively analyzed in order to create an appropriate platform for the discussion to take place. The table of codes can be seen in Annexure 9.

The key themes and their associated sub-themes were identified and have been compiled with associated discussions. The discussions relate the results of the interview under their key themes to the literature review in Chapter 2 as well as additional literature which is pertinent to the findings of the interviews.

4.3.1 Key Themes and Sub-categories

Once the recorded interviews were transcribed, the data was coded into sub-categories with associated quotes from the study participants. These were then further linked to four key themes which were identified in conjunction with the primary research question and research objectives. It must be noted that some of the sub-categories related to more than one key theme as the various elements of pain management overlapped to some degree.

The key themes, along with their relevant sub-categories, identified subsequent to the coding of the data were:

- Initiation of Pain Management
    - Physiological Indicators
    - Patient's Expression of Pain
    - External Influence
    - Mechanism of Injury
    - Movement/Splinting Required
    - Pain Score
    - Personal Opinion of Patients Pain
    - Predetermination

- Cessation of Pain Management
    - Maintaining Adequate Pain Management
    - Patients Expression of Comfort
    - Pain Score
    - Personal Opinion of Patients Pain
    - Patient Request
    - Proximity to Hospital
    - Previous Experience

- Choice of Agent/Method of Pain Management
    - Ketamine preferred to Morphine
    - Combination of Analgesics to achieve pain management
    - Targeting of Appropriate Dose
    - Poor Access to Administer Pharmacological Agent
    - Rate of onset of Agent
    - Midazolam no Analgesic Properties
    - Alternate Methods/Agents Preferred
    - Previous Experience
    - Patient Resistance to Pharmacological Agents
    - Size of Patient

- Prioritization of Pain Management
    - Pain Management is a Priority
    - Movement/Splinting Required

4.3.2 Initiation of Pain Management

The decision whether or not to initiate pain management for acute traumatic pain essentially forms the core of this research study. Findings from international studies indicate that a protocol formalising specific step by step guidelines to pain management is in the process of being compiled (RNAO, 2002; ICSI, 2008; NHMRC, 2010).

This trend is, however, not without its opponents who argue that pain management is reliant on clinical decision making and requires the specific evaluation and course of action specific for each patient or situation (Berben, Meijs, Grunsven, Schoonhoven and van Achterberg, 2011; McMannus and Sallee, 2005). To achieve this skill of making clinical decisions in an acute pre-hospital setting, Hennes and Kim (2006), point out that education is viewed as the key to success.

With this in mind, the five research participants who were interviewed were asked numerous questions in the attempt to elicit responses regarding how they came to a decision to initiate pain management. These methods and opinions are represented as follows:

4.3.2.1 Physiological Indicators

Two of the participants entered into specific discussion surrounding the suitibility of physiological indicators in determining pain and as such deciding to manage the pain. The first was that a participant identified that the pysiological indicators of a patient experiencing pain were a poor frame of reference in their decision making processes when determining whether or not to initiate pain management unless the patient was not capable of verbalizing their perceptions

> *"The physiological indicators are a poor indicator of pain unless the patient is obtunded"*. [P1]

The second comment from another participant was specifically focused on utilizing the physiological indicators in cases where the patient is not clearly expressing their situation

> *"the patient was severely intoxicated and as such we could not rely on their representation of the pain score and thus needed to rely on the physiological indicators".* [P2]

While both of these participants approached the issue from different perspectives, the first participant saying that physiological indicators are a poor indication of pain unless the patient is obtunded and the second participant saying that the physiological factors should be relied on when the other pain identification modalities cannot be utilized, they are essentially arguing from the same perspective.

The physiological indicators may not be the optimal or primary focus in determining the presence of pain or the need for pain managment in the concious patient with no impairment of any kind, however, as the patient becomes less capable of expressing their condition, through trauma, intoxication or any other mind/conciousness altering scenario, the need to utilize and validity of the physiological indicators in determining whether or not to initiate pain management increases (Foster, Yucha, Zuck and Vojir, 2003).

However, despite an increase in relevance in the obtunded patient, there are significant challenges in the identification of such physiological indicators in the pre-hospital setting as there are a myriad of additional influences which may impact on the physiological indicators recorded (Gélinas, Fortier, Viens, Fillion and Puntillo, 2004). Gélinas et al. continue to state that the accurate recording of physiological indicators for the purpose of decision making in pain management is only truly possible in the intensive care setting as even in the emergency department setting, too many external stimuli such as noise, movement and light exist which may influence the physiological indicators. It can, thus, be extrapolated that the pre-hospital setting will be even less accurate in terms of physiological indicators as the prevalence and severity of movement, noise, light and other stimuli will be far greater than in the in-hospital setting.

Similarly, Herr, Coyne, Key, Manworren, McCaffery, Merkel, Pelosi-Kerry and Wild (2006) advise that the use of physiological indicators as primary indicators for pain management are misleading and should only be considered in conjunction with a more relevant indicator or as an indication to begin further investigation or pain assessments (Foster, 2001).

There is limited evidence to support the use of physiological indicators to determine the presence of pain and as such it should not play a major role in the clinical decision making process. Finally, it is also imperative to note that the absence of physiological indicators supporting/indicating pain does not indicate an absence of pain (McCaffery and Pasero, 1999).

Despite the evidence discussed thus far, utilizing the physiological indicators as a means to determine whether or not to initiate pain management is a form of the hypothetico-deductive branch of clinical decision making as the practitioner is utilizing cue recognition, in this case a specific physiological indicator, and generating a hypothesis as to the cause and as such indicated treatment regime for the patient (Graber, 2003); (Gorden and Franklin, 2003).

4.3.2.2 Patients Expression of Pain

The patients' expression of their pain was a unanimously utilized indicator of pain and the need to initiate pain management by the five interview participants. Comments such as

> *"My initiation of pain management is largely governed by the patient telling me that they are in pain"*, [P1]

> *"The patients request for analgesia/pain management is a key factor in my decison making"* [P1] and

> *"The patients expression of servere pain...led to me administering morphine"* [P3].

This highlights a mindset amongst South African paramedics in terms of their decison making regarding the initiation of pain management based on the patients expression of pain.

A further comment also provided some insight into the participants' perceived roles with regards to pain managment

> *"I cannot deny the patient pain management if they are perceiving pain".* [P3]

This indicates a sense of duty and responsibility with regards to relieving the suffering of others, as is often found in the health care professions (Berben et al. 2011).

In addition to this, the threat of malpractice is often on the forefront of paramedics' minds. Furrow (2001) points out that paramedics should not allow their patients to suffer from pain and that it is the patient who can really only determine the extent of their pain. As such, the patients perception, above all else, should be the guiding principle in decsions pertaining to pain management (Furrow, 2001).

Similarly, the ICSI (2008) report, highlights that the patients' complaints of pain is the most accurate and reliable indicator of their pain, and thus, the paramedic can rely on the patients' commuication to initiate pain management (ICSI, 2008).

Despite Furrow (2001) and the ICSI (2008) opinions that relying solely on the patients' expression of pain is not without its challenges, Rupp and Delaney (2004) describe that this can sometimes lead to the inappropriate use of analgesic agents as a result of the subjectivity of patients perception of pain as well as their responses to pharmacological agents. It was noted that while some patients expressed significant relief from a placebo, other did not report a significant easing of pain, even after high doses of opiod analgesic agents (Rupp and Delaney, 2004).

The processes followed by the South African paramedics in this instance follow the adjustment heuristics methodology as they rely on the patients expression of pain as the focal point upon which their decision to initiate pain management rests (Cioffi and Markham, 1997; Croskerry, 2002). This form of dependance on a single element of information can lead to incorrect management as warned by Furrow (2001) and the ICSI (2008).

4.3.2.3 External Influence

External pressure may also play a major role in the contribution of the decision to initiate pain management. External pressure specifically increased the volumes/concentrations and rate at which analgesic agents were given by the study participants.

> "*Outside influences may play a significant part in how and how fast you provide analgesia"* [P1] and
>
> *"The patient screaming and the family pressurizing you does expedite pain management quite a bit"* [P3]

are an indication of how the mindset/approach towards the provision of analgesia can be altered by external or non-patient centric circumstances.

One participant also indicated that while not a medical criteria or true "external" influence,

> *"The patient had tears streaming down their face, which did play a role in my decision to provide analgesia".* [P5]

The external and in some cases emotional influences are discussed by numerous authors and can significantly shift the way in which pain managment is provided. The discussions range from disparities in medical decision making based on ethnic group,, gender, age, socio-economic background and even insurance status to emotional strain/pressure placed on the practitioner as a result of the presenting patient and/or scenario (McKinley, Potter and Feldman, 1996); (Hammers, Abu-Saad, van den Hout, Halfens and Kester, 1996); (Weisse, Sorum and Dominguez, 2003); (Mills, Schofer, Boulis, Holena and Abbuhl, 2010); (Burgess, Crowley-Matoka, Phelan, Dovidio, Kerns, Roth, Saha and van Ryn, 2008).

This form of pressure places significant strain on the decision making process and has the ability to hamper or even derail the process, to the detriment of the patient care which the practitioner is attempting to provide. As such, this theme is not definable as a decision making process, but should rather be identified as a barrier to accurate clinical decision making with which pre-hospital practitioners are faced.

4.3.2.4 Mechanism of Injury

Another factor leading to the initiation of pain management was the mechanism of injury. The statements of

> *"The mechanism of the incident, i.e. how the injury occurred played a major role in my decision to initiate pain management"*, [P1]

> *"In this case I would definately say that the mechanism was a pursuading factor in the initiation of pain management"*, [P2]

> *"In this case the mechanism of the injury payed a major role in my decsion to initiate pain management"* [P2] and

> "*The mechanism suggested that there would be a fairly substantial level of pain"* [P5] .

These quotes all highlight the way in which the process which causes the injury is directly linked to the South African paramedics pereption of the requirement of pain management.

In many instances, the mechanism of injury is used in order to predict patient outcome, According to insert Dalal et al reference (1989), these scenarios range from multiple trauma cases, to blunt trauma (Shatney and Sensaki, 1994) and Multi-system trauma (Knopp, Yanagi, Kallsen, Geide and Doehring, 1987).

Similar to the fndings of Dalal et al. (1989), Shatney and Sensaki (1994) and Knopp et al.'s (1987), research, the interview participants placed a high value on the mechanism of injury when deciding whether or not to initiate pain management.

Utilizing the mechanism of injury as an indicator to initiate pain management is an example where both intuitive/humanist and hypothetico-deductive models of clinical decision making are applied. While there is specific cue recognition in the sense that certain mechanisms will underpin a high index of suspicion of certain injuries based on the paramedics anatomical knowledge and academic teaching, leading to a hypothesis of an injury requiring pain managment (Tanner et al., 1987), there is also the availibility heuristics element of the paramedics having seen similar injuries and/or mechanisms before and recalling the successes or failures of previous courses of action in order to determine which pain management strategy to utilize (Buckingham and Adams, 2000; Croskerry, 2002).

4.3.2.5 Movement/Splinting Required

The transportation of the sick and injured is the primary function of all emergency medical services (Porter, 2004). As such, it is understandable that the requirement to move a patient is important. In the event that the patient is in pain, it may first be required to manage their pain before being able to move or transport them to hospital where they may receive further and in some cases life saving intervention. This potential delay, as a result of pain management, is a difficult decision for the paramedic to make (McMannus and Sallee, 2005).

This, as well as the attempts to assess and/or treat the patient may often be hindered by the scenario that the patient finds themselves in, or the degree of damage/trauma which they may have done to themselves

> *"We wanted to calm the patient down because it was almost impossible to assess them due to their restlessness as a result of both the mechanism and their pain response"* [P2] and

"My goal aside from pain management was also to partially sedate him so that it would be easier to move/manipulate the patient". [P3]

There are many factors which influence the movement of the patient, key amongst these is often the requirement for pain managment as highlighted by the study participants

"I knew that we would need to move the patient quite a bit, and thus administered analgesic agents" [P1] *,*

"The aim was to ease her pain, to be able to move her" [P4]*,*

"I viewed morphine as an aid in achieving the splinting of this patient" [P2] *and*

"In order to package and move this patient, their pain needed to be managed". [P5]

There is great significance placed on the pain experienced by the patient during the movement process (Breivik, Borchgrevink, Allen, Rosseland, Romundstad, Breivik, Kvarstein and Stubhaug, 2008). Brevik et al. continue to state that dynamic pain (pain during any form of movement) causes a far greater risk of exacerbation of underlying injury than pain experienced at rest and as such it is a priority to manage this dynamic pain.

From a decision making viewpoint, this theme is slightly different from the rest as the decision to manage the pain is heavily influenced by the decision to move the patient. As such the decision to move the patient which may be borne out of a number of elements, has led to the need to provide pain management being identified. This reflects availability heuristics, as the knowledge that the patient would experience pain if moved and thus require pain management, would most likely be due to the paramedic's previous experience.

4.3.2.6 Pain Score

Four of the five study participants felt that the pain score was not a good indicator for the initiation of pain management, despite the fact that 87% of questionnaire respondents indicated that a combination of the pain score and physiological indicators were their main indicators for the initiation of pain management. The participants identified this in their statements

> *"The pain score is too subjective to be seriously considered as it relies on the recolection of pain. It is almost impossible to recollect pain after a painful experience"* [P1] and

> *"My personal feeling about the pain score is that it is inaccurate, subjective and that it relies on the patient having experienced similar pain before"*. [P4]

Lorenz, Sherbourne, Shugarman, von Rubenstein, Wen, Cohen, Goebel, Hagenmeier, Simon, Lanto, and Asch (2009), indicate that while it is plausible that the pain score may be used as an additional vital sign, the reality is that the significant challenges that exist with its use preclude it from being the primary indicator to pain management that it aspires to be. This would lead to its exclusion from the decision making process either altogether or seeing its involvement in the decision making process limited to a secondary function as a cue in the cue recognition phase under the hypothetico-deductive decision making model (Tanner, 1987).

The other participant indicated that they agreed with the questionnaire results and that they often relied on the pain score as the indication to initiate pain management

> *"The 10/10 pain score was the major factor for initiating pain management"*. [P2]

While conceding that there are some limitation to the pain score, Breivik et al. (2008) argue that both the Numerical Rating Scale (NRS – rating out of 10) and the Visual Analog Scale (VAS) are of great value in identifying the specific pain status of a patient by their own rating at a determined point in time.

Despite the differences in outcome, the findings from the questionnaire and the answers given during the interview compare favourably with the same clinical decision making model. The hypothetico-deductive model is again utilized, in this case as the primary focus due to the numerical feedback being received by the practitioner fitting into the process of hypothesis generation as a fact rather than an intuitive process (Tanner, 1987).

4.3.2.7 Personal Opinion of Patients Pain

The personal opinion of the patient's pain also influenced the study participants in terms of the initiation of pain management. All the participants reported that this played a much greater role than they would like to admit. Statements such as

> *"I was in pain on his behalf given his injuries"*, [P1]

> *"I did not assess the patients pain score as they were obviously in severe pain"*, [P4]

> "*The injury looked sore to me!"*, [P4]

> *"Looking at that injury, there was no question that it would be painful"* [P5] and

> "*The injury itself played a major role in my decision making regarding pain management"* [P5].

