FACTORS AFFECTING IMPLEMENTATION OF ENTERAL FEEDING AMONG ICU AND EMERGENCY NURSES IN ONE OF THE REFERRAL HOSPITALS IN KIGALI, RWANDA

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A dissertation submitted in partial fulfilment of requirements for the degree of MASTER'S OF SCIENCE IN NURSING **(Critical Care and Trauma)**

In the College of Medicine and Health Sciences

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DECLARATION

I declare that this Dissertation contains my own work except where specifically acknowledged

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Signed……..

Date……..

DEDICATION

I most gratefully dedicate this work to the Almighty God who stayed alongside through my life.

I strongly dedicate this work to my family for their encouragement and their sacrifice during my studies.

To my supervisor, all my classmates for the best moments bonded together.

Finally to all my relatives and friends. God bless you.

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ABSTRACT

Introduction: Enteral tube feeding is usually a relatively straightforward method of nutritional support, and should be facilitated by a multi-professional team. Adequate nutrition support is vitally important in the management of patients in Intensive Care and Emergency units. Despite the use of enteral feeding, malnutrition in hospitalized patients is still being at high level as it occurs in an estimated 30%–50% of patients during their hospitalization. Early screening and initiation of enteral feeding for critically ill patients at risk of malnutrition may help to reduce the prevalence of malnutrition in ICU and Emergency. Nurses, who are the frontline workforce, play a big role in managing critically ill patients as caregivers, educators, managers and researchers.

The aim of the study: The aim of this study was to assess factors influencing enteral feeding practice for critically ill patients among ICU and Emergency department nurses in one of the referral hospitals in Kigali. Specific objectives of this study were (1) To determine the barriers to enteral feeding practice as perceived by ICU and Emergency nurses (2) To identify demographic factors associated with the barriers to enteral feeding practice for critically ill patients as perceived by ICU and Emergency nurses.

Methodology: This study was conducted in Adult Intensive Care Unit, PICU and Emergency in one of the referral teaching hospital in Kigali City. A quantitative approach and descriptive cross sectional design was adopted to conduct this study. A non-probability convenience sampling strategy was used to select ICU and Emergency nurses who met the study eligibility criteria to get the sample. All 69 nurses from both ICU and Emergency department were included in the study as sample size. Data collection used a structured questionnaire given to nurses who accepted to participate voluntarily in the study. The data were analyzed using Statistical Package for Social Sciences (SPSS) version 21.

Results: The results demonstrated that most predominant perceived barrier by nurses in ICU and Emergency is the feeding interruption (95.7%) followed by the lack of feeding formula (95%) while the least predominant barrier faced was the lack of training on Enteral feeding (68%) followed by the lack of guidelines (78.3%).

Conclusion: This study confirms that enteral nutrition (EN) is a multidisciplinary responsibility and delaying this vital care will predispose patients to underfeeding and malnutrition. The impact of this situation may be reflected in the quality of care, treatment costs, and disease process.

KEY WORDS

Critical care: According to Intensive Care Society document Levels of Critical Care for Adult Patients (2009) in Therapists et al., 2013, is defined as specialty staffed and equipped, separate and self-contained area of a hospital dedicated to the management and monitoring of patients with life threatening conditions.

Enteral feeding: Feeding provided through the gastrointestinal tract via a tube, catheter, or stoma that delivers nutrients distal to the oral cavity (Cober et al., 2015).

Emergency care: A sudden and usually unforeseen event that calls for immediate measures to minimize its adverse consequences (WHO, 2008).

Nutritional support: According to Hussein, 2008: Nutritional support is a vital part of the treatment in patients with critical illness and injury.

Nutrition therapy: According to Cahill et al., (2014) nutritional therapies are individualized and targeted nutritional care measures using diet or artificial nutritional support. Nutritional therapies can be therapeutic or preventive.

Barrier: is defined as factors that hinder the implementation of recommended guidelines in clinical practice and this result in an increased gap between recommended guidelines and practices.

LIST OF SYMBOLS AND ACRONYMS

CHUK: Centre Hospitalier Universitaire de Kigali

CMHS: College of Medicine and Health Science

EFT: Enteral Feeding Tube

EN: Enteral Nutrition

ET: Enteral Tube

GAL: Gut-Associated lymphoid tissue

GIC: Gastro Intestinal Complication

GIT:Gastro Intestinal Tact

GRV: Gastric Residual Volume

ICU: Intensive Care Unit

NHS: National Health Survey

PICU: Pediatric Intensive Care Unit

PN: Parenteral Nutrition

TSSC: Therapeutic Intervention Score System Category

USA: United State of America

WHO: World Health Organization

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CHAPTER ONE: INTRODUCTION

1.0. General introduction

Enteral tube feeding is usually a relatively honest method of nutritional support, and should be facilitated by a multi-professional team (Scott, 2015). It can be administered either into the stomach or directly into the small intestine, usually the jejunum (Scott, 2015). It is shown that" persistent metabolic demands and the difficulty of initiating feeding in ICU patients, energy deficits accumulate rapidly during the first week following admission to the ICU leading to an increased risk of infection, prolonged duration on mechanical ventilation, longer stay in the ICU and increased mortality" (Pichard, Berger and Pradelli, 2018). Despite the use of enteral feeding, malnutrition in hospitalized patients is still being at high level as it occurs in an estimated 30%–50% of patients during their hospitalization (Kozeniecki and Pitts, 2018). Early screening and initiation of enteral feeding for critically ill patients at risk of malnutrition may help to reduce the prevalence of malnutrition in ICU and Emergency. Nurses, who are the frontline workforce, play a big role in managing critically ill patients as caregivers, educators, managers and researchers.

This chapter consists of the background of the study, problem statement of the study, objectives of the study, research questions, and significance of the study, definition of concepts, scope of the study structure and organization of the study.

1.1. Background of the study

Enteral tube feeding is usually a relatively straightforward method of nutritional support, and should be facilitated by a multi-professional team (Scott, 2015). Adequate nutrition support is vitally important in the management of patients in the intensive care unit (Pichard et al., 2018). Enteral feeding delivers nourishment through a tube directly into the GI tract and is ordered for patients with a functioning GI tract who cannot ingest enough nutrition orally to meet their needs (Houston et al., 2017). It can be administered either into the stomach or directly into the small intestine, usually the jejunum (Scott, 2015). Patients in intensive care units (ICUs) often have different degrees of inflammation that may result in reduced energy and protein intake, increased energy expenditure, and protein catabolism. Every critically ill patient, regardless of pre-existing malnutrition, has a highly variable metabolic and immune response to injury or illness, which might be attenuated by an appropriately focused nutrition therapy. Nutrition support is therefore

considered to be an essential component in the management of critically ill patients (Padella *et al.*, 2016). It has been suggested that the cumulative energy debt after the first week of ICU admission is a strong predictor of negative clinical outcomes, such as an increase in days of mechanical ventilation, length of stay in the ICU, and infections (Padella *et al.*, 2016). Another study reported that delayed initiation of nutrition support exposes patients to energy deficits that they might be unable to compensate for during their remaining ICU stay (Wei 2015). In addition, protein catabolism and cumulative caloric deficit contribute to lean tissue wasting (Casaer 2013), and are associated with adverse outcomes (Alberda 2009). Nutrition support is therefore considered to be an essential component in the management of critically ill patients to mitigate the issue of malnutrition to critically ill patients.

