

**A DESCRIPTIVE STUDY OF NURSES' KNOWLEDGE AND  
PRACTICE ABOUT ADULT ENTERAL NUTRITION IN  
SPECIAL CARE UNITS OF A REFERRAL HOSPITAL IN  
MALAWI**

**MASTER OF SCIENCE (CRITICAL CARE AND TRAUMA NURSING)**

**CHIMWEMWE TUSEKILE MULA**

**UNIVERSITY OF KWAZULU NATAL**

**2011**

# DECLARATION

I, Chimwemwe Tusekile Mula, declare that this dissertation titled "A descriptive study of nurses' knowledge and practice about adult enteral nutrition in special care units of a referral Hospital in Malawi; is my original work. It has never been submitted for any other purpose or at any other University. I also declare that sources of information utilized in this work have been acknowledged.



11<sup>th</sup> APRIL 2011

Chimwemwe Tusekile Mula  
(STUDENT)

Date



11 APRIL 2011

Associate Professor Busisiwe Ncama  
(SUPERVISOR)

Date

## **DEDICATION**

This work is dedicated to you my parents Esmie and Watson Makuta for inspiring me with the importance of education. To my husband Masauko and my son Yankho who have always stood by me and believing that I could do it.

# ACKNOWLEDGEMENTS

All praises and honour to almighty God! This dissertation was made possible with God who provided the wisdom and strength. Thanks for the gift of life.

It is also my pleasure to thank those who made this thesis possible:

- ❖ I am indebted to my country for the scholarship awarded to pursue this master's programme. Had it not been for the government of Malawi, this project would have remained a dream. I owe my deepest gratitude to the government.
- ❖ To my employer; the University of Malawi and Kamuzu College of Nursing for facilitating the whole process in order for me to study at the University of KwaZulu-Natal.
- ❖ I share the credit of my work with my supervisor, Associate Professor Busisiwe Ncama, whose encouragement, guidance and support from the initial to the final level enabled me to develop an understanding of the subject.
- ❖ Special thanks to my Research Lecturer, Mrs Joanna Naidoo for the discussions we had in the Research process.
- ❖ I consider it an honour to Kamuzu College of Nursing Research and Publication Committee and Malawi College of Medicine Research Ethics Committee whose input made a great contribution during the proposal writing stage. To Dr A. Chimwaza, I am grateful for your advice while drafting my proposal

- ❖ I am indeed very grateful to Queen Elizabeth Hospital management for providing permission to use the hospital to collect data.
- ❖ My gratitude also goes to nurses caring for patients in ICU and HDU who willingly contributed to this study by responding to the questionnaire.
- ❖ I owe my deepest gratitude to the statisticians Fikile Nkwanyana and Tonya Esterhuizen for their input in the statistical analysis of this thesis.
- ❖ My friend Genesis Chorwe who has been a source of support for me throughout my studies and this dissertation. I thank you for the friendship.
- ❖ Lastly, I offer my regards and blessings to all friends who supported me in any respect during the completion of the project.

## **ABSTRACT**

The purpose of this study was to describe current tube feeding knowledge and practices to target appropriate quality improvement interventions. This study was important because literature has demonstrated gaps in nurses' knowledge and practice in this area. The Synergy model of patient care was used as a conceptual basis for this study.

Two data collection methods were used. A quantitative descriptive survey of nurses, using a questionnaire to collect information about knowledge and practice was undertaken concurrently with a retrospective review of case files between June and July, 2010. Ethical approval was sought from the relevant authorities. The whole population of nurses available was used, and a sample of 51 nurses that met the inclusion criteria responded to the questionnaire (100% response rate). A total of 78 eligible case files were reviewed using a checklist.

SPSS Version 15 was used to analyse the data. The findings revealed that most nurses (98%) had received tube feeding training while at college. However, nearly the same number of nurses (96%) reported having received no in-service training on tube feeding. The findings showed variability in the levels of knowledge. Furthermore, the use of outdated method, to confirm proper tube placement was reported. The majority of respondents reported that they document the care given, but this was not evident in the review of the case files. Environmental aspects such as tube/feed shortage, lack of guidelines and patients/ guardian refusal of tube feeding were reported as common problems affecting nurses' practice.

The standards for tube feeding suggested from literature are not attained. The characteristics of a nurse and the environment of care have an implication in tube feeding practices and can ultimately help to eliminate the gap in practice. The nurses' current knowledge and practice is a cause for concern. Recommendations include education, evidence based protocols and other efforts to improve tube feeding practice.

## **LIST OF ABBREVIATIONS**

SRN: State Registered Nurse

EN: Enrolled Nurse

NMT: Nurse Midwife Technician

ICU: Intensive Care Unit

HCU: High Dependency Care Unit

SCU: Special Care Unit

SPSS: Statistical Package for Social Sciences

ASPEN: American Society of Parenteral and Enteral Nutrition

AACN: American Association of Critical Care Nurses

COMREC: College of Medicine Research ethics Committee

QECH: Queen Elizabeth Central Hospital

HMIS: Health Management Information System

UKZN: University of Kwazulu Natal



## LIST OF TABLES

Table 1.1: Relevant nurse competencies	18
Table 2.1: Important events in the history of tube feeding	22
Table 3.1: Summary of content validity	53
Table 4.1: Sex of participants	63
Table 4.2: Level of training of participants	65
Table 4.3: Tube feeding training components	66
Table 4.4: Participants' general knowledge of enteral nutrition	69
Table 4.5: Participants' knowledge of specific enteral nutrition procedures	70
Table 4.6: Relationship between age and knowledge	71
Table 4.7: Relationship between level of nursing training and knowledge	72
Table 4.8: Scope of practice in enteral nutrition	73
Table 4.9: Tube feeding practices and communication of care	77
Table 4.10: Patient's positioning during tube feeding	78
Table 4.11: Documentation of enteral nutrition interventions	81
Table 4.12: Challenges experienced by nurses	84

## LIST OF FIGURES

Figure 1.1: The AACN Synergy Model of patient care	16
Figure 1.2: Application of the model to the study	17
Figure 2.1: Nutrition support algorithm	24
Figure 4.1: Age of participants	64
Figure 4.2: Length of practicing in the unit	67
Figure 4.3: Type of feed normally given to patients	79
Figure 4.4: Source of knowledge of participants	83

## APPENDICES

Appendix 1: Questionnaire	122
Appendix 2: Checklist	127
Appendix 3: Letter of ethical approval from UKZN	128
Appendix 4: Letter requesting permission from Malawi COMREC	129
Appendix 5: Letter of ethical approval from Malawi COMREC	130
Appendix 6: Letter requesting permission from QECH	131
Appendix 7: Letter of approval from QECH	132
Appendix 8: Endorsement letter from HMIS department	133
Appendix 9: Information sheet and consent	134

1.11.	The Conceptual Model	12
1.11.1	Patient characteristics	13
1.11.2	Nurse characteristics(Competencies)	13
1.11.3	Environment or system	15
1.12	Application of the model to the study	16
1.13	Conclusion	18

## **CHAPTER TWO: LITERATURE REVIEW**

2.1	Introduction and literature map	20
2.2	History of tube feeding	21
2.3.	Critical illness and nutrition	23
2.3.1	Metabolic characteristics of critical illness	23
2.3.2	Nutrition support in critical illness	24
2.3.3	Benefits of enteral nutrition	25
2.3.4	Complications of enteral nutrition	26
2.4	Guidelines on enteral nutrition	27
2.5	Nurses' competency in enteral nutrition support	31
2.5.1	Nurses' knowledge and practice in enteral nutrition support	31
2.5.2	Nurses' knowledge and practice in general management of enteral feeding	33
2.5.3	Ethical practice in enteral nutrition support	37

2.6	A Healthy practice environment and enteral Nutrition	40
2.7	Conclusion	42

## **CHAPTER THREE: RESEARCH METHODOLOGY**

3.1	Introduction	44
3.2.	Research paradigm and approach	44
3.3.	Research design	45
3.4.	Study location and setting	45
3.5.	Research population and sampling	46
	3.5.1 The inclusion and exclusion criteria for the questionnaire	47
	3.5.2 The inclusion and exclusion criteria for the case files	47
3.6	Data collection instruments	48
	3.6.1 The self administered questionnaire	48
	3.6.2 The checklist	50
3. 7.	Validity and reliability of the instruments	52
3.8.	Data collection procedures	54
	3.8.1 Self administered questionnaire	55
	3.8.2 Case note review	56
3. 9.	Data analysis	57
3.10	Data management	57

3.11	Ethics considerations	58
3.11.1	Human participants	58
3.11.2	Case note review	60
3.12	Dissemination of findings	60
3.13	Conclusion	60

## **CHAPTER FOUR: ANALYSIS OF THE RESULTS**

4.1	Introduction	62
4.2	Sample realization	62
4.3	Sociodemographic data of participants	63
4.3.1	Sex	63
4.3.2	Age	63
4.3.3	Level of nursing training	64
4.3.4	Enteral nutrition training	65
4.3.5	Work experience in the unit	66
4.4	Nurse characteristics (Competency)	67
4.4.1	Nurses' knowledge in general enteral nutrition issues	68
4.4.2	Nurses knowledge in specific enteral feeding procedures	69
4.4.3	Relationship between nurses age and knowledge	70

4.4.4	Relationship between level of nursing training and knowledge	71
4.4.5	Nurses scope of practice in enteral nutrition	73
4.4.6	Nurses' choice of tube feeding size	73
4.4.7	Method of tube placement confirmation	73
4.4.8	Prevention of complications	74
4.4.9	Communication of care	75
4.4.10	patient's head position during enteral feeding	78
4.4.11	Feeding regimen and type used	78
4.4.12	Documentation practice	79
4.5	The environment of care	82
4.5.1	Availability of guidelines and nutrition committee	82
4.5.2	Sources of knowledge	82
4.5.3	Challenges in the practice environment	83
4.5.4	Strategies for improvement	84
4.5.5	Relationship between documentation in ICU and HDU	85
4.6	Conclusion	87

## **CHAPTER FIVE: DISCUSSION OF FINDINGS.**

5.1	Introduction	89
5.2	Application of the model in the discussion	89
5.3.	Nurse characteristics (Competency)	91
5.3.1	Enteral nutrition training	91
5.3.2	General enteral nutrition knowledge	91
5.3.3	Knowledge of specific tube feeding procedures	92
5.3.4	Relationship between level of training and knowledge	93
5.3.5	Nurses scope of practice in enteral nutrition	93
5.3.6	Choice of feeding tube size and flushing of tube	93
5.3.7	Bedside confirmation of proper tube placement	94
5.3.8	Patient's head position during enteral feeding	95
5.3.9	Feeding regimen and type of feed used	95
5.3.10	Measuring gastric residual volume	96
5.3.11	Documentation of care	97
5.4.	The environment of care	97
5.4.1	In-service training	98



5.4.2	Main Source of knowledge	98
5.4.3	Availability of guidelines	99
5.4.4	Nutrition teams/committee	100
5.4.6	Relationship between documentation in ICU and HDU	101
5.4.7	Challenges in the practice environment	101
5.5	Recommendations	102
5.5.1	Recommendations to policy makers	103
5.5.2	Recommendations for nursing practice	103
5.5.3	Recommendations for education	104
5.5.4	Recommendations for further research	104
5.6	Strengths and Limitations of the Study	105
5.6.1	Field work	105
5.6.2	Methodological	105
5.7	Conclusion	107
	<b>REFERENCES</b>	109

# CHAPTER ONE: INTRODUCTION

## 1.1 INTRODUCTION

Enteral nutrition is a procedure that has been internationally practised by health care workers for a long time. The study focuses particularly on nurses' knowledge and practice in adult enteral nutrition. This chapter sets out a background of the study area. An overview is also provided which includes the problem statement, justification for the study, the objectives of the study, research questions, hypotheses and an operational definition of the major concepts used. Furthermore, the conceptual model relevant to the study is described and the chapter then concludes with a summary of the information contained therein.

## 1.2 BACKGROUND

Every living creature requires food to stay alive. As such, the Council of Europe 2003 argued that access to a safe and healthy variety of nutrition is a fundamental right for all patients (as cited in Persenius, 2008, p. 10). The body is the product of nutrition, and what is eaten will determine how often one falls sick, how physically fit one becomes, and how long one lives (Lopez, 2009). This demonstrates that nutrition is important for the health and wellbeing of both the well and the sick.

Nutrition is an important element in the care of a critically ill patient because critical illness causes hyper-metabolism, and adequate nutrition is required to limit muscle wasting, respiratory and gastrointestinal dysfunction that causes translocation of bacterial intestinal flora and alterations in immunity (Doing & Simpson, 2006; Marshall & West, 2004;). It is also associated with a reduced period of hospital stay, hospital

mortality, lower costs and fewer complications (Bourgault, Ipe, Weaver, Swartz, & O'Dea, 2007; Marshall & West, 2005). Bearing this importance in mind, it can then be concluded that nutrition is an important concept in the care of the critically ill although critical illness causes changes in food intake.

It is well known that the most natural and physiological way of obtaining food is via oral intake through the mouth, where food is broken down, transported, digested and absorbed into the body (Tan & Mathew, 2008). However for the sick, food related behaviours change; they may experience loss of appetite, they may vomit, or they may not be able to swallow at all. This affects their nutrition intake. Despite these problems; they still need nutrients to keep alive, to fight infections and to replace lost nutrients. Family members describe the situation in which their sick relative is not able to eat as a source of worry and desperation. In a study to investigate the experiences of family members and patients in a nutritional situation where the patient is not able to eat; Orrevall, Shelman and Herrington (2004) found that patients reported wanting to eat, but being unable to do so. Family members experienced powerlessness and frustration, as they could not help the patient to eat. The findings of this study call for attention to be focused on the provision of alternatives to nutritional problems in the critically ill by hospital staff, although the literature consulted indicates that nutritional practices in hospitals have low priority (Mowe et al., 2005).

A solution to the stated problem has been the use of enteral feeding. Enteral nutrition includes delivering a complete feed via nasogastric (nasoenteral), orogastric into the stomach or percutaneous tubes into the jejunum or duodenum (Seres, 2010).

However, the focus in this study is on nasogastric and orogastric tube feeding, where most nurses play a role.

Several studies have emphasised the role of nurses in this nutritional support, where it is argued that nutrition forms part of successful nursing care (Persenius, Larsson, & Hall-Lord, 2006; Marshall & West, 2005) and is accepted as a standard of care (ASPEN Board of Director and The Clinical Guidelines Task Force, 2002). Nurses caring for the critically ill are an important link in nutritional support because they administer nutritional formulas (Roberts, Kennerly, Keanne & George, 2003). When delivering tube feedings; the registered nurses' roles include deciding when to start the feeds, inserting and maintaining the tubes, administering the feeds, preventing and detecting complications (Urden, Stacy & Lough, 2006). This demonstrates that nurses have an impact on the outcome of enteral nutritional support.

But do these nurses have adequate knowledge of and skill in tube feeding? Many studies have reported that, despite the importance of enteral nutrition and existing data on evidence based nutritional guidelines; nutrition is still a significant concern in hospitals (Kobe, 2006; Persenius et al., 2006). Minimal attention has been paid to how enteral nutrition is experienced by nurses (Persenius, Larsson, & Hall-Lord, 2009). There are wide variations in the management of nutritional support, and many adult patients experience deterioration of nutritional status during their hospital stays (Behara et al., 2008; Marshall, 2008; Persenius et al., 2006). Likewise, maintaining consistency in feeding the critically ill has been a problem due to the inadequate knowledge of the nurses (Williams & Leslie, 2004). It is therefore important to take this concept seriously, to ensure that nurses' nutritional practices for the critically ill

adults are evidence-based. Currently in Malawi, there is no scientific data about nurses' tube feeding knowledge and practices in adult special care units, and whether what is in practice matches international guidelines. The delivery of health care in Malawi is mostly affected by the lack of adequate health care workers and material resources, despite the hospitals being loaded with acute and chronically critical patients. One of the hospitals overburdened with these patients is the referral hospital in one of the districts of the country under study.

This is the largest hospital institution providing general and specialist care. It is the oldest referral and district hospital in Malawi. Built in 1964, this government teaching hospital generally provides free services to the population. The hospital has one four-bedded general intensive care unit (ICU) where critically ill patients with potentially recoverable diseases (both adults and children) are admitted. Patients admitted to this unit suffer from various conditions such as trauma and sepsis. Patients in this unit benefit from a detailed observation, monitoring and treatment which include tube feeding. Previous donations of specialised medical equipment helped the hospital to establish high dependency units (HDU). There are three HDUs of which two are four-bedded surgical HDUs for male and female patients respectively, and one is a six-bedded medical HDU for both male and female patients. The HDUs are located within the main surgical and medical wards. Patients who have been discharged from the ICU yet still require close monitoring, but do not require intubation are admitted to these units. However, also due to the limited space in the Intensive Care Unit, some critically ill patients are nursed in these units. In all these areas, some of the patients have at least one organ failure, and some cannot

swallow and require enteral nutritional support. The HDU are low technology environments as compared to the ICU, but enteral nutrition practice is almost similar to that carried out in the ICU by a similar cadre of nurses.

The nurses who care for the critically ill patients are general registered nurses, enrolled nurses and nurse technicians trained locally as general nurses at university and colleges. The registered nurse training is over a period of four years for a degree and two years for a diploma bridging course. The nurse technician course is over three years. There is no specialist training for the critically ill. However, the Ministry of Health and Population started a reform of the health sector in December 1999, with the emphasis on quality assurance which was addressed in the 1999-2004 National Health Plan (Ministry of Health and Population, 2003). The objective was to improve quality care through capacity building and training of health care personnel who could provide quality care. In response to improving quality care through capacity building; basic critical care skills are integrated at various points according to their levels during their respective generic training programme. One of the critical care competencies which the registered nurses and nurse technicians are taught is the provision of enteral nutrition.

The Malawian Nurses and Midwives Council also ensures quality nursing care by monitoring standards of care. It guarantees that the curriculum in every nursing training institution is such that graduates will have sufficient basic knowledge, skills and attitudes for the practice of the profession (Nurses' and Midwives Council of Malawi, 1995). All this ensures that they graduate with the necessary skills for quality

nutritional support. Apart from the basic skills attained during their generic programs, nurses working in specialised units like ICUs and HDUs are trained on the job to enhance their knowledge and skills to ensure that specialised care is provided. Despite these efforts, the shortage of nurses is another challenge in Malawi.

To help with this problem, the Ministry of Health started the Locum system, whereby a nurse within the hospital temporarily fulfils the duties of another regular nurse (Collins English Dictionary, 2003). Nurses do this during their off-duty hours. This practice also occurs in these special care units under study, where staff rotates within the units, and other nurses from other general wards come to work in these sectors. This has helped to solve the staff shortage per shift. The HDUs being located within the main ward; nurses caring for patients in these HDUs are also responsible for the other general patients.

For patients who have problems with oral intake, tube feeding is prescribed by the doctor. The rest of the management of the patient on tube feeding is carried out by nurses. Both state registered nurses, nurse technicians and enrolled nurses are involved. The hospital has a dietician who has a diploma in nutrition and is responsible for the dietary management of the patients. The standard tube feeding practice at the hospital is intermittent or bolus. Every day there are, on average, at least two patients in each of these units who are on tube feeding or require it. However, to date, no study published in Malawi has explored tube feeding practices in adult patients. Therefore, a survey of the nurses caring for patients on tube feeding was required to determine the current level of their knowledge and practice.

This was important, as Bourgault et al. (2007) challenged that current practice has to be evaluated if there are no guidelines in the unit. Concurrently, Kenny & Goodman (2010) established that each procedural variation could be associated with a unique risk for the patient, and that identifying specific problem areas helps to indicate where to target during interventions.

### **1.3 PROBLEM STATEMENT**

Management of enteral tube feedings based on best evidence is important to realise health care improvements (Kenny & Goodman, 2010). However, although tube feeding practices have been documented in developed countries with more focus on the ICU setting; no study regarding this area has been documented in Malawi as yet, although critical illness and the need for enteral nutritional support are common in the largest hospitals of this country. Adding to this; there are no clear guidelines in some of these units, and practices vary.

The decision to choose tube feeding as a study area was based on my experience as a nurse, where one noticeable problem identified was inconsistency with regard to enteral nutritional practices. These variations in practice could be related to gaps in knowledge (Marshall, 2008) or to a lack of standardisation (Kenny & Goodman, 2010). The literature consulted also points out that enteral nutrition practice is heavily influenced by nurses' decision-making (Marshall & West, 2004). Problems such as delay in initiation of enteral feeding, lack of consistency and management of gastric residual volume among nurses have been reported (Demian, Halawa, Nisar, & Ahmad, 2007). However, whilst current literature on nurses' practices regarding enteral feeding is available in developed countries, and has demonstrated poor



knowledge (Kobe, 2006); the literature concerning enteral nutrition in developing countries, where nurses also play a role in feeding the critically ill is very scanty. Literature in the developed world shows that nurses' practices in nutritional support are not evidence-based (Marshall & West, 2004). What is known at the hospital under study is that a good number of adult patients are on tube feeding or require it, and that all cadres of nurses are involved in this practice. The question which remains is: What is the level of their knowledge and practice?

#### **1.4 JUSTIFICATION FOR THE STUDY**

Despite the statement which purports that "best practices should be implemented without delay rather than gathering data that would objectively quantify the extent of the problem" (Kenny & Goodman, 2010, p. S23); it is deemed necessary in the Malawian setting to come up with scientific evidence of the problem in order to get adequate support and to be more focused when solving it. This is in agreement with Heyland et al. (2003) who state that before improving practice related to nutritional support, it is important to find out first what is in practice, as identifying the gap between best practice and current practice will then help strategic intervention. Tackling this problem should therefore begin with identifying the current *status quo* of nurses' knowledge and practices. Without good enteral nutritional knowledge nurses may not provide appropriate nutritional support. It is therefore deemed necessary to investigate nurses' current level of knowledge and practice in enteral nutrition in a developing country, Malawi, where such a study has never been conducted.

## **1.5 SIGNIFICANCE OF THE STUDY**

The findings of the study may provide nurse managers with an in-depth understanding of the nurses' competencies which could help to develop appropriate guidelines for enteral nutritional practices in adult critically ill patients. With appropriate guidelines; practice may also improve, leading to a better outcome for the critically ill, thus reducing prolonged hospital stays, morbidity and mortality. The findings may also help to identify the problems encountered by nurses during their tube feeding practices. Awareness of these problems by nurse managers will help them to support their nurses. The findings may also help to provide recommendations to training institutions to review the curriculum and close the gaps identified therein, ensuring that upon qualification, nurses are well equipped with current knowledge and skills in enteral nutrition. Lastly, the findings may lay a foundation for research studies which focus more on nurses' competencies in patient nutritional practices. Such studies have not been documented in the Malawian setting.

## **1.6 THE PURPOSE OF THE STUDY**

The purpose of the study was to describe nurses' level of knowledge and practice of enteral nutritional support in critically ill adults in the Special Care Units (SCUs) of the Queen Elizabeth Central hospital; namely, the Intensive Care Unit and the Medical and Surgical High Dependency Units.