These quotes highlight the visual cues and responses that they generate amongst the South African paramedic, while comments such as

> *"I have had that injury myself and I know that it is painful"*,[P4]

> *"I was wondering how I would be feeling if I had sustained that injury"* [P2] and

"I think that one looks at the injury and compares it to ones personal experience either with a similar patient or an injury that one has sustained oneself" [P5].

These quotes reflect the paramedic's visceral feelings of the injury who may also be relating it to personal experience in treating previous patients and/or having experience the pain personally.

This phenomenon is not unique to the South African pre-hospital environment. Berben, et al. (2011), highlight this phenomenon as a common trend both in- and pre-hospitally. These authors continue to explain that the level of pain that a patient is experiencing is far more often determined by clinical observation and expert opinion than by the use of traditional pain scores as or other pain assessment instruments and methods.

In conjuction with this, it was also determined that the adequacy and skill in pain management in particular in the pre-hospital environment was largely governed by the practitioners ability to apply good, sound clinical decision making techniques to a given scenario in order to determine the best course of action.

This personal opinion takes on the form of an intuitive/humanist decsion making model and particularly, representational heuristics (Buckingham and Adams, 2000; Croskerry, 2002) as the participants indicated specific aspects which indicated the requirement to manage pain rather than the overall scenario of the patient.

4.3.2.8 Pre-determination

Three out of four interview participants reported that when they were called to an incident specifically for pain management, that this influenced them in their decision to provide pain management before even arriving on the scene. While they all explained that they would conduct a thorough assessment of the patient prior to providing analgesia, their comments indicated that their decision making was already focused on initiating pain management

"Having been called for pain management, I already knew that I was going to give 'something', probably morphine", [P4]

"The fact that the crew are calling you for pain management weighs on your mind, but you obviously still assess the patient" [P3] and

"If I am called for pain management, I usually administer the pharmacological agents". [P3]

While there is no literature which specifically speaks to the comments made by the participants regarding a "predetermination" of providing analgesia, in particular morphine to patients, there is a degree to which this speaks to adjustment heuristics as discussed by Croskerry (2002). If viewing the request for analgesia as the focal point to which the pre-hospital practitioners are anchoring themselves, then this could well be determined as a clincial decision making technique employed by South African paramedics.

4.3.3 Cessation of Pain Management

Arguably, as important as the indicators for the initiation of pain management, the indicators and thought processes leading up to the cessation of pain management are equally important. Understanding the way in which South African paramedics determine both when to initiate as well as cease pain management, will greatly aid in the understanding of clinical decision making as it pertains to pain management in the South African paramedic context.

4.3.3.1 Maintaining adequate pain management

Once a practitioner has achieved adequate pain management in their patient, the key focus becomes maintaining adequate levels of pain management so as not to undo the good of having achieved the desired level of pain management.

As one participant correctly queried,

> *"Why allow a patient to go back into a painful state when we could maintain their pain at an adequate level?"*, [P1].

This is addressed by the summation made by Thomas and Shewakramani (2008), that despite the best effort by healthcare practitioners, it is always best to recall that it is unacceptable to allow patients to suffer needlessly.

Pain is a dynamic process, and in particular in the pre-hospital environment were movement is a regular event, it must be constantly reassessed and readdressed in order to ensure that it is managed correctly (Porter, 2004).

The CDM process is a continuation of the previous process in the initiation themes. Having decided to initiate pain management, the factors or indicators to cease such management would need to be relatively significant. In this case, availability heuristics would play the major role as the practitioners would be aware of the effect/implication of their pain management wearing off.

4.3.3.2 Patients Expression of Comfort

Similarly to the indicator for the initiation of pain management of the patient's expression of pain, the patient's expression of comfort is seen by some of the interview participants as a good indicator that their pain management strategies have been effective and as a result, to cease pain management

> *"the patient expressed that they were comfortable, so I did not provide further pain management"*, [P1]

> *"The patient was comfortable and we could easily move them onto a stretcher and into the ambulance"*, [P3]

> *"The patient became calmer, more cooperative and was visibly in less discomfort"* [P2] *and*
>
> *"The way in which the patient comes across post initiation of an analgesic agent as compared to the way in which they came across initially which leads to the decision of whether to continue with pain management or not"* [P5].

As with the patients expression of pain as an initiation factor, so too can the approach identified by the ICSI (2008) be applied to the patient's expression of comfort. The patients self-report of pain is seen as the most accurate and reliable indicator of pain, and thus, the patients expression of the absence of pain should be held as the most accurate and reliable indicator for the cessation of pain management (ICSI, 2008).

While the above comments and concepts are valuable, it is equally important to be aware of and note the stages when analgesia has become too deep. Pasero and McCaffery (1994), developed the Pasero – McCaffery Opioid Induced Sedation Scale.

Table 3: Pasero – McCaffery Opioid Induced Sedation Scale

Code	Description	Recommended Action
S	Sleep – easy to arouse	Acceptable: No action necessary; supplemental opioid may be given if needed
1	Awake and Alert	Acceptable: No action necessary; supplemental opioid may be given if needed
2	Slightly Drowsy – Easily aroused	Acceptable: No action necessary; supplemental opioid may be given if needed
3	Frequently drowsy, arousable, drifts off to sleep during conversation	Unacceptable: Decrease opioid dose by 25–50% monitor sedation and respiratory status closely until sedation level is less than 3
4	Somnolent, minimal or no response to physical stimulation	Unacceptable: Stop opioid. Notify anesthesia provider; very slowly administer IV naloxone (0.4 mg naloxone in 10 ml saline; 0.5 ml over 2-minute period); monitor sedation and respiratory status closely until sedation level is less than 3

Adapted from McCafery and Pasero (1999)

The patients opinion must be respected from a legislative perspective, and as such this will inherently influence the decsion making process. The feedback regarding their pain will be fed into the hypothetico-deductive model of decsion making as the hypothesis of the patient's condition and future requirements in terms of interventions is continuously updated as more information/cues become available (Tanner, 1987).

4.3.3.3 Patients Expression Rather than their Pain Score

Having earlier discussed the accuracy of the numerical pain score, one participant's responses regarding the way in which the patient's expression of pain was more pertinent in determining the efficacy and as such adequacy of pain management detracted further from a reliance on the numerical pain score as a useful indicator with regards to either the initiation or cessation of pain management. The participants comment was

> *"His (the patients) expression of comfort guided me rather than his perception of pain based on the pain score"*.[P1].

These comments agree with Jones and Machen's (2003) study, which indicated that many pre-hospital practitioners ceased or withheld pain management as a result of their perceptions of the patient's pain differing from the degree of pain being expressed by the patient.

The process of selecting one indicator over another reflects to a critical and logical thought of the analytical model of clinical decision making (Croskerry, 2009). This method shows the practitioner structuring their thoughts and filtering the inputs to determine the course of action that they deem to be the most accurate.

4.3.3.4 Pain Score

To further emphasise the limited benefit of the numerical pain score in the ambit of clinical decision making in pain management specifically in the cessation of pain management in this case, one participant maintained

> *"If the patient says that their pain score has decresased, but that they are still experiencing pain, this will not preclude me from providing further analgesia"*. [P4]

This statement is slightly non-descript in its nature, as there is no reference to the degree to which the level of pain as per the pain score has decreased. Rather than discussing the pain score in further detail, it is perhaps more relevant to note that it is ultimately the patient experiencing pain rather than a numerical score that is being addressed. As many would argue that practitioners, in this instance paramedics have an obligation to manage patient's pain given that this is a fundamental human right (Lord, 2003), any decision regarding pain management and in particular cessation or withholding of pain management should ultimately be made taking the specific patients perception into consideration, rather than an inflexible numerical pain scale (Berben et al., 2011).

The patients perception must always be strongly considered, if not from a clinical perspective, then certainly from a legislative one. If the patient is expressing pain, then this cue would rapidly lead to the hypothesis that the patient is in pain and requires pain management in the vein of the hypothetico-deductive model of clinical decision making.

4.3.3.5 Personal Opinion of Patient's Pain

Along the same line as the personal opinion of patients pain as an indicator to initiate pain management, two interview participants felt that the same was true for the cessation of pain.

> *"I could see that the patient was comfortable and was happy to allow me to splint their limb, therefore I did not deem it neccessary to administer further morphine"* [P4] and

> *"There was a departure between what the patient was expressing their pain as and my perception of the patients pain"*, [P5].

These comments are fraught with some difficulty, as in other statements, the participants' have indicated that if a patient is expressing pain, that as a health care professional it is their responsibility to alleviate it (Lord, 2003).

However, if the patient wishes for pain relief seem disingenuine or possibly a suspicion exists that the patient may be displaying drug seeking behaviour, it may be necessary to trust the clinical judgement of the practitioner's personal opinion or assessment of the scenario (McQuay, 1999). When considering these aspects it is important to note than more often than not, opioids are withheld from patients who have justified claim to seek pain relief (McQuay, 1999).

The clinical decision making paradigm which needs to be applied here is one that falls under the intuitive/humanist model specific to the experienced practitioner, as they would need to make a decision based on their judgement alone, with limited additional information available to them. This could be extremely challenging for the newly qualified clinician as the decision would almost certainly rely on availability heuristics which are only developed over time (Croskerry, 2002; Banning, 2008).

4.3.3.6 Patient Request

One study participant shared an interesting scenario with the researcher. Subsequent to explaining the effects and potential side effects of the pharmacological agent that the participant was about to administer to their patient, the patient began requesting cessation of pain managment due to their fear of the effects and potential side effects of the pharmacological agent.

> *"We had explained the potential side-effects of morphine prior to administering the agent to the patient and once we had administered about 2mg the patient requested that we stop as he was fearful of the side-effects"*, [P2].

This statement must obviously be respected as it would be illegal to proceed against the patient's wishes.

Patients' fears and adversity in particular to opioid analgesics is well documented. Borne largely out of the stigma attached to opioid analgesics and the perception that they rapidly lead to opioid addiction, these perceptions must be carefully managed in order to provide the best level of care to the patient. In this case, it becomes difficult to provide the optimum level of pain management as the practitioner may not act against the patient's wishes (Hennes and Kim, 2006); (Berben et al., 2011).

There is no clincial decision in this instance as such, but rather a response in terms of actions to a legitimate request by the patient themselves.

4.3.3.7 Proximity to Hospital

An interesting point raised by four out of five interview participants was that their cessation of pain management was often not as a result of a clinical decision, but rather as a result of the end of the "pre-hosptial" phase of patient care by the arrival at a facility.

> *"We were very close to hospital and thus did not provide further analgesia"* [P2] and
>
> *"We ceased pain management as a result of arriving at the hospital"*, [P5].

These two answers reflect the common themes amongst the participants.

The arrival at hospital, while the end of the pre-hospital phase of patient care, is not the end of pain managment for the patient. In the abscence of an effective transition between the pre-hospital and in-hospital environments, the patient may suffer significantly due to not displaying any signs or symptoms of pain, if pain was adequately managed in the pre-hospital environment, as the emergency departments initial assessment may not reveal the requirement for further analgesia (Behara, Wears, Perry, Eisenberg, Murphy, Vanderhoef, Shapiro, Beach, Croskerry and Cosby, 2005).

As such, the decision making process, in this instance, would need to be an altogether different one from the usual scenario faced by the South African paramedic. The decision would require specifc consideration on how to gain the understanding of the receiving medical practiotioner of the extent of the patients' pain to ensure adequate continuous pain management.

Despite the legal responsibility shifting to the physician or hospital accepting the patient, good practice would dictate such a process be accurate and not deleterious to the patient and/or their condition and as such should form a part of the clinical decision making process around pain management.
Regardless of the concerns as they pertain to the continuum of care during the transition between the pre-hospital and hospital environments, there is no true decsion making process at play as the decision regarding pain management is made based on the responsibility of the care of the patient being transferred to another practitioner.

4.3.3.8 Previous Experience

One participant reported that the previous experience as a practitioner played a major role in determining when to cease pain management, they commented that the

> *"Experience of the practitioner is probably the biggest factor in the decision making process. I, as a newly qualified practitioner, would have pursued a pain score of 0/10 whereas now my experience guides me as to when to cease pain management"*.[P5].

This statement is in line with Hamers, van den Hout, Halfens, Abu-Saad and Heijltjes (1997) who clearly distinguish differences in the clinical decision making, in particular during analgesic administration, of novice, intermediate and experienced practitioners.

However, rather than attempting to review pain management specific literature as it pertains to this phenomenon, the clinical decision making implications of such a comment are of far greater relevance. The learning process described by the interview

participants is a representation of the intuitive/humanist model of clinical decision making at work. By identifying the difference between the method of practice of the inexperienced state as compared to the experienced state the interview participant suggests that South African paramedics follow the intuitive/humanist model of clinical decision making. This particular comment alludes to the specific area of the intuitive/humanist model being applied by the interview participant being availability heuristics (Buckingham and Adams, 2000); (Croskerry, 2002).

4.3.4 Choice of Agent/Method of Pain Management

A significant element of the decision making process as it pertains to pain management is the decision of which pharmacological agent or method of pain management to employ. In addition to this decision, numerous further decisions need to be made such as which agents or methods to combine and which doses to initiate and maintain pain management with. The participants had very varied opinions and thoughts on these choices, stemming from a large degree of subcategories which will be discussed below.

4.3.4.1 Ketamine Preferred to Morphine

A marked difference in opinion and decision making existed between the BTech, Ndip (currently completing their BTech) and CCA participants with regards to pharmacological agents. This was largely due to the fact that the BTech's and soon to be BTech's knew of additional pharmacological agents, in particular Ketamine, while the CCA's would not be immediately exposed to the same number of pharmacological agents. This shaped their perceptions of preferable pharmacological agents for use in pain management, specifically where Ketamine and Morphine were concerned as evidenced by their comments

> *"Ketamine is more rapid in onset than morphine and thus preferred in time critical scenario's"* [P1] and

> *"Ketamine is better in traumatic pain than Morphine"*, [P1].

This specific preference of agent has seen much literature published, notably Cromhout (2003) who indicates the vast benefits of Ketamine over Morphine in the pre-hospital environment.

Ketamine administration is associated with reduced deleterious effects such as hypotension, nausea and respiratory depression noted in higher dose morphine administration. This higher dose of opioid is often required in the pre-hospital environment due to numerous factors such as movement of the injured site and psychological factors, leading many to question its suitability in such an environment (Cromhout, 2003; Porter, 2004).

In stark contrast to Morphine and other opioids, Ketamine produces dissociative anaesthesia with profound analgesia while maintaining the patency of the airway, general muscle tone and reflexes. This makes it the ideal agent for analgesia in the pre-hospital environment (Porter, 2004).

The decision as to which agent to use would be largely left up to the individual practitioner and influenced by their qualification and as such access to medication. By considering the various element of the pharmacodynamics of the available agents, a decision would be made using the hypothetico-deductive model of clinical decision making, with a significant focus on the agents that the individual was exposed to from an educational perspective.