1.2. Problem statement

Critically ill patients are vulnerable to under feeding and malnutrition is common, occurring in an estimated 30%–50% of patients during their hospitalization (Wischmeyer , 2011). Numerous factors contribute to incomplete delivery of enteral nutrition, including insufficient nutrition risk screening in critically ill patients, underutilization of enteral feeding protocols, fixed rate-based enteral infusion targets with frequent enteral interruption, and suboptimal provider practices regarding nutrition support therapy. Disease condition and patient status is believed to be a primordial factor to effectiveness of the enteral feeding.

Critically ill patients are usually not able to maintain adequate nutritional intake to meet their metabolic demands on their own. It has been suggested that the cumulative energy debt after the first week of ICU admission is a strong predictor of negative clinical outcomes, such as an increase in days of mechanical ventilation, length of stay in the ICU, and infections (Padella *et al.*, 2016). It has also been reported that delayed initiation of nutrition support exposes patients to energy deficits that they might be unable to compensate for during their remaining ICU stay and therefore nutrition support through enteral feeding is part of their medical care (Wei 2015).

Enteral feeding is the preferred method of nutritional support than parenteral nutrition for the critically ill patients (Seres, Valcarcel and Guillaume, 2013). However a significant number of these patients are under-fed at CHUK. It is possible that common nursing practices associated with the delivery of enteral feeding may contribute to under-feeding. There is little data available describing nursing practice in this area. A study showed a gap between the recommended

guidelines and the actual practices at bedside (Darawad et al., 2018). Therefore, there is a need to identify the barriers affecting the practice of nurses for enteral feeding of patients in ICU and Emergency.

1.3. The aim of the study

The aim of this study was to identify the factors associated with barriers to enteral feeding among ICU and Emergency department nurses at one referral hospital in Kigali.

1.4. Research objectives

1.4.1. Specific objectives

The specific objectives for this study were:

1. To determine the barriers to enteral feeding practice as perceived by ICU and Emergency nurses

2. To identify demographic factors associated with enteral feeding practice for critically ill patients as perceived by ICU and Emergency nurses.

1.5. Research questions

The research questions for this study were:

1. What are the barriers to enteral feeding practice of as perceived by ICU and Emergency nurses?

2. What are the demographic factors associated with the barriers to enteral feeding for critically ill patient as perceived by nurses?

1.6. Significance of the study

This study was hoped to contribute to the improvement of nursing practice, whereby critically ill patients will be informed, screened and initiated for enteral feeding at an early stage. As malnutrition continues to increase among hospitalized critically ill patients (30-40%), this study will contribute to the improvement of care delivered to critically ill patients in ICU and Emergency at CHUK by informing strategies in ICU that will be undertaken to improve ICU patient nutritional status during hospitalization, be it development of guidelines and protocols or provision of resources to facilitate enteral feeding. The staff may subsequently be motivated by improvements in provisioning of resources for enteral feeding if issues surround resources.

Therefore the patient stay will be reduced thus improving the economy for patients and country in general.

Leaders and policy makers may use this study to follow up the implementation of the protocols and guidelines, and address the challenges encountered, at an early stage, for the success of the practice of enteral feeding. Findings from this study, will serve as a way to find enough information on enteral feeding practice and patient status, considering that the limits of data may be another hindrance in planning appropriately for relevant interventions.

Educators and researchers will use this study for accurate information on the enteral feeding practice status in our country, and could use it for other studies, considering that data on enteral feeding practice are still limited as stated by other researchers. The study could also be used in revising curriculum for preparing future nurses to provide better care to critically ill patients, for example, by including the course of Intensive and emergency management to critically patient especially early initiation of enteral feeding. In addition enteral feeding care should be considered as positive aspect of ICU and Emergency care due to its known advantages compared to others methods.

The study may inform any quality improvement efforts as far as nutrition of patients is concerned like early nutritional assessment and early feeding of patients. This study may also make nurses aware that nutrition is important too like other treatments for patients. The study may also inform the curriculum for educators on the content for education of nurses on nutrition.

1.7. Definition of Concepts

Critical care: According to Intensive Care Society document Levels of Critical Care for Adult Patients (2009) in Therapists et al., 2013, is defined as specialty staffed and equipped, separate and self-contained area of a hospital dedicated to the management and monitoring of patients with life threatening condition. It provides special expertise and the facilities for the support of vital functions and uses the skills of medical, nursing and other personnel specialized and experienced in the management of these problems.

Enteral feeding: Feeding provided through the gastrointestinal tract via a tube, catheter, or stoma that delivers nutrients distal to the oral cavity (Cober et al., 2015).

Emergency care: A sudden and usually unforeseen event that calls for immediate measures to minimize its adverse consequences (WHO, 2008). In the context of CHUK, emergency department provides emergency care at the same time as intensive care because usually patients

stay long time there waiting for availability of the bed in the ICU. This hospital is referral and public hospital which receives patients from almost the whole country with seven bed in adult ICU. It receives numerous critically ill patients both from general conditions and accidents and trauma patients in need of high dependent care. Due to shortage of bed in ICU, some patients are cared for in emergency while still waiting to be admitted in ICU.

Nutritional support: According to Hussein, (2008): Nutritional support is a vital part of the treatment in patients with critical illness and injury. Among the patients who are previously well nourished before ICU admission, nutritional disorders develop rapidly because of the metabolic demands of illness and healing, rapid fluid shifts, and the loss of specific vitamins and trace elements. Specialized nutrition support should be offered to patients who are malnourished or at risk of becoming malnourished when it would benefit patient outcomes or quality of life. In this study it refers to enteral feeding in ICU.

Nutrition therapy: According to Cahill et al., (2014) nutritional therapies are individualized and targeted nutritional care measures using diet or artificial nutritional support. Nutritional therapies can be therapeutic or preventive. They can be provided in a variety of settings, including in- and out-patient services and dietary advice can be part of a nutritional therapy but is not a nutritional therapy itself because it lacks the necessary structural element. In this study it refers to the role played by the dietician/nutritionist to assess and give information/advice to ICU patients, families and staff.

Barrier: is defined as factors that hinder the implementation of recommended guidelines in clinical practice and this result in an increased gap between recommended guidelines and practices. It may be related to individuals, social issues or the organizations and should be identified in order to develop strategies to overcome these barriers for producing a change in current practice. In this study it refers to barriers to implementation of enteral feedings guidelines as recommended by ESPEN in 2006 and NHS (National Health Service from England) in 2015.

1.8. Structure/Organization of the study

This study is organized into 5 chapters. Chapter one is the introduction of the study in terms of background issues and aim and plan of the study.

Second chapter is giving the existing literature in the area and deducing the gaps that need to be pursued with further research. Chapter three is methodology that details the process of the study from how it will be conducted, population and sample involved, instruments used, ethics of research observed and limitations. Chapter four is about data presentation and analysis. There is also chapter five which presents discussion of the results in the context of existing literature. Finally, chapter six is concerning the conclusion and recommendation.

Conclusion: This chapter is describing the general overview of enteral feeding, the background; the problem statement and is identifying the need of study, the objectives, the research questions, including the significance of the study.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

A literature is defined as an overview of research on a given topic and answers to related research questions (Shunda, 2007). It can be an informative, critical, and useful synthesis of a particular topic. It can identify what is known in the subject area, identify areas of controversy or debate, and help formulate questions that need further research (Bolderston, 2008).