## **1.7 THE OBJECTIVES OF THE STUDY**

1.7.1 To describe the nurses' level of enteral nutritional knowledge in the ICU and HDUs.

1.7.2 To describe the current practice of nurses in enteral nutritional support in the ICU and HDUs.

1.7.3. To describe the environmental factors affecting nurses' practice in enteral nutrition in the ICU and HDUs

## **1.8 THE RESEARCH QUESTIONS**

1.8.1. What is the level of nurses' knowledge of adult enteral nutritional support for the critically ill adults in the ICU and HDUs?

1.8.2. How do nurses provide enteral nutrition to adult critically ill patients in the ICU and HDUs?

1.8.3 What are the factors affecting nurses' practice in enteral nutritional support in the ICU and HDUs?

## **1.9 THE RESEARCH HYPOTHESES**

The following were the research hypotheses:

1.9.1 There is poor enteral nutritional knowledge among nurses providing this care to critically ill adult patients in the ICU and HDUs.

1.9.2 Poor knowledge in enteral nutrition is likely to cause poor feeding practices by nurses.

1.9.3 There are environmental factors that are likely to affect nurses' tube feeding practices in these units.

## **1.10 OPERATIONAL DEFINITION OF KEY CONCEPTS**

### **❖ Nurses**

In the research study these are State Registered Nurses and enrolled nurses/nurse technicians.

*State Registered Nurses* are graduate nurses who have a diploma or a degree in nursing.

*Enrolled Nurses/Nurse technicians* are certified nurses working under supervision of a registered nurse or a senior enrolled nurse who have a certificate in nursing.

### **❖ Knowledge**

This refers to expertise and skills acquired through education or experience, and the theoretical or practical understanding of enteral nutrition issues.

### **❖ Practice**

This describes the nurses' methods of providing tube feeding.

### **❖ Enteral Nutrition**

This entails the provision of liquid feed through a tube passed through the nose or mouth into the stomach. In the study this concept is used interchangeably with the term 'tube feeding'.

### **❖ Critical illness**

This refers to a disease or state in which, although it may be recoverable it is life threatening and death is possible. The patient is either in an acute or chronic state of the critical illness.

## 1.11 THE CONCEPTUAL MODEL

Conceptual models that recognise the relationship between patient characteristics and nurse competencies are important, because they ensure high quality care outcomes (Brewer et al., 2007; Curley, 2004). In the same way, the conceptual model for this study was drawn from the American Association of Critical Care Nurses (AACN) Synergy Model for Patient Care. This model helped to isolate the relevant variables under study and to state their relationship.

The AACN Synergy model for patient care defines nursing practice based on the needs of the patient, and the characteristics of the nurse to attain optimal patient outcome (Progressive Care Fact Sheet, 2007). When nurse competencies relate to patient needs, and the characteristics of the nurse and patient synergise, optimal patient outcomes can result (Kaplan, 2009). All patients have similar needs, but the more compromised the patient is, the more severe or complex his needs will be (Kaplan, 2009). Similarly, in this study; the nutritional needs of the critically ill are more complex.

The three components of the model which interact to form a professional model of practice are: Patient characteristics, nurse competencies (characteristics) and the health care environment or system (Kaplow & Reed, 2008). The authors further state that the eight nurse competencies provide a framework to articulate the work of nurses and can be utilised to differentiate between practices, and to ensure that the nurse competencies match the needs of the patient. The environment side of the

model addresses the context in which the patient needs and the nurse competencies take place (Kaplow & Reed, 2008).

### **1.11.1. Patient Characteristics**

According to Kaplow and Reed (2008) the patient characteristics span a continuum and include:

- Vulnerability - susceptibility to actual or potential stressors that may adversely affect patient outcomes.
- Stability - the ability to maintain a steady state of equilibrium.
- Complexity - the intricate entanglement of two or more systems (e.g. body, family, therapies).
- Resource availability - extent of resources.
- Participation in care - extent to which patients/families engage in care.
- Participation in decision-making - extent to which patients/families engage in decision-making.

### **1.11.2 Nurse Characteristics (Competencies)**

Critical care nursing is an integration of knowledge, skills, experience and attitudes (Kaplan, 2009). The nurse characteristics are therefore the bedside competencies which are essential for the provision of care to critically ill patients and families. Hardin and Kaplow (2005) claim that to meet patient needs, nurses require certain characteristics identified as:

- Clinical judgment - Clinical decision-making, critical thinking, and a global grasp of a situation, coupled with nursing skills acquired through a process of

integrating formal and informal experiential knowledge and evidence based guidelines

- Advocacy and moral agency – working on another’s behalf, and representing the concerns of the patient and nursing staff; serving as a moral agent in identifying and helping to resolve ethical and clinical concerns within and outside the clinical setting.
- Caring practices - nursing activities that create a compassionate, supportive and therapeutic environment, with the aim of promoting comfort and healing, and preventing unnecessary suffering.
- Collaboration - working with others in a way that promotes a contribution toward achieving optimal patient goals. Involves intra- and inter-disciplinary work with colleagues
- Systems thinking – a body of knowledge and tools which allow the nurse to manage any environmental and system resources.
- Responses to diversity - the sensitivity to recognise, appreciate and incorporate differences into the provision of care. Differences may include, but not be limited to those of culture, spiritual belief, gender, race, lifestyle, age, and values.
- Facilitation of learning - the ability to facilitate learning, both formal and informal.
- Clinical inquiry - the ongoing process of questioning and evaluating practice and providing informed practice. Creating practice changes through research utilisation and experiential learning.

### **1.11.3. Environment or System**

According to Kaplow and Reed (2008), for synergy to occur, an environment must be provided where nursing care promotes attainment of the highest achievable outcomes. Without an environment which supports the two sides; the synergy will be less optimal. According to the authors, factors in the environment include:

- Shared decision-making.
- Adequate resources.
- Professional development opportunities.
- A positive interdisciplinary relationship.



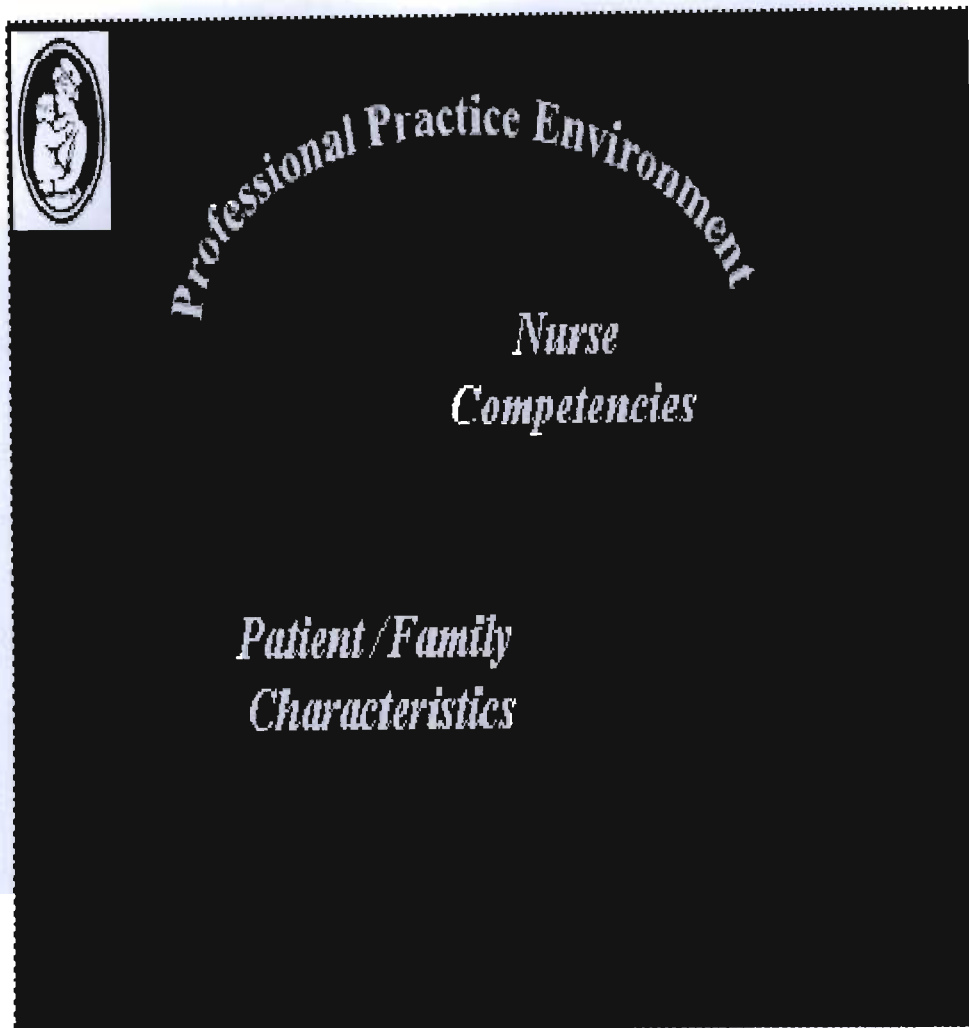
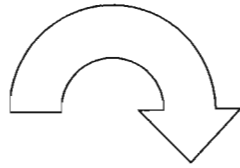


Figure 1.1 The AACN Synergy Model of Patient Care (Adopted from the AACN, Hardin & Kaplow, 2005)

#### 1.12 APPLICATION OF THE CONCEPTUAL MODEL TO THE STUDY

This model can be used in clinical practice to describe patient needs and nurse competence (Curley, 2004). The researcher has thus used the nurse characteristics part of the model to investigate the competencies which are knowledge and practice in enteral nutrition in the critically ill (patient characteristic) in Special Care Units, namely the Intensive Care Unit and the High Dependency Care Units: (the environment). See Figure 1.2.



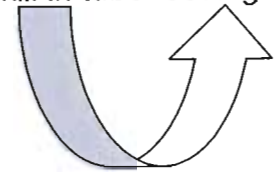
**Patient/family characteristics:**

Critically ill, unable to eat normally

Patient/family need assistance on decision-making and provision of feed

**Nurse characteristics:**

Knowledge and skill in tube feeding



**Environment of care:** ICU and HDU with resources, training opportunities, teamwork

**Figure 1.2. Application of the model to the areas under study**

Some variables in the environment such as the nurses' opportunity for professional development, resources like the availability of enteral feeds, the interdisciplinary relationship with doctors and dieticians have been assessed, as they have an impact on the nurses' knowledge and practice. This is important, because any gaps identified in the nurse characteristics and the environment would mean that there is a mismatch between nurse characteristics and patient characteristics, hence compromised enteral nutritional practices would result. This is in line with Kaplow

and Reed (2008), who state that the characteristics of a nurse can be used to differentiate practice, and to ensure that the competencies of the nurse match the needs of the patient. In this study, nurses' knowledge and practice are nurses' competencies. The relevant nurse competencies which relate very well to the study have been outlined in Table 1.1 below:

**Table 1.1 The relevant nurse competences related to the study**

Competency according to the model	Application to the study
Clinical judgment	Analyses assessment data and makes decision to initiate enteral nutrition
Caring practices	Implements enteral nutrition, monitors the patient and prevents complications
Collaboration	Works in consultation with physicians and dieticians, patients/families to implement enteral nutrition intervention
Response to diversity	Appreciates the use of evidence-based guidelines in enteral nutrition, incorporates patient/family believes and values in this care.

### 1.13 CONCLUSION

This chapter has outlined the background to the problem where the role of nurses in tube feeding has been highlighted. The purpose, study objectives and research questions were discussed. Due to gaps in this practice, the researcher decided to describe the nurses' knowledge and practice in a developing country where there is a dearth of such studies. The model proposed for the study was the modification of

the AACN Synergy model of patient care which describes the nurse competencies well. Before the researcher deals with the body of the research, key elements on enteral nutrition found in literature will be presented in the next chapter.

# CHAPTER TWO: LITERATURE REVIEW

## 2.1 INTRODUCTION AND LITERATURE MAP

This chapter reviews the literature on nurses' knowledge and practice about enteral nutrition in critically ill adult patients in order to provide a theoretical background to the study. The review starts with a brief historical background of tube feeding and the nurses' role in meeting the nutritional needs of patients. It also highlights the available literature on current evidence-based guidelines on tube feeding, to help conceptualise and put the study into context. Then using the conceptual model as a guide, the main focus of the literature review is on the key concepts which relate closely to the study: These are:

1. Patient characteristics which focus on critical illness and nutrition.
2. Nurse characteristics which focus on nurses' knowledge and practice (competency) in nutritional assessment, tube feeding management, and ethical practice issues relating to tube feeding.
3. The environment of care in relation to tube feeding which has been discussed. Although the literature presents the environment of care in a variety of contexts, this paper has focused on its application to tube feeding. This is in line with Persenius (2008) who makes it clear that successful nutritional care is dependent on careful management, supported by an effective infrastructure, nurses' competence and the environment the nurse works in.

The literature search was conducted using popular medical data bases such as Pubmed, Science direct, Sage pub and terms such as 'enteral nutrition', 'tube feeding practices', 'nutrition in the critically ill', 'enteral nutrition guidelines' and

'nurses' knowledge of tube feeding' were used. Recent literature between 2000 and 2010 was used in order to limit the review and acquire only the most current evidence.

## **2.2 HISTORY OF TUBE FEEDING**

Understanding the origin of tube feeding may help researchers to appreciate the importance of this care. Enteral feeding has a 500 year long history in Europe, and its principle as defined by John Hunter when he wrote about a patient with paralysis of the swallowing muscles is, "It becomes our duty to adopt some artificial mode of conveying food into stomach, by which the patient may be kept alive while the disease continues (Korner et al., 2006, p.197). This statement demonstrates that historically, the health care practitioner has an important role to play in meeting the nutritional needs of the patient despite his inability to swallow. History records that the development of tube feeding started with the Egyptians, as summarised in Table 2.1 below (adopted from O'Meara et al., 2008).

**Table 2.1 Important events in the history of the development of enteral nutrition**

Date	Event
16 <sup>th</sup> and 17 <sup>th</sup> centuries	Use of enemas of wine, milk and grain broths. Use of naso- and oropharyngeal tubes.
1700s and 1800s	Use of orogastric tubes for milk, eggs, broth and whisky
1800s	Nasopharyngeal device and orogastric tubes to feed egg, sugar, wine and milk mixture.
1910s	Introduction of drop-by-drop feeding.
1940	Development of automatic feeding pump.
1950s	Refinement in hospital kitchen methodology to prepare liquified solid foods.
1960S	Space diet used to provide nutrition to patients with severe gastrointestinal complications.
1980-2000	Use of enteral nutrition to support optimal digestion and absorption, to enhance the immune system, to aid wound healing, and to promote intestinal health and treat illness and injury.

From a nursing perspective, history also affirms that patients should not be left without nutritional support. Florence Nightingale 1895, argued that, "Every careful observer of the sick will agree in this that thousands of patients are annually starved in the midst of plenty" (as cited in Kobe, 2006, p.2). This concern shows that from a historical perspective attending to the nutritional needs of patients is one of the most important practice areas in nursing.

## **2.3. CRITICAL ILLNESS AND NUTRITION**

As described in the synergy model; the critically ill patient (patient characteristic) who cannot eat orally is vulnerable to stressors that may affect his/her outcome. In this section, the effect of critical illness and its implication for nutrition support will be discussed.

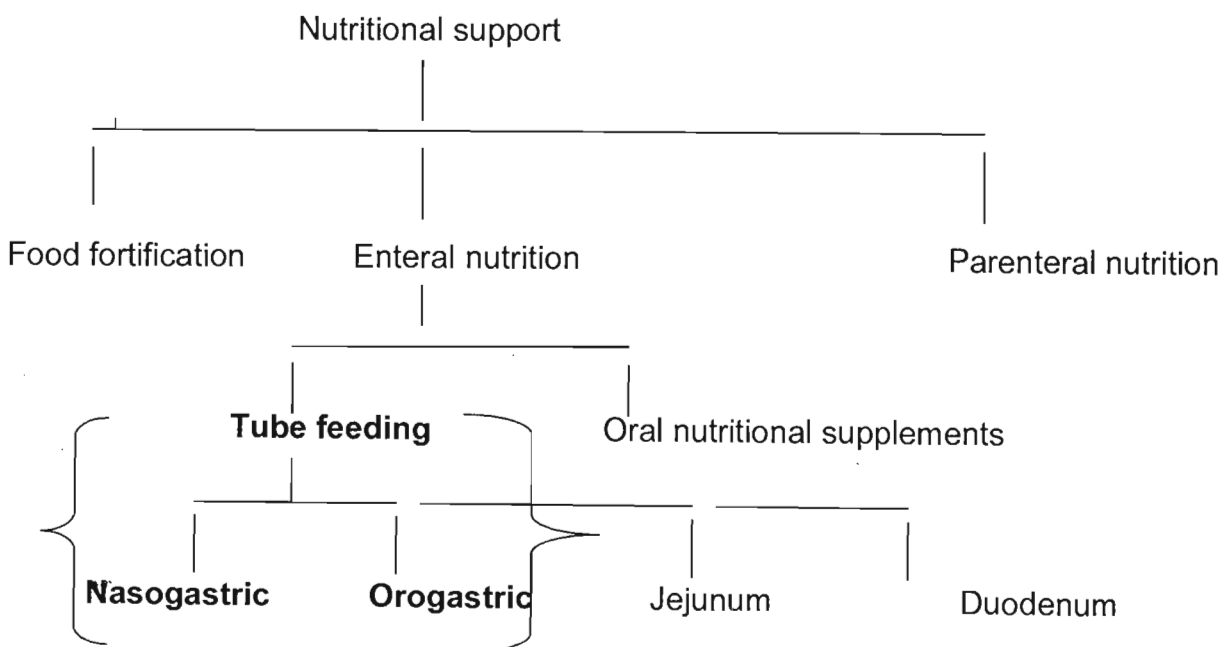
### **2.3.1 Metabolic Characteristics of Critical Illness**

In general, illness causes different changes in body functioning. The metabolic response to injury consists of two phases: the shock phase, characterised by a reduction in metabolic activity, a fall in body temperature, and mobilisation of energy reserves (Phelan, 2010; Reid & Campbell, 2004). The recovery phase is that of regeneration and repair, and is characterised by an increase in metabolism and temperature, resulting in the loss of lean and fat body mass and a suppressed appetite (Reid & Campbell, 2004). This implies that the healing process should take place before all the body nutrient reserves are exhausted. Therefore, an awareness of these associations has led to the practice of providing nutritional support to critically ill patients. As such the complexity of the metabolic response to critical illness provides the basis for nutritional therapy (Phelan, 2010). Similarly, the phrase, “if the gut works, use it” (Ireton-Jones, 2006, Para. 2.), suggests that the critically ill who cannot swallow but have intact gastrointestinal tracts are to be given nutritional support.



### 2.3.2 Nutritional Support in Critical Illness.

Normally, oral food intake is always the first option. However situations may arise when the intake is insufficient or contraindicated (Howard, 2009). On these occasions, alternatives have to be provided to support the patient's nutritional intake, as food is fundamental to life and should be started after resuscitation, before the onset of severe metabolic disorders (Phelan, 2010; Howard, 2009). Nutritional support refers to introducing liquid feed into the gut orally in the form of food fortification, enterally through a tube or parenterally into a vein (Nightingale, 2010; O'Keefe, 2009) to provide calories, protein, electrolytes, vitamins, minerals, trace elements, and fluids (Seres, 2010) with a therapeutic intent (ASPEN Board of Directors Task Force, 2002). See Figure 2.1.



**Figure 2.1. Nutritional support in accordance with ASPEN guidelines**

(Modified from: Persenius, 2008)

Initially, parenteral feeding was the common method used to feed the critically ill. However, its current use is restricted to patients with absolute contraindications to

enteral nutrition (ASPEN Board of Directors Task Force, 2002). The authors mention that for most patients, the common use of the enteral route is recommended.

### **2.3.3 Benefits of Enteral Nutrition**

When patients are not able to feed normally tube feeding is the best alternative (Williamsa & Leslie, 2004). Moreover the enteral route is always preferable to the parenteral route because of its benefits, provided there are no contraindications such as ileus, gastrointestinal ischemia, persistent vomiting or mechanical obstruction (Tan & Mathew, 2008; ASPEN Board of Directors Task Force, 2002). The benefits and advantages of enteral nutrition support include improved wound healing, decreased catabolic response to injury, improved gastrointestinal structure and function that prevents bacterial translocation, improved clinical outcomes, reduction in complication rates and length of hospital stay, and improved cost savings (Artinian, Hicham, & Bruno, 2006; Marshall & West, 2004; ASPEN Board of Directors and clinical guidelines Task Force, 2002). Consequently, with adequate enteral nutrition, recovery is marked by a restoration of appetite, a replacement of body energy stores and a rebuilding of the lost body mass (Seres, 2010). Looking at these benefits it can therefore be argued that tube feeding should be the common practice to provide nutrition in a safe manner.

The simple method of tube feeding which can be used at the bedside by nurses has benefits. Nasogastric tube feeding requires little skill, and enables early commencement of enteral feeding (O'Keefe, 2009). Furthermore, in patients with chronic disorders, bolus feeds can be administered, which are easier for nursing staff

to administer than continuous feeds and allows pH to restore between feeds hence minimizing gastric colonization (O' Keefe, 2009; Williams & Leslie, 2004;). In the same way, Metheny (2006) advocates intragastric feeding rather than small bowel feeding, because compared to small-bowel tubes, gastric tubes are easier and less expensive to place. All these are common practice methods used in the hospital under study.

#### **2.3.4 Complications of Enteral Nutrition**

Despite its importance, tube feeding comes with complications and the administration of enteral nutrients can be difficult. There are physiological-related complications affecting gastrointestinal, metabolic, and respiratory functioning (Hernandez, Torres & Jimenez, 2006; ASPEN Board of Directors and clinical guidelines Task Force, 2002) such as high gastric residuals, bacterial colonisation in the stomach and an increased risk of aspiration pneumonia (Hernandez et al., 2006). Mechanical complications can occur during placement. Manual placement of a nasogastric tube at the bedside can result in misplacement, mucosal injury with bleeding, or intestinal perforation (O'Keefe, 2009). Furthermore, mechanical complications may also be due to possible contamination of enteral feeds and feeding systems such as poor handling of formula, inadequate cleaning of utensils used during mixing and feeding, and hand contamination (ASPEN Board of Directors and clinical guidelines Task Force, 2002). However; enteral nutrition still stands as a preferred method by which to deliver nutrition support to the critically ill (Heyland, Cook, & Scoentfield, 2001). This implies that these obstacles have to be overcome, because the benefits outweigh the risks. All that is required is an understanding of the potential problems to be encountered, following which interventions can be

instituted to safely and effectively tube feed the critically ill. One of these is the use of evidence-based guidelines.