4.3.4.2 Combination of Analgesics to Achieve Pain Management

One of the interview participants reported about the many attempts that they had seen were practitioners have attempted to achieve their pain management goals by only attempting one pharmalogical agent or mether,

> *"There is no silver bullet, a combination of analgesics is ideal"*. [P1]

Other participants expanded on their thought processes and discussed alternative methods and pharmacological agents in the pursuit of pain management

> *"I do not feel that morphine was the best agent in this case, ketamine or a combination of agents which we do not currently have access to would have been more beneficial"*. [P1]

While not holding to the comment of the correct agents not being available, Jennings, Cameron, Bernard, Walker, Jolley, Fitzgerald and Masci (2011) agree that a combination of agents, in particular Ketamine and Morphine is the most effective method of pre-hospital pain management. The use of morphine in addition to ketamine was superior to that of morphine alone when measuring the reduction of pain in patients experiencing moderate to severe pain resulting from trauma. Ketamine also showed a more rapid relief from pain than morphine with the best pain management results being noted when a dose of ketamine was administered shortly after a dose of morphine. This combined agent method not only saw the greatest and most rapid pain relief, but also the least number of side effects when compared to either agent (Morphine or Ketamine) in isolation (Jennings et al., 2011).

There is no specific decision making model followed based on the comments of the interview participants, but rather a consensus regarding the literature indicating that a combination of agents is preferable to a single analgesic agent.

4.3.4.3 Targeting of Appropriate Dose

Current HPCSA protocols do not stipulate a starting/initiation dose, but rather advocate a titration to effect methodology for morphine administration (HPCSA, 2006). This can be quite challenging in terms of the pain management goals which the practitioner is aiming to achieve. As such, an ongoing debate has been the targeting of the appropriate initiating and/or maintenance dose of, in particular, morphine. Numerous opinions on and reasons for the method that the participants had chosen to administer the analgeic agents were provided, these included,

> *"I administered the dose in a way that would have a minimial effect on haemodynamics, but still targeting a 'sufficient' dose"*, [P1]

this shows consideration given to the potentially deliterious effects of morphine such as respiratory depression, nausea and hypotension (Porter, 2004).

> *"High dose administration tends to happen in particular with the pressure of the family"*, [P3]

the impact of external factors on desired outcome and timelines (Hammers et al., 1996); (Weisse et al., 2003), a point further cemented by the comentary that,

> *"The urgency with which I needed to get the patient to hospital caused me to shorten the interval between administration of morphine rather than waiting the full 20minutes for peak effect"*. [P5]

The peak effect of morphine is documented as being noted aproximately 20 minutes post administration (HPCSA, 2006), this can be at odds with the timelines for management and transportation to hosptial as targeted by prehospital practitioners (Behara et al., 2005).

It is also important to note that in many instances, prehosptial practitioners are guilty of underdosing their patients when it comes to pain management. Convoluted protocols such as those discussed above are partially to blame, but the practitioners themselves also need to focus on the patients responses rather than on a specific dose in order to determine the "appropriate" dose (Thomas and Shewakramani, 2008).

The decision making process followed in order to clarify the correct initiating dose of pharmacological agents is one that is largely based on the knowledge of the potential deliterious effects as outlined by Porter (2004). This is in keeping with the hypothetic-deductive model of clinical decision making by following the acquired, critical thinking element under this type of decision making (Tanner, 1987).

4.3.4.4 Poor Access to Administer Pharmacological Agent

One of the participants indicated that as a result of an inability to gain intravenous access in order to provide morphine, they used Midazolm as an agent to achieve "pain management"

> *"Intravenous access was not available, so I used the mucosal aspiration device to deliver Midazolam"*. [P3]

No literature exists to discuss the use of midazolam in isolation as an analgesic agent, midazolam is listed as a sedative with no analgesic properties (SAMF, 2012); (HPCSA, 2006), and as such should not be used as dsicussed by the interview participant.

The decision to make use of the agent like this would indicate a tendancy to follow an adjustment heuristic model of decision making, and indicates why there are risks involved with this method Cioffi and Markham, 1997); (Croskerry, 2002). By purely focusing or anchoring themselves on the fact that pain management needs to be achieved without intravenous access, an agent – in this case midazolam, is chosen based on the manner in which it can be delivered, rather than its indication for use.

4.3.4.5 Rate of Onset of Agent

A further consideration towards the method/agent used to achieve pain management was the onset of action of the pharmacological agent. One participant stated that

> *"I place a high emphasis on getting the patient to hospital in the shortest amount of time, the time it takes for morphine to reach peak effect is just too long, which is why I add dormicum to the process"*. [P3]

This process again has no literature to support it and would appear to be localized to South Africa. Synergistic effects are noted in the combination of morphine and midazolam when attempting to achieve sedation for the purposes of airway managment or other procedures requiring sedation, but this would not be applicable or appropriate for the use in pain managment (Tverskoy, Fleyshman, Ezry, Bradley and Kissin, 1989).

4.3.4.6 Midazolam with No Analgesic Properties

A similar point to the two above also came up in another participant's interview and they strongly opposed the above type of statement/scenario,

> *"I think that the combination of morphine and midazolam, or midazolam in isolation for pain management is completely inappropriate, midazolam has absolutely no analgesic properties"*. [P1]

This "inappropriate" use of midazolam has not been documented or discussed by in any literature as such, but by reviewing the HPCSA (2006) protocols as well as the SAMF (2012) indications, no link between midazolam and pain management can be found.

This is an opinion of one of the participants and more a commentary on current practice than a clinical decision making facet.

4.3.4.7 Alternate Methods/Agents Preferred

Every interview participant made reference to an alternate method or agent that they would have preferred to employ in their pain management regimes amongst the presented cases. While the specifics amongst the participants varied, there was a definite sense that they thought that they should have access to further methods/agents in order to aomplish their task of pain management.

> *"Based on experience and a pain score of 3/10 and below, I would focus on alternate methods rather than intravenous morphine to control the patients pain"*, [P4]

> *"I believe that there should be Entonox or Profalgan or other non-ALS pain medication for cases were pain exists but is not overly severe"*, [P3]
> *"We only achieved the desired level of comfort after adding benzodiazepines to the management of the patient",* [P3]

> *"In particular in children, alternate agents to those currently available would be great"*, [P3]

> *"I look for the sedation effect of midazolam, if the patient can be 'asleep' during the splinting process, then they are less likely to do themselves further harm"*, [P3]

> *"I wished that we had a better (more potent) analgesic agent"*, [P2]

> *"Based on the response of the patient, I had to query as to whether morphine was a sufficiently potent agent or not, it did not majorly improve the patients perception of pain"*, [P2]

"I think that if we had been able to call a doctor to perform a limb block or administer Ketamine, this would have been far more beneficial to the patient", [P5]

"Due to the effects of morphine on the patients haemodynamic status, an alternate agent would have been preferable", [P5]

"Had alternate analgesic agents or processes been availible, I believe that this would have been a better option", [P5]

"Much of the pain was alleviated by positioning the inury with the morphine just adding comfort" [P5] and

"From experience I have also seen that there are better analgesic agents and methods out there other than morphine, and my wish is for these to be made available to us one day so that we may better manage our patients". [P5]

While the scope of this research was not to determine which pharmacological interventions should be made availible to South African paramedics, but rather as to their decision making processes in relation to these pharmacological agents, the discussion as to which agents are optimal and/or which agents should be included in the South African paramedics ambit of practice is beyond the scope of this study.

Even though the individual comments made by the interview participants speak to agents outside of their scope of practice, or unavailable to them at this point in time and as such does not directly influence their clinical decision making, it does indicate a forward thinking mentality of the South African paramedic towards achieving the optimal care for their patients.

4.3.4.8 Previous Experience

One of the interview participants felt that the choice of which method or pharmacological agent to use in the pain management process was largely relient on previous experience

> *"Previous experience plays a massive role; you can relate back to what you or other paramedics have done in the past in order to determine the best course of action. It is how you grow as a practitioner"*. [P4]

This type of decision making speaks directly to availibility heuristics as determined by Croskerry (2002). This recalling of previous scenerios and patient presentation is viewed as one of the cornerstones of the intuitive/humanist model of decision making (Banning, 2008).

4.3.4.9 Patient Resistance to Pharmacological Agents

As an indication of pertinent information that may be gleaned from the patient when determining which agents and processes to employ in the pursuit of pain managment, was presented by one participant who expalined a scenario where,

> "*The patient indicated that he was resistant to pain medication, therefore I gave him a higher dose"*. [P2]

While it is not uncommon for patients to develop or inherently (genetically) be resistant to certian medications, morphine does not seem to be one of them. There are unconfirmed reports that there may be a predisposition of native-americans to be resistant to morphine, but no formal studies to substantiate such claims (Tate and Goldstein, 2004). The only documented circumstances of morphine resistance are in long-term chronic useres of morphine in terminal scenarios, but even then, the resistance can usually be overcome by increased theraputic doses (Scholes, Gonty and Trotman, 1999).

As a result of this scenario not being very common, the intuitive/humanist model of clinical decision making cannot accurately be applied. In this instance, the inexperienced practitioner would attempt to follow teaching or an algorthym which may not exist while the experienced practitioner would most likely not have encountered such a scenario. In essence, the practitioner would be forced to follow a hypothetico-deductive model of clinical decision making in order to determine alternate courses of action or methods of managing the patient.

4.3.4.10 Size of Patient

A consideration with most pharmacological agent administrations is the size, generally lean or ideal body mass, of the patient in order to determine appropriate dosing (Cheymol, 2000). One participant indicated that

> *"Based on the fact that the patient was a woman and of a small build, I gave a lower initial dose of morphine"*. [P5]

The ALS protocol (HPCSA, 2006) indicates that reduced doses of various pharmacological agents should be administered to children and the elderly. These categories of patients are noted as having developmental physiological differences to adults, however from a size/weight perspective, obesity carries certain requirements interm of considering pharmacokinetics, while smaller or thinner adults do not (Cheymol, 2000).

The size of the patient would be a cue for the practitoner to recognize and filter into their clinical decsion making process (Tanner, 1987). While this would indicate a hypothetico-deductive model, there is also reason to suggest that a intuitive-humanist perspective could be applied in that the practitioner may have had previous experience in either the same or similar setting where the size of the patient and as a result outcome of management differed. This would speak to representational heuristics as the size of the patient would be the key factor in isolation leading to a clinical decision being made (Buckingham and Adams, 2000); (Croskerry, 2002).

4.3.5 Prioritization of Pain Management

An important aspect of this study was to determine the way in which South African paramedics viewed pain management, the degree to which they placed emphasis on it and which priority it held in their continuum of care. This largely aided in forming an understanding of the thought processes associated with pain managment and to a degree the ways in which the decision to manage pain was made.

4.3.5.1 Pain management is a priority

All the interview participants reported that in the abscence of immediately life-threatening conditions, that pain management took the highest of priorities. Their comments included,

> *"Pain management should be provided sooner rather than later"*, [P1]

> *"In the abscence of primary survey compromise, pain managment becomes the priority in patient care"*, [P4]

> *"I move to pain management very quickly, as soon as the primary and secondary surveys are secure"*, [P3]

> *"I believe that as the pain score increases, so too should the degree to which the practitioner is proactive about managing it (the pain)"*, [P2]

> *"Pain management – sooner rather than later!"*, [P2]

> *"I think that pain managment should be effected sooner rather than later"* [P5] and

> *"I would say that pain management is of the utmost importance, and to delay it is simply not good practice"*. [P5]

These sentiments are echoed by Porter (2004), who states that in the event that pain management is required, that as soon as the primary survey has been secured, pain management should be initiated. Tenabe (1995) takes this concept even further by stating that the pain assessment should form a part of the primary survey as a result of the far reaching impact that pain has on the patients as well as on the management of the patient, particularly in the prehospital environment.

4.3.5.2 Movement/Splinting Required

While the above clearly indicates the place that pain management holds in terms of the continuum of care amongst the interview participants, the participants also expressed various scenarios where pain management became a necessity in order to be able to further manage their patients. This does sometimes only ocurr in retrospect though, after an intervention has been attempted and failure noted due to the patients pain levels,

> *"I should have administered morphine earlier, before trying to move the patient"*. [P4]

In other instances, it is quite obvious as the patients pain precluded further assessment or management,

> *"We needed to manage the patients pain before they would allow us to control their bleeding, which was a major priority"*. [P5]

In addition to the cases where pain managment was a requirement prior to furher management, one of the respondents also noted that,

> *"I am of the opinion that any splinting or movement of a potentially painful injury should be preceded by the administration of an analgesic agent"*. [P5]

The statements of the interview participants were mostly reflective in nature in this regard. Porter (2004) indicates that the requirement for splinting, moving or in any other way manipulating the site of an injury or the patient themselves should immediatly indicate a requirement for pain management.

4.3.6 Summary of the interview results

Table 4: Summary of the interview results

Themes	***Sub-Themes***	***Type of Clinical Decision Making***
Indication for Initiation of Pain Management	Physiological Indicators	Hypothetico-deductive
	Patients Expression of Pain	Adjustment Heuristics
	External Influences	Barrier to CDM
	Mechanism of Injury	Hypothetico-deductive & Availability Heuristics
	Moving/Splinting Required	Availability Heuristics
	Pain Score	Hypothetico-deductive
	Personal Opinion of Patients Pain	Representational Heuristics
	Predetermination	Adjustment Heuristics
Cessation of Pain Management	Maintaining Adequate Pain Management	Availability Heuristics
	Patients Expression of Comfort	Hypothetico-deductive
	Patients Expression Rather than Pain Score	Hypothetico-deductive
	Pain Score	Hypothetico-deductive
	Personal Opinion of Patients Pain	Availability Heuristics
	Patients Request	None
	Proximity to Hospital	None
	Practitioner Experience	Availability Heuristics
Choice of Agent	Ketamine Preferred to Morphine	Hypothetico-deductive
	Combination of Analgesics	None
	Targeting Appropraite Dose	Hypothetico-deductive
	Poor Access to Administer Analgesic Agent	Adjustment Heuristics
	Rate of Onset	None
	Midazolam no analgesic properties	None
	Alternate Methods	None
	Previous Experience	Availability Heuristics
	Patient Resistance	Hypothetico-deductive
	Patient Size	Hypothetico-deductive & Representational Heuristics
Prioritization of Pain Management	Pain Management is a Priority	None
	Movement/Splinting Required	None

4.4 CONCLUSION

This chapter presented the level 1 and level 2 that emerged in the study. The summary of these codes are outlined in Annexure 9. Chapter 5 presents the recommendations made based on the results of the study.

CHAPTER 5

CONCLUSION AND RECOMENDATIONS

5.1 INTRODUCTION

This chapter will conclude the research by providing answers to the research questions and objectives as well as identifying recommendations made based on the results and discussions of chapter four. As this study was largely exploratory and investigative in nature, the results were directly associated with the primary research question and research objectives and were represented as such.