A literature review is an objective and critical summary of published research literature relevant to a topic under consideration for research. It compiles and evaluates the research available on a certain topic or issue that you are researching and writing about (Topic, 2015). Its purpose is to create familiarity with current thinking and research on a particular topic, and may justify future research into a previously overlooked or understudied area.

This section will revise the existing literature basing on statistics and epidemiology regarding barriers and factors associated with the nurse's practice of enteral feeding among hospitalized critically ill patients in ICU and Emergency. The sources of information were Google search, Google scholar, British medical center (BMC), Research gate, Health affairs and others. The terms used for searching were barriers to implementation of enteral feeding guidelines, factors impending the practice of enteral feeding, feeding protocol, and critical care and critically ill patient. The citation used reference style of Harvard- cite them Right ninth edition.

2.2. Theoretical Literature

Enteral nutrition is feeding provided through the gastrointestinal tract via a tube, catheter, or stoma that delivers nutrients distal to the oral cavity (Cober *et al.*, 2015). They're ordered for patients with a functioning GI tract who can't ingest enough nutrition orally to meet their needs (Houston, Fuldauer and Nutrition, 2017). It is shown that critically ill patients are hypermetabolic and have increased energy demands, therefore this makes nutritional support a vital nursing intervention (Darawad *et al.*, 2018). The same study revealed that, in the Intensive Care Units, enteral nutrition is based on opinions rather than evidence-based practice (Darawad *et al.*, 2018). Malnutrition and weight loss due to sub-optimal oral intake are common in critically ill patients with conditions that lead to loss of normal body control function, such as neurological disorders and are mostly associated with increased morbidity, disability and mortality (Stavroulakis and Mcdermott, 2016).

Numerous factors have been shown to contribute to incomplete delivery of enteral feeding including insufficient nutrition risk screening in critically ill patients, underutilization of enteral feeding protocols, fixed rate-based enteral infusion targets with frequent enteral nutrition interruption, and suboptimal provider practices regarding nutrition support therapy (Stavroulakis and Mcdermott, 2016). Barriers are factors that impede the implementation of recommended guidelines in clinical practice and are likely to increase the gap between recommended guidelines and current practices (Darawad *et al.*, 2018). Those barriers may be related to individuals, social issues, or the organizations. For producing a change in practice, identification of barriers should be done correctly in order to develop strategies to overcome these barriers. Barriers such as feeding tube not in place, delay in physicians' orders, delay in initiation of motility agents, lack of enteral nutrition formula and/or feeding pumps, and delay in the initiation time of enteral feeding were identified (Darawad *et al.*, 2018).

2.2.1 The barriers associated with enteral feeding practice among ICU and Emergency nurses

In critical care, malnutrition has a significant, negative impact on a patient's ability to respond to medical treatment and enteral nutrition can counteract the metabolic changes associated with critical illness that increase the risk for serious complications and poor clinical outcomes. Inadequate delivery of nutrition support and underfeeding persist in intensive care units despite the availability of guidelines and current research for best practice. Recent studies have shown that nutrition support protocols are effective in promoting nutritional goals in a wide variety of intensive care patients. Nurses are in a unique position to take an active role in promoting the best nutritional outcomes for their patients by using and evaluating nutrition support protocols (Collen & Karen, 2017).

According again to Collen and Karen (2017), the nurse should respect and implement the following protocols and guidelines: The nurses should assess the patients on admission to the intensive care unit (ICU) for nutritional risk and calculate both energy and protein requirements to determine goals of nutrition therapy; they should initiate enteral nutrition (EN) within 24-48 hours following the onset of critical illness and admission to the ICU; and increase to goals over the first week of ICU stay; they should take steps as needed to reduce risk of aspiration or improve tolerance to gastric feeding by using prokinetic agents; continuous infusion,

chlorhexidine mouthwash; elevate the head of bed; and divert the level of feeding in the gastrointestinal tract.

The nurse should also implement enteral feeding protocols with institution-specific strategies to promote delivery of enteral feeding and avoid using gastric residual volumes as part of routine care to monitor ICU patients receiving enteral feeding (Collen & Karen, 2017).

Observational studies of nutrition practices in the intensive care unit have consistently demonstrated gaps between what evidence-based guidelines recommend and what is actually done at the bedside while nutrition therapy is important for the critically ill patients (Cahill *et al.*, 2012).

According to Cahill *et al.*, (2012); the possible barriers that prevent optimally feeding their critically ill adult patients includes lack of feeding tube in place, delays in physicians ordering, delays in initiation of motility agents and small bowel feeding, lack of availability of enteral formula and/or feeding pumps, lack of ICU physicians requesting that patients to be fed enterally and other aspects of care taking priority over nutrition.

According to Kozeniecki, Pitts and Patel, (2018); malnutrition in hospitalized patients is common and occurs in an estimated 30%–50% of patients during their hospitalization and may be due to numerous barriers such as numerous ICU processes, interruptions, and provider attitudes and perceptions.

2.2.2 The factors associated with barriers to enteral feeding practice for critically ill patients

Poor enteral feeding is classified in three varying degrees, namely; patients who are severely underfed, patients who are moderately underfed and patients who are mildly underfed. Factors interfering with successful administration of enteral feed in critically ill patients includes the use of the feeding tube to deliver contrast, the need for prokinetic drugs, a high Therapeutic Intervention Score System category (TSSC) and elective admissions (Binnekade *et al.*, 2005). According to Meara *et al.,* (2008); factors involved in the incomplete delivery of prescribed amounts of enteral nutrition include interruptions, problems with small-bore feeding tube, residual volumes, weaning procedures, radiology, and preparation for surgery, shock and bath.

According to Mula, (2014); the factors associated with enteral feeding practice include feed or tube shortage, staff shortage, patients or guardians refusal, ignorance of guardians, inadequate knowledge of nurses, difficult monitoring, patients removing or coughing up the tube and lack of guidelines.

According to El-regal *et al.*, (2016); factors impeding adequate delivery of enteral nutrition for critically ill patients include level of activity, stress, thermic effect of the food and GIT complications like high gastric residual volume (GRVs), abdominal bloating, vomiting, constipation and diarrhea.

2.2.3. The needed resources to help the nurses to implement the enteral feeding practice well

To successfully manage the patient's nutritional need, a team working approach is needed. Each discipline is responsible for managing and monitoring the patient's physiologic and psychological needs. A dietitian is needed to order and calculate patients' caloric requirements so that the nurse can deliver and monitor them as well. The nurse assistants are also needed to help positioning the patient in a comfortable position, give care as well as behavioral monitoring. In order to manage the patients well, additional specialists such as a wound ostomy nurse are needed to monitor the risk of pressure injuries compounded by malnutrition or dehydration (Amanda& Paul Fuldauer, 2017). However in developing countries including Rwanda we may not afford these additional specialists.

For terminally ill patients, palliative care specialists can help evaluate the benefits and risks of continuing enteral feeding and help clinicians navigate ethical issues, such as whether to continue enteral feedings and other life-prolonging measures and also help manage symptoms and make suggestions based on the patient's or family's goal of care (Amanda& Paul Fuldauer, 2017). Other needed resources include enteral feeding tubes of different types and features, syringes and clamps, feeding formula and its container, and materials for confirming its placement like stethoscope and ultrasound (Houston & Fuldauer, 2017).