## **2.4 GUIDELINES ON ENTERAL NUTRITION.**

A guideline is a recommendation for the care of individuals in specific circumstances based on the best available evidence (National Collaborating Centre for Acute Care, 2006). Therefore, relevant guidelines on tube feeding were reviewed to assist further in putting the study into context. The major focus was the use of the American Society of Parenteral and Enteral Nutrition's (ASPEN) international guidelines which are recommended worldwide and have been used by most of the authors.

### **2.4.1 Training**

All health care professionals directly involved in patient care should receive education and training relevant to their post on the importance of providing adequate nutrition. This should cover indications, ethical legal issues, how to recognise and deal with complications, and where to seek expert advice (Howard, 2009; ASPEN Board of Directors and clinical guidelines Task Force, 2002).

### **2.4.2 Multidisciplinary team**

Discussion about tube feeding should involve a multidisciplinary nutrition support team (Stroud, Duncan & Nightingale, 2003).

### **2.4.3 Indications for enteral feeding**

Tube feeding is indicated in unconscious patients with swallowing disorders or partial intestinal failure (Stroud et al., 2003).

Tube feeding is also indicated for a patient who is likely to eat little or nothing for the next five days or who exhibits increased catabolism (National Collaborating Centre for Acute Care, 2006).

#### **2.4.4 Contraindications**

Absolute contraindications to enteral feeding include diffuse peritonitis, intestinal obstruction, intractable vomiting, intractable diarrhoea, and gastrointestinal ischemia (ASPEN Board of Directors and clinical guidelines Task Force, 2002).

#### **2.4.5 Documentation**

A written summary covering subjective and objective data on nutrition assessment, specific recommendation, route of administration and monitoring parameters should be made (ASPEN Board of Directors and clinical guidelines Task Force, 2002).

#### **2.4.6 Consent**

Health care professionals involved in starting or stopping the feed should obtain informed consent from patients, if competent. If patients are not able to consent, doctors should act in the patients' best interests (National Collaborating Centre for Acute Care, 2006; Stroud et al., 2003). The patient/family has a right to accept or refuse this form of nutrition as long as the benefits and burdens have been considered and explained (ASPEN Board of Directors and clinical guidelines Task Force, 2002; Hernandez et al., 2006).

#### **2.4.7 Feeding access**

Enteral nutrition should be provided through a large bore nasogastric or orogastric tube to allow for more accurate assessment of gastric residual volumes before each

bolus feed. This is important in preventing aspiration (Stroud, et al., 2003; Keithley & Swanson, 2004).

#### **2.4.8 Patient's Head Position**

Unless contraindicated, the head of the bed should be elevated at 30 to 45 degrees for 30 minutes during intermittent feeding to minimise aspiration. If this is not possible, then an attempt should be made to at least elevate the head of the bed to 15 degrees (Heyland et al., 2003).

#### **2.4.9 Bedside Method of Confirming Correct Tube Placement**

This can be conducted by aspirating the gastrointestinal contents and placing a drop of aspirated fluid on PH indicator strips, which should be available in all wards. A pH of 5.5 or less is indicative of placement in the stomach (Hunt, Smith, & Sutcliffe, 2004; Metheny, 2009).

The method of placing the tube in water to check for bubbling should not be used (Metheny, 2009).

The auscultatory method is not reliable to differentiate between respiratory and gastric placement (Metheny, 2009).

#### **2.4.10 Bowel sounds**

The absence of bowel sounds is common in the critically ill and does not reflect an inability of the small bowel to assimilate nutrients. Enteral nutrition should not be withheld or the feed rate reduced because of absent bowel sounds (O' Keefe, 2009).

#### **2.4.11 Diarrhoea**

Diarrhoea is not an essential problem to withhold tube feeding as there are many factors affecting it (Hernandez et al., 2006).

#### **2.4.12 Feeding Regimen in Intermittent administration**

Most patients do not require expensive feeds (Howard, 2009). There is no advantage in giving the patient water or a diluted feed, as this practice leads to the delivery of insufficient nutrients. By means of a syringe, 300 to 500cc of liquid feed should be provided between five and eight times a day, or by gravity, 500cc over a period of three to six hours, given between three and four times a day (Hernandez et al., 2006).

#### **2.4.13 Prevention of feeding tube occlusions**

Occlusions are often caused by the coagulation of a protein-based formula as it comes in contact with acids. This can also be associated with the performance of gastric residual checks (Keithley & Swanson, 2004). Therefore, the authors recommend routine flushes with 30mls water before and after each intermittent feed, and before and after administering medication.

#### **2.4.14 Assessment of gastric residual volume (GRV)**

This assessment is only carried out on patients who have tubes placed in the stomach, (not in the small bowel) because the stomach is the reservoir that collects formula, whereas the small bowel continuously propels contents forward. 200mls is a high gastric residual volume for the critically ill, and any discarded gastric contents should be documented as output in the fluid balance record (ASPEN Board of Directors and clinical guidelines Task Force, 2002).

#### **2.4.15 Monitoring intake and output**

Fluid balance charting should be conducted to ensure that the patient is not underfed or overfed (National Collaborating Centre for Acute Care, 2006; Stroud et al., 2003).

#### **2.4.16 Inspection of nostrils**

Nasal erosion is common in the nasogastric tube; therefore daily checking of the skin is recommended (National Collaborating Centre for Acute Care, 2006).

### **2.5 NURSES' COMPETENCY IN ENTERAL NUTRITION SUPPORT**

These guidelines are beneficial, but do not replace the nurses' knowledge and skills (National Collaborating Centre for Acute Care, 2006). This implies that the nurse, using her knowledge and skill should also use the guidelines to facilitate evidence-based practice. Nurses are important in enteral nutrition supportive therapy, as several aspects involved in this care are their responsibility. The literature suggests that there are at least three key elements contributing to nutritional support, namely nutritional assessment, nutrition management (such as patient monitoring, preventing complications) and ethical issues (Howard, 2009; Mowe et al., 2006). Nurses providing tube feeding should be competent in all these aspects. The focus in this review was thus on nurses' knowledge and practice based on these important areas.

#### **2.5.1 Nurses' Knowledge and Practice in Nutrition Assessment**

Nurses have a greater responsibility in decision-making regarding the initiation of a feed. This is important, because the delivery of enteral feeding is a nursing task, and



the patient should receive the correct amount of nutrients as soon as possible (Turner, 2005). Several nutrition practices such as the timing when informing the physician to implement feeding, suggesting and carrying out interventions are influenced by nurses (Persenius, 2008; Bourgault et al., 2007; Marshall & West, 2005). These statements imply that the first step for nurses to take before informing the physician about the patient's nutritional needs is performing a nutrition assessment, where the patient's inability to eat normally could be identified.

Nutrition assessment is the utilisation of static body compartments and the examination of alterations caused by under-nutrition to identify malnourished patients, or patients at risk of malnutrition (ASPEN Board of Directors and clinical guidelines Task Force, 2002). The nurse has a role to play in this aspect. Moreover, while enteral feeding is usually initiated and prescribed by the attending doctor, it is a nursing responsibility to prompt the doctor (Turner, 2005). The nurse, having concluded a nutritional assessment such as observing a patient's reduced level of consciousness and inability to swallow; can suggest to the doctor the initiation of enteral nutrition.

Poor knowledge and practice of nutritional assessment has, however been documented in the literature. Persenius et al. (2006) administered a questionnaire to forty-four nurses caring for the critically ill in an ICU, and conducted forty bedside observations to identify nurses' perceptions and practices in enteral nutrition. They found that the majority of nurses felt that nutritional assessment was not their responsibility. Similarly, Fulbrook, Bongers and Albarran (2007) in their survey to

gain an overview of enteral nutrition practices, found that there are some variations in enteral nutrition practices across European intensive care units. The involvement of nurses in performing nutritional assessments was minimal. They concluded that limited involvement of nurses in assessments requires attention, as this may lead to underestimation of identification of patients requiring enteral nutritional support.

Contrary to the above findings; Persenius et al. (2009) in their other study to gain insight of nurses' experiences of nutritional processes found encouraging results relating to nutritional assessment. Eight registered nurses and four enrolled nurses were asked to talk about a patient's nutritional care. The findings were that nurses had professional confidence, in that they were able to connect each individual patient's nutritional needs and preferences to their knowledge and earlier experiences of similar patients through assessment. It was found that combining the knowledge of patients over time, and being aware of one's own knowledge in connection with former experiences regarding nutritional care, gave nurses confidence in handling other similar patients. These findings indicate that experience may also influence nurses' practice in nutritional assessment.

### **2.5.2 Nurses' Knowledge and Practice in General Management of Enteral Feeding.**

Safe tube feeding management involves confirmation of tube placement using current evidence methods to prevent complications. However, poor practice has been reported in this area. Roynette, Bongers, Fulbrook, Albarran and Hofman (2008) in their study to assess enteral feeding practices in European ICUs, found

that some methods, such as auscultation of injected air to confirm placement of the tube which had been banned, is still widely used across Europe. Current practice recommends the use of the PH measurement (Metheny, 2009).

Monitoring a patient on tube feeding is another practice area required of a nurse, as enteral nutritional support has its complications which have to be prevented. This is important, as the provision of such care does not happen by accident (Howard, 2009). This was supported by the ASPEN Board of Directors and clinical guidelines Task Force (2002) who called for the use of proper monitoring parameters such as the aspiration of gastric residual volume to monitor patient intolerance to feed. However, a cohort study by Jonghe et al. (2001) carried out on 51 patients who were on enteral and parenteral nutrition in a 12-bed medical ICU to assess the amount of nutrient prescribed and delivered; showed that the amount of feed delivered, compared to the amount prescribed, was significantly lower in enteral than parenteral methods of nutrition. Gastric residual volumes were not measured. Similarly, Roberts et al. (2003) did a retrospective study by collecting data from fifty files of patients who were on different enteral nutritional therapy. They found that advancement of feeding was slow. Furthermore, Marshall and West (2005) confirm that practices associated with the measurement of gastric residual volumes are the most significant potential contributors to underfeeding. These findings demonstrate that nurses are deficient in their knowledge of managing gastric residual volumes to prevent complications.

Knowledge in tube feeding management issues is a prerequisite to effective provision of this care. Stanton (2008) states that people who understand the reason why they are doing something do a better job. This implies that having adequate knowledge improves practice. In a study to assess nurses' knowledge before and after implementation of an education programme; Bourgault et al. (2007) gave test questions to fifty-five nurses working in an ICU, a stroke unit, a mixed progressive care unit and a cardiac recovery unit. The aim of the study was to evaluate nurses' knowledge in line with the developed guidelines. Findings were that the mean score from the test given before an educational programme on guidelines was implemented was 45%. After the educational program, the mean score increased to 84%. Only 30% of the nurses suggested that tube feeding could be initiated in patients who did not have bowel sounds, and 41% of the nurses indicated that tube feeding should be stopped if GRV were less than 200ml. Similarly, in a quasi-experimental design study to develop, implement and evaluate evidence-based guidelines for nutritional support following acute stroke; Perry and Mc Laren (2003) found that there were improvements in compliance with guidelines for nutrition support using an educational change and management strategy, infective episodes showed a significant reduction in the post-test group. It can therefore be argued that implementation of an education programme using evidence-based guidelines helps to improve nurses' knowledge. This strategy demonstrates that knowledge has to be evaluated or examined among nurses as it is an essential element in tube feeding practice.

Apart from the knowledge, some factors contributing to underfeeding have been reported. Cabodevila (2008) assessed factors associated with interruptions in enteral nutrition in critically ill patients receiving mechanical ventilation. An observation prospective study of 59 patients who were receiving enteral nutrition was done in the ICU. The results showed that patients received approximately 50% of prescribed feeds. Prolonged interruptions were mainly related to use of a small bore feeding tube, increased residual volumes and other reasons. This study shows that, apart from a gap in knowledge, other factors also affect nurses' practice in giving the right amount of enteral nutrition. These have to be identified and addressed in order to improve practice.

Flushing the tubes to prevent clogging and the proper positioning of the patient are other practice guidelines to be implemented in tube feeding. Kenny and Goodman (2010) did an evidence-based implementation project with pre-test and post-test measures. Data collection before and after implementation of the protocol were based on literature review and included nurses' knowledge of the procedure in relation to prevention of complications. Results indicated that overall knowledge about enteral feeds and methods of unclogging the tubes differed before and after. There was improvement in the incidence of the head of the bed elevation after education had been provided. This implies that to prevent complications, nurses have to be equipped with current evidence.

### **2.5.3 Ethical Practice in Enteral Nutrition Support**

Provision of enteral nutrition has its legal implications which call for nurses to make effective decisions before implementation. Therefore apart from the technical considerations in tube feeding; ethical considerations have to be born in mind as well (Hernandez et al., 2006). It is considered unethical to withhold nutritional support in those likely to become malnourished due to critical illness (Stroud et al., 2010). Nutritional care is guided by four principles which set out how to do what is good and right for the patient with respect for his/her integrity and autonomy (Persenius, 2008). Artificial nutrition has been seen as a medical treatment that patients and their relatives may accept or refuse (Casarett, Kapo & Kaplan, 2005). Therefore, starting, stopping or withholding such treatment is a medical decision which should be made, in consideration of the wishes of the patient (Stroud et al., 2010). This calls for giving adequate information to patient/ relative in order to obtain an informed consent and doing proper documentation of care. Nurses have a role to play in these ethical issues.

#### **Obtaining Informed Consent**

The decision about the use of tube feeding should be made in the same way as other medical treatment decisions (Casarett et al., 2005). Henceforth, to help patients and families make decisions about artificial nutrition, the emphasis should be on the fact that artificial nutrition is a medical therapy administered for medical indication by trained personnel (Casarett et al., 2005). The potential benefits, risks, and discomfort of the treatment should be properly explained (Hernandez et al., 2006) so as to allow the patient or relative to make an informed decision before

consenting. This concurs with Casarett et al. (2005) who established that the administration of artificial nutrition without consent is an intrusion on personal freedom of choice. Therefore, obtaining informed consent is an important element in tube feeding.

This practice is not carried out by nurses alone, as doctors too are primarily involved. In a study to determine surrogates' perceptions about who made the decision to place a feeding tube for their sick relative; Lewis et al. (2006) found that 75% of patients' relatives preferred the decision to be shared with the physician, and many reported that their informational needs were not completely satisfied. This implies that apart from nurses; doctors play a primary role in the decision-making.

### **Documentation of Enteral Nutritional Support**

Documentation is a detailed view of the patient's condition, the health provider's actions and the patient's responses to those actions (Miles, 2009). Properly documented care provides evidence in law suits because documentation of care is the same as the actual care given (Ferrell, 2007). Similarly, documentation of enteral nutritional support follows the same principle. This is important because the prescribed nutritional support is like medication intervention which should be documented (Howard, 2009). Health care providers have an obligation to maintain professional practice standards of documentation (Miles, 2009). In the same way, the author contends that the college curriculum of an accredited school includes the teaching of documentation. Nurses should thus document any observation and

action taken in respect of a patient concerning tube feeding to facilitate communication of care and in case of lawsuits.

Documentation practice has legal implications, and can be improved if nurses have adequate knowledge about what to document, although some factors may also affect this practice. Ferrell (2007) concurs by stating that although nursing documentation is taught at school; nurses find that they are tired and busy on the job and often fail to document. The author reports a case where a patient with stroke had a gastrostomy tube feeding. The standard of care was that documentation of GRV and four-hourly flushes be done. On three consecutive days, feeding was not done due to high GRV. On transfer to another unit, notes indicated head elevation, but no documentation of GRV and tube patency was done. The patient died of aspiration and a lawsuit was brought against the nurses because there was no evidence of their care available, due to poor or incomplete documentation. Contrary to the above incidence; Kenny and Goodman (2010) found improved documentation practice after implementation of guidelines. A review of the nurses' documentation procedures showed that there was a 10% improvement in documentation of patient education, a 15% improvement in fluid flush documentation, and 100% head elevation documentation among nurses. These findings also show that documentation practice improves with the use of guidelines.



## **2.6 A HEALTHY PRACTICE ENVIRONMENT AND ENTERAL NUTRITION.**

Apart from the need for adequate knowledge and skill by nurses supported by guidelines; a healthy practice environment is also a prerequisite to successful tube feeding management. Inter-professional and environmental factors that support collaboration, communication, shared decision-making, adequate resources and professional development opportunities are important (Stanton, 2008; Kaplow & Reed, 2008).

Collaboration during nutritional care is an important environmental factor that promotes good practice. The physician has an overall nutritional responsibility, making sure that an assessment is performed, and prescribing nutritional treatment in consultation with registered nurses and enrolled nurses (Persenius et al., 2009). Nurses coordinate enteral nutrition support (Roberts et al., 2003). When it comes to tube feeding, teamwork during the planning and the calculation of the feed is a common practice, because there is a need for shared decision-making from different disciplines such as consultation with a dietician (Hanson, 2004). The skill of nurses is pivotal to the success of this practice and Registered Nurses have an independent responsibility for assessment and prescription (Mowe et al., 2005; Roberts et al., 2003). Furthermore, Mowe et al. (2005) assert that Registered Nurses and enrolled nurses collaborate regarding patients' nutritional care; with the RN acting as a supervisor for the enteral nutrition and each nurse being responsible for her own actions.

In a study to gain insight into nutritional processes by nurses and other staff in their work, Persenius et al. (2009) state that nurses reported the importance of teamwork. Nurses indicated that despite having limited knowledge and experiences; an open mind to inquiry helped them to look for new solutions through dialogue with others. The delivery of enteral feed was often delegated by the Registered Nurse to the enrolled nurses. Nurses could suggest improvements and this resulted in professional confidence. This suggests that consultation and collaboration help to implement nutritional support effectively and that an open mind helps people to learn from others. Similarly, dietitians are part of this team when it comes to nutritional support. This was evident in a study by Ellmer (2007) who distributed questionnaires to dietitians, nurse managers and doctors in ten Burn Units in South Africa to assess the current protocol and practices of nutrition. Findings were that multidisciplinary ward rounds were routine according to 88.9% of the nurse managers, and that dietitians reported good communication among the team members.

Communication is the core of the synergy model. Stanton (2008) reports that an open door policy helps nurses to feel comfortable as issues do not go unresolved because there is a system to address problems before they can impact on patient care. Consequently, for an effective implementation of enteral nutrition for the critically ill; communication among doctors, nurses, dietitians and the patient/family is crucial, as a lack of appropriate information channels can lead to confusion about what to do.

Concurrently, in settings where enteral nutritional practice is carried out, the environment should allow for continued education, and learning should be encouraged among nurses. The Canadian Nurses Association (2010) argues that Registered Nurses should evaluate themselves, seek feedback, and plan self-directed learning activities to ensure professional growth. Furthermore, the authors state that nurses are also expected to know how to locate and use results of research findings to inform and build evidence-based practice.

Adequate resources are also a prerequisite to effective enteral nutrition practice. Persenius et al. (2009) report that having tools such as guidelines and documentation charts support effective provision of nutritional care. Therefore, enteral nutrition support should be provided in an environment with adequate resources for the effective implementation of this care.

## **2.7 CONCLUSION.**

It was evident through the review of this literature that enteral nutrition support is important for the critically ill. Even though nurses have a role to play; studies in European countries have demonstrated a gap in important areas of this nutritional support, showing the need for more research in enteral nutrition. The review has also shown that, apart from the nurse, the environment of care also influences the nurses' practice. However, gaps in research still exist in this environment of care as it relates to tube feeding. Very limited information is available in Africa, yet this practice affects this continent as well. Considering the importance of nutrition in the critically ill and the responsibility the nurses are entrusted with regarding nutritional care, the researcher conducted a similar study in her developing country, Malawi. The study

thus aimed at describing nurses' enteral nutrition knowledge and practice. The next chapter describes the methodology that was used to conduct the study.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 INTRODUCTION**

The objectives of the study and the time available for the researcher guided the choice of the methodology. This chapter thus describes the approach and the design that was chosen for the study. In chronological order, the study setting, study population, data collection instruments, methods of data collection and data analysis will be described. How data was managed and the ethical issues that transpired during the course of study and the procedures that were followed will also be discussed. The study aims at describing the nurses' level of knowledge and practice about adult enteral nutrition in the special care units of the QECH.

### **3.2. RESEARCH PARADIGM AND APPROACH**

The researcher adopted a positivist paradigm, therefore the study was quantitative. This was chosen as a suitable approach because it allows the subjects' independence. Polit and Beck (2004) state that the ontological assumption is that the environment is fixed and well organized, such that it can be studied objectively. This is in line with the study where the researcher investigated the independent existence of facts about knowledge and practice of enteral nutrition. This was studied and described without any interference with the participants' minds, as the researcher detached herself from the participants as far as was possible by using a self administered questionnaire and a checklist.

### **3.3. RESEARCH DESIGN**

The research design is an overall strategy that was adopted. With the positivist paradigm as a belief; a quantitative non-experimental descriptive survey was chosen as a suitable approach. Polit & Beck (2004) assert that survey research collects information on people's knowledge and opinions. Similarly, the intention of the researcher was to determine nurses' knowledge and practice about enteral nutrition. Furthermore, the authors state that the purpose of descriptive research is also to observe and document aspects of a situation, just as the researcher in this study performed a case note review to check some documented aspects of nutritional care.

The researcher intended to gather information on the phenomena of tube feeding in order to describe associated factors such as nurses' knowledge, behaviours, their experience, and the environment of care. This is in line with Kelly, Clark, Brown and Sitzia (2003) who established that the aim of descriptive research is to describe important factors associated with that situation such as demographics, experiences and knowledge.

### **3.4. STUDY LOCATION AND SETTING**

A referral hospital was chosen as the study location because it is the biggest hospital in the country, where many critically ill patients are located. The study settings were the Intensive Care Unit and the three High Dependency Care Units (one medical and two surgical). These settings were chosen because they are where the critically ill, either acute or chronic, are nursed, and enteral nutrition practice is commonly conducted. This was also in response to Fulbrook et al. (2007) who observed that

their similar study had a limitation, in that it involved an ICU setting only, while tube feeding practice is also common outside the ICU. This researcher thus decided to include HDUs to avoid incurring the same limitation.

### **3.5. RESEARCH POPULATION AND SAMPLING**

Population is the entire aggregation of cases in which the researcher is interested (Polit & Beck, 2004). For the questionnaire, the target population included all nurses caring for the adult critically ill who were involved in enteral nutritional support. These were State Registered Nurses, nurse technicians and enrolled nurses. There were fifty-five in all the units who are working permanently and on locum; rotating in similar units, and those who came from other wards. Both cadres; Registered Nurses and enrolled nurses/nurse technicians were invited to participate. This was also in response to Persenius (2008) who, in her study involved Registered Nurses only, and suggested that it would be of interest to include enrolled nurses because they are also involved in this nutritional support.

Since the population was small, all members of the population were invited to participate. Therefore the whole population was used as a sample. This concurs with Burns and Grove (2009) who state that in some studies the entire population is the target of study because of its smaller size. This was maximised by personally explaining to the respondents about the study and its importance so that they could consent. Multiple sample sites which are the Intensive Care Unit and the High Dependency Units were used so that the findings could be more generalisable. This is in line with Resnick (2006) who states that by incorporating multiple sample sites the findings may be more generalisable.