5.2 FINDINGS OF THE STUDY

Despite the primary research question being a stand-alone element in this research in its own right, the research objectives were specifically selected to extract the required level of detail in order to adequately address the primary research question. The information gained by determining the answers to the research objectives served as the basis to inform the overall outcome of the answer to the primary research question.

5.3 RESEARCH OBJECTIVES

As outlined in chapter one, three research objectives existed:

- Determine how South African paramedics currently manage patients experiencing acute traumatic pain.
- Explore the prioritization of pain management during the continuum of care of the patient with traumatic pain.
- Determine if there are context-specific factors that affect the decision making processes of South African paramedics in acute pain management.

These three research objectives allowed for the targeted investigation into the clinical decision making processes currently being applied by South African paramedics. Below is a summary of the findings as discussed in Chapter 4.

5.4 CURRENT PAIN MANAGEMENT PROCESSES

The South African paramedics approach to pain management can be loosely grouped into three phases, the assessment phase, the initiation/pain management phase and the re-evaluation/conclusive phase. The dynamic process which occurs before, during and after these phases is the clinical decision making process. The understanding of these phases, born out of the study can be seen in graphical form in Figure 5.1.

5.4.1 Assessment Phase

The assessment phase should be taken as the time prior to arrival until pain management is instituted. During this phase numerous aspects impacting on the clinical decision making process of the South African paramedic were identified. This began with the reason for their services being sought, in the event were the specific request was for pain management, a degree of predetermination existed amongst the paramedic population, however, it was the process of physically assessing the patient where the most significant discoveries were made.

It was noted that the vast majority of South African paramedics did not rely heavily on either the pain score or the physiological indicators of the patient as was initially suggested by both current paramedic training and initial questionnaire results, but rather on the patients verbalization of pain (often noted as a request for pain management) and the paramedics personal perception of the pain being experienced by the patient. While both of these indicators are significantly subjective, the latter was of particular interest as this personal perception of pain could most likely only accurately develop by extensive experience with such patients. This method of determining the requirement for pain management is in keeping with the intuitive/humanist model of clinical decision making.

5.4.2 Initiation/Pain Management Phase

Having determined the need for pain management, the decision making process shifted immediately to the choice of agent or method to be employed to achieve the goal of adequately managing the patients' pain, as well as to the initiation dose if administering a pharmacological agent.

At this point in time the pain management choices, in particular with reference to pharmacological agents, currently employed by South African paramedics are largely governed by the paramedics' scope of practice as set out by the HPCSA and thus their qualification. The CCA and NDip EMC portion of the South African paramedic population rely almost exclusively on Morphine Sulphate as their one and only means of controlling pain in the pre-hospital environment, while the recent expansion of the Emergency Care Practitioners (ECP/BTech) scope of practice has seen the inclusion of Ketamine in the pre-hospital pain management arsenal.

While strong opinions abound regarding these two pharmacological agents, the need for a wider scope of pre-hospital pain management agents was clearly identified given the nature in which they are intended to be utilized. The rapid nature with which most scenarios in the pre-hospital environment are carried out, seem to either require pharmacological agents or interventions with a faster onset of action than Morphine Sulphate or less potency than Ketamine. Agents for the effective control of mild to moderate pain as well as extremely severe pain were determined to be lacking and sought for inclusion in future scope of practice updates by the practitioners.

Limited consideration was given to the psychological and/or positioning related elements of pain relief as these were not deemed suitably in the pre-hospital emergency environment. While there were elements of the intuitive/humanist model of decision making involved in this phase of pain management, predominantly linked to a degree of previous experience with a particular pharmacological agent influencing the way in which the paramedic utilized it, the majority of the decision making in this phase followed the hypothetic-deductive model of clinical decision making.

5.4.3 Re-evaluation/Conclusive Phase

Upon having controlled the patients pain to an adequate degree (able to reassess or transport the patient), the decision as to whether to continue with pain management or not became the key focus of the South African paramedic.

During the re-evaluation/conclusive phase of the pain management process, the clinical decision making of the paramedics very closely matched the hypothetico-deductive model with the inputs received from the patient as well as the practitioners observation being analytically assessed against the initial evaluation prior to generating hypotheses regarding the patients current state of pain as well as the potential for continued pain management being required.

Of interest was that the patient feedback which was viewed in an intuitive/humanist decision making light during the assessment phase of pain management, while still being a key factor, was viewed as one aspect of many in the decision making process during the re-evaluation/conclusive phase.

In a number of scenarios the re-evaluation/conclusive phase only saw continuous re-evaluation of the patient's condition, as the arrival at a hospital or other medical facility which saw the transfer of responsibility of the patient precluded a decision making process to end the pain management process.

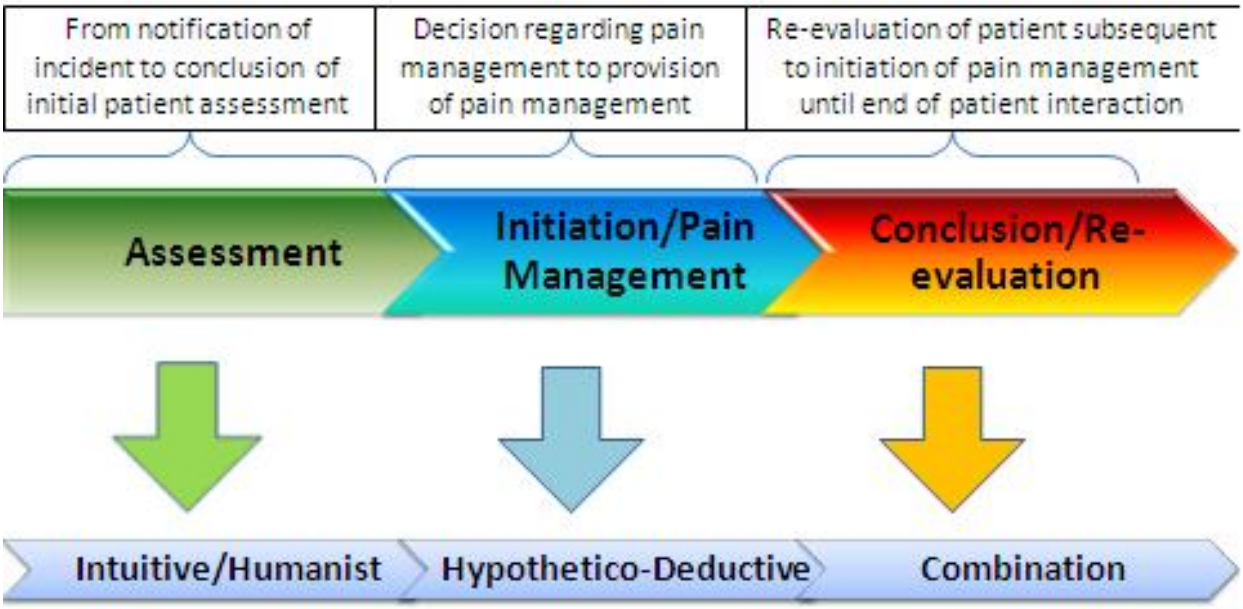


Figure 5.1: Phases of South African Paramedic Clinical Decision Making in Pain Management

5.4.4 Prioritization of Pain Management

Pain management was deemed as being exceptionally important within the continuum of care to South African paramedics. This was evidenced by the fact that aside from the primary survey of immediately life-threatening conditions requiring immediate intervention, pain management was seen as the next most important element of pre-hospital patient care as a whole.

This provides valuable insight into the position which pain management holds in the minds of the South African paramedic and also speaks to the fact that an element of clinical decision making regarding pain management is present in each and every incident which they attend to and patient that they treat. Although this may range from a brief noting of the absence of the requirement to manage pain, to the in-depth clinical decision making processes associated with the three phases of the pain management process, pain management is clearly a priority and at the top of the mind of South African paramedics.

5.4.5 Specific Factors Influencing Clinical Decision Making

With regards to context specific factors influencing the clinical decision making of South African paramedics in the acute pain management setting, the major contributing factors were the movement and further management required in order to appropriately treat and transport the patient to hospital. These considerations of what actions lay ahead played a major role in the South African paramedics anticipation of potentially pain inducing manipulations of injury sites and other pain inducing processes and as such acted as a precursor or initiator of the clinical decision making process leading to pain management.

While the literature suggested the external (outside of the immediate scenario) non-clinical factors may play a role in influencing the clinical decision making process, there was limited information forthcoming from this study to support this phenomena in the South African paramedic context. Some evidence to suggest that certain emotional triggers influenced the decision making of the South African paramedic in so far as rates and dosages of administration were concerned existed, but this was quite limited and further investigation into this area would be required in order to provide a more accurate answer to the extent to which non-clinical factors influenced South African paramedic clinical decision making.

5.5 PRIMARY RESEARCH QUESTION

The primary research question which while answered in isolation was also largely informed by the findings as they pertained to the three research objectives. The primary research question as per chapter one was:

What are the factors that influence the clinical decision making of paramedics in South Africa when managing patients experiencing traumatic pain?

In order to accurately answer the primary research question, it was important to understand that the term “factors” was expanded upon greatly during the course of the study. Rather than merely identifying factors which influenced the decisions to initiate or not to initiate pain management, the term came to encompass every and all elements which in any way shape and/or form influenced clinical decision making in South African paramedics when managing traumatic pain.

The three phases of the South African paramedics’ clinical decision making process as it pertains to pain management highlight the changes in the methods of clinical decision making employed by South African paramedics within a single incident. This not only highlighted the truly dynamic thought processes of the South African paramedic, but also indicated that factors which informed both the intuitive/humanist decision making model and the hypothetico-deductive decision making model were relevant to the clinical decision making of the South African paramedic .

This meant that both internally focused factors such as previous experience, personal perceptions and opinions as well as externally focused inputs such as the patients’ perception, pain score, physiological indicators, the mechanism of the injury and the required interventions factored into the South African paramedics’ clinical decision making in managing patients experiencing traumatic pain.

5.6 LIMITATIONS OF THE STUDY

While every effort was made to ensure that the study was as free of limitation as possible, the very nature of the research dictated that there would be certain limitations. This was further compounded by the complex nature of clinical decision making and the many unique elements which influence such a process.

From a procedural point of view, while necessary, the questionnaire component of the study was limited by two key factors. First, the questionnaire was largely structured utilizing single-selection check box answers as choices to the questions; this limited the extent to which participants could express the expanse of their thoughts in a process as dynamic as clinical decision making. Secondly, despite the best efforts of the researcher in achieving 100% study population receipt of the questionnaire, the lack of an accurate database of South African paramedics made this all but impossible. However, as the questionnaire was predominantly used as a purposive selection tool for the in-depth interview process, this was not seen as a detractor from the validity of the study.

The in-depth interviews were conducted using structured questions, with allowance made for pursuit of in-depth conversations regarding the participants' decision making processes and other relevant data. The interviews were limited to no more than one hour each, this had both the benefit of being concise and specific to the topic and the limitation of only having 60 minutes to explore a topic as dynamic as clinical decision making.

In addition to the time challenges, it must be noted that attempting to recreate the participants state of mind as it was during the clinical decision making process at the scene of an incident is not fool proof. Many element of decision making practices, in particular of more experienced individuals occur almost sub-consciously and as such this is very difficult information to extract.

Despite these limitations, the researcher was confident that the validity and reliability of the information obtained was sound and of value to this study, future research into this field and the pre-hospital community as a whole.

5.7 CONCLUSION

The international focus on the alleviation of suffering as one of the primary focuses of health care providers in every ambit of practice cannot be emphasised enough. The ultimate success of any clinical treatment regime or procedure can only be achieved by a careful combination of experience and deductive reasoning known as clinical decision making.

This study identified the key elements influencing the South African paramedic in both these important regards. With clinical decision making at its core and pain management as its guiding focus, this study provided commentary for the first time on South African paramedic clinical decision making in traumatic pain management, allowing for the vital process of pain management to be scrutinized by the cornerstone of good clinical practice, robust clinical decision making. As a first foray into these inextricably connected environments, it is imperative that future researchers conduct further research into both of these fields, be it in isolation or in combination, in order to ensure that South African paramedics and the South African pre-hospital environment as a whole continues to advance towards best practice so that any person residing or visiting South Africa benefits from the best possible healthcare available.

5.8 EXPERIENCES AND RECOMMENDATIONS

The experiences and recommendations of this study can be separated into two broad categories, those that pertain to research and the research process, and those that pertain to clinical decision making by South African paramedics.

5.8.1 The Research Process

The researcher made significant discoveries regarding his own time management and research methodology as a whole during the course of this study. The processes of creating, distributing and collecting the questionnaire and developing and conducting the interviews were fascinating and a learning experience indeed. During the course of these processes, a few observations were made which if addressed could greatly ease future researchers seeking to explore the South African pre-hospital environment and greatly simplify the process of adding to the body of knowledge being created in this environment.

Key amongst these aspects for potential address was the challenges related to accessing the population of South African paramedics. The HPCSA as the governing body of the profession keeps a record of all registrations. However there are very limited and rarely updated contact details available. This hampered the researcher and could potentially hamper future researchers attempting to access the South African paramedic population. The recommendation to remedy this would be for the creation of research community or easily accessible databases of paramedics within South Africa for the purposes of research. This database could be managed by an academic institution which could proactively invite paramedics to join either upon graduation or by contacting the various employers of paramedics in South Africa.

By fostering a culture of research, advancement and growth of the profession, the research believes that significant advancements in pre-hospital care and its relevant associated fields can be made. This, and the research born out of it, would ultimately benefit not only the patients that they serve, but also the practitioners, policy makers and educators involved in the pre-hospital environment in South Africa.

5.8.2 Clinical decision making by South African paramedics

Upon embarking upon the research journey, the researcher knew relatively little about clinical decision making and the fact that as a paramedic himself, he applied it subconsciously every time that he was called to an incident or treated a patient. During the course of the interviews, it became apparent that the researcher was not alone in being oblivious to this vital process which is central to all health care.

The researcher feels strongly that the by learning about clinical decision making before, during and after the study, and as such transforming the clinical decision making process from a completely sub-conscious process to a more conscious one, that his quality of patient care and accuracy of clinical decision making has improved. This realization led the researcher to make two key recommendations regarding clinical decision making by South African paramedics. The first is that considerable further research is required to continue delving into this incredibly complex yet vitally important aspect of pre-hospital care, while the second is that with the greater understanding of clinical decision making in the South African pre-hospital context, education and training practices should evolve to include it in their syllabi in order to empower future generations of South African paramedics to better understand their own thought processes and ultimately improve the care received by all South Africans.

5.8.2.1 Additional Recommendations

In addition to the two specific categories of experiences and recommendations, a further area of interest emerged during the interviews, numerous South African paramedics feel that their scope in terms of pain management tools is too limited, with the extremes of pain, mild pain and very severe pain, being the key areas where they felt that additional pharmacological agents or pain management techniques were missing.

It is a further recommendation of this study that given the nature of South African paramedic clinical decision making, further research be done into the expansion and/or potential alternatives to current pain management strategies and agents available to the South African paramedic.