According to Amanda and Paul Fuldauer (2017), nurses should monitor the patients for feeding tolerance by auscultating the abdomen for bowel sounds and by inspecting abdominal distension and tenderness. The nurse should also know that patients who complain of fullness or nausea

after feeding starts, may have higher a Gastro Residual volume (GRV). The other role of a nurse is to monitor on an ongoing basis, the patients for gastric distention, nausea, bloating and vomiting.

2.3. Empirical Literature

Enteral tube feeding is an effective method of providing nutrients for individuals who are unable to meet their nutritional requirements in different healthcare settings across the world (Ojo, 2015).

A study conducted by Klek *et al. (2014)* in Poland about the implementation of Home enteral nutrition revealed that there was an improvement in clinical outcomes and decreased health care costs through weight gain in patients, reduced incidence of infectious complications and the number of hospital admissions.

In another study in Malawi, Brewster *et al. (1998)* reported that routine tube enteral feeding was associated with the improvement body weight gain in the treatment of kwashiorkor. For critically-ill patients, Enteral Nutrition has shown to be the most preferred method of nutritional support due its capacity to improve clinical outcomes and lowers health-related costs compared to parenteral nutrition (Ojo, 2015).

According to Houston and Fuldauer (2014) traumatic brain injury is associated with the alteration of the level of consciousness to the point where the patient can't eat or drink safely. In this case, a coma may be induced to reduce pressure inside the brain or promote respiratory support and constitute an absolute indication of enteral feeding.

About 55% of patients with stroke experience dysphagia and enteral feeding is used as option if there is need to find a safe consistent way of food that the patient can tolerate by mouth (Houston, Fuldauer and Nutrition, 2014). In contrast, multiple studies showed that current feeding practices failed to provide patients in intensive care units (ICU) with adequate feeding in which more than 35% of ICU patients are malnourished (Ojo, 2015).

This constitutes an increased risk for patients to infection and impairs wound healing and leads to prolonged hospital stay. Increased costs of health care associated with increased morbidity and mortality were identified in underfed patients.

2.3.1. Advantages of enteral nutrition over parenteral nutrition

Adequate nutrition is a key component to providing holistic care to critically ill patients. It is shown that early assessment of the need for nutritional support and providing early intervention can have many beneficial outcomes for critically ill patients, including improved disease progression and recovery time, improved immune response, and decreased overall complications (Cooper, Nursing and Field, 2018).

Early feeding for critically ill patients may be provided via enteral or parenteral routes. Both intravenous and enteral nutrition are used for metabolic support when patients cannot take adequate amounts of intake orally with the primary goal of avoiding progressive lean tissue catabolism due to starvation (Kenneth A.*et al.*, 2008)**.** It is shown that both enteral and parenteral nutrition can serve that function well. However, there is increasing evidence that significant benefits are gained when nutrients are delivered via the gut compared to the parenteral route. The same study revealed that not only the economic benefits are attributed to enteral feeding but also there is an existence of a significant body of clinical work demonstrating reductions in septic complications when nutrients are delivered via the gastrointestinal tract (Kenneth A.*et al.*, 2008). A study done on the advantages of enteral nutrition over parenteral nutrition stated that it is a strong and commonly held belief among nutrition clinicians that enteral nutrition is preferable to parenteral nutrition as EN presents several advantages to critically ill patients compared to parenteral nutrition (Seres D. et al, 2013). In this study, the following benefits were found to be associated with the practice of enteral feeding among critically ill patients, such as preservation of mucosal architecture, preservation of gut associated lymphoid tissue (GALT), preservation of hepatic immune function, preservation of pulmonary immune function, reduction of inflammation, reduction of antigenic leak from the gut with significant interference with pathogenicity of gut organisms. Finally EN was found to be less hyperglycemic methods of feeding to critically ill patients (Seres et al, 2013).

Another study done on the nutrition management of the critically ill pediatric patient demonstrated that enteral nutrition provides a number of benefits to the critically ill pediatric patient (Abad-jorge, 2013). In general, they found that EN is more physiological than PN, maintains the physiologic and functional integrity of the GI mucosa by nourishing the gut first, and thus prevents or decreases the risk for bacterial translocation. In addition to this, EN was

found to be also more cost-effective than PN and within adult patients it is associated with both decreased risk of infectious complications and length of stay, as compared with patients nutritionally supported with PN (Abad-jorge, 2013). In Pediatric Intensive Care Unit (PICU), enteral feeding was shown to be beneficial method of feeding to pediatric ill patients where the management of fluid and electrolyte balance is often easier when using EN. Furthermore, EN was shown to have protective immunity as it may promote anti-inflammatory effects by decreasing cytokine production, such as tumor necrosis factor and interleukin (Abad-jorge, 2013).

According to European, Canadian, and American clinical practice guidelines, the enteral route is preferred for delivering early nutrition support among ICU patients(Padilla F*et al.*, 2016).The same study demonstrated that early nutritional support in the form of enteral nutrition provides important benefits in terms of the interaction between the gut and the systemic immune response in critically ill patients and helps to maintain gut integrity and the physiologic stress response (Pedilla*et al.*, 2016).

One study conducted on Early versus delayed enteral nutrition support for critically ill adults (Protocol) found that early enteral nutrition has physiological effects that provide both nutritional and non-nutritional benefits to critically ill patients (Padilla et al, 2016). Nutritional benefits derive from the delivery of exogenous nutrients, which supply sufficient protein and calories, deliver micronutrients and antioxidants, and maintain lean body mass (Kudsk 2007). Also it is believed that when started as soon and as safely as possible following ICU admission, enteral nutrition provides important non-nutritional benefits, which are derived from several physiological mechanisms that maintain the functional and structural integrity of the intestinal mucosa (Skeie *et al.*, 2018 and Kuragano *et al.*, 2014). Enteral nutrition directly stimulates intestinal contractility and the release of trophic substances and neuropeptides, which play a role in mucosal defenses (Kudsk, 2001). Furthermore, enteral nutrition stimulates the release of immunoglobulin A (IgA) by gut-associated lymphoid tissues (GALT), which prevents bacterial adherence to the epithelial cells and prevents an increase in intestinal permeability (Kudsk, 2002; Kudsk, 2007). Immune mechanisms caused by enteral nutrition result in the attenuation of oxidative stress and inflammatory responses, while also supporting the humoral immune system

(Kudsk, 2002). Finally, enteral nutrition modulates the metabolic responses that help reduce insulin resistance (McClave, 2009).

2.4. Critical Review and Research Gap identification

The literature that the researcher reviewed gave the relevant information about the practice of nurses in different corners of the world. Different studies revealed the importance enteral feeding practice in the management of critically ill patients. It also demonstrates several factors/Barriers faced by nurses while implementing this practice. It gives us the overview on some studies conducted in different countries like India, Botswana, Poland etc. but it does not tell us about the Rwandan situation, mainly Centre Hospitalier Universitaire de Kigali. There is no research conducted in Rwanda about factors impeding the practice of enteral feeding of nurses in ICU & Emergency. However anecdotal evidence tells that the selected site (CHUK) predominantly uses enteral feeding due to financial constraints.

2.5 Conceptual Framework

The key construct of this study is the enteral feeding practices by pediatric ICU, adult ICU and Emergency nurses. It is placed in the center of the framework. The relationships between it and other components of the framework are represented by the arrows.