A population might also consist of all hospital records (Polit & Beck, 2004). Likewise, for the case note review, a population of seventy eight eligible files of patients who were on tube feeding between January 2009 and July 2010 was reviewed.

### **3.5.1. The Inclusion and Exclusion Criteria for the Questionnaire**

The inclusion criterion was nurses who were male or female. These comprised those working on a fulltime or on a locum basis and who had worked in the unit for at least a total period of three months, though not on a continuous basis.

The exclusion criteria comprised those who refused to participate after having been given the information about the study and those who were on leave. To get a fairly homogenous population to control extraneous variables (Polit & Beck, 2006), all foreign nurses working in these units were also excluded.

### **3.5.2. The Inclusion and Exclusion Criteria for the Case Files**

Inclusion criteria were comprised of case files with documented evidence that a nasogastric or orogastric tube was inserted for feeding.

The exclusion criteria consisted of all files with a doctor's order for enteral nutrition, but no evidence of tube insertion. All files, despite having evidence of tube placement but no nurses' documentation sheets attached, were also excluded, because it was assumed that those records were probably lost.



### **3.6. DATA COLLECTION INSTRUMENTS**

The researcher used two tools to collect data in order to answer the objectives of the study. A self-administered structured questionnaire (Appendix 1) was given to nurses, and a checklist (Appendix 2) for review of nurses documented interventions relating to enteral nutrition. Below is a description of each of these instruments and their forms of measurement.

#### **3.6.1 The Self-Administered Questionnaire**

This is a formal, structured written instrument where respondents complete the questionnaire themselves (Polit & Beck, 2004). The researcher modified a questionnaire by Persenius et al. (2006) in order to suit the context under study. Basic information from the researcher's clinical experience and evidence from the literature also assisted in developing relevant questions. The questions assessed the basic tube feeding knowledge and practices. Some questions required the participants to select from multiple responses, others from only one response and still others required a worded response. This is a typical feature in survey research (David & Sutton, 2004).

The questionnaire was comprised of 29 questions. Question number four and ten had 5 items each and question number 11 had seven items. The questions were designed in three sections, using multidimensional scales to assess the following variables:

#### **Section A Socio-demographic information**

The aim of this section was to determine some nurse characteristics which might influence their practice. Questions regarding age, gender, formal training on enteral

nutrition and their years of work experience, and in-service training were asked. Six questions regarding this variable were formulated.

### **Section B. Knowledge of Enteral Nutrition**

In line with the knowledge variable, the researcher adopted the relevant nurse characteristics according to the synergy model to come up with questions that relate to nurses' knowledge. These related to clinical judgment (such as nutrition assessment), caring practices (such as tube feeding management and prevention of complications), collaboration and Clinical enquiry. Nine questions seeking knowledge were formulated, where questions 7 to 10 related specifically to the general tube feeding issues such as tube feeding initiation and contraindications. Knowledge questions 11 A to G focused on enteral feeding procedures. Questions 12 to 15 were intended to determine nurses' knowledge of some environmental issues relating to enteral nutrition.

### **Section C. Practice in Enteral Nutrition**

Fourteen questions asking about practices were formulated to determine whether respondents perform specific interventions and how they do them. Questions 16 to 18 related to respondents' scope of practice, choice of feeding tube and method of tube placement confirmation. Questions 19 to 24 related to practice measures to prevent complications and communication of care. Practice questions 28 and 29 were open-ended questions incorporated in order to get the participants' self-expression of the environmental factors which affect their enteral nutrition practice and their suggestions for improvement. This concurs with Hong (2005) who states that open-ended questions allow respondents to fully and spontaneously explain in their own language.

### **3.6.2 The Checklist**

The researcher used this method to strengthen the objectivity of the survey. This method assisted in getting some information which was not possible to capture using the questionnaire. This helped to improve the quality of the data collected. Lilford et al. (2007) contend that the quality of clinical care is often assessed by retrospective examination of case notes. In this regard, tube feeding clinical care by nurses was retrospectively assessed by reviewing the files. The researcher; using the literature (Roynette et al., 2008; Kenny & Goodman, 2010; Towell & Van Dijk, 2005) and her professional clinical experience of documentation of enteral nutritional care as a base, developed an evidence-based checklist with relevant critical areas that required documentation as an extraction sheet. The checklist data sheet had two parts: Part A concerned the patient's relevant demographics, and Part B was about the nurses' documented interventions. This was used as a guide to collect the relevant information. Information sources were doctors' progress notes' sheets, nurses 'progress notes' sheets, intake and output charts, care plan charts, treatment sheets and an ICU recording chart.

#### **Construction of the Checklist**

The following minimal standard variables relating to specific areas of care for patients on tube feeding were used for the checklist.

**Nutritional assessment-** For this criterion, the researcher was looking for any documentation by nurses detailing facts such as the patient's ability to eat, swallow, his/her level of consciousness, vomiting, diarrhea etc. Where this was written up by the doctor it was not considered relevant to the study, since the study related to nurses' practice.

**Consultation-** For this criterion, the researcher was looking for nurses' documentation of any nutritional consultation made with the doctor or dietician, i.e. informing the doctor about the patient's inability to eat, or any change in the level of consciousness, informing kitchen staff about the patient's prescribed tube feedings, etc.

**Obtaining consent-** Relevant documentation for this criterion was the nurses' documentation of any explanation given to the patient or relative regarding the need for tube feeding. There is no specific consent form, and documentation is done on progress notes.

**Confirming tube placement-**The researcher was looking for any documentation of which bedside method was used to confirm that the tube was in the right place before initiating the feed.

**Feeding regimen-** It should be noted that the criterion 'feeding regimen' documentation was only limited to the documented prescribed regimen and not how nurses documented the actual amount of intermittent/boluses given. This was beyond the scope of this study.

**Bowel records-** The researcher was looking for two monitoring interventions: auscultation for bowel movements, and the recording of the number of stools passed. In most cases in the units this was done by the doctor/anaesthetist during his/her round; however, the researcher focused on the nurses' documentation charts and progress notes.

**Fluid balance record-** Apart from the recording of intravenous fluid, the researcher was looking for related tube feeding intake and output such as recordings of the actual tube feeding taken and any output such as vomiting, gastric residuals, etc.

**Measures to prevent complications-** Under this criterion the researcher was looking for documented measures such as head elevation to prevent aspiration, flushing the tube to prevent clogging, aspirating gastric residual volume to check for tolerance, etc.

### **3. 7. VALIDITY AND RELIABILITY OF THE INSTRUMENTS**

Validity is the extent to which an instrument measures what it is supposed to measure (Polit & Beck, 2004). In the questionnaire and the checklist, the researcher ensured content validity by incorporating key questions and criteria respectively about enteral feeding, to help answer the objectives, and in line with the concepts of the model. Professional opinion was also sought from experienced critical care nurses working in ICU. Table 3.1 below shows the content validity and illustrates items of the measurement that correspond to the study objectives.

**Table 3.1 Summary of content validity: Objectives, the concepts in the model and measurements**

Content validity from the research objectives	
Research Objective	Items for measurement
To describe nurses' knowledge of enteral nutrition	Self-administered questionnaire: Section A. Q4 and 5, Section B Q7 to 11
To describe nurses' practice in Enteral nutrition	Self-administered questionnaire: Section C.Q 16 to 27 The checklist for case note review: Part B
To describe the environmental factors affecting nurses' practice	A self-administered questionnaire: Section C. Q28 and 29
Content validity from the Concepts within the conceptual model	
Concept	Items for measurement
Nurses' characteristics (competency)	A self-administered questionnaire: Section A Section B. Q 7 to 11, Section C. Q 16 to 27
The environment of Care	A self-administered questionnaire: Section B.Q12 to 15 Section C. Q28 and 29.

Reliability is the accuracy and consistency of information obtained in the study (Polit & Beck, 2004). To ensure the reliability of the questionnaire a pilot study was done. Ten questionnaires were given to nursing students who had just finished their diploma bridging courses at the university in the country under study and had been working in the study units. This was done to check the content and structure of the

questionnaire and whether it was relevant to the study topic. The pilot study participants were asked to objectively evaluate the questionnaire looking at confusions, appropriateness/relevance, gaps, and time taken. After the pilot study the questionnaire was modified, based on the data obtained from the pilot group. Some questions were similar as evidenced by the pilot group giving similar responses, so one was taken out; the format was changed to reduce the number of pages as participants indicated that the questionnaire appeared too long (face validity) though it took them between 15 and 20 minutes to respond

To ensure validity the researcher verified with the nurse in-charge to check if the checklist was according to their standard practice. To ensure reliability of the checklist the researcher tested it by randomly selecting and reviewing ten case files from all the units and it was found that some criteria that were put on the checklist were not applicable to the study setting. This was documentation of pH gastric contents which is not a standard practice in the study settings. Therefore this criterion was taken out. The criteria of documentation of length of tube at exit point when it is inserted was also not the standard practice and it was also taken out. After the pretesting the checklist was revised and finalized.

### **3.8. DATA COLLECTION PROCEDURES**

The study was conducted between 4<sup>th</sup> June and 31<sup>st</sup> July, 2010. Both distribution of the questionnaire and review of the case files were done concurrently by the researcher. Data collection commenced after all required ethical requests and approvals had been obtained at all levels, including permission to review the

patients' files (see Appendices 3 to 8 for these letters of ethics requests and approvals).

### **3.8.1 Self-administered questionnaire**

After receiving a letter of approval to conduct the study from the hospital management, the researcher approached the unit matrons from the study settings to get a list of the potential study participants. The first introduction of the researcher was effected. The study and its purpose were explained to the matrons and they were shown the acceptance letters.

After obtaining verbal consent from the matrons, the researcher compiled a schedule to visit the participants in their respective places of work. The members available on that day were briefed about the study, and were given the information and consent sheet. They were assured of anonymity and confidentiality. After obtaining consent from each one individually, and once each participant had agreed to participate, s/he signed the Informed Consent, and the questionnaire was then handed out to those who consented to participate in the study. Some responded on the same day, others were followed up later. The same approach was carried out daily, during day and night duty shifts until all the study participants had been briefed about the study. Maintaining distance from the research participants to control intervention and bias was ensured as far as possible, by allowing them to fill out the questionnaire in the absence of the researcher. Five participants did, however fill out the questionnaire in the presence of the investigator because they felt that it would be easier for them as clarification could be given to them as they needed it.



Out of the population of 55 nurses, a total of 51 questionnaires were distributed and returned (100% response rate) by nurses working in the ICU, the two surgical HDUs and medical HDUs. Two nurses were foreigners trained outside Malawi so they were not included, one nurse was away on maternity leave, and one declined to participate, stating that she was always very busy every time the researcher approached her to explain about the study.

### **3.8.2 Case note review**

Permission was sought from the hospital Health Management information System library (HMIS) department which is responsible for keeping patients' case files (see endorsement Appendix 3.8). After getting consent, the researcher engaged the respective clerks responsible in the department to assist in retrieving the files of patients who had been admitted to the ICU and HDU. The researcher herself was responsible for collecting the relevant files that contained all the records and evidence that a nasogastric tube was inserted.

According to protocol, for ICU; the recording charts are kept in the ICU department, therefore the researcher collected the data from the ICU and was assisted by the ICU clerk in retrieving the charts. The ICU clerk was paid 1, 000 Malawi Kwacha for the work and 5 HMIS library clerks were paid 3,000 Malawi Kwacha each for their work. A total of 78 case files that met the inclusion criteria were reviewed to assess nurses' practice of documentation as these relate to tube feeding. The researcher was guided by the checklist to capture the relevant data. Where the relevant data was identified a tick was made below 'Yes'. If the item the researcher was looking for

was not written down in the records as it could have been, the assumption was thus that the intervention had not been performed and a tick was entered under “NO”.

### **3.9. DATA ANALYSIS**

All questionnaires and checklists were checked for completeness of responses/ticks. According to Burns and Grove (2004) the purpose of statistical analysis is to summarise data collected, explore the meaning of deviations in the data, and test the proposed relationship in a theoretical model. In this study, the Statistical Package for Social Sciences, Version 15 (SPSS V15) was used to summarise the data. Two forms of descriptive statistics, namely the central tendency in the distribution and association among some variables were applied. To describe the socio-demographic, knowledge and practice data, descriptive statistics using frequencies and percentages, mean and standard deviation were used. The numerical variable ‘age’ and categorical variable ‘level of nursing training’ were correlated with ‘knowledge’. ‘Ward setting’ was correlated with ‘documentation practice’.

### **3.10 DATA MANAGEMENT**

Procedures to control the factors that undermine the validity or reliability of the results were followed (Polit & Beck, 2004). The questionnaires and checklists displayed no names. All the data was used for the purpose of this study only. This ensured that access to the information was as confidential as possible. The questionnaires and checklists were kept confidentially in a locked cabinet during the research period. An electronic data log-in code known only to the researcher was used. Data will then be kept for a period of five years in a secure location by means

of an arrangement with the supervisor at the school. After five years, the data will be disposed of by incineration, and electronic data will be erased.

### **3.11 ETHICS CONSIDERATIONS**

The study was sent to the University of KwaZulu-Natal and the Malawi College of medicine Ethics Research Committees for approval.

#### **3.11.1 Ethics Consideration for Human Participants**

The research participants were not under the impression that they were 'required' to participate. Having obtained permission from the hospital Director and the respective unit matrons was not a guarantee that the respondents would participate. The hospital matrons knew which groups of nurses were included in the study but not who actually responded to the questionnaire. This helped to avoid the impression that the participants were coerced by their supervisors. All this was done in accordance with the ethics principles required by human research. Moreover, the consent entailed anonymity, confidentiality, right to privacy, protection from discomfort and the right to withdraw (Polit & Beck, 2004) as stipulated in appendix 9. Therefore principles of justice, autonomy, beneficence, and non-maleficence were observed as follows:

**Justice-** To ensure freedom from exploitation; the questions were reasonable in number so that too much of the respondents' time was not needed to answer. The questionnaire was given to participants in their workplace by the researcher, and they were not restricted by having to respond immediately, but could do so at their

own convenience. An agreement was, however concluded as to a reasonable time for the collection of the questionnaires.

**Autonomy**- Respect for the respondents was observed by first informing them of the aim, the process, the researcher's responsibility and the risks and benefits of the study they were to participate in. Consent to participate was obtained from each participant who agreed to participate. The consent form indicated that participation was voluntary, and that participants had the right to withdraw at any time they wished. One participant declined to participate in the study therefore the questionnaire was not given to that person, and no penalty was attached to this. Questions did not pose any ethical problems.

**The principle of beneficence** was observed in the design. Potential benefit was communicated to the participants; however it was made clear that the benefits would be applicable to all nurses in the hospital, and that responding to the questionnaire did not prioritise the benefit to the respondents in any way. They were thus informed that there was no direct personal or monetary benefit. The research topic itself had the potential to improve nurses' practice in the first place, as well as patient care. The participants were able to state their situation in an objective way, with no risk of being personalised.

**Privacy** was ensured by indicating that no personal identification appeared on the questionnaire. This ensured that the researcher could not link the participants to the data. The completed questionnaires were directly collected from the participants by the researcher herself from all the HDUs. The ICU questionnaires were collected by the sister in charge and sealed in an envelope and the researcher collected all the

questionnaires once. This was done to prevent frequent entrance into the unit which was prohibited as such the researcher did not contravene the hospital regulations too often.

### **3.11.2. Ethics Consideration for Case Note Review**

The review of records had its own ethical implications. The hospital could have been reluctant to make their records available for scientific studies to the issue of the divulgence of patient and staff identities. This was addressed by engaging the researcher herself who is in the same profession to collect data. Patients' hospital numbers and not their names were used to identify a particular case note. No names of the personnel responsible for documenting the care were recorded. The review of records was done in the unit where the records are kept and in the presence of staff working in the department, and no case notes were taken away from the premises.

## **3.12 DISSEMINATION OF FINDINGS**

A copy of the findings will be submitted to the Nursing Department at the Ministry of Health and the Queen Elizabeth Central Hospital. Bound copies will also be submitted to the libraries of the two universities concerned for public use. With support from the supervisor, the findings will be published in accredited journals. All this will be done to facilitate the utilisation of the research findings.

### **3.13 CONCLUSION**

This chapter outlined the research method that was followed. Tools used to collect data, and measures to ensure that ethical principles were adhered to were described. The following chapter will present the analysis of the data.

# CHAPTER FOUR: ANALYSIS OF THE RESULTS

## 4.1 INTRODUCTION

This chapter gives an account of the study findings on nurses' knowledge and practice about adult tube feeding in the special care units of the QECH. Data collection was done using two types of data collection tools: a questionnaire and a case note checklist to review documentation of tube feeding interventions done by nurses. Descriptive statistics and a nonparametric test were used to analyse the data. Cross-tabulations and Pearson's Chi-square, Fisher's Exact Test and a Mann-Whitney U test analysis were used to determine the extent of the relationship between the two socio-demographic variables 'age' and 'level of training' and knowledge variable. A  $p$  value of  $< 0.05$  was considered as statistically significant.

To begin with, the actual occurrences during data collection regarding the study population will be explained. This will be followed by a description of the socio-demographic characteristics of the participants.

## 4.2 SAMPLE REALISATION

The researcher achieved the sample size of 51 participants by personally approaching and explaining the study to the nurses. A total of 51 questionnaires were returned representing a 100% response rate. This is very high, showing the willingness of respondents to give their input to the research as compared to a

similar study by Persenius et al. (2006) who involved nurses from three hospital ICUs where 44 nurses participated with a 70% response rate.

### 4.3 SOCIO-DEMOGRAPHIC DATA OF PARTICIPANTS

This section describes the gender, age and level of nursing training and experience of the participants in order to determine whether some of these characteristics might influence the respondents' knowledge and practice in tube feeding.

#### 4.3.1 Sex

Of the total 51 participants, the majority 92.2 % (n=47) were female and 7.8 % (n=4) were male (Table 4.1). This is a normal trend, as historically the nursing profession has always been female dominated.

**Table 4.1 Distribution of participants according to sex (N= 51)**

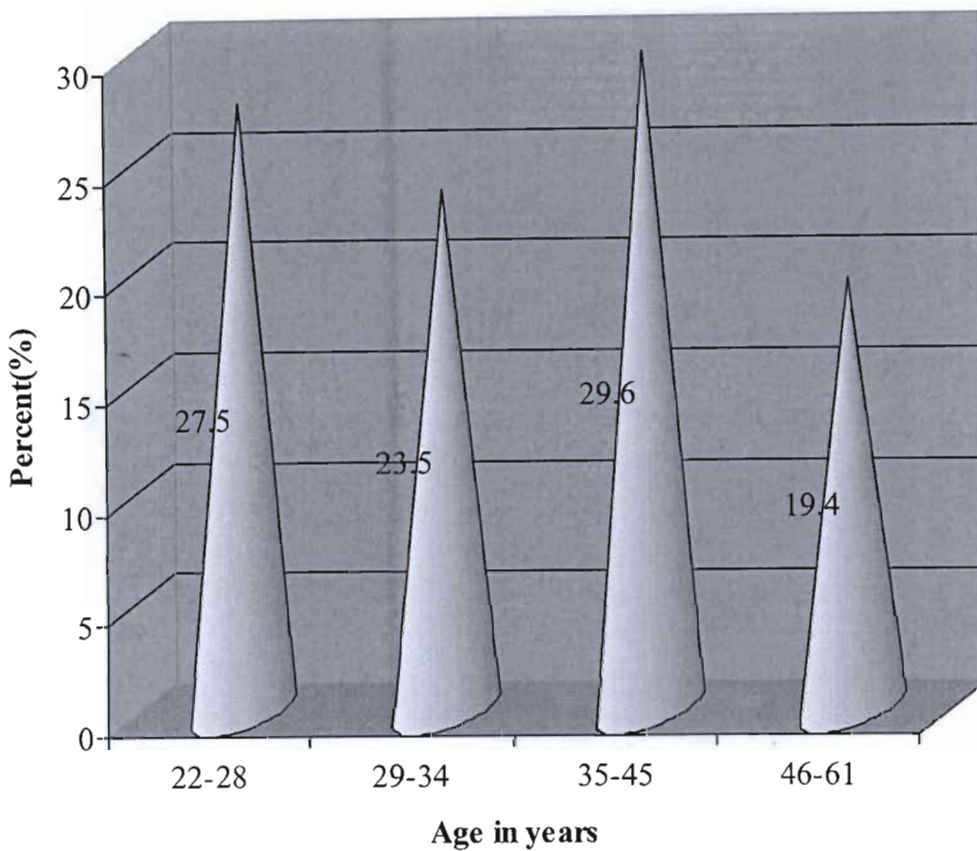
Gender	<i>n</i> (%)
Male	4 (7.8)
Female	47(92.2)
Total	51(100%)

#### 4.3.2. Age

The majority, 29.4% (n=15) of the participants were in the middle-aged group, aged between 35 and 45 years, followed by the youngest group, 27.5% (n=14) who were



aged between 22 and 28 years. (Figure.4.1) The minimum age was 22 and the maximum age was 61 with a mean age of 37.51.



**Figure 4.1 Age distribution of participants**

#### **4.3.3. Level of Nursing Training**

The findings show that more than half of the participants, 56.9 % (n=29) were enrolled nurses or nurse technicians who had a certificate in nursing. (Table 4.2) Registered nurses included diploma holders, 31.4%, (n=16) and degree holders, 11.8% (n=6). This implies that the majority of nurses involved in tube feeding practice are certificate nurses.

**Table.4.2 Distribution of participants according to level of nursing training (N=51)**

Level of nursing training	<i>n</i> (%)
Certificate (ENM/NMT)	29 (56.9)
Diploma	16(31.3)
Degree	6 (11.8)
Total	51(100%)

#### **4.3.4 Enteral Nutrition Training**

Almost all participants, 98% (n=50) indicated that enteral nutrition was part of their nursing training in college, while 2 % (n=1) did not have any enteral nutrition training in college and this percentage comprised an enrolled nurse, aged 36 years. Likewise, the findings show that most participants received relevant training in specific aspects regarding tube feeding while at college (Table 4.3). All the participants, 98% (n=50) who indicated that their college training had tube feeding as a topic, also indicated that they had received a practice demonstration of the procedure.