REFERENCES

Abbuhl, F., Reed, D. 2003. Time to analgesia for patients with painful extremity injuries transported to the emergency department by ambulance. *Pre-hospital Emergency Care*, 7: 445-447

Alonso-Serra, H.M., Wesley, K. 2003. Pre-hospital Pain Management: Position Paper. *Prehospital Emergency Care*, 7 (4): 482-488

Banning, M. 2008. Clinical Reasoning and its Application to Nursing: Concepts and Research Studies. *Nurse Education in Practice*, 8 (3):177-183

Bauman, A.O., Deber, R.B. 1989. *Decision Making and Problem Solving in Nursing : an Overview and Analysis of Relevant Literature*. Toronto: University of Toronto, Centre for Public Management

Behara, R., Wears, R.L., Perry, S.J., Eisenberg, E., Murphy, A.G., Vanderhoef, M., Shapiro, M., Beach, C., Croskerry, P., Cosby, K. 2005. A conceptual framework for studying the safety of transitions in emergency care. *Advances in Patient Safety*, 2: 309-321

Benner, P., Tanner, C., Chesla, C. *Expertise in Nursing Practice: Caring, Clincal Judgement and Ethics*. 2nd Edition. New York: Springer Publishing Company

Berben, S.A.A., Meijs, T.H.J.M, van Grunsven, P.M., Schoonhoven, L., van Achterberg, T. 2011. Facilitators and barriers in pain management for trauma patients in the chain of emergency care. *Injury*, Accepted 31st January 2011

Boyce, C., Neale, P. 2006. *Conducting in-depth Interviews: A Guide for Designing and Conducting In-Depth Interviews for Evaluation Input*. Pathfinder International Publishing

Breivik, H., Borchgrevink, P.C., Allen, S.M., Rosseland, L.A., Romundstad, L., Breivik-Hals, E.K., Kvarstein, G., Stubhaug, A. 2008. Assessment of Pain. *British Journal of Anaesthesia*, 101 (1): 17-24

Brockoppa, D., Downeyb, E., Powersc, P., Vanderveerc, B., Wardena, S., Ryana, P., Saleh, U. 2004. Nurses' clinical decision-making regarding the management of pain. *Accident and Emergency Nursing*, 12: 224-229

Buckingham, C.D., Adams, A. 2000. Classifying clinical decision making: a unifying approach. *Journal of Advanced Nursing*, 32 (4): 981-989

Burgess, D.J., Crowley-Matoka, M., Phelen, S., Dovidio, J.F., Kerns, R., Roth, C., Saha, S., van Ryn, M. 2008. Patient race and physicians' decisions to prescribe opioids for chronic low back pain. *Social Science and Medicine*, 67: 1852–1860

Chambers, J.A., Guly, H.R. 1993. The need for better prehospital analgesia. *Archives of Emergency Medicine*, 10: 187-192

Cheymol, G. 2000. Effects of obesity on pharmacokinetics implications for drug therapy. *Clinical Pharmacokinetics*, 39 (3): 215-231

Cioffi, J., Markham, R. 1997. Clinical decision-making by midwives: managing case complexity. *Journal of Advanced Nursing*, 25: 265-272

Cordell, W.H., Keen, K.K., Giles, B.K. 2002. The high prevalence of pain in emergency care. *American Journal of Emergency Medicine,* 20 (3): 165–169

Cresswell, J.W. 2009. *Research design. Qualitative, quantitative and mixed methods approach.* 3rd Edition. Thousand Oaks: Sage Publications

Cresswell, J.W., Plano-Clark, V.L. 2010. *Designing and Conducting Mixed Methods Research*. 2nd Edition. Los Angeles: Sage Publications

Cromhout, A. 2003. Ketamine: Its use in the Emergency Department. *Emergency Medicine*, 15 (2): 155-159

Croskerry, P. 2002. Achieving Quality in Clinical Decision Making: Cognitive Strategies and Detection of Bias. *Academic Emergency Medicine*, 9 (11): 1184-1204

Croskerry, P. 2005. The Theory and Practice of Clinical Decision Making. *Canadian Journal of Anaesthesia*, 52 (6): 1-8

Croskerry, P. 2009. A Universal Model of Diagnostic Reasoning. *Academic Medicine*, 84 (8): 1022-1028

Dalal, S.A., Burgess, A.R., Siegel, J.H., Young, J.W., Brumback R.J., Poka, A., Dunham, C.M., Gens, D., Bathon, H. 1989. Pelvic fracture in multiple trauma: classification by mechanism is key to pattern of organ injury, resuscitative requirements, and outcome. *Journal of Trauma*, 29(7): 981-1000

Division of Clinical Pharmacology, Faculty of Health Sciences, University of Cape Town. 2012. *South African Medicines Formulary*. 10th Edition. Cape Town: Health and Medical Publishing Group (HMPG)

Duchscher, J.E.B. 1999. Catching the Wave: Understanding the Concept of Critical Thinking. *Journal of Advanced Nursing*, 29 (3): 577-583

Elstein, A.S., Swartz, A. 2006. Clinical problem solving and diagnostic decision making: selective review of the cognitive literature. *British Medical Journal*, 324: 729-732

Foster, R.L. 2001. Nursing Judgment: The Key to Pain Assessment in Critically Ill Children. *Journal of the Society of Paediatric Nurses*, 6 (2): 90-96.

Foster, R.L., Yucha, C.B., Zuck, J., Vojir, C.P. 2003. Physiologic correlates of comfort in healthy children. *Pain Management Nursing*, 4(10): 23-30

Furrow, B.R. 2001. Pain Management and Provider Liability: No More Excuses. *Journal of Law, Medicine and Ethics*, 29: 28-51

Gawande, A. 2002. *Complications: A Surgeon's Notes on an Imperfect Science*. London: Metropolitan Books

Gélinas, C., Fortier, M., Viens, C., Fillion, L., Puntillo, K. 2004. Pain Assessment and Management in Critically Ill Intubated Patients: A Retrospective Study. *American Journal of Critical Care*, 13: 126-136

Ghafouri, H., Shokraneh, F., Saidi, H., Jokar, A., 2011. How do Iranian emergency doctors decide? Clinical decision making processes in practice. *Emergency Medical Journal,* Accepted 14 March 2011.

Gordon, M. 1987. *Nursing Diagnosis, Process and Application*. New York: McGraw Hill

Gordon, R., Franklin, N. 2003. Cognitive underpinnings of diagnostic error. *Academic Medicine*, 78 (8): 782

Graber, M. 2003. Metacognitive training to reduce diagnostic errors: Ready for prime time. *Academic Medicine*, 78 (8): 781.

Hahn, C. 2008. *Doing Qualitative Research on your Computer: A Practical Guide*. Los Angeles: Sage Publications

Hamers, J.P.H., Abu-Saad, H.H., van den Hout, M.A., Halfens, R.J.G., Kester, A.D.M. 1996. The influence of children's vocal expressions, age, medical diagnosis and information obtained from parents on nurses' pain assessments and decisions regarding interventions. *Pain*, 65: 53-61

Hamers, J.P.H., van den Hout, M.A., Halfens, R.J.G., Abu-Saad, H.H., Heijltjes, A.E.G. 1997. Differences in pain assessment and decisions regarding the administration of analgesics between novices, intermediates and experts in pediatric nursing. *International Journal of Nursing Studies*, 34 (5): 325-334

Hammond KR. 1996. How convergence of research paradigms can improve research on diagnostic judgement. *Medical Decision* Making, 16(3): 281–287.

Hardy, D., Smith, B. 2008. Decision Making in Clinical Practice. *British Journal of Anaesthetic and Recovery Nursing*, 9 (1): 19-21

Health Professions Council of South Africa. 2006. *Advanced Life Support Practitioner protocols*. Pretoria: HPCSA

Health Professions Council of South Africa. 2009. *Emergency Care Practitioner Scope of Practice*. Pretoria: HPCSA

Health Professions Council of South Africa. 2010. Personal communication via email to Mulder, R., 3rd June 2010

Hennes, H., Kim, M.K., 2006. Prehospital Pain Management: Current Status and Future Direction. *Clinical Paediatric Emergency Medicine*, 7: 25-30

Herr, K., Coyne, P.J., Key, T., Manworren, R., McCaffery, M., Merkel, S., Peloise-Kelly, J., Wild, L. 2006. Pain Assessment in the Nonverbal Patient: Position Statement with Clinical Practice Recommendations. *Pain Management Nursing*, 7 (2): 44-52

Institute for Clinical Systems Improvement (ICSI). 2008. *Health Care Guideline: Assessment and Management of Acute Pain 6th Edition.* USA: ICSI

Jennings, P.A., Cameron, P., Bernard, S., Walker, T., Jolley, D., Fitzgerald, M., Masci, K. 2011. Morphine and Ketamine Is Superior to Morphine Alone for Out-of-Hospital Trauma Analgesia: A Randomized Controlled Trial. *Annals of Emergency Medicine*, Accepted November 2011

Jensen, J., Croskerry, P., Tavers, A. 2009. Paramedic Clinical Decision Making during high acuity emergency call: design and methodology of a Delphi study. *BMC Emergency Medicine*, 9 (1): 17

Jones, G.E., Machen, I. 2003. Prehospital Pain Management: The Paramedics' Perspective. *Accident and Emergency Nursing*, 11: 166-172

Kassirer, J.P. 1976. The Principles of Clinical Decision Making: An Introduction to Decision Analysis. *The Yale Journal of Biology and Medicine*, 49: 149-164

Kearney, N., Richardson, A., Di Giulio, P. 2000. *Cancer nursing practice: a textbook for the specialist nurse*. Edinburgh: Churchill Livingstone

Klein, G., Calderwood, R. 1991. Decision models: lessons from the field. *IEEE Transactions on Systems. Man and Cybernetics*, 21 (5): 1018-1026

Knopp, R., Yanagi, A., Kallsen, G., Geide, A., Doehring, L. 1987. Mechanism of injury and anatomic injury as criteria for prehospital trauma triage. *Annals of Emergency Medicine*, 17: 55-55

Kovacs, G., Croskerry, P. 1999. Clinical Decision Making: An Emergency Medicine Perspective. *Academic Emergency Medicine*, 6 (9): 947-952.

Laxmisan, A., Hakimzada, F., Sayan, R.O., Green, A.R., Zhang, J., Patel, V.L. 2007. The multitasking clinician: Decision-making and cognitive demand during and after team handoffs in emergency care. *International Journal of Medical Informatics*, 76: 801-811.

Lincoln, Y.S., Guba, E.G. 1985. *Naturalistic Inquiry*. Los Angeles: Sage Publications

Long, T., Johnson, M. 2000. Rigour, Reliability and Validity in Qualitative Research. *Clinical Effectiveness in Nursing*, 4: 30-37

Lipman, M. (2006). *À l'école de la pensée: enseigner une pensée holistique.* Brussels: De Boeck Publishing

Lord, B. 2003. Pain Management: Can Education Make a Difference?. *Journal of Emergency Primary Healthcare*, 1: 3-4

Lorenz, K.A., Sherbourne, C.D., Shugarman, L.R., von Rubenstein, L., Wen, L., Cohen, A., Goebel, J.R., Hagenmeier, E., Simon, B., Lanto, A., Asch, S.M. 2009. How Reliable is pain as the fifth Vital Sign?. *Journal of American Board of Family Medicine*, 22 (3): 291-298

MacFarlane, C., Benn, C.A. 2003. Evaluation of emergency medical services systems: a classification to assist in determination of indicators. *Emergency Medical Journal*, 20:188–191

MacFarlane, C., van Loggerenberg, C., Kloeck, W. 2005. International EMS systems in South Africa - past, present, and future. *Resuscitation*, 64(2):145-148

Macintyre, P.E., Schug, S.A., Scott, D.A., Visser, E.J., Walker, S.M. Acute Pain Management: Scientific Evidence Working Group of the Australian and New Zealand College of Anaesthetists and Faculty of Pain Medicine. 2010. *Acute Pain Management: Scientific Evidence.* 3rd edition. Melbourne: ANZCA & FPM

Manias, E., Aitken, R., Dunning, T. 2004. Decision-making models used by 'graduate nurses' managing patients' medications. *Journal of Advanced Nursing*, 47 (3): 270-278

Matzopoulos, R.G., Prinsloo, M.R., Bopape, J.L., Butchart, A., Peden, M.M., Lombard, C.J. 1999. Estimating the South African trauma caseload as a basis for injury surveillance. South African Medical Research Council, 1999.

Maxwell, J.A. 2009. *Qualitative Research Design: An interactive Approach*. Los Angeles: Sage Publications

McCaffery, M., Pasero, C. 1999. *Pain: Clinical Manual*. 2nd Edition. St. Louis: Mosby

McKinley, J.B., Potter, D.A., Feldman, H.A. 1996. Non-Medical Influences and Medical Decision Making. *Social Science and Medicine*, 42 (5): 769-776

McMannus, J.G., Sallee, D.R. 2005. Pain Management in the Prehospital Environment. *Journal of Special Operations Medicine*, 8 (1): 111-119

McQuay, H. 1999. Opioids in Pain Management. *The Lancet*, 353: 2229-2232

Meents, E., Boyles, T. 2010. Emergency medical services - poor response time in the rural Eastern Cape. *South African Medical Journal*, 100(2): 790-791

Mills, A.M., Shofer, F.S., Boulis, A.K., Holena, D.N., Abbuhl, S.B. 2010. Racial disparity in analgesic treatment for emergency department patients with abdominal and back pain. *American Journal of Emergency Medicine*, 29: 752-756

Norman, G. 2005. Research in clinical reasoning: past history and current trends. *Medical Education*, 39 (4): 418-427

Nuland, S.B. 1994. *How We Die: Part 2*. London: Chatto and Windus

Orme, L., Maggs, C. 1993. Decision making in clinical practice: how do expert nurses, midwives and health visitors make decisions? *Nurse Education Today*, 13: 270-276

Pasero, C., McCaffery, M. 1994. Avoiding opioid – induced respiratory depression. *American Journal of Nursing,* 94(4): 25-31

Pillay, Y. 2008. Clinical Decision Making by Paramedics in Emergency Rapid Sequence Intubation. Masters of Technology in Emergency Medical Care Thesis, Durban University of Technology, Durban

Polit, D.F. and Beck, C.T. 2008. *Nursing research: generating and assessing evidence for nursing practice.* 8th edition. New York: Lippincott Williams and Wilkins

Porter, K. 2004. Ketamine in Prehospital Care. *Emergency Medicine Journal*, 21: 351-354

Registered Nurses Association of Ontario (RNAO). 2002. *Assessment and Management of Pain.* Toronto: Registered Nurses Association of Ontario

Rolfe, G. 2006. Validity, trustworthiness and rigour: quality and the idea of qualitative research. *Journal of Advanced Nursing*, 53 (3): 304-310

Rupp, T., Dalaney, K.A. 2004. Inadequate Analgesia in Emergency Medicine. *Annals of Emergency Medicine*, 43 (4): 494-503

Sandhu, H., Carpenter, C. 2006. Clinical Decisionmaking: Opening the Black Box of Cognitive Reasoning. *Annals of Emergency Medicine*, 48 (6): 713-719

Scholes, C.F., Gonty, N., Trotman, I.F. 1999. Methadone titration in opioid-resistant cancer pain. *European Journal of Cancer Care*, 8: 26-29

Shatney, C.H., Sensaki, K. 1994. Trauma team activation for 'mechanism of injury' blunt trauma victims: time for a change?. *Journal of Trauma*, 37 (2): 275-278

Tanner, C.A. 2006. Thinking Like a Nurse: A Research-Based Model of Clinical Judgment in Nursing. *Journal of Nursing Education*, 45 (6): 204-211

Tanner, C., Padrick, K., Westfall, U., Putzier, D. 1987. Diagnostic reasoning strategies for nurses and nursing students*. Nursing Research*, 36: 358-363

Tate, S.K., Goldstein, D.B. 2004. Will tomorrow's medicines work for everyone? *Nature Genetics*, 36 (11): 34–42.