The framework shows that enteral feeding practices by pediatric ICU, adult ICU and Emergency nurses is affected by different barriers and factors which prevent its optimal implementation (Cahill *et al.*, 2012) while it is the preferred way of feeding the critically ill patient and an important means of counteracting the catabolic state induced by severe diseases (Kreymann *et al.*, 2006).

Besides the enteral feeding practices placed in the center, the four elements in relation with it are represented by the rectangles and they include the demographic characteristics, the barriers that can affect the Enteral feeding practices, the factors associated with its poor implementation and the resources that can help its optimal implementation. Those elements are explained in the paragraphs below.

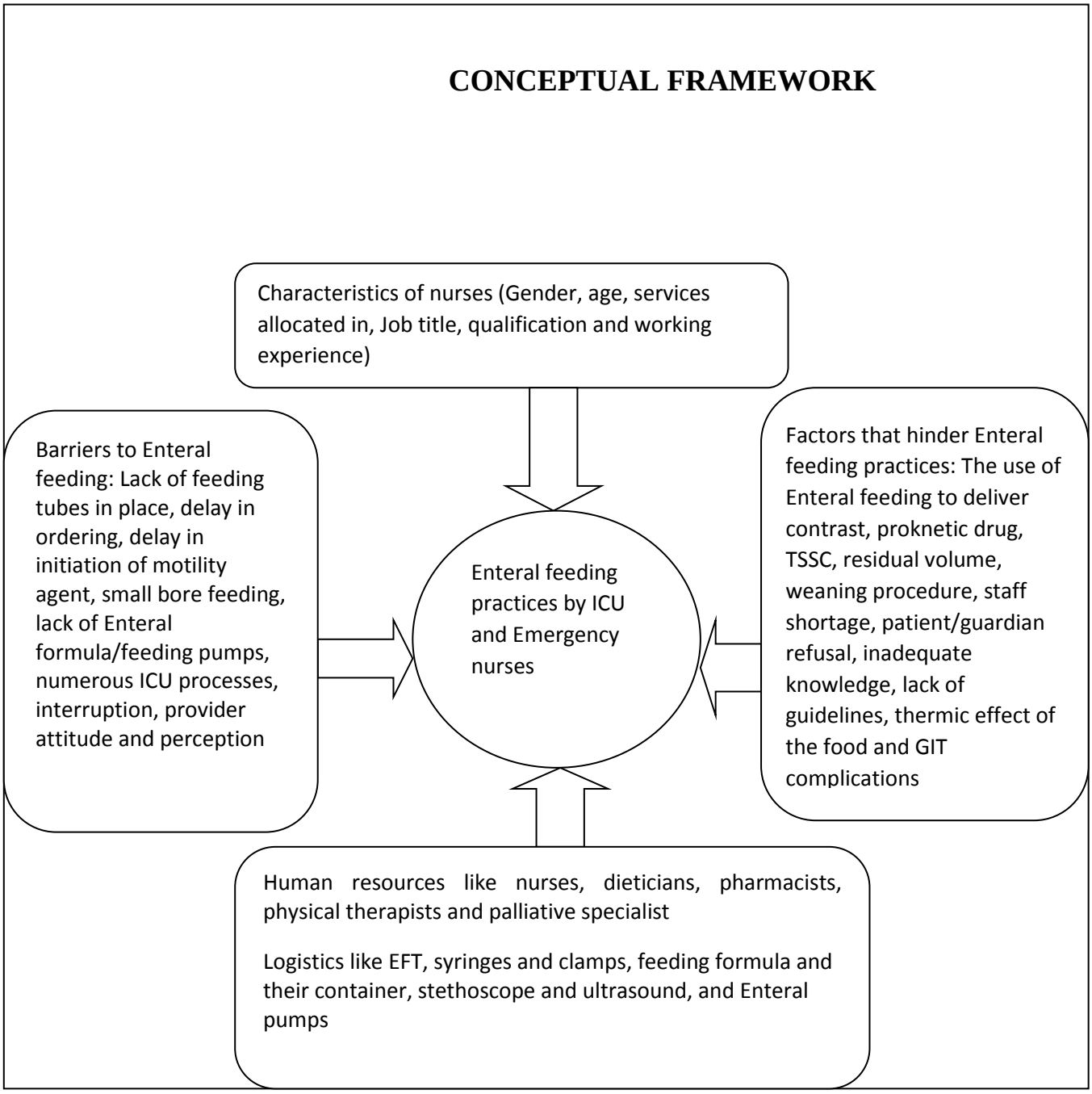
Those elements of the framework following clockwise direction start by the demographic characteristics which show the difference between the respondents according to the demographic information and they cannot affect the construct in the center of the framework.
The second element represent the factors that affect enteral feeding practice in adult ICU, pediatric ICU and emergency services which are the use of Enteral feeding to deliver contrast, proknetic drug, TSSC, residual volume, weaning procedure, staff shortage, patient/guardian refusal, inadequate knowledge, lack of guidelines, thermic effect of the food and GIT complications (Binnekade *et al.*, 2005). These factors cannot stop the implementation of Enteral feeding for critically ill patients but if they are present they can affect the achievement on the optimal implementation of it.

The other element represent the needed resources to help the nurses to implement well the enteral feeding practice which are the human resources like nurses, dieticians, pharmacists, physical therapists and palliative specialist and logistics like EFT, syringes and clamps, feeding formula and their container, stethoscope and ultrasound, and Enteral pumps (Amanda& Fuldauer, 2017). These resources can affect the enteral feeding practices by ICU and Emergency nurses by enhancing its implementation.

The last element represent the barriers that can affect nurses' implementation of Enteral feeding as presented in the framework includes lack of feeding tube in place, delays in physicians ordering, delays in initiation of motility agents and small bowel feeding, lack of availability of enteral formula and/or feeding pumps, lack of ICU physicians requesting that patients be fed enterally and other aspects of care taking priority over nutrition (Cahill *et al.*, 2012). If these barriers are present, the implementation of Enteral feeding by nurse is not possible.

See Figure 2.1 below.

CONCEPTUAL FRAMEWORK



Adopted from Leanne Jack (2014)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1. Introduction

This chapter describes the research methodology that supported the research process as well as the analysis and interpretation of the results. It describes the phases of the research and it is organized under the following titles: Research Approach and Design, Target Population, Sample Size and Sampling strategy that was used, Research Instrument, Piloting, Reliability and Validity of the Instrument, Data Collection Procedures and, Data Analysis Technique, and ethical principles that guided the study.

3.2. Research approach

In this research, non-experimental quantitative approach was used to determine factors affecting enteral feeding practice among ICU and Emergency Department nurses at one referral hospital in Kigali. Quantitative methods emphasize objective measurements and the statistical, mathematical, or numerical analysis of data collected through polls, questionnaires, and surveys, or by manipulating pre-existing statistical data using computational techniques. Quantitative research focuses on gathering numerical data and generalizing it across groups of people or to explain a particular phenomenon.

3.3. Research design

A research design is a strategy that is used to find responses to research questions and specify the variables to be considered, the type of data which are to be collected, the methods and the time of data collection (Polit and Beck, 2008). A descriptive cross sectional design was used to determine factors influencing/affecting enteral feeding among ICU and Emergency Department nurses at one referral hospital in Kigali.

According to Levin (2OO6), Cross-sectional studies are carried out at one point in time or over a short period. They are usually conducted to estimate the prevalence of the outcome of interest for a given population, commonly for the purposes of public health planning.