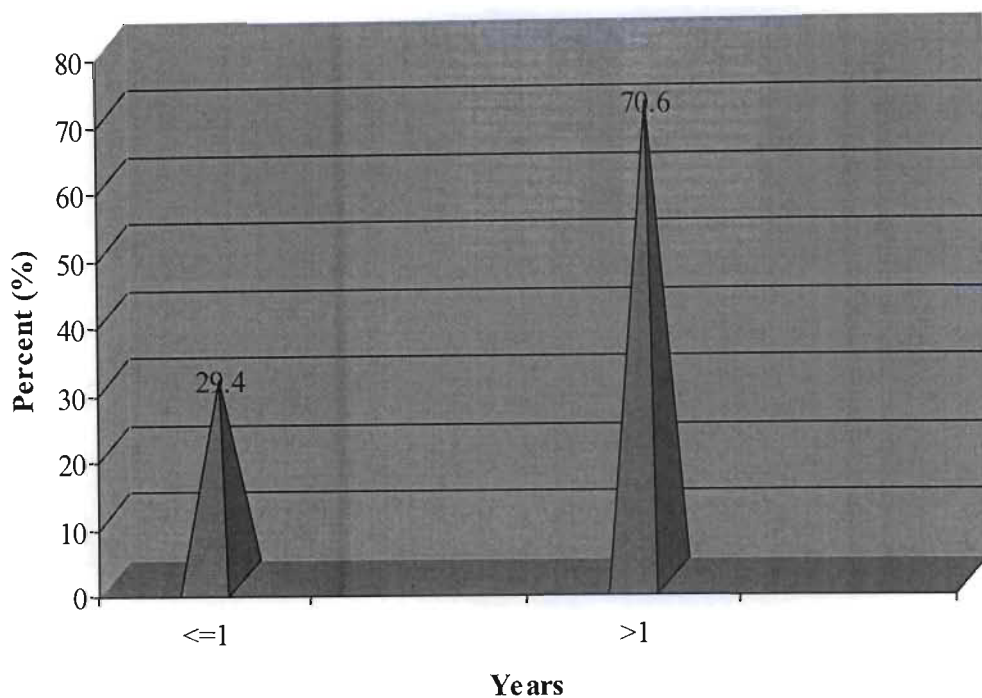
**Table 4.3 Participants' responses as to what was included in their training regarding enteral nutrition (N=51)**

Item	Yes <i>n</i> (%)	No <i>n</i> (%)
Demonstration of tube feeding	50(98)	1(2)
Nutritional assessment	46(90.2)	5(9.8)
Type of feed to give through the tube	47(92.2)	4(7.8)
Specifying the amount to give	41(80.4)	10(19.6)
Complications to observe for	46(90.2)	5(9.8)

The findings also revealed that 96.1 % (n=49) participants had never had in-service training in enteral nutrition, while only 3.9 % (n=2) indicated that they had received in-service training on tube feeding.

#### **4.3.5 Work Experience in the Unit**

The majority of the participants, 70.6% (n=36) had had more than 1 year of work experience in the critical care unit, and 29.4 % (n=15) participants had been working for 1 year and below (Figure 4.2).



**Figure 4.2 Length of practicing in the unit**

#### **4.4 NURSE CHARACTERISTICS (COMPETENCY)**

The study findings on nurses' knowledge and practice will be presented using the core concept 'Nurse characteristics' from the conceptual model being used. Therefore to test the null hypothesis that there is poor knowledge and practice in enteral nutrition among nurses; the results on nurses' competency (knowledge and practice) were observed. This section will therefore describe the findings on nurses' knowledge and practice in enteral nutrition in order to determine the level of their competency.

#### **4.4.1. Nurses' Knowledge of General Enteral Nutrition**

The study findings revealed a variation in knowledge about general enteral nutrition issues among participants (Table 4.4). Most of the participants, 88.2% (n=45) demonstrated adequate knowledge when they agreed with the statement that 'initiating tube feeding early can help to reduce the period of hospital stay and mortality' although some, 11.8% (n=6) disagreed. However, an almost similar number of participants, 86.3% (n=44) demonstrated poor knowledge when they agreed that it is true that an absence of bowel sounds is an absolute contraindication to enteral nutrition; only 13.7% (n=7) indicated that this is false thereby demonstrating adequate knowledge. Similarly, almost half of the participants, 47.1% (n=24) also demonstrated poor knowledge when they indicated that vomiting is an absolute contraindication to enteral nutrition.

**Table 4.4 Participants' responses to their knowledge of general enteral nutrition issues**

Statement	True <i>n</i> (%)	False <i>n</i> (%)
Initiating tube feeding early can help to reduce the period of hospital stay and mortality	45(88.2)	6(11.8)
As long as the patient is on intravenous fluids s/he can stay well nourished for one week	19(37.3)	32(62.7)
Enteral nutrition should be initiated within 24-48 hours for patients who cannot swallow	40(78.4)	11(21.6)
The following are absolute contraindications to enteral nutrition:		
Peritonitis	35(68.6)	16(31.4)
Intestinal obstruction	42(82.4)	9(17.6)
Vomiting	24(47.1)	27(52.9)
Diarrhoea	11(21.6)	40(78.4)
Absence of bowel sounds	44(86.3)	7(13.7)

#### **4.4.2 Nurses' Knowledge of Specific Enteral Feeding Procedures**

The study findings revealed that the majority of the participants are competent enough in the procedures outlined (Table 4.5). It should be noted that all participants, 100% (n=51) are competent in inserting a nasogastric tube. However,

almost half of the participants indicated that they are not competent enough in nutritional assessment, 43.1% (n=22); choosing the appropriate formula to feed, 49% (n=25) and aspirating gastric residual volume, 43.1% (n=22).

**Table 4.5 Participants' responses about their knowledge of specific enteral nutrition procedures**

Statement	Yes <i>n</i> (%)	No <i>n</i> (%)
Assessment of patient's nutritional status	29(56.9)	22(43.1)
Insertion of a nasogastric tube	51(100)	0(0)
Checking for proper tube placement	47(92.2)	4(7.8)
Giving continuous tube feeding	35(68.6)	16(31.4)
Giving bolus/intermittent tube feeding	37(72.5)	14(27.5)
Choosing the appropriate formula to feed	26(51)	25(49)
Aspirating gastric residual volume	29(56.9)	22(43.1)

#### 4.4.3 The Relationship between Age and Knowledge

The Chi-Square test revealed that there is no association between age and knowledge. The Pearson,  $\chi^2 = 3.207$ ,  $df = 3$ ,  $p = .361$  was not significant (see Table 4.10).

**Table 4.6 Relationship between Age and Knowledge**

Knowledge	<i>n</i>	>Md	<=Md	significance ( <i>p</i> )
Age <=28	14	7	7	.361
29-34	12	4	8	
35-45	15	7	8	
+46	9	5	4	

#### **4.4.4 The Relationship between Level of Nursing Training and Knowledge**

In order to test the differences between the two independent groups on a continuous measure, the Mann-Whitney U test was applied (Pallant, 2007). In the study results, the researcher wanted to test the difference in knowledge (dependent variable) of tube feeding between certificate nurses and state registered nurses (independent variables) and answer to the question: Do SRN and certificate nurses differ in terms of their knowledge of tube feeding?

First the knowledge scores were determined by taking the number of correct responses by each respondent out of the total of 15 knowledge items on the questionnaire (Q7 to Q11). Each correct answer received a score of 1, and a score of zero was awarded for an incorrect answer. The total correct responses were then divided by the total items and multiplied by 100 to get a percentage. The percentage scores were graded as 'poor', 'average' or 'adequate' to determine the knowledge level. The grading was designed by the researcher, using her work experience as there was no standard scoring available in the literature.



Grading was classified as follows: 0 to 49% - poor, 50 to 64% - average and 65% and above – adequate (above average).

The Mann-Whitney U test revealed no significant difference in knowledge levels between the Certificate nurses and SRNs. The probability value ( $p$ ) was .91 (rounded) which was above .05 so the result was not significant. There was no statistically significant difference between the knowledge of certificate nurses and state registered nurses. The median for certificate nurses was 10.5000 and for SRNs it was 10.0000.

Certificates ( $Md = 10.5000, n= 28$ ) and state registered nurses ( $Md =10.0000, n=22$ )  
 $U 302.000, z -.119, p .905, r=017$  (Table 4.11).

**Table 4.7 Relationship between Level of Training and Knowledge**

Knowledge	$n$	U	Md	z.	significance ( $p$ ). $r$
State registered nurses	22	302.000.	10.	-.119	.91(rounded) .017
Certificate nurses	28		10.5		

To determine the strength of the relationship, the effect size,  $r$  was calculated manually as follows:  $r= z/\text{square root } n$  (Pallat, 2007). Therefore  $r = .017$ . This was a very small effect using Cohen’s (1988) criteria of: .10 for small effect, .30 for medium effect, and .50 for large effect (Pallant, 2007). A correlation of zero indicates no relationship. The results confirm that there is no relationship at all between level of training and knowledge.

#### 4.4.5 Nurses' Scope of Practice in Enteral Nutrition

When considering the nurses' scope of practice, the majority of participants admitted that all three intervention areas are within the scope of their practice (Table.4.6). However, almost half of the participants, 43.1% (n=22) agreed that nutritional assessment is not within the scope of their practice.

**Table.4.8 Scope of Practice in Enteral Nutrition**

Scope	Yes	No
	<i>n (%)</i>	<i>n(%)</i>
Nutritional assessment	29(56.9)	22(43.1)
Inserting a nasogastric tube	45(88.2)	6(11.8)
Tube feeding the patient	42(82.4)	9(17.6)

#### 4.4.6. Nurses' Choice of Tube Size

The common tube size that was reported as being used was large bore, chosen by the majority, [68.6% (n=35)] followed by the small bore, chosen by 23.5 % (n=12) of the participants while a few, 7.8% (n=4) indicated that they used any tube type available.

#### 4.4.7 Method of Tube Placement Confirmation.

When describing the appropriate method for tube placement confirmation, the majority, [92.2% (n=47)] indicated that they use the bubbling method, very few, 3.9%

(n=2) indicated that they use a PH indicator strip while the remaining 3.9 % (n=2) indicated that they use the auscultation method.

#### **4.4.8. Prevention of Complications**

Items in this category of the Likert scale were intended to determine the frequency of performing certain interventions to prevent complications and communication of care. The response categories were coded a 1 to 4 for Never, Sometimes, Almost always and Always respectively. In order to discuss these in a more meaningful way, the categories Never and Sometimes (1 and 2) were grouped together and were interpreted as poor practice, while Almost always and Always (3 and 4) were also grouped together and were interpreted as good practice: Therefore, when analysing and interpreting the frequency of practices to prevent complications the results as explained below were recorded.

The majority of participants reported good practice in 'Confirming tube placement' with 3.9 % (n=2) of them indicating that this is 'Almost always' done, and 80.4 % (n=41) indicating that this is 'Always done'. Only a few reported poor practice in this aspect with 2 % (n=1) indicating that this is 'Never' done and 13.7 % (n=7) indicating that this is 'Sometimes' done.

The results of 'Flushing the tube' also indicated good practice by a larger proportion with 9.8% (n=5) indicating that this practice is 'Almost always' done, and 74.5% (n=38 ) indicating that this is 'Always' done. A few demonstrated poor practice with 3.9 % (n=2) who indicated that this is 'Never' done, and 11.8 % (n=6) who indicated that this is 'Sometimes' done.

The results of 'Checking gastric residual volume' showed poor practice by the majority as 45.1 % (n=23) indicated that this is 'Never' done, and 19.6 % (n=10) indicated that this is 'Sometimes' done. Only a few demonstrated good practice with 3.9 % (n=2) indicating that this is 'Almost always' done and 31.4 % (n=16) indicating that this is 'Always' done.

Similarly, the results of 'Daily inspection of nostrils' showed that this practice is poorly done by the majority with 19.6 % (n=10) indicating that this practice is 'Never' done, and 35.3 % (n=18) of the participants who indicated that this is 'Sometimes' done. A few demonstrated good practice with 17.6 % (n=9) of the participants responding that this practice is 'Almost always' done, and 27.5 % (n=14) indicating that this is 'Always' done.

#### **4.4.9. Communication of Care**

When analysing the frequency of communication of care the following results were recorded:

Enteral nutrition documentation: The majority reported good practice with 23.5 % (n=12) of the participants agreeing that this is 'Almost always' done, and 47.1 % (n=24) stating that this is 'Always' done. A few respondents reported poor practice where 5.9 % (n=3) indicated that this practice is 'Never' done and 23.5 % (n=12) indicated that this is 'Sometimes' done.

Discussion of nutritional management: The results showed that the majority reported good practice in this area with 13.7 % (n=7) concurring that this is 'Almost always' done and 39.2 % (n=20) indicating that this is 'Always' done. A few respondents

reported poor practice where 9.8 % (n=5) participants mentioned that this is 'Never' done, and 33.3 % (n=17) indicating that this is 'Sometimes' done. (See Table 4.7)

**Table 4.9 Participants' responses about specific tube feeding practices to prevent complications and communicate care**

Statement	Never <i>n (%)</i>	Sometimes <i>n (%)</i>	Almost always <i>n (%)</i>	Always <i>n (%)</i>
Confirms tube placement before delivery of feed	1(2.0)	7(13.7)	2(3.9)	41(80.4)
Flushes tube before and after administration of feed	2(3.9)	6(11.8)	5(9.8)	38(74.5)
Checks gastric residual volume before initiating feed	23(45.1)	10(19.6)	2(3.9)	16(31.4)
Conducts daily inspection of nostrils/mouth	10(19.6)	18(35.3)	9(17.6)	14(27.5)
Documents any nutritional support or complication about the patient	3(5.9)	12(23.5)	12(23.5)	24(47.1)
Discusses nutritional management of patients during ward rounds	7(13.7)	17(33.3)	7(13.7)	20(39.2)

**4.4.10 Patient’s Head Positioning**

The findings show that the majority of the participants, 76.5% (n=39) know that patients are placed in a specific position during tube feeding (Table 4.8). For the participants who agreed, the following results revealed the specified positions as indicated by them.

When describing the position, a higher proportion 33.3% (n=17) indicated that patients are placed in the semi fowler position, while 27.5% (n=14) indicated that patients are placed in an upright/sitting position and 15.7% (n=8) indicated various other positions such as supine, lateral, etc.

**Table 4.10 Participants’ responses on patient’s head position**

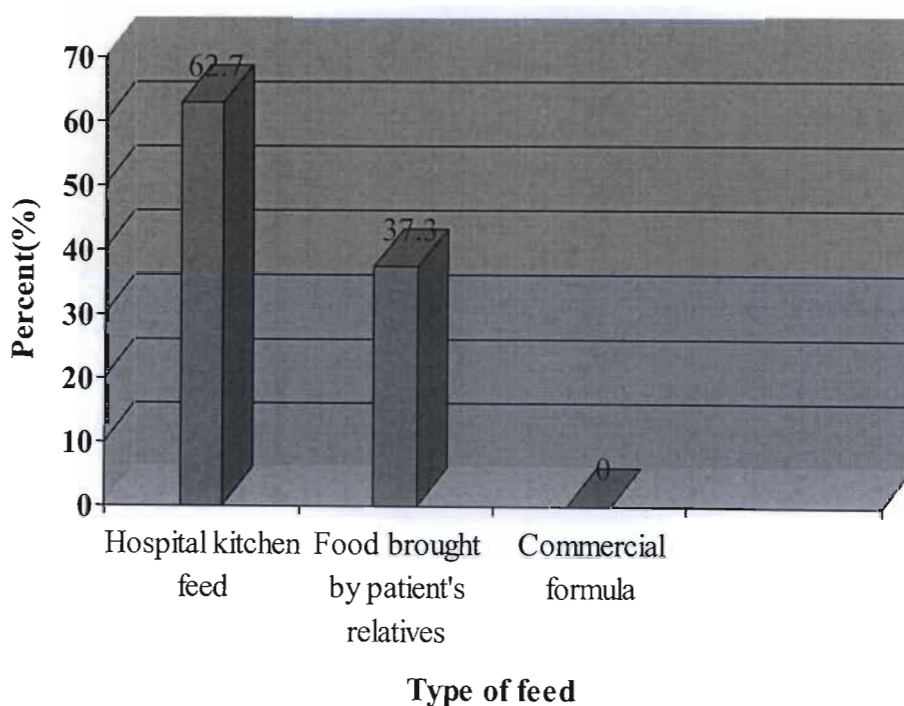
Are patients placed in a specific position during tube feeding?	n (%)
No	12 (23.5%)
Yes	39 (76.5%)
Specified Positions:	
Semi fowlers	17 (33.3)
Upright/sitting	14 (27.5%)
Other	8 (15.7%)

**4.4.11 Feeding Regimen and Type**

The study findings have revealed that the majority of the participants, 80.4% (n=41) rely on the doctor to prescribe the feeding regimen, while 13.7% (n=7) indicated that

they give any amount and rate depending on feeds available, and only 5.9% (n=3) of the participants indicated that they give 20 to 50mls of feed per hour.

The results revealed that the common type of feed given to patients by tube feeding is hospital kitchen feed chosen by a larger proportion of participants, 62.7% (n=31), followed by feed brought in by the patient's relatives, 37.3% (n=19). One participant did not respond to this item. Commercial formula is not used as shown by the results (Figure 4.3).



**Figure 4.3 Feeds normally given to patients on tube feeding**

#### **4.4.12 Documentation Practice**

This section describes findings on nurses' documentation of tube feeding practices which was done through a review of patients' case files. The checklist had two sections. The first focused on patients' relevant characteristics to get an overview of



the type of patients on tube feeding. The other section was on nurses' documented interventions to assess nurses' documented interventions on tube feeding.

### **Patients' identification**

The patients' hospital numbers were used as identification. The review discovered that 41% (n=32) of the case files had an identification number, while many of them, 59.0% (n=46) had no number indicated and this was more common in the ICU charts.

### **Diagnosis and condition on admission to the unit**

The review identified that the majority of the patients' files, 42.4% (n=33) that were on tube feeding displayed a diagnosis of head injury, followed by meningitis identified in 17.9 % (n=14) of the case files, then 5.1 % (n=4) of the patients had eclampsia, while 34.6 % (n=27) had other diagnoses such as cancer of the oesophagus, stroke, epilepsy, etc. Of all these patients, only 3.8 % (n=3) were able to eat on admission to the unit, and 96.2 % (n=75) were not able to eat normally on admission to the unit.

### **Ward/ Unit**

Out of 78 case files reviewed the largest number, [35.9% (n=28)] were from the ICU, followed by 28.2 % (n=22) from the male surgical HDU, and 25.6 % (n=20) were from the medical HDU, while the smallest number of files, 10.3% (n=8) were from the female surgical HDU.

### **Time of feed initiation**

From the review it was identified that tube feeding was initiated within 24 to 48 hours in 51.3% (n=40) of the patients' case files, while in 29.5% (n=23) of the case files it

was initiated after 48 hours, and in 19.2% (n=15) of the files, the time period after which tube feeding was initiated was not indicated, therefore this was difficult to determine.

**Nurses’ documentation of nutrition interventions**

The results show that many of the relevant nursing tube feeding interventions are not documented. Of major concern is the finding that confirmation of tube placement is never (0%) documented. However, at least more than half, 55.1% (n=43) of the case files had documentation of the feeding regimen, and 52.6 % (n=41) of the case files had documentation of the fluid balance record (Table 4.9).

**Table.4.11 Documentation of enteral nutrition nursing interventions**

Nursing intervention	Yes <i>n (%)</i>	No <i>n (%)</i>
Nutritional assessment	23 (29.5)	55 (70.5)
Doctor/Dietician consulted	2 (2.6)	76 (97.4)
Obtaining patient consent	5 (6.4)	73 (93.6)
Confirmation of tube placement	0 (0)	78 (100)
Feeding regimen	43 (55.1)	35 (44.9)
Bowel sound records	15 (19.2)	63 (80.8)
Fluid balance record	41(52.6)	37(47.4)
Measures to prevent complications	12 (15.4)	66 (84.6)

Findings from the last intervention 'Measures to prevent complications' where it was specified that the documented measure be indicated showed that 12.8% (n=10) of the case files had a documented measure of "head elevation" to prevent aspiration, while only 1.3% (n=1) indicated a documented measure of "flushing the tube" to prevent clogging, and 1.3% (n=1) recorded a documented measure of "strapping the tube" to prevent displacement.

#### **4.5. THE ENVIRONMENT OF CARE**

In order to test the hypothesis that environmental factors are likely to affect nurses' practice in tube feeding, the results of guidelines, nutritional committee, sources of knowledge and challenges experienced by nurses were observed and analysed as follows:

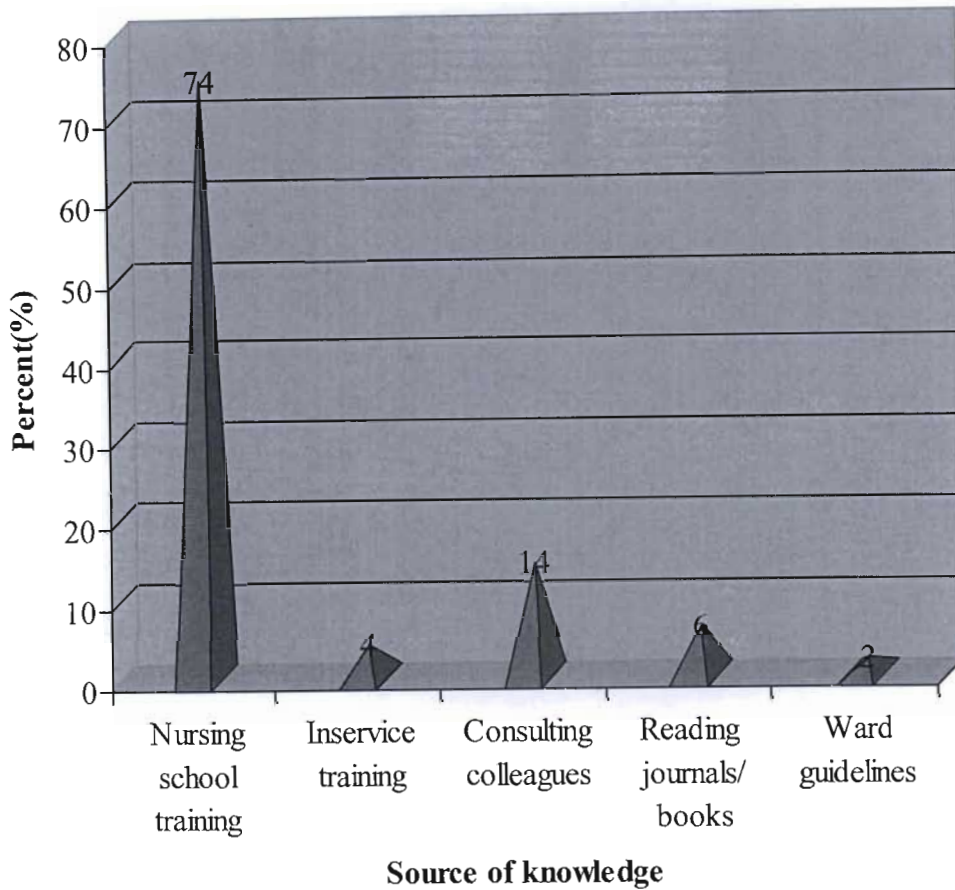
##### **4.5.1. Availability of Guidelines and Nutrition Committee**

When considering nurses' awareness of tube feeding guidelines in the unit, the majority, 76.5% (n=39) stated that there are no guidelines in the units, while 23.5 % (n=12) indicated that there are guidelines. The findings also showed that the majority, 86.3% (n=44) responded that there is no nutrition committee, while 13.7 % (n=7) indicated that there is one, but that no one (0%) is a member of such a committee.