Tenabe, P. 2005. Recognizing Pain as a Component of the Primary Assessment: Adding D for Discomfort to the ABC's. *Journal of Emergency Nursing*, 21: 299-304

Thomas, S.H., Shewakramani, S. 2008. Prehospital Trauma Analgesia. *The Journal of Emergency Medicine*, 35 (1):47-57

Thompson, C., Dowding, D. 2002. *Clinical Decision Making and Judgment in Nursing*. London: Churchill Livingstone

Tverskoy, M., Fleyshman, G., Ezry, J., Bradley Jr, E.L., Kissin, I. 1989. Midazolam-Morphine Sedative Interaction in Patients. *Anaesthesia and Analgesia*, 68: 282-285

Vassiliadis, J., Hitos, K., Hill, C. 2002. Factors influencing prehospital and emergency department analgesia administration to patients with femoral neck fractures. *Journal of Emergency Medicine*, 14: 261-266

Wallis, L.A., Garach, S.R., Kropman, A. 2008. State of Emergency Medicine in South Africa. *International Jouranal of Emergency Medicine*, 1: 69-71

Weisse, C.S., Sorum, P.C., Dominguez, R.E. 2003. The Influence of Gender and Race on Physicians' Pain Management Decisions. *The Journal of Pain*, 4 (9): 505-510

World Health Organization. 2008. Mortality and Burden of Disease Statistics: Disease and Injury Country Estimates

Yin, R.K. 2011. *Qualitative Research from Start to Finish*. New York: The Guilford Press

Annexure 1: University Ethics Approval

DURBAN UNIVERSITY of TECHNOLOGY

Faculty of Health Sciences

ETHICS CLEARANCE CERTIFICATE

Student Name	Richard Kevin Mulder	**Student No**	21032856
Ethics Reference	FHSEC 020/10	**Date of FRC Approval**	07/06/10
Qualification	M.Tech.: Emergency Medical Care		
Research Title:	**Clinical decision making by South African paramedics in the management of acute traumatic pain**		

In terms of the ethical considerations for the conduct of research in the Faculty of Health Sciences, Durban University of Technology, this proposal meets with institutional requirements and confirms the following ethical obligations:

1. The researcher has read and understood the research ethics policy and procedures as endorsed by the Durban University of Technology, has sufficiently answered all questions pertaining to ethics in the PG4a and agrees to comply with them.
2. The researcher will report any serious adverse events pertaining to the research to the Faculty of Health Sciences Research Ethics Committee.
3. The researcher will submit any major additions or changes to the research proposal after approval has been granted to the Faculty of Health Sciences Research Committee for consideration.
4. The researcher, with the supervisor and co-researchers will take full responsibility in ensuring that the protocol is adhered to.
5. ***The following section must be completed if the research involves human participants:***

	YES	NO	N/A
❖ ***Provision has been made to obtain informed consent of the participants***	✓		
❖ Potential psychological and physical risks have been considered and minimised	✓		
❖ Provision has been made to avoid undue intrusion with regard to participants and community	✓		
❖ Rights of participants will be safe-guarded in relation to: - Measures for the protection of anonymity and the maintenance of Confidentiality.	✓		
- Access to research information and findings.	✓		
- Termination of involvement without compromise	✓		
- Misleading promises regarding benefits of the research	✓		

[redacted] 07/06/10

SIGNATURE OF STUDENT/RESEARCHER — DATE

[redacted] 07/06/10

SIGNATURE OF SUPERVISOR/S — DATE

[redacted] 07/06/10

SIGNATURE OF HEAD OF DEPARTMENT — DATE

[redacted] 07/06/10

SIGNATURE: CHAIRPERSON OF RESEARCH ETHICS COMMITTEE — DATE

Annexure 2 - Participant Information Sheet - Questionnaire

Dear Colleague,

Thank you in advance for taking the time to read this information sheet and aiding in my research by completing the attached questionnaire.

Study Title:
"*Clinical decision making by South African paramedics in the management of acute traumatic pain*"

Name of Supervisor: Dr N.Sibiya (nokuthulas@dut.ac.za)
Name of Co-Supervisor: Mr Yugan Pillay (yuganp@dut.ac.za)
Name of Student: Richard Mulder (079 5 222 888)
Name of Institution: Durban University of Technology
Dept. of Emergency Medical Care & Rescue

Purpose of the study:
The purpose of this study is to understand the factors contributing to the clinical decision making (CDM) process of South African paramedics in the acute pain management of patients with acute traumatic pain.

The potential exists for there to be far reaching implications of a better understanding of South African paramedic CDM, ranging from improved guidelines for future educational interventions to expansion of the paramedic scope of practice.

Your role:
All you would need to do is take a few minutes to answer the questions in the attached questionnaire.

If you would be open to potentially being contacted for a follow up interview to make up a part of the active study participants, please indicate this on the last question of the questionnaire.

Should you be selected to be a study participant and are still willing to participate, further information about the process will be provided to you.

Risks:
There are no risks to you or your organization as all information divulged in the questionnaire will be kept confidential.

Incentives:
There are no financial incentives for you to participate in this study; however it may contribute to your own professional development and understanding of clinical decision making as a whole.

All of your information is confidential and the results will be used for research purposes only. Should you have any questions/concerns about any aspect of this study please feel free to contact me or my supervisors directly (contact details above).

Thank you once again for your time and your potential decision to participate in this study.
Kind Regards,

Richard Mulder (M.Tech. Emergency Medical Care – Final year student)

Annexure 3 - Participant Information Sheet – Interviews

Dear Colleague,

Thank you for taking the time to complete the questionnaire and indicating your preparedness to aid me even further in my research by becoming a study participant.

Study Title:

"*Clinical decision making by South African paramedics in the management of acute traumatic pain*"

Name of Supervisor: Dr N.Sibiya (nokuthulas@dut.ac.za)
Name of Co-Supervisor: Mr Yugan Pillay (yuganp@dut.ac.za)
Name of Student: Richard Mulder (079 5 222 888)
Name of Institution: Durban University of Technology
Dept. of Emergency Medical Care & Rescue

Purpose of the study:

The purpose of this study is to understand the factors contributing to the clinical decision making (CDM) process of South African paramedics in the acute pain management of patients with acute traumatic pain.

The potential exists for there to be far reaching implications of a better understanding of South African paramedic CDM, ranging from improved guidelines for future educational interventions to expansion of the paramedic scope of practice.

Your role as a study participant:

I will be contacting you at your convenience in order to set up a time (again, at your convenience) where we can either meet or speak telephonically as is your wish.

I will require your pain management related patient report forms for a specified period. The patient information will be discarded thus providing for patient anonymity while you and your organization will be afforded the utmost of confidentiality.

I will be interviewing you to gain in depth knowledge about your specific methods of clinical decision making in pain management.

The interview will not exceed 1hour in length and you may terminate your involvement in the study at any point in time.

Risks:

There are no risks to you or your organization as all information divulged in the patient report forms and interviews will be kept strictly confidential.

Incentives:

There are no financial incentives for you to participate in this study; however it may contribute to your own professional development and understanding of clinical decision making as a whole.

All of your information is confidential and the results will be used for research purposes only. Should you have any questions/concerns about any aspect of this study please feel free to contact me or my supervisors directly (contact details above).

Thank you once again for your time and your potential decision to participate in this study.

Kind Regards,

Richard Mulder (M.Tech. Emergency Medical Care – Final year student)

Annexure 4 - Informed Consent Form – Interview Participants

Date : _____/_____/_____
The title of the research project is "***Clinical decision making by South African paramedics in the management of acute traumatic pain***"

Name of Supervisor: Dr N.Sibiya (nokuthulas@dut.ac.za)
Name of Co-Supervisor: Vacant Mr Yugan Pillay (yuganp@dut.ac.za)
Name of Research Student: Richard Mulder (079 5 222 888)
Name of Institution: Durban University of Technology
Dept. of Emergency Medical Care & Rescue

Purpose of the Study
The purpose of this study is to understand the factors contributing to the clinical decision making (CDM) process of South African paramedics in the acute pain management of patients with acute traumatic pain. The potential exists for there to be far reaching implications of a better understanding of South African paramedic CDM, ranging from improved guidelines for future educational interventions to expansion of the paramedic scope of practice.

Please circle the appropriate answer

1. Have you read the participant information sheet? YES / NO

2. Have all questions that you have regarding the study been satisfactorily answered? YES / NO

4. Have you had an opportunity to discuss this study? YES / NO

5. Are you satisfied with your level of understanding of the study? YES / NO

6. Who have you communicated your questions/concerns to? _____

7. Do you understand your role within this study? YES / NO

8. Do you understand that you may withdraw from this study? YES / NO
   a) At any time
   b) Without needing to justify your decision
   c) Without impacting on you in any way in the future

9. Do you consent to voluntarily participate in this study? YES / NO

Participant Name: _____(in block letters)

Signature: _____ Date: _____

Witness Name: _____(in block letters)

Signature: _____ Date: _____

Research Student: Richard Mulder

Signature: _____ Date: _____

If you have answered NO to any of the above questions, please do not hesitate to contact either of my supervisors who will be able to assist you.

Annexure 5 - Research Information Sheet and Consent Form – Report Form Viewing

Dear Sir/Madam of organization/DOH,

Thank you in advance for taking the time to read this information sheet and aiding in my research by considering my request.

Study Title:
"*Clinical decision making by South African paramedics in the management of acute traumatic pain*"

Name of Supervisor: Dr N.Sibiya (nokuthulas@dut.ac.za)
Name of Co-Supervisor: Mr Yugan Pillay (yuganp@dut.ac.za)
Name of Student: Richard Mulder (079 5 222 888)
Name of Institution: Durban University of Technology
Dept. of Emergency Medical Care & Rescue

Purpose of the study:
The purpose of this study is to understand the factors contributing to the clinical decision making (CDM) process of South African paramedics in the acute pain management of patients with acute traumatic pain.

The potential exists for there to be far reaching implications of a better understanding of South African paramedic CDM, ranging from improved guidelines for future educational interventions to expansion of the paramedic scope of practice.

My Request:
As a phase of the data collection process, I am hoping to obtain patient report forms completed by your employee/staff _____Study Participant_____, when having managed a patient for acute traumatic pain. These forms would only be viewed during the interview with your employee/staff, after which they will be return to yourselves/your staff.
All identifying patient information (name, address, financial information, etc) will be blacked out and treated with the strictest confidentiality. The same will hold true for you employee as well as your organization/service with no names or identifying features being included in the research document. These documents will be used to inform discussions surrounding the clinical decision making process of the treating paramedic.

All of your information is confidential and the results will be used for research purposes only. The information will be kept safe until the required time period has elapsed upon which the data will be incinerated

Should you have any questions/concerns about any aspect of this study please feel free to contact me or my supervisors directly (contact details above).

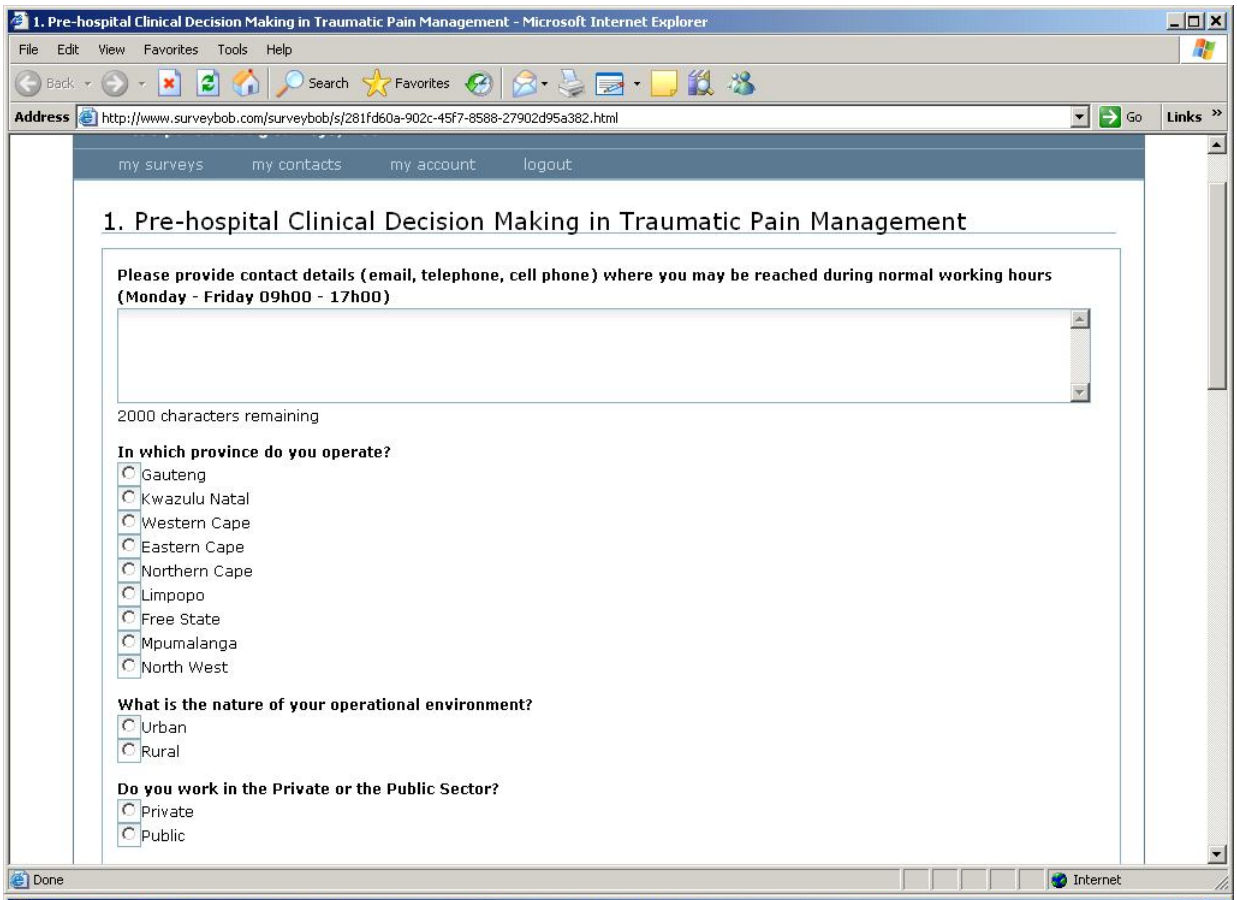
Thank you once again for your time and your potential decision to consent and assist me in this study.
Kind Regards,
Richard Mulder (M.Tech. Emergency Medical Care – Final year student)