3.4. Research setting

The study was conducted in Centre Hospitalier Universitaire de Kigali (CHUK) located in Rwanda, Kigali City province, Nyarugenge District; Gitega ector. This hospital serves as

National Referral hospital and teaching hospital that provides quality services in the health sector. CHUK delivers healthcare services to the general Population that come from almost all the Rwandan country and is the public institution. The setting was chosen because it has its own specific protocol regarding enteral feeding which cannot be applied to other referral hospitals.

3.5. Population

The target population in a study is the entire population in which a researcher is interested in and to which he/she would like to be able to generalise the study results. The individual units of a population are called elements. An accessible population is that portion of the target population to which the researcher has reasonable access to (Burns & Grove 2014; Polit & Beck 2012).

The target population for this study was composed of all 69 registered nurses working in critical care: intensive care unit and emergency of CHUK.

3.6. Sampling

This section describes the sample size and sampling techniques that were used for the study.

3.6.1. Sampling strategy

A non-probability convenience sampling strategy was used to select ICU and Emergency nurses who met the study eligibility criteria to get the sample. Convenience sampling method was adopted as the number of the staff in these units is small.

3.6.1.1 Inclusion criteria

All registered nurses who worked in ICU and emergency department were included in the study and who consented.

3.6.1.2 Exclusion criteria

All registered nurses who did not sign consent to participate in the study and those who were on leave during the period of data collection.

3.6.2. Sample size

The sample size were all 69 registered nurses who work in ICU (adult and pediatric) and emergency department.

3.7. Data Collection

Data collection is the process of gathering information needed for research. The data may be collected in numbers or words (Creswell, 2014). Data collection methods are approaches used to gather information for research and those are observation, interviews, and questionnaires.

3.7.1. Data Collection instruments

A structured questionnaire which consisted of seven structured groups of question was used to find out the factors affecting nurse's practice to effective enteral feeding for critically ill patients in ICU and emergency at CHUK. They are about demographic information related barriers, material related factors of enteral feeding, accessibility of protocol and guidelines related barriers of enteral feeding, knowledge related barriers of enteral feeding, treatment related barriers of enteral feeding and patient related barriers of enteral feeding. All those question are developed using a simple language that respondents could be able to understand so that they could complete it without researcher's assistance in order to minimize biases during data collection. The questionnaire was developed in three languages used in Rwanda, which are Kinyarwanda, French and English to minimize the barriers of communication to the respondents and enhance informed consent.

3.7.2. Validity and reliability of research instruments

Validity of an instrument refers to its capacity to measure that which it was designed to measure while reliability is the degree with which an instrument accurately measures something free of error (Garcia de Yébenes Prous *et al*., 2009). In this study face validity, which is the extent to which an instrument looks as if it measures what it is intended to measure, was used (Patton in Havins, 2006). If one can look at an instrument and understand what is being measured, it has face validity (Patton in Havins, 2006). This questionnaire is adapted from a recently used questionnaire in Darawad *et al.*'s research about "ICU Nurses' Perceived Barriers to Effective Enteral Nutrition Practices: A Multicenter Survey Study" (Darawad *et al.*, 2018) which match with this study topic "factors affecting implementation of enteral feeding practice among ICU and emergency nurses in one of the referral hospitals in Kigali, Rwanda" and was validated by Cahill et al. to be valid for this objective (Cahill *et al.*, 2014).

Table 3.1: Content validity

Objectives	**Research question**	**Questionnaire**
To determine the barriers associated to enteral feeding practice among ICU and Emergency nurses	What are the barriers associated to enteral feeding among ICU and Emergency nurses?	**Q_2 (№ 1– 28)**
To identify factors associated with poor enteral feeding practice for critically ill patient.	What are the factors that hinder the practice of enteral feeding practice for critically ill patient?	**Q_3 (1– 30)**

3.7.3. Data collection procedure

After getting approval from IRB/CMHS, the researcher applied for permission to conduct research from CHUK ethics committee. Once permission was granted, the researcher met the managers of CHUK, ICU and Emmergency to introduce himself and explain the study purpose and ask permission to conduct the study in their institution. The ones who agreed to participate in the study signed the consent form writen in Kinyarwanda, French and English according to participants preferred language, then the researcher distributed questionnaires to the respondents. The respondants gave back the completed questionnaires to the researcher after completion and this process took about three months so that the researcher found the time to reach to all nurses working in ICU and emergency departments who wanted to participate in this study.

3.8. Data analysis

The data were analyzed using Statistical Package for Social Sciences (SPSS) and Microsoft excel software. The information was expressed in numerical form such as frequencies, averages and means. The inferential statistics were used for associations among variables like demographics and some barriers and factors. The research records showed frequencies and percentages.

3.9. Ethical considerations

The defence of ethical guidelines refers to whether a researcher demonstrates competency, maintains honesty in the management of the resources, acknowledges sources and the input of supporters during the study and presents an accurate report of the finding. The researcher respected the following ethical protocols: Request for permission to conduct the study from University of Rwanda/CMHS, then he submitted it to the Research committee at CHUK. The informed consent of the participants was obtained and assured by explaining to them the purpose of the study, the methods of data collection and the significance of the study. In order to maintain the privacy of the participants, the researcher guided participants not to indicate their names on the questionnaire. In case there was need for withdrawal from the study, participants were allowed to withdraw freely at any time without experiencing any penalty or sanction. Anonymity and confidentiality were maintained by hiding the identity of respondents and by declining any unauthorised access to the information or data from the subjects.

The researcher informed the participants that there would be no payment for their participation in the study but hoped that the study would benefit future quality improvement efforts. The results obtained from the study assisted the researcher to formulate conclusion and recommendations basing on the findings.

3.10. Data management

All data were collected, quantified and entered in software such as SPSS version 21 and Microsoft excel for data analysis. Then stored on secured external hard disk. Soft data were stored in a password controlled personal computer. Hard data like questionnaires were kept in a locked cupboard with the key known to the researcher only. Keeping confidentiality was assured and data were used only for the research purpose. The data will be kept for three years after completion of the study then destroyed by incineration.

3.11. Data Dissemination

The results/findings from the study will be published in a peer review journal in order to be accessible to the user in need. The researcher will also provide a final project report to the study research setting in order to facilitate them to set strategies to overcome barriers faced in enteral feeding practice.

3.12. Limitations of the study

The study was conducted in Centre Hospitalier Universitaire de Kigali and the results will not be generalized to other teaching hospitals in Rwanda because of the small sample of nurses due to the small population of nurses working in ICUs and emergency. Data were collected using structured questionnaire. The study focused on nurses working in A&E and ICU of CHUK, the findings were not widespread to the other health care providers or staff working in the same hospital as these units are unique and barriers in them may not be shared by other wards. Critically ill patients are found mostly in those services, so others were not concerned by this research. The study was limited by low sample size, and the data was self-reported, therefore the participants may have given expected data (Hawthorne effect).

3.13: Conclusion

This chapter described the study approach that was quantitative, study design that was nonexperimental cross-sectional, the study setting was in one public referral hospital and conducted in three services caring for critically ill patients. The sampling strategy was convenience sampling methods, data collection methods used a questionnaire which was validated and reliable. Data collection procedures respected the academic and ethical regulations. Data analysis were done using SPSS with descriptive statistics, data management respected the regulations, ethical consideration were respected for the participants and it was voluntary with informed consent. Data dissemination is planned also done for academic purpose and study limitations were found to be small size of the sample population.