##### **4.5.2 Sources of Knowledge**

The item on nurses' sources of knowledge showed that a higher proportion's main source of knowledge about tube feeding, 74% (n=37) was nursing school training, while 4% (n=2) indicated that their main source was in-service training, and 14% (n=7) indicated that consulting colleagues was their main source of knowledge. Very

few, 6% (n=3) indicated journals/books as a source, and only 2 % (n=1) indicated the use of guidelines as their main source of knowledge (Figure 4.4).



**Figure 4.4 Nurses' main source of knowledge about enteral nutrition (N=50)**

#### **4.5.3. Challenges in Practice Environment**

Participants were asked to explain the challenges facing them. These were open-ended questions and themes resulting from categories of 'challenges' and 'how to improve' were extracted, coded and analysed quantitatively.

Most participants, 68.6% (n=35) indicated that feed/tube shortage was the common challenge, followed by patients'/guardians refusal of tube feeding, 35.3% (n=18). Only 2 % (n=1) mentioned the lack of guidelines as a challenge (Table 4.12).

**Table 4.12 Challenges experienced by nurses during tube feeding management**

Item	n(%)
Feed/tube shortage	35 (68.6%)
Staff shortage	3 (5.9%)
Patients/guardians refusing/ignorance of guardians	18 (35.3%)
Inadequate knowledge of nurses	5 (9.8%)
Difficult monitoring	3 (5.9%)
Patients removing/coughing up tube/vomiting	3 (5.9%)
Cold feed	1(2.0%)
Lack of guidelines	1(2.0%)

#### 4.5.4 Strategies for Improvement

When analysing the item 'how to improve', the majority, 54.9 (n=28) indicated in-service training as a strategy for improvement, 11.8% (n=6) indicated having guidelines/procedure manuals, two sets of 5.9% (n=3) each indicated nutritional assessment and having a nutritional committee as another strategy for improvement, 3.9% (n=2) of the participants indicated having adequate staff as a way of improving

tube feeding practice, while 3.9% (n=2) indicated monitoring the amount and 5 sets of 2% (n=1) indicated that exchange visits, giving handovers, giving the right amount, prescribing feeds and having meetings could help to improve the practice.

#### **4.5.5 The Relationship between Documentation Practice in ICU And HDUs**

In order to explore the relationship between two categorical variables you need two categorical variables with two or more categories (Pallant, 2007). In this study, the researcher explored the relationship (association) between the environment of care (ICU and HDU) with documentation practice and answered the question: Are ICU nurses more likely to perform more documentation than HDU nurses? The Chi-Square Test and Fisher's Exact Test were thus applied as follows:

##### **Nutrition assessment**

The Pearson Chi square  $\chi^2=10.489$ ,  $df=1$ ,  $p=.001$  revealed that the proportion of ICU nutritional assessment documentation is significantly different from the proportion of HDU documentation. Therefore, there is an association between the ward setting and documentation of nutritional assessment. The percentage of nutritional assessment documentation done in the ICU was 7.1 % (n=2) of the recording charts, and the HDU documentation of nutritional assessment was done in 42.0 % (n=21) of the recording charts.

##### **Consultation**

Fisher's Exact Test revealed that the proportion of ICU documentation of consultation is not significantly different from that of the HDU with a  $p$  value of .534. Therefore there is no association between the ward setting and the documentation of

consultations made. The percentage of documentation done was: ICU 0.0% while the HDU was 2 (4.0%) of the recording charts.

### **Consent**

Fisher's Exact Test revealed that the proportion of the ICU documentation of consent is not significantly different from that of the HDU, with a  $p$  value of .649. Therefore, there is no association between the ward setting and documentation of consent. The percentage of documentation done in the ICU was 1(3.6%) and in the HDU, documentation of consent was 4 (8.0%) of the recording charts.

### **Feeding regimen**

The Pearson Chi square  $\chi^2=35.553$ ,  $df=1$ ,  $p=.00$  revealed that the proportion of ICU feeding regimen documentation is significantly different from that of the HDU. Therefore there is an association between the ward setting and documentation of the feeding regimen. The percentage of feeding regimen documentation done in the ICU was 100 % ( $n=28$ ), and the HDU documentation of the feeding regimen was 30.0 % ( $n=15$ ) of the recording charts.

### **Bowel records**

The Pearson Chi square  $\chi^2= 20.802$ ,  $df=$ ,  $p=.000$  revealed that the proportion of ICU bowel record documentation is significantly different to that of the HDU. Therefore, there is an association between the ward setting and documentation of bowel records. The percentage of bowel record documentation done in the ICU was 46.4 % ( $n=13$ ) and the HDU documentation of bowel records was 4.0 % ( $n=2$ ) of the recording charts.

### **Fluid balance record**

The Pearson Chi square  $\chi^2=19.251$ ,  $df=1$ ,  $p<0.001$  revealed that the proportion of ICU fluid balance record documentation is significantly different from the proportion of HDU documentation with a  $p$  value of  $<0.001$ . Therefore, there is an association between the ward setting and the documentation of fluid balance. The percentage of documentation done in the ICU was 24 (85.7%), and the HDU documentation of bowel records was 17 (34.0%) of the recording charts.

### **Measures to prevent complications**

Fisher's Exact Test revealed that the proportion of ICU documented measures to prevent complications is not significantly different from the proportion of HDU documented measures with a  $p$  value of .521 which is higher than the expected  $p$  value .05. Therefore there is no association between the ward setting and the documentation of measures to prevent complications.

## **4.6 CONCLUSION**

Analysis and summary of the results has shown that the majority of participants are females, with many of them being middle-aged. Participants had received general training in tube feeding. There is a variation in their knowledge ranging from the majority having adequate knowledge in many aspects, to a similar majority lacking knowledge in some aspects. Poor practice has also been shown by the majority, especially in checking gastric residual volume, daily inspection of nostrils and in documentation. The results have also revealed some environmental factors such as lack of guidelines, a nutrition committee, and tube/feed shortage, together with patient factors such as refusal of tube feeding which may affect nurses' practice.



Having taken into consideration other socio-demographic factors that were studied; 'age' and 'level of nursing training' was not associated with 'knowledge'. However, the findings have revealed that while there is some association in nurses' documentation of other aspects of care and ward setting, there is none in others. Nurses in the ICU do more documentation of the feeding regimen, bowel records, and fluid balance record than those in the HDU. Nurses in the HDU do more documentation of nutritional assessment than those in the ICU. Documentation of consultation, consent, and documentation of measures to prevent complications have no relationship with the ward setting.

The next chapter contains a discussion of the findings, recommendations strength and limitations of the study.

## **CHAPTER FIVE: DISCUSSION OF FINDINGS.**

### **5.1 INTRODUCTION**

This study pursues one goal: describing nurses' knowledge and practice in tube feeding in the ICU and the three HDUs of the QECH. In this chapter, the major findings will be discussed in relation to the Synergy model of patient care. The discussion will be supported by the literature. Thereafter, the recommendations, the study's strength and limitations emanating from the findings will be outlined.

### **5.2 APPLICATION OF THE SYNERGY MODEL IN THE DISCUSSION**

According to the Synergy model of nursing practice, the characteristics of the patient assist the nurses in recognising how a patient is vulnerable, and this helps in identifying the essential nurse competencies that synergise to result in optimal outcome (Hardin & Hussey, 2003). Likewise, the critically ill patients requiring tube feeding need a nurse who is competent in tube feeding, in an environment with adequate resources, good collaboration, communication and evidence-based guidelines for optimal tube feeding support. In this case, the nurse competencies as identified in the study's findings will be discussed, followed by the environmental findings. A summary of the major findings that will be a focus of the discussion are provided below.

- Almost all of the participants had tube feeding training while at college; however the majority of them had never had in-service training in tube feeding.

- There is variability in their enteral nutrition knowledge. Adequate knowledge has been reported on general enteral nutrition issues such as the importance of tube feeding, the time of feed initiation and some absolute contraindications. Poor knowledge and practice in other aspects such as assessment, measuring GRV, the use of outdated procedure for tube placement confirmation was noted.
- The findings have also revealed poor documentation of tube feeding interventions in general. Documentation of tube placement confirmation is never done, however, documentation of the feeding regimen and fluid balance charting was evident in the majority of case files.
- The findings demonstrated that the environment of care is poor, as evidenced by the majority of participants reporting an absence of guidelines in the unit. The majority also reported nursing college training as their main source of knowledge. A good number of nurses also reported tube/feed shortage, patients/guardians refusing tube feeding as the common challenges experienced.
- There is no association between the demographic variables of 'age' and 'the level of nursing training' and the participants' knowledge.
- There is some association between the documentation of nutrition assessment, the feeding regimen, bowel records, fluid balance charting and the environment of care, and no association in the documentation of consultations, consent, and measures to prevent complications.

### **5.3 NURSE CHARACTERISTICS (COMPETENCY)**

In this section the discussion focuses on the findings relating to nurses' knowledge and skill in tube feeding. These characteristics will answer the two objectives of the study: description of nurses' knowledge in tube feeding, and a description of their practice in tube feeding.

#### **5.3.1. Enteral Nutrition Training**

The findings of the present study confirm that tube feeding training at nursing colleges and universities is obviously provided, since it was reported that almost all, 98.0% (n=50) nurses had received tube feeding as part of their topics offered in their training. This result seems logical, because the curriculum for both levels of nurses has an aspect of nutrition for the patient. This finding is in line with the guideline which stipulates that all nurses involved in tube feeding should receive relevant enteral nutrition training (ASPEN Board of Directors and Clinical Guidelines Task Force, 2002).

#### **5.3.2 General Enteral Nutrition Knowledge**

The findings of this research study revealed that nurses have variable knowledge about enteral nutrition, as it was found that in one aspect the majority would demonstrate knowledge, whereas in the other aspect, a similar majority demonstrated inadequate knowledge. For example, 86.3 % (n=44) indicated that an absence of bowel sounds is an absolute contraindication to tube feeding. Similar findings were identified by Roynette et al. (2008). In their study of 383 European ICUs to assess enteral feeding practices, they found that the presence of bowel sounds was one of the main criteria for initiation of enteral feeding. This contradicts

with current evidence. According to O' Keefe (2009); bowel sounds will not occur in a patient who is not eating, as bowel sounds are an indication of intestinal activity and enteral feeds enable the passage of air and fluid and can therefore be a treatment for absent bowel sounds. The absence of bowel sounds is common in critical illness (Webster & Galley, 2000) and should not be taken as an absolute contraindication to enteral nutrition (Hernandez et al., 2006).

### **5.3.3 Knowledge in Specific Tube feeding Procedures**

The knowledge results also show that almost half of the nurses are not competent enough in assessment of patients' nutritional status, 43.1% (n=22). Similar findings were reported by Persenius, Hall-Lord, Baath, and Larsson (2008) who found that according to the nurses, not all patients were nutritionally assessed, and nurses scored lower regarding nutritional assessment. Fulbrook et al. (2007) in their study to gain an overview of enteral nutrition practices in European ICUs also concluded that there was limited involvement of ICU nurses performing nutritional assessments. Raja et al. (2007) further argue that nurses' time and nutrition assessment knowledge were the main barriers to efficient screening. The author suggested a need for induction programs for new staff and increased feedback to nurses regarding assessment practice.

Likewise, almost half of the nurses, 43.1% (n=22) reported that they are not competent enough in aspirating GRV. These results concur with Persenius et al. (2006) who mentioned that Registered Nurses do not often check gastric residual volume, even though high gastric aspirate is an early marker of upper digestive intolerance.

#### **5.3.4 The Relationship between the Level of Nursing Training and the Level of Knowledge**

The study also shows that there is no association between knowledge and the level of training. Because nurses are all trained in tube feeding during their pre-service education, and this task of tube feeding is equally performed by both cadres; this result seems logical.

#### **5.3.5 Scope of Tube Feeding Practice**

Nurses have a greater role to play in enteral nutritional support. This has been supported by the finding in this study where the majority reported that all aspects of enteral nutrition namely: nutritional assessment (56.9%), insertion of the tube (88.2%) and the tube feeding procedure (82.4%) are within the scope of their practice. However comparing the three aspects; nutritional assessment was reported by a smaller percentage of nurses. These findings contradict with Perry (1997) who found that nurses generally felt that nutritional assessment was primarily the nurses' responsibility.

#### **5.3.6 Choice of Tube Size and Flushing the Tube**

The survey results indicated that the majority of nurses, 68.6% preferred to use a large bore tube indicating that they have knowledge of the appropriate tube size for gastric tube insertion. The literature promotes that for gastric tubes, large bores are recommended for easy gastric aspirations (ASPEN Board of Directors and clinical guidelines Task Force, 2002). The use of small diameter tubes causes clogged tubes and the standard practice of routinely flushing tubes with 15 to 30 mls of water after checking GRV after each intermittent feed is recommended (Keithley & Swanson, 2004). This practice is in line with findings in this study, where that

majority, 84.5% (n=43) reported that they 'Almost always/ Always flush the tube. Similar findings were evident in Roynette et al. (2008) where the maintenance of tube patency was ensured in 76.6% of the ICUs by regular flushes.

### **5.3.7 Bedside Confirmation of Proper Tube Placement**

Nurses may be responsible for verifying the correct feeding tube position upon initiation, prior to intermittent feeding (Metheny, 2009), however use of outdated methods has been reported (Williams & Leslie, 2005). Likewise in this study, although the majority of nurses reported that they confirm tube placement outdated method is used. A larger proportion, 92.2% (n=47) of the nurses reported that they use the bubbling method to confirm proper tube placement, contrary to Persenius et al. (2006) who found that the majority of nurses used auscultation over the epigastric areas to confirm tube placement. Though different; both methods are not based on current evidence, and false positive results have been experienced (Fulbrook et al., 2006; Williams and Leslie, 2005). The guidelines recommend use of more than one method such as the pH aspirate, the colour of the aspirate and auscultation as the best bedside confirmatory, though x-ray remains the gold standard (Williams & Leslie, 2005). However, the authors still establish that they have found no evidence to support alternative methods other than the gold standard. Contrary to this Metheny, Meert and Clouse (2007) claim that bedside tests are used with varying degrees of success. Turgay and Khorshid (2010) further show that repeated radiographic confirmation is not practical, and poses a radiation hazard. Metheny and Meert (2004) still mention bubbling as one of the bedside methods to use. These contradicting observations could be one of the explanations as to why nurses still

use different bedside methods. In the settings under study, x-ray is not used as it is not feasible.

### **5.3.8 Patient's Head Positioning During Tube Feeding**

In both the questionnaire and the case note review, head elevation was common, a finding that is not in accordance with Persenius et al. (2006), who found minimal head elevation by nurses. However, this may not be conclusive, because these authors used a more objective method of data collection which is bedside observation. In this study it was also observed that nurses reported different positions although similar to head elevation, i.e. semi fowlers, upright, sitting; while none mentioned a specific angle. The reason for this could be that in practice at the hospital under study, head angle is estimated. Similar findings were reported by Dillon, Munor and Grap (2002), where 67 nurses participated in an observation study and the findings were that nurses were accurate in estimating bed angles, thus concluding that nurses are able to estimate backrest elevation accurately. All this is in line with current guidelines which mention that unless contraindicated, the head of the bed should be elevated at 30 to 45 degrees during intermittent feeds to minimise aspiration, and where not possible; should be elevated by as much as 15 degrees (ASPEN Board of Directors and clinical guidelines Task Force, 2002).

### **5.3.9 Feeding Regimen and Type of Feed Normally given**

The findings in this study have demonstrated that nurses depend on doctors to prescribe the regimen, 80.4% (n=41). These findings are supported by Jonghe et al. (2001) who asserted that the prescription of nutritional support is a process involving physician knowledge and interest of nutrition. This could be the reason why this study found that the feeding regimen is documented more in the ICU where doctors



and anaesthetists are readily available than in the HDU. Although optimum commencing volume of feed has not been established by research, regimes are still derived from expert opinion (Williams & Leslie, 2005). This is recommendable, as it gives a guide for nurses to communicate the care, and maintain consistency on how much feed to give, unlike when the regimen is not prescribed and documented. There is therefore a need for good cooperation between nurses and doctors when it comes to prescribing the feeding regimen.

The majority of nurses, 62.7 % (n=31) indicated that the most common feed given is the hospital kitchen feed. These are similar findings to those in the Kenyatta hospital where Kobe (2006) found that the majority of nurses (66%) reported that they give a hospital kitchen feed. Contrary to this; in South Africa, Ellmer (2007) found that in the ten Burn Units studied; only commercial products were used. Despite the difference, neither the cheapest nor the most expensive formula is necessarily the best (Howard, 2009). For hospital kitchen feed, ASPEN gives new recommendations that: the formula should be prepared in a clean environment using an aseptic technique by specifically trained personnel (Tanzi, 2009). However this study did not establish how the feed is prepared to ensure patient safety in the hospital under study.

### **5.3.10 Measuring Gastric Residual Volume**

Some nurses, 45.1% (n=23) indicated that they 'Never' check GRV, while others, 19.6% (n=10) indicated that they 'Sometimes' do it which demonstrates poor practice in measuring gastric residual volume. These findings are consistent with Jonghe et al. (2001) who found that gastric residual volumes were not measured by nurses in the ICU.

### **5.3.11 Documentation of Care**

The majority of nurses, 70.6% (n=36) reported that they document their practices. This is good practice, as Powell-Tuck (2007) mentions that nurses should keep a record of their patients' nutrition. However, despite reports of good practice by the majority, this wasn't evident when the case files were reviewed. Many of the tube feeding aspects of care were not documented. These findings are consistent with Persenius et al. (2008) who found that important nutritional parameters were not documented by SRNs. Generally, the low score of documentation is remarkable because the responsibility of documentation lies mainly with the nurses. Findings in the study could be like this because, according to experience, documentation has been a problem in nurses' practice in general. Therefore a number of areas need to be considered when interpreting nurses' documentation as equal to nursing care delivered. Binnekade et al. (2005) also mention that although the recording itself does not improve feeding practice; it might lead to the recognition that the patient is underfed while being fed. Therefore, other ways have to be found to improve practice. It is possible that the problem could lie with the tool being used, or a shortage of time. However, all this aside, professional ethics still maintains that accurate and complete medical records are an obligation, and that undocumented care is a deviation from standards (Miles, 2009).

## **5.4 THE ENVIRONMENT OF CARE**

Discussion in this section focuses on the findings relating to the environment of care that have an impact on nurses' practice in tube feeding. These factors will help to answer the objective: To describe the factors affecting nurses' tube feeding management of patients in SCUs.

#### **5.4.1 In-Service Training**

Delivering excellent nutritional care requires that education and training be offered. Contrary to this, it was found in this study that almost all nurses, 96.1 % (n=49) involved in tube feeding practice have never had in-service training in this area. This contradicts the guidelines which mention that all health care professionals involved in this care should be oriented in this practice (ASPEN Board of Directors and Clinical Guidelines task Force, 2002).

#### **5.4.2 Main Source of Knowledge**

The nurses' main source of knowledge about enteral nutrition was their nursing school training as reported by 72.5% (n=37) of nurses; while in-service training, consulting colleagues, reading journals and using guidelines contributed to a small extent. Findings of this study contradict with Persenius et al. (2006), who found that the ICU nurses' primary source of knowledge was consulting colleagues. This might pose a problem, as Adams and Mc Carthy (2005) argue that current nursing school practice is often based on tradition, trial and error, and books. It may imply that most issues taught are not evidence-based which confirms an underutilisation of research findings.

Barriers for research utilisation could be that the nurse is isolated from knowledgeable colleagues with whom to discuss issues, journals are not readily available, or facilities are not adequate for implementation (Bostrom, Kajermo, Nordstrom, & Wallin, 2008; Persenius et al., 2006). This indicates that there is a barrier for research utilisation as evidence from research is disseminated through

journals, unit guidelines, and in-service training which, according to the findings; is uncommon in the setting under study. However, encouraging results were identified by Squires, Moralejo and LeFort (2007) who found that nurses ranked procedure manuals as their number one source of practice knowledge.

### **5.4.3 Availability of Guidelines**

Policies and procedures are one possible strategy for moving research evidence into practice among nursing staff (Squires et al., 2007). In the same way, there is a need for a standardised method to improve the delivery of enteral nutrition (Bourgault et al., 2007) as an absence of guidelines may affect one's practice. Nurses value the use of scientific evidence to guide practice (Cullen & Title, 2004). Contrary to these statements, it was found in this study that the majority of nurses, 76.5% (n=39) are aware of the absence of guidelines on tube feeding in their units. This finding is inconsistent with the two studies. Persenius et al. (2006) found that the majority of nurses reported the presence of written guidelines about enteral nutrition. Concurrently, Fulbrook et al. (2007) reported that three-quarters of the respondents to the questionnaire replied that they used clinical protocols or guidelines for enteral feeding. However, the presence of guidelines is no guarantee of guideline utilisation (Persenius et al., 2006; Squires et al., 2007). Consequently, Squires et al. (2007) assert that guidelines are unlikely to change practice without an active implementation strategy, and that organisational factors also play key roles. One strategy is that practice has to be reviewed constantly (Howard, 2009). Therefore, apart from the guidelines, other environmental issues have to be considered.

#### **5.4.4 Nutrition Teams/committee**

A multiprofessional nutrition support team is required for artificial nutrition (Powell-Tuck, 2007). Contrary to this statement, it was also noted from this study that a large number of nurses, 86.3% (n=44) reported the absence of a nutritional team at the hospital. These findings are consistent with Fulbrook et al. (2007) who, in their study reported that only 36.1% of respondents indicated that their ICU was supported by a nutrition support team. The authors further contend that the involvement of ICU nurses in nutrition support teams has not been described in the literature.

The findings show further that discussion about nutritional issues is somehow poorly done where almost half of the nurses, 47% (n=24) demonstrated poor practice, findings that also correlated with case note review which showed no documentation of consultation in 97.4 % (n=76) of case files. This is inconsistent with recommended practice. Korner et al. (2006) state that experienced and properly organised groups working to agreed protocols have fewer nutritional complications. Most importantly, a dietician should be involved in the selection of formula (Ireton-Jones, 2006). Since it was reported by the majority, 67.2% (n=32) that the feed they normally give comes from the hospital kitchen where the dietician works; this might reflect some collaboration between the nurse and the dietician. Therefore these findings may not be conclusive. It is important to learn how the nurse, doctor and dietician collaborate to identify the appropriate feed.