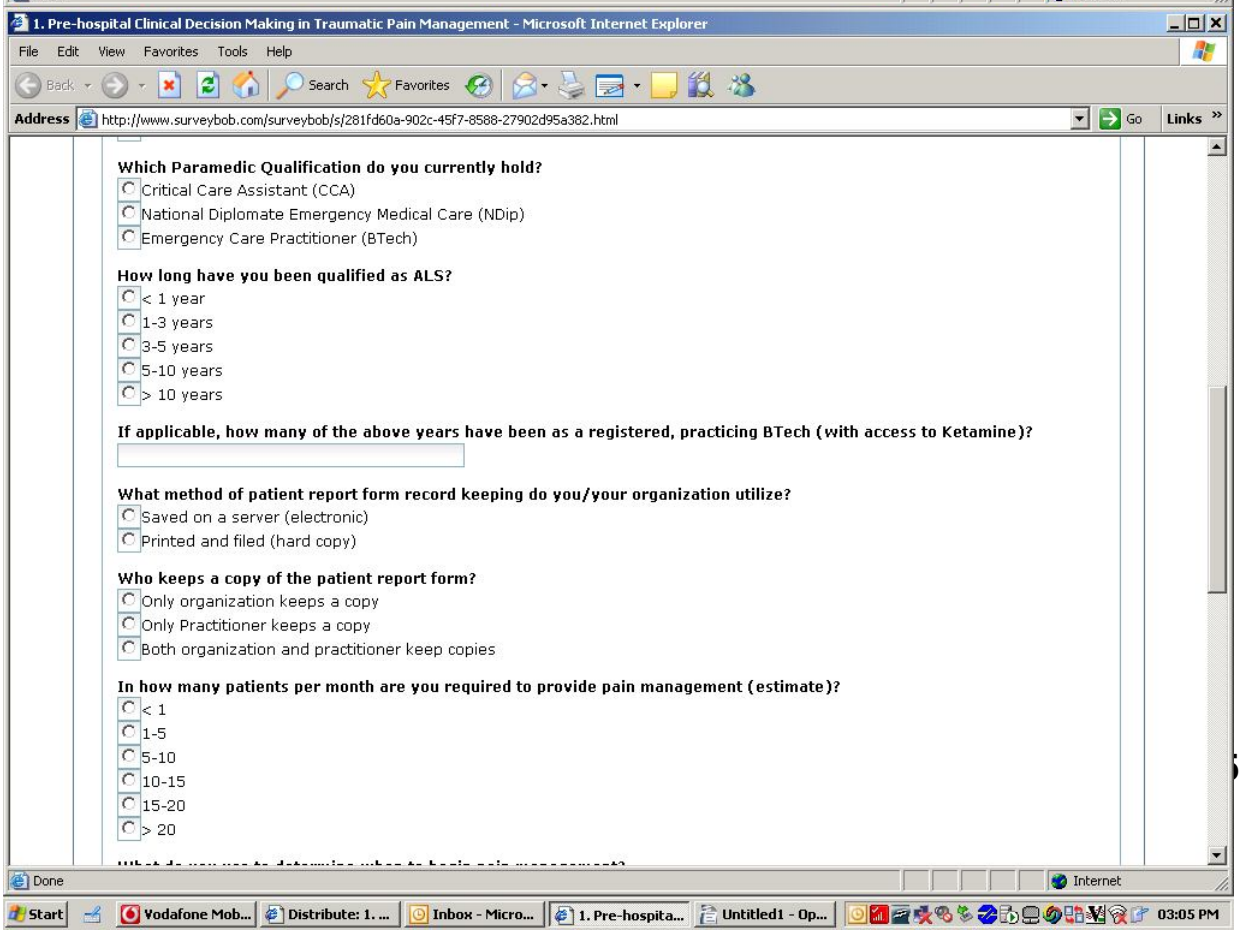
(Please circle)
Consent Granted / Declined

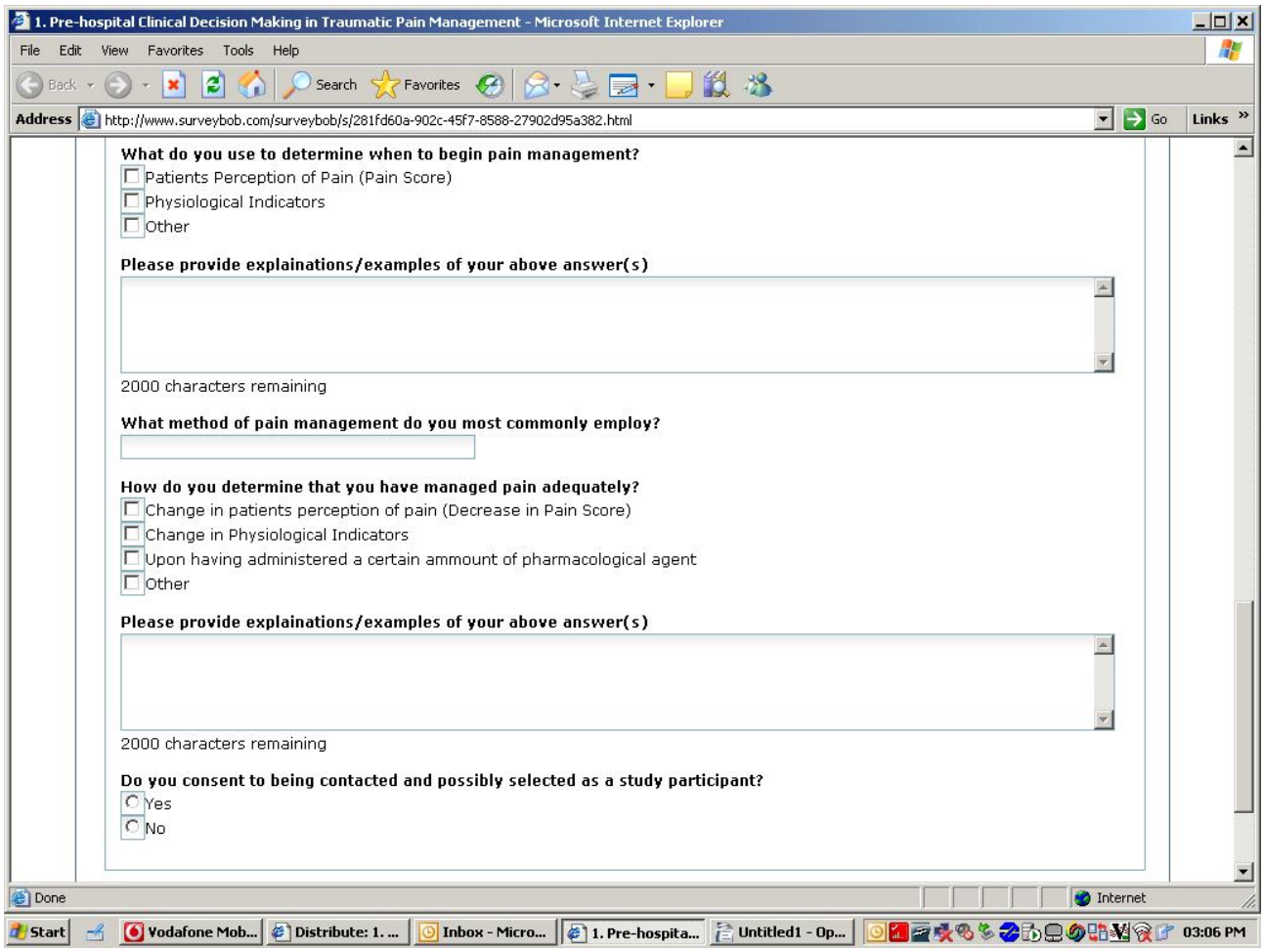
_____	_____
Representative of Organization/DOH	Richard Mulder
_____	_____
Witness	Date

Annexure 6 – Questionnaire

Designed using SurveyBob online survey and questionnaire freeware (www.surveybob.com)






1. Pre-hospital Clinical Decision Making in Traumatic Pain Management - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://www.surveybob.com/surveybob/s/281fd60a-902c-45f7-8588-27902d95a382.html
Go Links
What do you use to determine when to begin pain management?
Patients Perception of Pain (Pain Score)
Physiological Indicators
Other
Please provide explainations/examples of your above answer(s)
2000 characters remaining
What method of pain management do you most commonly employ?
How do you determine that you have managed pain adequately?
Change in patients perception of pain (Decrease in Pain Score)
Change in Physiological Indicators
Upon having administered a certain ammount of pharmacological agent
Other
Please provide explainations/examples of your above answer(s)
2000 characters remaining
Do you consent to being contacted and possibly selected as a study participant?
Yes
No
Done
Internet
Start
Vodafone Mob...
Distribute: 1. ...
Inbox - Micro...
1. Pre-hospita...
Untitled1 - Op...
03:06 PM

Annexure 7 - Recording and Transcription Confidentiality Agreement

Dear Sir/Organization

Thank you for the opportunity to make use of your facilities for the purposes of recording and transcribing my interviews in line with my research.

Study Title:
"*Clinical decision making by South African paramedics in the management of acute traumatic pain*"

Name of Supervisor: Dr N.Sibiya (nokuthulas@dut.ac.za)
Name of Co-Supervisor: Mr Yugan Pillay (yuganp@dut.ac.za)
Name of Student: Richard Mulder (079 5 222 888)
Name of Institution: Durban University of Technology
Dept. of Emergency Medical Care & Rescue

Purpose of the study:
The purpose of this study is to understand the factors contributing to the clinical decision making (CDM) process of South African paramedics in the acute pain management of patients with acute traumatic pain.

The potential exists for there to be far reaching implications of a better understanding of South African paramedic CDM, ranging from improved guidelines for future educational interventions to expansion of the paramedic scope of practice.

Confidentiality Aspect:
Please indicate by means of your signature that you are satisfied with and able to ensure following conditions:

During Interviews

- Confidentiality of:
    - Study Participants (name, etc.)
    - Information contained in interview
        - Recording
        - Transcription

Post Interviews

- Deletion/Destruction of:
    - Recordings
    - Transcriptions

Thank you again for the use of your facilities and my research, even though there is no direct benefit to your organization.
Kind Regards,
Richard Mulder

Representative of Organization	Richard Mulder
Witness	Date

Annexure 8 - Interview Schedule

The interview process will consist of 3 phases.

Phase 1
As discussed in the research methodology, the information gained from the questionnaires as well as from the literature review will be provided to the study participants as a basis from which to begin the interview.

This will take place in that the study participants will be asked to share their opinion of the results/themes indicated in the questionnaires. Their responses will be discussed and explored to gain a better understanding of their thoughts.

Phase 2
The study participants will be asked to detail their thought processes in specific patient scenarios. These scenarios will be study participant specific and consist of a maximum of 5 of the specific study participants previous patients, as provided by the participants.

The schedule of questions to be applied to the participants is as follows:

1. What are your thoughts on the questionnaire results?
    a. Discussion surrounding thoughts and answers

2. With reference to the cases that you provided, what was the thought process that you followed when determining whether or not to initiate pain management?
    a. Discussion surrounding thoughts and answers

3. What were the contributing factors (environmental/social/situational) to your decisions regarding pain management of this patient?
    a. Discussion surrounding thoughts and answers

4. With the benefit of reviewing the case now, is there anything that you would have changed in your management and why?
    a. Discussion surrounding thoughts and answers

5. When, during the course of patient management, do you believe it to be the optimal time to provide pain management?
    a. Discussion surrounding thoughts and answers

After the questions had been completed, the five cases will be returned to the participants, and they will be thanked for their time and participation in the study.

The answers/explanations given by the study participants will be explored in conjunction with pre-existing clinical decision making models as determined in the literature review.

Phase 3

The study participants will be given an opportunity to openly discuss any aspect of pain management or clinical decision making that they chose.

During this time the researcher will attempt to keep the discussion within the framework of the study by referring to previous statement of the study participant or literature review conducted prior to the interviews.

The above 3 phases are subject to change slightly throughout the research process as well as during the interview as is the nature of qualitative research. The study participants will not be restricted from expressing any opinion or thought and while these may not fall within the above mentioned 3 phases, will still be transcribed and analysed as a part of the study process.

Annexure 9 – Interview Codes

Number	Illustrative words from Interview Transcriptions	Initial Code (Level 1)	Level 2 Code	Qualification	Years Qualified	Province
1	"The responses for indicators for initiating pain management are to be expected"	commentary on questionnaire responses	Initiation of Pain management	Btech EMC	5-10 years	Gauteng
2	"The physiological indicators are a poor indicator of pain unless the patient is obtunded"	Physiological Indicators - Poor Sign	Initiation of Pain management	Btech EMC	5-10 years	Gauteng
3	"my initiation of pain management is largely governed by the patient telling me that they are in pain"	Patients expression of pain	Initiation of Pain management	Btech EMC	5-10 years	Gauteng
4	"why allow a patient to go back into a painful state when we could maintain his pain at an adequate level"	Maintaining Adequate Pain management	Cessation of Pain Management	Btech EMC	5-10 years	Gauteng
5	"Ketamine more rapid than morphine, preferred in time critical scenario"	Ketamine Preferred to Morphine	choice of agent/ method of pain management	Btech EMC	5-10 years	Gauteng
6	"significant urging from crowd and bystanders led me to want to achieve a 'pain-free' state in the patient expeditiously"	External Influence - led to faster agent administration	choice of agent/ method of pain management	Btech EMC	5-10 years	Gauteng
7	"Outside influences (not patient centric) may play a significant part in determining how and how fast you provide analgesia"	External Influence - led to faster agent administration	Initiation of Pain management	Btech EMC	5-10 years	Gauteng
8	"the patient expressed that they were comfortable, so I did not provide further pain management"	Patients expression of comfort	Cessation of Pain Management	Btech EMC	5-10 years	Gauteng

9	"ketamine is better in traumatic pain than morphine"	Ketamine Preferred to Morphine	choice of agent/ method of pain management	Btech EMC	5-10 years	Gauteng
10	"There is no silver bullet, a combination of analgesics is ideal"	Combination of Analgesics to achieve pain management	choice of agent/ method of pain management	Btech EMC	5-10 years	Gauteng
11	"His expression of comfort guided me rather than his perception of pain based on the pain score"	patients expression rather than numerical pain score	Cessation of Pain Management	Btech EMC	5-10 years	Gauteng
12	"the mechanism of the accident, i.e. How the injury occurred played a major role in my decision to initiate pain management"	Mechanism of Injury	Initiation of Pain management	Btech EMC	5-10 years	Gauteng
13	"I knew that we would need to move the patient quite a bit and thus administered analgesic agents"	Movement/Splinting Required	Initiation of Pain management	Btech EMC	5-10 years	Gauteng
14	"The pain score is too subjective to be seriously considered as it relies on the recollection of pain. It is almost impossible to accurately recollect pain after a painful experience"	Pain Score is Subjective - poor sign	Initiation of Pain management	Btech EMC	5-10 years	Gauteng
15	"the patients request for analgesia/pain management is a key factor in my decision making"	Patients expression of pain	Initiation of Pain management	Btech EMC	5-10 years	Gauteng
16	"I do not feel that morphine was the best agent in this case, ketamine or a combination of agents which we do not currently have access to would have been more beneficial"	Morphine not ideal agent	choice of agent/ method of pain management	Btech EMC	5-10 years	Gauteng
17	"I was in pain on his behalf given his injuries"	Personal Opinion of Patients Pain	Initiation of Pain management	Btech EMC	5-10 years	Gauteng