CHAPTER FOUR: PRESENTATION OF FINDINGS

4.1. Introduction

This chapter presents the study findings according to the objectives of the study, which were (1) to determine the barriers to enteral feeding practice as perceived by ICU and Emergency nurses, (2) To identify demographic factors associated with barriers to enteral feeding practice for critically ill patients as perceived by ICU and Emergency nurses. About 69 questionnaires were distributed to 69 respondents and the respondents had the free right to not answer some questions depending on their will. Questionnaires were distributed to the respondents after obtaining their consent and data entry was done using a computer and analysis was done using the Statistical Package for the Social Sciences (SPSS) software Version 21. All 69 distributed questionnaires were collected back with all questions answered.

4.2. Distribution of nurses by demographic characteristics

The respondents of this study were 69 nurses in which 3(4.3%) were unit managers, 63(95.7) were bedside nurses. Adult ICU were 33(47.8%), pediatric ICU were 10(14.5%) and emergency were 26 (37.7%). The respondents were aged between 23 and 48 years old in which 40(58%) were females against 29(42%) who were males. The qualification of the respondents was as follows: The nurses with certificate diploma were 1(1.4%), advanced diploma were 47(68.1%), bachelor's degree were 17(24.6%) and those with master's degree were 4(5.8%). The respondents' experience was as follows: 16(23.2%) had less than 1 year experience, 19(28.9%) between one and three years, 18(24.6%) between four to six years, 3(4.3%) between seven to nine years, 8(11.6%) between ten to fourteen years and 5(7.2%) were fifteen years and above. The details of distribution of nurses by demographic characteristics are illustrated in table 4.1below**.**

Table 4.2. Distribution of nurses by demographic characteristics

Variables	Frequency: n=69	Percentage:%
Distribution of nurses by gender		
Male	29	42
Female	40	58
Total	69	100
Distribution of nurses by working service		

Adult ICU	33	47.8%
Pediatric ICU	10	14.5%
Emergency	26	37.7%
Total	69	100
Distribution of nurses by job title		
Bedside nurses	66	95.7%
lUnit managers	3	4.3%
Total	69	100
Distribution of nurses by qualification		
Master's level	4	5.8%
Bachelor degree	17	24.6%
Advanced diploma	47	68.1%
Certificate diploma	1	1.4%
Total	69	100
Distribution of nurses by working experience		
Less than one year	16	23.2%
Between 1-3 years	20	29%
Between4-6 years	17	24.6%
Between 7-9 years	3	4.3%
15 years and above	5	7.2%
Total	69	100

4.3. Presentation of the factors affecting enteral feeding practice as perceived by ICU and Emergency nurses

The participants were asked to determine the barriers associated with enteral feeding practice. The questions were grouped into six categories relating to barriers of enteral feeding practice which were: Human resources related barriers, material resources related barriers, accessibility of protocol and guidelines related barriers, knowledge related barriers, treatment related barriers and patient related barriers. The responders were supposed to answer **Yes** if they faced the suggested barrier or **No** if they did not face the suggested barrier among the possible barriers provided in the questionnaire.

In general, the majority of ICU and Emergency nurses were aware and able to identify the factors which were predominantly barriers that they faced while providing enteral feeding to critically ill patients as evidenced by the findings presented below.

4.3.1: Human resources related barriers of enteral feeding.

The respondents reported most barriers that hindered the practice of EN as being overworked, 67(97.1%), physician not ordering EN reported by all respondents, 69(100%), and staff shortage

reported by 56(81.2%), which is grouped into the following elements: Lack of Dietician 65(94.2%), Intensivist 69(100%), Clinical Pharmacist 69(100%) and Palliative Care Specialist 69(100%). The detailed human resources barriers to enteral feeding are shown in table 4.2 below.

Table 4.3.1: Human resources related barriers of enteral feeding.

Variables	Frequency N=69	**Percentage %**
The physicians delay in ordering enteral feeding for the patients.		
Yes	9	13
No	60	87
The physicians do not want to order enteral feeding for the patients		
No	69	100
I am overworked		
Yes	67	97.1
No	2	2.9
I have to wait for the dietitian to assess the patient		
Yes	39	56.5
No	39	43.5
The dietitian time dedicated to the ICU is not enough during regular weekday hours		
Yes	39	56.5
No	30	43.5
There is no dietitian time dedicated to the ICU during regular weekday hours		
Yes		
No	50	72.5
	19	27.5
The dietitian coverage is not sufficient during evenings, weekends and holidays		
Yes		
No	65	94.2
	4	5.8
I cannot find the dietitian during evenings, weekends and holidays		
Yes	57	82.6
No	12	17.4
New orders for enteral feeding are not filled in ICU on weekends/after hours		
Yes		
No	47	68.1
	22	31.9
I have to wait for physician/radiologist to read x-ray and confirm tube placement		
Yes		
No	15	21.7
	54	78.3
There is not enough nursing staff to adequately feed the critically ill patients		
Yes		
No	56	81.2
	13	18.8
A problem of staff shortage		
Yes	54	78.3
No	15	21.7

Presence of intensivists/clinical nutrition physicians Yes No	 28 41	 40.5 59.5
Presence of dietitians Yes No	 39 30	 56.5 43.4
Presence of clinical pharmacists Yes No	 69 0	 100 0
Lack of physical therapists Yes No	 0 69	 0 100
Lack of palliative care specialists Yes No	 0 69	 0 100

4.3.2 Materials resources related barriers of enteral feeding.

Participants also reported lack and insufficiency of appropriate material and feeding related equipment, such as: lack of standard and semi-elemental feeding formula reported by 65(94.2%) and 66(95.7%) respectively, feeding tubes by 57(82.6%), feeding pump by 61(88.4%), absence of duodenal tube by 64(92.8%) and nutrition bag by 69(100%) as the most predominant material related barriers for EN (See Table 4.3 below).

Table 4.3: Materials resources related barriers of enteral feeding (N=69)

Variables	**Frequency**	**Percentage**
I miss feeding tubes, syringes and other needed materials in place Yes No	 57 12	 82.6 17.4
I miss the feeding formula Yes No	 65 4	 94.2 5.8
There is no feeding pump in the unit Yes No	 61 3	 88.4 12.6
There is no semi-elemental formula available (Only standard formula available Yes No	 66 3	 95.7 4.3
There are no duodenal tubes available (Only gastric tubes). Yes No	 64 5	 92.8 7.2
Use different tubes for feeding and delivering contrast for critically ill patient Yes No	 12 57	 17.4 82.6

Lack of prokinetic drugs Yes No	 47 22	 68.1 31.9
Facing problems with small-bore feeding tube such as absence clogged or not approved Yes No	 20 49	 29 69.6
Access to enteral feeding formula Yes No	 5 64	 7.2 92.8
Feeding tubes availability Yes No	 67 2	 97.1 2.9
Availability enteral pumps Yes No	 34 35	 49.3 55.7
Availability of nutrition bag/Container Yes No	 0 69	 0 100
Availability of feeding pump set Yes No	 26 41	 37.7 59.4
Availability of syringes and clamps Yes No	 51 17	 73.9 24.6
Access to materials for confirming tube placement Yes No	 39 29	 56.5 43.5

4.3.3 Protocol and guidelines accessibility related barriers of enteral feeding.

For feeding protocols and guidelines accessibility, the results show that 58(84.1%) reported not to have any protocol in place to guide them in initiating and progression of EN, 54((78.3%) reported that guideline is not readily accessible to refer on it while 49(71%) reported not to be familiar with the protocol and guidelines against 50(72.5%) who reported not to have good understanding of the language of the current guideline. See Table 4.4 below.