Although only the minority, 5.9% (n=3) suggested having a nutrition committee and only 2.0% (n=1) recommended having meetings to improve care; a nutrition support team helps in consultations about nutrition-related management issues and helps to improve practice. Similarly, Heyland et al. (2003) in their study, statistical analysis of

the factors associated with optimal provision of nutrition support, found that the presence of a dietician assigned to the ICU was associated with better nutrition support. However, Behara et al. (2009) in nutrition survey of physicians; found that despite having a nutrition committee; the physicians had only an average level of comfort with the availability of the nutrition support team.

#### **5.4.6 Relationship between nurses' documentation in ICU and HDUs**

The results of the association between the ward setting and the documentation of nutritional assessment, the feeding regimen and fluid balance recording shows the importance of the environment of care in relation to the documentation of these aspects of care. A lot of files from the HDU 42% (n=21) reflecting documentation of assessment show that the nurses in the HDU work more in the area of assessment than the ICU nurses, while many of the files reflecting the documentation of the feeding regimen 100% (n=28) and fluid balance recording 85.7%(n=24) in the ICU show that the ICU nurses work more in the area of the feeding regimen and fluid balance recording. However, it should be noted that the ICU nurses are well supported by doctors regarding the aspect of the feeding regimen. The different documentation tools used by the two settings may also contribute to the differences.

#### **5.4.7 Challenges in the Practice Environment**

There are many major contributing factors to unintentional underfeeding such as staffing shortages and unavailability of feeds (Marshall & West, 2004). Findings in this study also show the same. The majority of nurses, 68.6% (n=35) reported feed/tube shortage as a major challenge experienced during tube feeding practices. However, it was surprising to note that only 5.9 % (n=3) mentioned staff shortages

as a challenge, yet it has always been the talk that standards are dropping at the hospitals due to the staff shortages. Possibly the locum practice may be assisting in improving staff numbers per shift. It was also evident from the findings, that patient/family members refusals of tube feeding was the second most common represented challenge faced by 35.3% (n=18) of the nurses. This might be related to a lack of adequate information given to them. In a study to determine patients' relative perceptions about information they received to make decision about tube feeding of their sick relatives, and to determine who they would have preferred to help in their decision; Lewis et al. (2006) found that relatives preferred greater physician participation and reported that their informational needs were not met completely. This means that the relatives' acceptance of tube feeding may be improved if physicians become involved, and adequate information is supplied. Casarett et al. (2005) concur, stating that all clinicians need to be better able to engage patients and families in meaningful discussions relating to artificial nutrition. However, it is not known in the setting under study to what extent doctors are involved and what information is given to patients/family members to enable them to decide about consenting to tube feeding. A study in this area could help to identify the problems.

The third core concept; Patient characteristics, is not the focus of the study therefore it has not been discussed.

## **5.5 RECOMMENDATIONS**

There is a need for adequate knowledge, skill and a healthy practice environment in this study population. Therefore, recommendations for policy-makers, nursing

practice, education and research have been outlined by drawing from the evidence indicated by the results.

### **5.5.1 Recommendation to Policy-Makers**

The prevalence of critically ill adult patients requiring tube feeding in this study (78 eligible case files) shows that this practice is common. Therefore, it is recommended that the Nurses and Midwives Council of Malawi emphasise the integration of evidence-based guidelines on enteral nutrition into existing tube feeding training and practice.

### **5.5.2 Recommendation for Nursing Practice**

The study has demonstrated a discordant pattern of knowledge. Nurses need to be re-educated regarding certain specific aspects. It is recommended that the hospital nursing management take a leading role in developing guidelines, and have a policy in place for in-service training to orient nurses in this practice. Nursing practice should also focus on educating the patients/guardians about tube feeding so as to improve informed consent which will help with compliance in respect of this care.

There is a need to improve practice, especially in teamwork and documentation where nurses need adequate support. Good documentation of tube feeding is important, because it helps the nurses to communicate and give individualised care such that there is consistency in feeding the patient and any problems are communicated in time.



Because there is no association between the level of nursing training and knowledge, positive role models for both cadres of nurses are needed to supervise, guide and encourage the nurses when managing patients on tube feeding .

The hospital should establish nutrition committees for collaboration of care and to ensure that the patient receives the right formula. The nursing management should also support nurses by providing adequate and appropriate resources like feeding tubes.

### **5.5.3 Recommendation for Education**

Tube feeding is taught at all levels of nursing training according to the participants studied. However, its content has to be revised to ensure that it is based on current evidence, and it should be the educational institutional policy to revise the content frequently. The scope should also be clear, so that nurses upon graduation, know their boundaries, as some have shown that nutritional assessment is not within the scope of their practice.

### **5.5.4 Recommendation for further Research**

To the researcher's knowledge this study is the first to be done in the country and serves as a baseline study. Further research to include more settings would be valuable. There are gaps identified for further research to strengthen findings. For example; there is a need to assess the kitchen feed preparation process and how much is given, how the nurses, doctors and dieticians work towards enteral nutrition support. There is also a need to investigate the perceptions or experiences of patients/guardians on tube feeding, as it was reported that a good number of patients/guardians refuse tube feeding. There is also a need for research on the

different documentation tools used by the nurses in the settings under study. It should be the hospital policy to establish research on patient nutrition.

## **5.6. STRENGTHS AND LIMITATIONS OF THE STUDY**

### **5.6.1 Fieldwork**

Despite targeting the whole population (55) not all nurses were available. However, all the questionnaires (51) distributed were returned, giving a response rate of 100% which is acceptable. This might be because the researcher personally approached the participants and this facilitated the response (Polit & Beck, 2006).

This was a local study, as the participants were from one hospital only, therefore the findings may not be generalised to other referral hospitals. However, all participants involved in the tube feeding practice were invited to participate with a good response rate but perhaps including the other two regional referral hospitals might have been desirable. Therefore, the study provides new information on the nature of nurses' tube feeding knowledge and practices which may be of interest to other critical care settings.

### **5.6.2 Methodological**

The study is a good example of mixed method data collection (questionnaire and case note review). It is typically descriptive, because the goal was to identify existing practice in order to target areas of change, and as an initial study which will be used as a basis for introducing evidence-based practice in tube feeding. Furthermore, to this researcher's knowledge, this study is unique in that no other research has

explored tube feeding practices in an HDU setting. Incorporating both cadres of nursing levels also makes it distinct.

The fact that self-administered questionnaire data was not collected by interviewers made it a relatively more cost effective way of collecting large amounts of data compared to the cost of hiring interviewers (Polit & Beck, 2006). Therefore the study design was feasible, as the researcher could afford to do it without employing any research assistant to help with the actual data collection.

However, a limitation of the questionnaire is that the participants in the self-administered questionnaire could provide responses based on what they believed the researcher wanted to know, rather than data reflecting the true state of the practice (Marshall, 2008). For example, they might have responded well regarding their knowledge of enteral nutrition due to their educational backgrounds, but this might not have been reflected in their practice as has been revealed. Most recent studies have attempted to overcome the bias of self-reporting by using two methods of data collection (Persenius et al., 2006). This is why the researcher used two methods of data collection in order to overcome this bias, thus some practice information relating to the study was objectively assessed using the case note review.

Similarly, interpretation of the questionnaire responses could not be conclusive, as indicators of nurses' actions and documentation as evidence of nursing activities (Perry, 1997) because what actually happens in practice might not be a reflection of the questionnaire response or the observed documented activities. Bedside

observation of tube feeding practice would be the most objective method, but this was not feasible for the researcher due to time and money constraints.

It is also very important to mention that the nurses who responded to the questionnaire might not be the very same nurses involved in the documentation because of the high turnover rate of nurses' experienced at the hospital. Therefore, correlation of the two might not be conclusive; hence the potential limitation of the evidence should be kept in mind. However, the researcher tried to review the most recent case notes to ensure that it could be correlated with responses from the questionnaire.

The case note review did not account for the actual documented feed given (type and amount) as this was also beyond the scope of the study. Therefore further research in this area is needed, as there are reports of discrepancy between prescribed and delivered feed (ASPEN Board of Directors task force, 2002).

The data produced by survey research are likely to lack details or depth on the topic being investigated (Kelly, et al., 2003). The same is the case with this study. All details about enteral nutrition in relation to knowledge and practice have not been captured in the questionnaire and the review of case files. However, important basic information was obtained which has given a picture of the current *status quo* in the practice of tube feeding, and may prompt further areas of study.

## **5.7 CONCLUSION**

The aim of the study was to describe nurses' knowledge and practice about tube feeding in an adult SCU of the QECH. From the findings it emerged that socio-demographic characteristics such as age and level of nursing training is not

associated with the nurses' knowledge. Nurses have demonstrated variances in knowledge. Some tube feeding practices are poorly done and are not evidence-based. Some factors in the environment have been identified which may affect their practice. The findings therefore underscore the importance of adequate knowledge and a health practice environment for optimal provision of tube feeding. Focusing on the three core concepts of the Synergy model; the findings show that Synergy is less optimal. There is a mismatch between the nurse characteristics, patient characteristics and the environment in which tube feeding practice is taking place which may lead to a poor outcome in enteral nutrition support.

## REFERENCES

- Adams, S., & Mc Carthy, A. M. (2005). Evidence based practice and school nursing. *The Journal of School Nursing*, 21 (5), 258-265. doi: 101177/10598405050210050301.
- Artinian, V., Hicham, K., & Bruno, D. (2006). Effects of early enteral feeding on the outcome of critically ill mechanically ventilated medical patients. *Chest*, 129(4), 960- 967. Retrieved March 3, 2009, from mhtml:file:///f:\effects of early enteral nutrition.mht.
- ASPEN Board of Directors and Clinical Guidelines Task Force (2002). Guidelines for the use of Parenteral and Enteral Nutrition in Adult and Pediatric patients. *International Journal of Nutrition and Metabolic Support*, 26(1), 1-150.
- Behara, A. S., Peterson, S. J., Chen, Y., Butsch, J., Lateef, O., & Komanduri, S. (2008). Nutrition support in the critically ill. A physician survey. *Journal of Parenteral and Enteral Nutrition*, 32(2), 113-119. Retrieved March 9, 2009, from <http://pen.sagepub.com>.
- Binnekade, J. M., Tepask, R., Bruynzeel, P., Mathus-Vliegen, E. M. H., Haan, R. J. et al. (2005). Daily enteral feeding practice in the ICU: Attainment of Goals and interfering factors. *Critical Care*, 9(3), 218-225. Retrieved September 19, 2010, from <http://ccforum.com/content/9/3/R218>.
- Ostrom, A. M., Kajermo, K. N., Nordstrom, G., & Wallin, L. (2008). Barriers to research utilization and research use among registered nurses working in the care of older people: Does the Barriers scale discriminate between research users and non research users on perceptions of barriers? *Implementation Science*, 3(24).doi:10:1186/1748-5908-3-24.

Bourgault, A., Ipe, L., Weaver, J., Swartz, S., & O'Dea, P. J. (2007). Development of evidence based guidelines and critical care nurses knowledge of enteral feeding. *Critical care Nurse*, 27 (4), 17-29. Retrieved March 10, 2009, from <http://ccn.aacjournals.org/cgi/content/full/27/4/17>.

Brewer, B. B., Wojner-Alexandrov, A. W., Triola, N., Pacini, C., Cline, M., Rust, J. E. et al. (2007). AACN Synergy model's characteristics of patients: Psychometric analyses in a tertiary health care system. (Challenges in critical care). *American Journal of Critical Care*, 16, 158-167. Retrieved May 13, 2009, from <http://www.accessmylibrary.com/coms2/summary-0286-29954077-ITM>.

Burns, N. & Grove, S.K. (6<sup>th</sup> ed.). (2009). *The Practice of Nursing Research: Conduct, Critique and Utilization*. Philadelphia: Saunders Elsevier.

Cabodevila, E.M. (2008). Evaluation of delivery of enteral nutrition in critically ill patients receiving mechanical ventilation. *American Journal of Critical Care*, 17, 53-61.

Canadian Nurses Association (2010). *Canadian Registered Nurses Examination Competencies*. Retrieved July 30, 2010, from [www.cna-nurses.ca/CNA/nursing/rnexam/.../default\\_e.aspx](http://www.cna-nurses.ca/CNA/nursing/rnexam/.../default_e.aspx).

Casarett, D., Kapo, J., & Caplan, A. (2005). Appropriate use of artificial nutrition and hydration - Fundamental principles and recommendations. *The New England Journal of Medicine*, 353 (24), 2607-2611. Retrieved February 2, 2010, from [www.nejm.org](http://www.nejm.org).

Collins English Dictionary (6<sup>th</sup> ed.). (2003). Harper Collins Publishers: Collins UK.

Cullen, L. & Title, M. G. (2004). Promoting evidence based practice: An internship for staff nurses. *Worldviews on Evidence Based Nursing*, 4, 215-223.

Curley, M. (2004). Excellence in nursing knowledge. *Nursing Knowledge International*. Sigma Theta Tau Honor Society of Nursing. Retrieved from <http://www.nursingknowledge.org/portal/main.aspx?pageid=3507andcontent10=56511>.

David, M., & Sutton, C. D. (2004). *Social Research. The Basics*: Sage Publications: London. Retrieved August 9, 2010, from [co.za/books](http://co.za/books).

Demian, S. T., Halawa, N. N., Nisar, B., & Ahmad, J. (2007). Nurses' driven enteral feeding protocol improves caloric intake in critically ill patients, *Chest*, 132(4). Retrieved March 26, 2009, from <http://meeting.chestjournal.org/cgi/content/132/4/442c>.

Dillon, A., Munor, C. L. & Grap, M. J. (2002). Nurses' accuracy in estimating backrest elevation. *American Journal of Critical Care*, 11, 34-37. Retrieved September 11, 2010, from [linkinghub.elsevier.com/retrieve/pii/S0964339703000284](http://linkinghub.elsevier.com/retrieve/pii/S0964339703000284) –.

Doing, G. S. & Simpson, F. (2006). Early enteral nutrition in the critically ill: Do we need more evidence or better evidence? *Current Opinion Critical Care*, 12(2), 126-130. Retrieved from Pubmed [www.pubmed.gov](http://www.pubmed.gov).

Ellmer, M. (2007). *The nutritional management of adult burn wound patients in South Africa*. (Master's dissertation, Stellenbosch University 2007). Stellenbosch, South Africa.



- Ferrell, K. G. (2007). Documentation, part 2: The best evidence of care. *American Journal of Nursing*, 107 (7), 61-64. Retrieved October 2, 2010, from <http://www.nursingcenter.com>.
- Fulbrook, P., Bongers, A. & Albarran, J. W. (2007). A European survey of enteral nutrition practices and procedures in adult intensive care units. *Journal of Clinical Nursing*, 16(11), 2132-41.
- Hanson, D. (2004). Nutrition in critical care. *Critical Care Nursing Clinics of North America*, 16(4), xv-xvi. Retrieved July 22, 2009, from <http://www.ccnursing.theclinics.com/article.PIIS0899588504000723/fulltext>.
- Hardin, S. & Hussey, L. (2003). AACN Synergy model for patient care. Case study of a CHF patient. *Critical Care Nurse*, 23(1), 73-76. Retrieved April 23, 2009, from [ccn.aacnjournals.org](http://ccn.aacnjournals.org).
- Hardin, S. & Kaplow, R. (2005). *Synergy for Clinical Excellence*. Jones & Bartlett publishers, Canada..
- Hernandez, J. A., Torres, P. N., & Jimenez, A. M. (2006). Clinical use of enteral nutrition. *Nutrition Hospitalaria*, 21 (2), 85-97.
- Heyland, D. K., Schroter-Noppe, D., Drover, J.W., Jain, M., Keefe, L., Dhaliwal, R. et al.(2003). Nutrition support in the critical care setting: Current practice in Canadian ICUs-Opportunities for Improvement? *Journal of Parenteral and Enteral Nutrition*, 27(1), 73-83. doi: 10.1177/014860710302700174.

Heyland, D. K., Cook, D. J., Scoentfield, P. S. (2001). The effect of acidified enteral feeding on gastric colonization in the critically ill patient: Results of a multicenter randomized trial. *Critical Care Medicine*, 29, 1955-61.

Hong, L. K. (2005). Analysis of open ended questions with word processor. *Journal of Qualitative Sociology*, 7 (1-2).

Howard, P. (2009). Managing the patient's journey through nutritional care. *AWMF Online*. Bristol, UK. Retrieved September 7, 2010, from <mhtml:file:///E:\AWMF online-Enteral Nutrition>.

Hunt, G., Smith, A. & Sutcliffe, A. (2004). Insertion, Management and Care of Nasogastric Tubes. *South Tees Hospitals NHS*. Document No: GC27.

Ireton-Jones, C. S. (2006). Tools for living better on home IV and tube feeding. *Home Enteral Nutrition*. Oley foundation. Retrieved February 7, 2010, from <http://www.oley.org/lifeline/henND/html>. on February 7, 2010.

Jonghe, B. D., Appere-De-Vechi, C., Fournier, M., Tran, B. Merrer, J., Melchior, J., et al. (2001). A prospective survey of nutritional support practices in intensive care unit patients: What is prescribed? What is delivered? *Critical Care Medicine*, 29 (1), 8-12. Retrieved June 24, 2010, from [journals.lww.com/ccmjournal/.../2001/.../Enteral\\_tube\\_feeding\\_in\\_the\\_intensive\\_care\\_unit\\_2.aspx](http://journals.lww.com/ccmjournal/.../2001/.../Enteral_tube_feeding_in_the_intensive_care_unit_2.aspx).

Kaplan, L. (2009 ed.). (2009). *Professional Caring and Ethical Practice using the Synergy model*. Kaplan CCRN. Retrieved from [Books.google.co.za/books?isbn=1427797722](http://Books.google.co.za/books?isbn=1427797722).

Kaplow, R. & Reed, D. (2008). AACN Synergy Model for Patient Care: Nursing Model as a force of Magnetism: The synergy model as a professional model of care. *Medscape Today*. Retrieved April 4, 2009, from <http://www.medscape.com/viewarticle/1572309-4>.

Keithly, J. K. & Swanson, B. (2004). Enteral nutrition: An update on practice recommendations. *Medsurg Nursing*. Retrieved February, 2, 2010, from <http://findarticles.com/p/articles/mi-m0FSS/is>.

Kelley, K., Clark, B., Brown, V. & Sitzia, B. (2003). Good practice in the conduct and reporting of survey research. *International Journal for Quality in Health Care*, 15 (3), 261-266. Retrieved February 10, 2010, from <http://intqhc.oxfordjournals.org/cgi/content/full/15/3/261>.

Kenny, D. J. & Goodman, P. (2010). Care of the patient with enteral tube feeding: Evidence-based practice protocol. *Nursing Research*, 59 (1S), S22- S31.

Kobe, J. (2006). *Aspects of nutritional knowledge, attitudes and practice of nurses working in the surgical division at the Kenyatta national hospital, Kenya*. (Master's dissertation, Stellenbosch University 2006) Stellenbosch, South Africa. Retrieved March 2, 2009, from [scholar.sun.ac.za/bitstream/handle/10019.1/1514/Kobej.pdf?sequence=1](http://scholar.sun.ac.za/bitstream/handle/10019.1/1514/Kobej.pdf?sequence=1).

Korner, U., Bondolfi, A., Buhler, E., MacFie, J., Meguid, M. M., Messing, B. et al. (2006). Ethical and legal aspects of enteral nutrition. *Clinical Nutrition*, 25, 196-202. doi:10.1016/j.clnu.2006.01.024.

- Lewis, C. L., Hanson, L. C., Golin, C., Garrett, J. M., Cox, C. E., Jackman, A. et al. (2006). Surrogates' perceptions about feeding tube placement decisions. *Patient Education and Counseling*, 61, 246-252. Retrieved August 5, 2010, from [www.elsevier.com/locate/pateducou](http://www.elsevier.com/locate/pateducou) .
- Lilford, R.J., Edwards, A., Girling, A., Tanna, G.L.D., Nicholl, J., Hofer, T. et al. (2007). Inter-rater reliability of case note audit: A systemic review. *Journal of Health Services Research Policy*, 12(3), 173-180. Retrieved August 7, 2010, from [www.haps.bham.ac.uk](http://www.haps.bham.ac.uk) > . > PSRP.
- Lopez, L. (2009). *Importance of Nutrition*. Retrieved December 3, 2009, from <http://ezinearticles.com/?importance-of-nutrition&id=3158742>.
- Marshall, A. (2008). Information use in clinical practice: A case study of critical care nurses' enteral feeding decisions. (Doctoral dissertation, The University of Sydney 2008), Sydney, Australia.
- Marshall, A. & West, S. (2005). Enteral feeding in the critically ill: Are nursing practices contributing to hypocaloric feeding? *Intensive and Critical Care Nursing*, 22 (2), 95-105.
- Marshall, A. & West, S. (2004). Nutritional intake in the critically ill: Improving practice through research. *Australian Critical Care*, 17(1), 6-15.
- Metheny, N. A. (2009). Verification of feeding tube placement. *AACN Practice Alert*. Retrieved September 16, 2010, from [www.aacn.org](http://www.aacn.org).

- Metheny, N. A. (2006). Preventing respiratory complications of tube feeding: Evidence-based practice. *American journal of Critical Care*, 15,360-369. Retrieved September 29, 2010, from <http://www.ajconline.org>.
- Metheny, N. A., Meert, K. L. & Clouse, R. E. (2007). Complications related to feeding tube placement. *Curr Opin Gastroenterol*, 23(2), 178-182. doi: 10.1097/MOG.0b013e3280287a0f.
- Metheny, N. A., & Meert, K. L. (2004). Monitoring feeding tube placement. *Nutrition in Clinical Practice*, 19(5), 487-494. doi I: 10.1177/0115426504019005487.
- Miles, L. (2009). Tampering in the medical record. *LDHP Medical Review Services: Newsletter articles*. Retrieved July 20, 2010, from <///E:/protocol%documetnation.htm>.
- Ministry of Health and Population. (2003). *Human resources for the health sector strategic plan 2003 to 2013*. Zomba: Government printers.
- Mowe, M., Bosaeus, I., Rasmussen, H.H., Kondrup, J., Unosson, M., & Irtun, O. (2006). Nutritional routines and attitudes among doctors and nurses in Scandinavia: A questionnaire based survey. *Clinical Nutrition*, 25, 524-532. Retrieved September 17, 2010, from <http://intl.elsevierhealth.com/journals/clnu> .
- National Collaborating Centre for Acute Care. (2006). Nutrition support for adults oral nutrition support, enteral tube feeding and parenteral nutrition: Method, evidence and guidelines. *Royal College of Surgeons*. Retrieved August 21, 2010, from [www.rcseng.ac.uk/publications/docs/nutrition support html/.pdf](http://www.rcseng.ac.uk/publications/docs/nutrition%20support%20html/.pdf)file.