18	"my belief about pain is that it is something we (as paramedics) can address and as such we should (address it)"	Pain should be addressed	Initiation of Pain management	Btech EMC	5-10 years	Gauteng
19	"I administered the dose in a way that would have a minimal effect on haemodynamics, but still targeting a 'sufficient' dose"	targeting appropriate dose	choice of agent/ method of pain management	Btech EMC	5-10 years	Gauteng
20	"Pain management should be sooner rather than later"	Pain Management is a Priority	Prioritization of pain management	Btech EMC	5-10 years	Gauteng
21	"I think that the combination of morphine and midazolam or midazolam in isolation for pain management is completely inappropriate, midazolam has absolutely no analgesic properties"	Midazolam not an analgesic	choice of agent/ method of pain management	Btech EMC	5-10 years	Gauteng
22	"the vital signs and pain score are the most important factors in determining the need for pain management, so this is exactly what I expected"	commentary on questionnaire responses	Initiation of Pain management	Ndip	1-3 years	KZN
23	"my personal feeling about the pain score is that it is inaccurate, subjective and that it relies on the patient having experiences similar pain before"	Pain Score is Subjective - poor sign	Initiation of Pain management	Ndip	1-3 years	KZN
24	"if the patient says that their pain score has decreased but that they are still expressing pain, this will not preclude me from providing further analgesia"	Pain Score is Subjective - poor sign	Cessation of Pain Management	Ndip	1-3 years	KZN
25	"I did not assess the patients pain score as they were obviously in severe pain"	Personal Opinion of Patients Pain	Initiation of Pain management	Ndip	1-3 years	KZN
26	"the aim was to ease her pain and be able to move her"	Movement/Splinting Required	Initiation of Pain management	Ndip	1-3 years	KZN

27	"I should have administered morphine earlier - before trying to move her"	Movement/Splinting Required	Prioritization of pain management	Ndip	1-3 years	KZN
28	"I could see that the patient was comfortable and was happy to allow us to splint the limb, therefore I did not deem it necessary to administer further morphine"	Personal Opinion of Patients Pain	Cessation of Pain Management	Ndip	1-3 years	KZN
29	"having been called for pain management, I already knew that I was going to give something, probably morphine"	Predetermined idea to provide pain management	Initiation of Pain management	Ndip	1-3 years	KZN
30	"The injury looked sore to me!"	Personal Opinion of Patients Pain	Initiation of Pain management	Ndip	1-3 years	KZN
31	"based on experience and pain score of 3/10 and below I would focus on alternate methods rather than intravenous morphine to control the patients pain"	Alternate Method/Agents preferred	choice of agent/ method of pain management	Ndip	1-3 years	KZN
32	"I have had this injury myself and I know it is painful"	Personal Opinion of Patients Pain	Initiation of Pain management	Ndip	1-3 years	KZN
33	"In the absence of primary survey compromise, pain management becomes the priority in patient care"	Pain Management is a Priority	Prioritization of pain management	Ndip	1-3 years	KZN
34	"Previous experience plays a massive role; you can relate back to what you or other paramedics have done in the past and determine the best course of action. It is how you grow as a practitioner"	Previous Experience as a Practitioner	choice of agent/ method of pain management	Ndip	1-3 years	KZN
35	"I am amazed at the accuracy of the cessation reason results, I think that this is certainly the case"	commentary on questionnaire responses	Cessation of Pain Management	CCA	1-3 years	Gauteng

36	"I find that in many patients, if the patients perception of their pain is managed, then a large part of the pain management job has already been done"	commentary on questionnaire responses	choice of agent/ method of pain management	CCA	1-3 years	Gauteng
37	"my goal aside from pure pain management was also to partially sedate him so that it would be easier to move/manipulate the patient"	Movement/Splinting Required	Initiation of Pain management	CCA	1-3 years	Gauteng
38	"the patient indicated that he was resistant to pain medication, therefore I gave him higher doses"	Patient Resistance to Pharmacological Agents	choice of agent/ method of pain management	CCA	1-3 years	Gauteng
39	"I firmly believe that if the patient is in pain that we should treat them"	Pain Management is a Priority	Initiation of Pain management	CCA	1-3 years	Gauteng
40	"the fact that the crew call you for pain management weighs on your mind, but you obviously still asses the patient"	Predetermined idea to provide pain management	Initiation of Pain management	CCA	1-3 years	Gauteng
41	"I believe that there should be access to Entonox or Profalgan or other non-ALS pain medications for cases were pain exists, but is not overly severe"	Alternate Method/Agents preferred	choice of agent/ method of pain management	CCA	1-3 years	Gauteng
42	"the patients expression of severe pain and the fact that we needed to move him led to me administering morphine"	Patients expressions of pain & Movement/Splinting Required	Initiation of Pain management	CCA	1-3 years	Gauteng
43	"We only achieved the desired level of comfort after adding benzodiazepines to the management of the patient"	Alternate Method/Agents preferred	choice of agent/ method of pain management	CCA	1-3 years	Gauteng

44	"the patient was comfortable and we could easily move him onto a stretcher and into the ambulance"	Patients expression of comfort	Cessation of Pain Management	CCA	1-3 years	Gauteng
45	"Intravenous access was not available so I used the MAD to deliver Midazolam"	Poor access to administer agents	choice of agent/ method of pain management	CCA	1-3 years	Gauteng
46	"In particular in children, alternate agents to those currently available would be great"	Alternate Method/Agents preferred	choice of agent/ method of pain management	CCA	1-3 years	Gauteng
47	"the patients friends and family were freaking out"	External Influence - led to faster agent administration	Initiation of Pain management	CCA	1-3 years	Gauteng
48	"the patient screaming and the family pressurizing you does expedite pain management quite a bit"	External Influence - led to faster agent administration	Prioritization of pain management	CCA	1-3 years	Gauteng
49	"high dose administration tends to happen in particular with the pressure of the family"	Targeting of Appropriate Dose	choice of agent/ method of pain management	CCA	1-3 years	Gauteng
50	"I cannot deny the patient pain management if they are perceiving pain"	Patients expression of pain	Initiation of Pain management	CCA	1-3 years	Gauteng
51	"I place a high emphasis on getting the patient to hospital, the time it takes for morphine to reach peak effect is just too long, which is why I add dormicum to the process"	Rate of onset of agent	choice of agent/ method of pain management	CCA	1-3 years	Gauteng
52	"If I am called for pain management, I usually administer the pharmacological agents"	Predetermined idea to provide pain management	Initiation of Pain management	CCA	1-3 years	Gauteng

53	"I look for the sedation effect of midazolam, if the patient can be 'asleep' during the splinting process, then they are less likely to do themselves further harm"	Alternate Method/Agents preferred	choice of agent/ method of pain management	CCA	1-3 years	Gauteng
54	"I move to pain management very quickly, as soon as the primary and secondary surveys are secure"	Pain Management is a Priority	Prioritization of pain management	CCA	1-3 years	Gauteng
55	"I do not believe that one can focus on the patients perception of pain when determining whether or not to initiate pain management"	commentary on questionnaire responses	Initiation of Pain management	Ndip	3-5 Years	North West
56	"the patient was severely intoxicated and as such we could not rely on their representation of the pain score and thus needed to rely on physiological indicators"	Physiological Indicators Utilized	Initiation of Pain management	Ndip	3-5 Years	North West
57	"We had explained the potential side-effects of morphine prior to administering the agent to the patient and once we had administered about 2mg the patient requested that we stop as he was fearful of the side-effects	Patient Request	Cessation of Pain Management	Ndip	3-5 Years	North West
58	"I was wondering how I would be feeling if I had sustained that injury"	Personal Opinion of Patients Pain	Initiation of Pain management	Ndip	3-5 Years	North West
59	"In this case I would definitely say that the mechanism was a persuading factor in the initiation of pain management"	Mechanism of Injury	Initiation of Pain management	Ndip	3-5 Years	North West
60	"We wanted to calm the patient down because it was almost impossible to assess them due to their restlessness as a result of both the mechanism and pain response"	Movement/Splinting Required	Initiation of Pain management	Ndip	3-5 Years	North West

61	"the knowledge of what we needed to do in order to move the patient certainly influenced my decision to initiate pain management"	Movement/Splinting Required	Initiation of Pain management	Ndip	3-5 Years	North West
62	" I wished that we had a better (more potent) analgesic agent"	Alternate Method/Agents preferred	choice of agent/ method of pain management	Ndip	3-5 Years	North West
63	"The 10/10 pain score was the major factor for initiating pain management"	Pain Score Utilized	Initiation of Pain management	Ndip	3-5 Years	North West
64	"We were very close to hospital and thus did not provide further analgesia"	Proximity to Hospital	Cessation of Pain Management	Ndip	3-5 Years	North West
65	"The patient became calmer, more cooperative and visibly in less discomfort"	Patients expression of comfort	Cessation of Pain Management	Ndip	3-5 Years	North West
66	"I viewed morphine as an aid in achieving the splinting of this patient"	Movement/Splinting Required	Initiation of Pain management	Ndip	3-5 Years	North West
67	"In this case the mechanism of the injury played a major role in my decision to initiate pain management"	Mechanism of Injury	Initiation of Pain management	Ndip	3-5 Years	North West
68	"Based on the response of the patient, I had to query as to whether morphine was a sufficiently potent agent or not, it did not majorly improve the patients perception of pain"	Alternate Method/Agents preferred	choice of agent/ method of pain management	Ndip	3-5 Years	North West
69	"I think that if we had been able to call a doctor to perform a limb block or administer Ketamine this would have been far more beneficial to the patient"	Alternate Method/Agents preferred	choice of agent/ method of pain management	Ndip	3-5 Years	North West

70	"I believe that as the pain score increases, so to should the degree to which the practitioner is proactive about managing it (the pain)"	Pain Management is a Priority	Prioritization of pain management	Ndip	3-5 Years	North West
71	"We need to remember "first do no harm" if the patient is in pain, we should manage it"	Pain Management is a Priority	Initiation of Pain management	Ndip	3-5 Years	North West
72	"Pain management - sooner rather than later"	Pain Management is a Priority	Prioritization of pain management	Ndip	3-5 Years	North West
73	"I think that the results are accurate, as I think that this is where we as practitioner begin our decision making process as to initiate pain management or not"	commentary on questionnaire responses	Initiation of Pain management	CCA	5-10 Years	Western Cape
74	"We needed to manage the patients pain before they would allow us to control their bleeding which was a major priority"	Movement/Splinting Required	Prioritization of pain management	CCA	5-10 Years	Western Cape
75	"The mechanism of the injury suggested that there would be a fairly substantial level of pain"	Mechanism of Injury	Initiation of Pain management	CCA	5-10 Years	Western Cape
76	"Looking at the injury, there was no question that it would be painful"	Personal Opinion of Patients Pain	Initiation of Pain management	CCA	5-10 Years	Western Cape
77	"the urgency with which I needed to get the patient to hospital caused me to shorten the interval between administration of morphine rather than waiting the full 20minutes for peak effect"	Targeting of Appropriate Dose	choice of agent/ method of pain management	CCA	5-10 Years	Western Cape
78	"The injury itself played a major role in my decision making regarding pain management"	Personal Opinion of Patients Pain	Initiation of Pain management	CCA	5-10 Years	Western Cape

79	"due to the effects of morphine on the patients haemodynamic status, an alternate agent would have been preferable"	Alternate Method/Agents preferred	choice of agent/ method of pain management	CCA	5-10 Years	Western Cape
80	"we ceased pain management as a result of arriving at hospital"	Proximity to Hospital	Cessation of Pain Management	CCA	5-10 Years	Western Cape
81	"In order to package and move the patient, their pain needed to be managed"	Movement/Splinting Required	Initiation of Pain management	CCA	5-10 Years	Western Cape
82	"The patient was in obvious pain, I could tell before I had even reached the patient"	Patients expression of pain	Initiation of Pain management	CCA	5-10 Years	Western Cape
83	"There was a departure between what the patient was expressing their pain to do and my perception of the patients pain"	Personal Opinion of Patients Pain	Cessation of Pain Management	CCA	5-10 Years	Western Cape
84	"Had alternate analgesic agents or processes been available, I believe that this would have been a better option"	Alternate Method/Agents preferred	choice of agent/ method of pain management	CCA	5-10 Years	Western Cape
85	"The patient had tears streaming down their face, which did play a role in my decision to provide analgesia"	External Influence - led to faster agent administration	Initiation of Pain management	CCA	5-10 Years	Western Cape
86	"based on the fact that the patient was a woman and of a small build, I gave a lower initial dose of morphine"	Size of Patient	choice of agent/ method of pain management	CCA	5-10 Years	Western Cape
87	"Much of the pain was alleviated by positioning the injury with the morphine just adding to the comfort"	Alternate Method/Agents preferred	choice of agent/ method of pain management	CCA	5-10 Years	Western Cape

88	"I think that one looks at the injury and compares it to one personal experience either with a similar patient or an injury that one has sustained oneself"	Personal Opinion of Patients Pain	Initiation of Pain management	CCA	5-10 Years	Western Cape
89	"The way in which the patient comes across post initiation of an analgesic agent as compared to the way in which they came across initially which leads to the decision of whether to continue with pain management or not"	Patients expression of comfort	Cessation of Pain Management	CCA	5-10 Years	Western Cape
90	"Experience of the practitioner is probably the biggest factor in the decision making process, I as a newly qualified practitioner would have pursued a pain score of 0/10 whereas now my experience guides me as to when to cease pain management"	Previous Experience as a Practitioner	Cessation of Pain Management	CCA	5-10 Years	Western Cape
91	"I think that pain management should be effected sooner rather than later"	Pain Management is a Priority	Prioritization of pain management	CCA	5-10 Years	Western Cape
92	"I am of the opinion that any splinting or movement of a potentially painful injury should be preceded by the administration of an analgesic agent"	Movement/Splinting Required	Prioritization of pain management	CCA	5-10 Years	Western Cape
93	"From experience I have also seen that there are better analgesic agents and methods out there other than morphine, and my wish is for these to be made available to us one day so that we may better manage our patients"	Alternate Method/Agents preferred	choice of agent/ method of pain management	CCA	5-10 Years	Western Cape
94	"I would say that pain management is of the utmost importance, and to delay it is simply not good practice"	Pain Management is a Priority	Prioritization of pain management	CCA	5-10 Years	Western Cape