- Nightingale, J. (2010). Nutritional support teams: How they work, are setup and maintained. *Frontline Gastroenterology*. doi:10.1136/fg.2009.000224.
- Nurses and Midwives Council of Malawi. (1995). Nurses and Midwives Act. Zomba: Government Printers.
- O'Keefe, S. J. D. (2009). A guide to enteral access procedures and enteral nutrition. *Nature and Reviews.Gastrology and Hepatology*, 6, 207-215. doi:10.1058/nrgastro.2009.20.
- O'Meara, D., Mireles-Cabodevila, E., Frame, F. Hummell, C., Hammel, J., Raed, A. et al. (2008). Evaluation of delivery of enteral nutrition in critically ill patients receiving mechanical ventilation. *American Journal of Critical Care*, 117 (1), 53-61. Retrieved October 6, 2009, from <http://www.ajconline.org>.
- Orrevall, Y., Shelman, C. & Herrington, M. (2004). The path from oral nutrition to home parenteral nutrition: A qualitative interview study of the experience of advanced cancer patients and their families. *Clinical Nutrition*, 23 (6), 1280-1287.
- Pallant, J. (3<sup>rd</sup> ed.). (2007). *SPSS Survival Manual*. Australia: The McGraw-Hill Companies.
- Perry, L. (1997). Nutrition: A hard nut to crack: An exploration on the knowledge, attitudes, and activities of qualified nurses in relation to nutritional nursing care. *Journal of Clinical Nursing*, 6, 315-324, Retrieved December 7, 2009. from [www.interscience.wiley.com/journal/119176258/articletext?](http://www.interscience.wiley.com/journal/119176258/articletext?)
- Perry, L. & McLaren, S. (2003). Nutritional support in acute stroke: The impact of evidence-based guidelines. *Clinical Nutrition*, 22(3), 283-293. doi:10.1016/s026-5614(02)00213-3.

- Persenius, M., W. (2008). *Nutritional nursing care. Nurses' interactions with the patient, the team and the organization*. (Dissertation, Faculty of Social and Life Sciences, Karlstad University, Karlstad). Retrieved July 22, 2010, from [www.kau.se](http://www.kau.se).
- Persenius, M. W., Larsson, B.W. & Hall-Lord, M. L. (2009). To have and to hold nutritional control: Balancing between individual and routine care. A grounded theory study. *Intensive and Critical Care Nursing*, 25, 155-162. doi:10.1016/j.iccn.2009.03.002.
- Persenius, M. W., Larsson, B. W. & Hall-Lord, M.L. (2006). Enteral nutrition in intensive care: Nurses' perceptions and bedside observations. *Intensive and Critical Care*, 22(2), 82-94. Retrieved March 3, 2009, from [mhmtl:file://E:\ScienceDirect-Intensive and critical care Nursing Enteral nutrition](http://mhmtl:file://E:\ScienceDirect-Intensive and critical care Nursing Enteral nutrition).
- Persenius, M.W., Hall-Lord, M., Baath, C. & Larsson, B. W. (2008). Assessment and documentation of patients' nutritional status: Perceptions of registered nurses and their chief nurses. *Journal of Clinical Nursing*, 17, 2125-2136. doi:10.1111/j.1365-2702.2007.02202.x.
- Phelan, D. (2010). Nutrition Update. *European Society of Intensive Care Medicine*, p1-62. Retrieved October 4, 2010, from [pact.esicm.org/media/Nutrition%2011 updated %20 April %202010.pdf](http://pact.esicm.org/media/Nutrition%2011%20updated%20April%202010.pdf).
- Polit, D. F. & Beck, C. T. (6<sup>th</sup> ed.). (2006). *Essential of Nursing Research: Methods, Appraisal, and Utilization*. Lippincott Williams & Wilkins: Philadelphia.
- Polit, D. F. & Beck, C.T. (7<sup>th</sup> ed.). (2004). *Nursing Research. Principles and Methods*. Lippincott Williams & Wilkins: Philadelphia.

- Powell-Tuck, J. (2007). Organization of food and nutritional support in hospitals. *BAPEN Advancing Clinical Nutrition*. Publication of British Association for Parenteral and Enteral Nutrition: Barts and the London.
- Progressive Care Fact Sheet (2007). *American Association of Critical Care Nurses*. Retrieved April 25, 2009, from [www.aacn.org.WD/practice/content/progressivecarefactsheet.content?menu=practice](http://www.aacn.org.WD/practice/content/progressivecarefactsheet.content?menu=practice). April .
- Raja, R. Gibson, S., Turner, A., Winderlich, J., Porter, J., Cant, R. et al. (2007). Nurses' view and practices regarding use of validated nutrition screening tools. *Australian Journal of Advanced Nursing*, 26(1), 26-33. Retrieved September 1, 2010, from [www.ajan.com.au/vol26-iv2-Raja](http://www.ajan.com.au/vol26-iv2-Raja) .
- Reid, C. L. & Campbell, I. T. (2004). Nutritional and metabolic support in trauma, sepsis and critical illness. *Current Anaesthesia and Critical Care*, 15(4-5), 336-349. doi:10.1016/j.cacc.2004.06.005.
- Resnick, B. (2006) Outcomes Research: You do have the time! *Journal of the American Academy of Nurse Practitioners*, 18,505-509. doi:10.1111/j.1745-7599.2006.00/12.x.
- Roberts, S. R., Kennerly, D. A., Keanne, D., & George, C. (2003). Nutritional support in the intensive care. *The Journal for High Acuity, Progressive and Critical care*, 23, 49-57. Retrieved July 15, 2010, from [ccn.aacnjournals.org](http://ccn.aacnjournals.org).
- Roynette, C. E., Bongers, A., Fulbrook, P., Albarran, J. W., & Hofman, Z. (2008). Enteral feeding practices in European ICUs: A survey from the European federation of



critical care nursing associations. *The European Journal of Clinical Nutrition and Metabolism*, 3, e33-39. doi:10.1016/j.eclnm.2007.10.004.

Seres, D. (2010). Overview of nutritional support in critically ill patients. *Up To Date for Patients*. Retrieved February 7, 2010, from [www.utdol.com/patients.content/topic.do?topic key](http://www.utdol.com/patients.content/topic.do?topic key).

Squires, J. E., Moralejo, D., & LeFort, S. M. (2007). Exploring the role of organizational policies and procedures in promoting research utilization in registered nurses. *Implementation Science*, 2(17), 1-11. doi: 10.1186/1748-5908-2-17.

Stanton, C. (2008). Making your workplace healthy. *AORN Journal*. Retrieved December 22, 2009, from [www.aorn.org/News/september2008 News/healthy work/](http://www.aorn.org/News/september2008 News/healthy work/) .

Stroud, M., Duncan, H. & Nightingale, J. (2003). Guidelines for enteral feeding in adult hospital patients. *Gut*, 52(vii), vii1-vii12. Retrieved May 18, 2010, from [www.gutjnl.com](http://www.gutjnl.com).

Tan, J., & Mathew, N.G. (2008). Enteral nutrition. *Nutrition Updates*, 34(4), 70-76.

Tanzi, M. G. (2009) ASPEN: New enteral nutrition practice recommendations. *Pharmacy Today*. Encyclopedia. Retrieved from [www.britannica.com/bps/additionalcontent/18/37131352/ASPEN-New-enteral-nutrition-practice-recommendations](http://www.britannica.com/bps/additionalcontent/18/37131352/ASPEN-New-enteral-nutrition-practice-recommendations) .

Towell, R. & Van Dijk, M. (2005). Guidelines, procedures and competencies for the overall management of enteral tube feeding (including gastrostomy) in adult patients. *Ashford and St Peter's Hospitals. Issue 3*. NHS Trust:

- Turgay, A. S. & Khorshid, L. (2010). Effectiveness of the auscultatory and pH methods in predicting feeding tube placement. *Journal of Clinical Nursing*, 19, 1553-1559. doi: 10.1111/j.1365-2702.2010.03191.x.
- Turner, R. E. (2005). Enteral Nutrition in the critically ill- A nursing update. *SAJCC*, 21(2), 88-90
- Urden, L.D., Stacy, K. M. & Lough, M. E. (5<sup>th</sup> ed.). (2006). *Thelan's Critical Care Nursing. Diagnosis and Management*. Mosby: Elsevier.
- Webster, N., R. & Galley, H., F. (2000). Nutrition in critically ill patients. *Educational Review*, 45, 373-379. Retrieved September 16, 2010, from [www.rcsed.ac.uk/journal/vol45-614560008.htm](http://www.rcsed.ac.uk/journal/vol45-614560008.htm).
- William, T. A. & Leslie, G. D. (2005). A review of nursing care of enteral feeding tubes in critically ill adults: Part 11. *Intensive and Critical Care Nursing*, 21(6), 5-15. doi:10.1016/j.iccn.2004.08.003.
- William, T. A. & Leslie, G. D. (2004). A review of nursing care of enteral feeding tubes in critically ill adults: Part 1. *Intensive and Critical Care Nursing*, 20 (6), 330-343. doi:10.1016/j.iccn.2004.08.02.

**THANK YOU FOR TAKING YOUR TIME TO HELP WITH THIS QUESTIONNAIRE**

**A Descriptive Study of Nurses' Knowledge and Practice about Adult Enteral Nutrition in Special Care Units of QECH, Malawi.**

**SECTION A: SOCIO-DEMOGRAPHIC DETAILS** *(Please tick where applicable)*

1. Sex

A) Male	
B) Female	

2. Age

	.....years
--	------------

3. What is your highest level of nursing training?

A) Certificate	
B) Diploma	
C) Degree	

D) Others *( Please specify)* -----

4. Was enteral nutrition a part of your training in your nursing school?	Yes	No
A) If yes, Did this training involve a practice demonstration on how to provide the tube feeding?		
B) Did the training involve nutritional assessment?		
C) Did it involve the type of feed to give through the tube?		
D) Did it involve specifying the amount to give?		
E) Did it involve complications to observe for?		
5. Apart from the nursing school training; have you had any in service training on enteral nutrition?		

6. How long have you practiced in this unit? -----

**SECTION B: KNOWLEDGE DETAILS**

	True	False
7. Initiating tube feeding early can help to reduce the period of hospital stay and mortality		
8. As long as the patient is on Intravenous fluids he can stay well nourished for one week.		
9. Enteral nutrition should be initiated within 24-48 hours for patients who cannot swallow		
10. The following are absolute contraindications to enteral nutrition		
A) Peritonitis		
B) Intestinal obstruction		
C) Vomiting		
D) Diarrhea		
E) Absence of bowel sounds		

11. Are you competent enough in the following procedures?

		Yes	No
	A) Assessment of patient nutritional status		
	B) Insertion of a nasogastric tube		
	C) Checking for proper tube placement		
	D) Giving continuous tube feeding?		
	E) Giving bolus (intermittent) tube feeding?		
	F) Choosing the appropriate formula to feed?		
	G) Aspirating gastric residual volume		
12.	Are there any written guidelines regarding enteral nutrition in your ward?		
13.	Is there a nutrition committee in your hospital		
14.	If yes to Q13. Are you a member in the committee?		

15. What is your main source of knowledge regarding enteral nutrition practice? *(Tick the most one only)*

1) My nursing school training	
2) In service training	
3) Consulting colleagues i.e. nurses, doctors	
4) Reading from Journals/books	
5) Unit guidelines	

## SECTION C: PRACTICE DETAILS

16. What is your scope of practice in enteral nutrition? *(Tick all that apply)*

1) Nutritional assessment	
2) Inserting a nasogastric tube	
3) Tube Feeding the patient	

17. What kind of feeding tube do you normally use?

1) Small bore	
2) Large bore	

18. How do you confirm proper tube placement when you have inserted a nasogastric tube?  
*Please tick one that applies*

1) Using bubbling method when tube is placed in water	
2) Using PH indicator strips( litmus paper)	
3) Auscultation of abdomen for air	

	Never 1	Sometimes 2	Almost always 3	Always 4
19. Do you Confirm tube placement before delivery of feed?				
20. Do you Flush tube before and after administration of feed?				
21. Do you Check gastric residual volume before initiating feed?				
22. Do you conduct daily inspection of nostrils?				
23. Do you document any nutritional support or complication about your patient?				
24. Do you discuss nutritional management of patients during ward rounds?				

25. Are patients placed in a specific position during tube feeding? Yes..... No.....

(If yes specify position)-----

26. At what rate do you provide enteral nutrition? (Tick only one that applies)

1) Any amount and rate depending on amount of feed available	
2) Depends on doctor's prescription	
3) 20 to 50 mls per hour (or 300-500mls 5-8 times a day)	

27. What feeds do you normally give to patients on tube feeding? (Please tick one type commonly used)

1) Hospital Kitchen feed i.e. soups, milk	
2) Feed brought by patients relatives	
3) Commercial formulas	

28. What are the challenges you face in your enteral nutrition practice. (Please list the most two)

A) -----

B) -----

29. How do you think enteral nutritional support of the critically ill can be improved in your ward? (Please give two suggestions)

A) -----

B) .....

**THANK YOU FOR PARTICIPATING IN ANSWERING THIS QUESTIONNAIRE!**

Appendix 2

Code Number.....

**Checklist for Review of Nurses' Documented Interventions  
Regarding Enteral Nutrition**

**A. Patient's information**

1. Patient's Hospital number-----
2. Diagnosis \_\_\_\_\_
3. Condition on admission 1) Able to eat 2) Not able to eat
4. Ward / Unit .....
5. Tube feeding initiated within 24 to 48hours? Yes/ No (Date of admission.....date feeding was ordered .....Date of tube insertion/feeding initiation.....)

	<b>B. Nurses' Interventions</b>	<b>Documentation</b>	
		<b>Yes</b>	<b>No</b>
6	Nutritional assessment		
7	Dr/ Dietician consulted		
8	Consent is obtained		
9	Confirmation of tube placement		
10	Feeding regimen		
11	Bowel records		
12	Fluid balance records		
13	Measures to Prevent complications		
14	If yes, indicate documented measures:		





**UNIVERSITY OF  
KWAZULU-NATAL**

*University of KwaZulu-Natal  
Research Office  
Govan Mbeki Centre  
Westville Campus  
University Road  
Chilberns Hills  
Westville  
3629*

*South Africa  
Tel No: +27 31 260 3587  
Fax No: +27 31 260 2384*

*E-mail : [naidoo4@ukzn.ac.za](mailto:naidoo4@ukzn.ac.za)*

28 October 2009

Mrs C Mula  
P O Box 4041  
DURBAN  
4000

Dear Mrs Mula

**PROTOCOL: Descriptive study of nurses' knowledge and practice of enteral nutrition in special care units of Queen Elizabeth Central Hospital, Malawi**  
**ETHICAL APPROVAL NUMBER: HSS/0765/2009: Faculty of Health Sciences**

In response to your application dated 02 October 2009, Student Number: **208510639** the Humanities & Social Sciences Ethics Committee has considered the abovementioned application and the protocol has been given **FULL APPROVAL**.

**PLEASE NOTE: Research data should be securely stored in the school/department for a period of 5 years.**

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

A handwritten signature in black ink, appearing to read 'Steve Collings'.

**Professor Steve Collings (Chair)**  
**HUMANITIES & SOCIAL SCIENCES ETHICS COMMITTEE**

SC/sn

cc: Dr B Ncama  
cc: Mr S Reddy



Appendix 4

University of Malawi  
**KAMUZU COLLEGE OF NURSING**

P. O. Box 415,  
Blantyre  
Tel 01873623  
Fax 01875341  
E mail [kcnbt@malawi.net](mailto:kcnbt@malawi.net)

5<sup>th</sup> January, 2010

The Chairman  
College of Medicine Research Ethics committee  
Blantyre. Malawi

Dear Sir,

**REQUEST FOR RESEARCH ETHICAL APPROVAL**

I am currently studying for Master of Science in Critical care and Trauma nursing at the university of kwazulu Natal, Howard College, Durban.

I intend to conduct a study on Nurses knowledge and practice in enteral nutrition in adult special care units of Queen Elizabeth central hospital; namely Intensive Care Unit, High Dependency Units and Burn unit. I intend to ask nurses who are working in these areas to answer a questionnaire and to review case files in the month of March 2010. Enclosed is my research proposal according to COMREC guidelines.

The purpose of the letter is therefore to seek ethical approval from your committee.

I look forward for your assistance,

Yours sincerely,

Mrs. Chimwemwe Mula

Tel 0881061915      E mail [chimwemula@yahoo.com](mailto:chimwemula@yahoo.com)



UNIVERSITY OF MALAWI

Principal

Prof. R.L. Broadhead, MBBS, FRCP, FRCPC, DCH

Our Ref.:

Your Ref.: P.01/10/857

College of Medicine

Private Bag 360

Chichiri

Blantyre 3

Malawi

Telephone: 01 877 245

01 877 291

Fax: 01 874 700

Telex: 43744

22<sup>nd</sup> March 2010

Mrs. C. T Mula  
Kamuzu College of nursing  
P.O Box 415  
Blantyre 3

Dear Mrs. C.T Mula,

**RE: P01/10/857 – Descriptive study of Nurses' knowledge and Practice of enteral nutrition in special care units at Q.E.C.H.**

I write to inform you that COMREC reviewed your proposal which you resubmitted. I am pleased to inform you that your proposal was approved on 22<sup>nd</sup> March 2010 after considering that you addressed all the issues which were raised in earlier reviews.

As you proceed with the implementation of your study we would like you to take note that all requirements by the college are followed as indicated on the attached page.

Yours Sincerely,

A handwritten signature in black ink, appearing to read 'J.M. Mfutso-Bengo'.

Prof J.M Mfutso-Bengo  
**CHAIRMAN - COMREC**

JMMB/ck



University of Malawi  
**KAMUZU COLLEGE OF NURSING**

P. O. Box 415,  
Blantyre  
Tel 01873623  
Fax 01875341  
E mail [kenbt@malawi.net](mailto:kenbt@malawi.net)  
21<sup>st</sup> February 2010

The Hospital Director  
Queen Elizabeth Central Hospital  
Blantyre.

Dear Sir,

**CLEARANCE REQUEST TO CONDUCT A RESEARCH STUDY**

I am an Assistant Lecturer at Kamuzu College of nursing currently studying for Master of Science in Critical care and Trauma nursing at the University of Kwazulu Natal, Howard College, Durban.

I intend to conduct a study on Nurses knowledge and practice in enteral nutrition in adult special care units of Queen Elizabeth central hospital; namely Intensive Care Unit, High Dependency Units and Burn unit. I intend to use two methods to collect data:

(a) Ask nurses who are working in these areas either on full time or locum to answer a questionnaire and participation to the study will entirely be voluntary.

(b) Do a case note review of patients' files that were on tube feeding. I intend to conduct the study in the month of June, 2010.

The purpose of the letter is therefore to seek clearance from your office to use your facility. Enclosed are ethical approval letters from University of Kwazulu Natal research ethics committee and College of Medicine research ethics committee.

I look forward for your response.

Yours sincerely,

Mrs. Chimwemwe Mula Tel 265 0710918401 E mail [chimwemula@yahoo.com](mailto:chimwemula@yahoo.com)

Facsimile: (265) 01 876928  
Email: [queenshosp@globemw.net](mailto:queenshosp@globemw.net)

All communications should be addressed to:  
The Hospital Director



QUEEN ELIZABETH CENTRAL HOSPITAL  
P.O. BOX 95  
BLANTYRE  
MALAWI

Ref No. QE/10

2<sup>nd</sup> June, 2010

Chimwemwe Mula Mrs.  
Kamuzu College of Nursing  
P.O. Box 415  
BLANTYRE

Dear Sir/Madam

**PERMISSION TO CONDUCT RESEARCH AT QUEEN ELIZABETH  
CENTRAL HOSPITAL ON "NURSES KNOWLEDGE AND PRACTICE IN  
ENTERAL NUTRITION IN ADULT SPECIAL CARE UNITS**

The above refers.

I am pleased to inform you that your request to conduct research at QECH has been accepted.

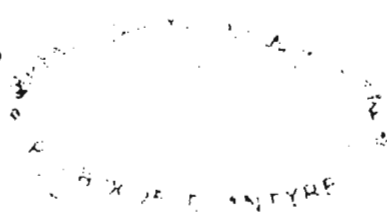
We will appreciate if a copy of your findings is shared with the hospital.

All the best in your studies.

Yours faithfully,

A handwritten signature in black ink, appearing to be 'T.N. Soko'.

T.N. Soko  
CHIEF NURSING OFFICER  
For: **HOSPITAL DIRECTOR**





## Appendix 9

### INFORMATION SHEET AND CONSENT TO BE A RESEARCH PARTICIPANT

#### TITLE:

#### **A Descriptive Study of Nurses' Knowledge and Practice about Adult Enteral Nutrition in Special Care Units of QECH, Malawi.**

You have been asked to be a part of a research study because of the role you play in nursing patients on enteral nutrition. This form gives you information on the study in order to help you decide if you want to participate. Please take time to read the information presented here, which will explain the details of this project. Please ask any questions about any part of this project that you do not fully understand. Your participation is entirely voluntary and you are free to accept or decline to participate. You are also free to withdraw from the study at any point even if you do agree to take part.

#### **A. Purpose and Background**

In order to address evidence based practice in enteral nutrition for the critically ill in Malawi; particularly Queen Elizabeth Central Hospital, I am currently conducting a research project as a Masters student to describe the current nurses' knowledge and practice in enteral nutrition.

The findings from the study will be used to inform policy makers in hospitals and educational institutions in hopes to develop evidence based protocols that will be used in teaching and in practice

#### **B. Study contacts**

Investigator: Mrs. Chimwemwe Tusekile Mula

Kamuzu College of Nursing. P.O.Box 415, Blantyre, Malawi

E mail: [chimwemula@yahoo.com](mailto:chimwemula@yahoo.com)

Chairman of COMREC

Telephone Number: 01871911

#### **C. Procedures**

If you agree to participate in the study, the following will take place:

1. You will be asked to answer questions about yourself and knowledge and practice of enteral nutrition
2. You will answer the questionnaire on your own and it will take about 30 minutes.

#### **D. Costs**

There are no costs to you associated with participation in this study

**E. Risks**

Your participation in this research does not hold any physical risks. However it may cause some loss of privacy. Therefore everything will be done to assure confidentiality.

**F. Benefits**

There are no direct benefits to you arising from the study; however your contribution of providing valuable information may hopefully be used to create interventions that might be used to teach you and other nurses about enteral nutrition

**G. Alternatives**

You are free to participate in this study or not. It is okay to not participate. You will simply be excluded from the study without any consequences to yourself

**H. Confidentiality**

The information collected will be treated as confidential and the questionnaires you complete will be coded. You will not need to provide your name. The code will only be known to the investigator. After the study has been completed, the data will be stored in a locked file. Results from the study may be published unanimously in a journal or used for teaching purposes.

**Request for more information**

You may have more information about the study which you are free to ask at any time. The investigator has provided her phone number so that you can contact her.

**I. Consent**

By signing below, I ..... (Your full name) agree to take part in the research study. I declare that:

- I have read or had read to me this information and it is written fully in a language I am fluent and comfortable with.
- I have had a chance to ask questions and all my questions have been adequately answered
- I understand that taking part in this study is voluntary and have not been pressurized to take part.
- I may choose to leave the study at any time and will not be penalized in any way
- I have been given a copy of this consent form to keep.

Signature ..... On (date).....