Table 4.: Protocol and guidelines accessibility related barriers of enteral feeding. (N=69)

Variables	**Frequency**	**Percentage**
I am not familiar with current guidelines of enteral feeding for patients in ICU Yes No	 49 20	 71 29
I do not understand the language of the recommendations of the current guidelines for enteral feeding. Yes No	 50 19	 72.5 27.5

The current guidelines for nutrition are not readily accessible when I want to refer to them		
Yes	54	78.3
No	15	21.7
I cannot find feeding protocol in place to guide me for the initiation and progression of enteral feeding		
Yes	58	84.1
No	11	15.9
Outdated feeding protocol		
Yes	30	43.5
No	39	56.5

4.3.4: Knowledge and attitude related barriers to enteral feeding

Regarding knowledge and attitude related barriers to enteral feeding, 69(100%) reported that EN is having good impact on patient outcome while 64(92.8%) reported that EN is a good practice for critically ill patients. But 64(92.8%) reported not having any training on EN, 62(89.9%) reported not having enough training on EN, 60(87%) reported having difficulties in obtaining small bowel access for patient not tolerating EN and 56(81.2%) identified that poor communication can lead to delay in initiation or progression of enteral feeding. See Table 4.5 below

Table 4.5: Knowledge and attitude related barriers to enteral feeding

Variables	**Frequency (n=69)**	**Percentage (%)**
I believe that provision of enteral feeding does not impact patient outcomes		
Yes	0	0
No	69	100
I think enteral feeding is not good for a critically ill patient		
Yes	5	7.2
No	64	92.8
I do not have training on enteral feeding for critically ill patient		
Yes	64	92.8
No	5	7.2
I do not have enough training about enteral feeding for critically ill patients		
Yes	62	89.9
No	7	10.1
I do not practice enteral feeding because it is hard to administer.		
Yes	4	5.8
No	65	94.2
I do not practice enteral feeding because it is hard to monitor		
Yes	5	7.2
No	64	92.8
There is no scientific evidence supporting enteral feeding practice		
Yes	5	7.2
No	64	92.8

Inadequate knowledge of some nurses		
Yes	19	27.5
No	50	72.5
The nurses fail to restart enteral feeding to patients after an interruption		
Yes	32	46.4
No	37	53.6
Delays in initiating motility agents in patients not tolerating enteral nutrition		
Yes	51	73.9
No	18	26.1
Delays and difficulties in obtaining small bowel access in patients not tolerating enteral nutrition		
Yes	60	87
No	9	13
Poor communication amongst the ICU team regarding the nutrition management results in delays in initiating or progression of enteral feeding		
Yes	56	81.2
No	13	18.8

4.3.5: Distribution of treatment related barriers of enteral feeding.

The findings in this category showed that 52(75.4%) reported that EN can increase the hospital cost while feeding interruption was reported to be the most barrier related to treatment in which different circumstances were identified to be involved in EN interruption, like being interrupted by residual volumes, 66(95.7%), being interrupted by weaning process from mechanical ventilation, 56 (81.2%), being interrupted by preparation for surgical interventions, 54(78.3%), procedures that require enteral nutrition to be interrupted, 57(82.6%), against 64(92.8%) reporting that interruption by bathing process cannot be a barrier to enteral nutrition. See Table 4.6 below.

Table 4.6: Treatment related barriers of Enteral feeding N=69

Variables	**Frequency**	**Percentage:%**
Increased hospital cost for enterally fed patients		
Yes	52	75.4
No	17	24.6
Being interrupted by residual volumes		
Yes	66	95.7
No	3	4.3
Being interrupted by weaning process		
Yes	56	81.2
No	13	18.8
Being interrupted by preparation of surgical interventions		
Yes	54	78.3
No	15	21.7
Being interrupted by hemodynamic instability or shock Yes	24	34.8
No	45	65.2

Procedures that require enteral nutrition to be interrupted		
Yes	57	82.6
No	12	17.4
Interruption of enteral nutrition to perform radiological procedures		
Yes	28	40.6
No	41	59.4
Interruption by bathing process		
Yes	5	7.2
No	64	92.8

4.3.6. Patient related barriers of enteral feeding.

Finally, low level of physical activity/reduced bowel movement which was reported by 65 (94.2%) of all respondents and gastro-intestinal tract complications like abdominal bloating, vomiting, constipation and diarrhea reported by 57(82.6%), were the two important barriers related to patient condition. See Table 4.7 below.

Table 4.7: Patient related barriers of enteral feeding N=69

Variables	**Frequency**	**Percentage:%**
A problem of patients or guardians refusal		
Yes	31	44.9
No	38	55.1
A problem of ignorance of guardians		
Yes	13	18.8
No	56	81.2
Some patients remove or cough up tube		
Yes	38	55.1
No	31	44.9
Low level of physical activity/reduced bowel movement		
Yes	65	94.2
No	4	5.8
Injury stress		
Yes	25	36.2
No	44	63.8
The thermic effect of the food.		
Yes	9	13
No	60	87
Gastro-Intestinal Tract complications like abdominal bloating, vomiting, constipation and diarrhea		
Yes	57	82.6
No	12	17.4

4.4: Demographic factors associated to enteral feeding practice for critically ill patients as perceived by ICU and Emergency nurses.

After determining each of the barriers according to categories as specified above, the researcher computed the associations between the demographic characteristics and the barriers to enteral feeding according to the categories in the questionnaire, namely Human resource, material resource, accessibility of protocols and guidelines, knowledge and attitude treatment and patient/family related barriers as demonstrated in the following tables below. Chi-square test was used to determine these associations set at p value of ≤ 0.05.

4.4.1: Demographic factors associated with human resources related barriers of enteral feeding.

Table 4.8 demonstrates associations between demographic characteristics and human resource related factors/barriers (p value ≤ 0.05), for example associations were found between:

Gender and Human resources among the following factors:

The dietician coverage is not sufficient during evenings, weekends and holidays (p value 0.017).

Working place and Human resources

The dietitian time dedicated to the ICU is not enough during regular weekday hours P value 0.000); There is no dietitian time dedicated to the ICU during regular weekday hours (p value =0.000); New orders for enteral feeding are not filled in ICU on weekends/after hours (p value =0.000) and a problem of staff shortage (p value=0.019).

Age of participants and Human resources

Presence of dietitians (p value =0.000), Lack of palliative care specialists (0.000).

Job title and human resources

Presence dietitians (p value =0.000)

Qualification of participant and human resources

New orders for enteral feeding are not filled in ICU on weekends/after hours (p value=0.05)

Working experience of participant and human resources

A problem of staff shortage (p=0.05)

Table 4.8: **Demographic factors associated with human resources related barriers of enteral feeding.**

Gender and human resources barriers	**Chi-square**	**P Value**
The physicians delay in ordering enteral feeding for the patients.	0.200[a]	0.654
I am overworked	0.046[a]	0.831
I have to wait for the dietitian to assess the patient	010 [a]	0.919
The dietitian time dedicated to the ICU is not enough during regular weekday hours	0.65 [a]	0.418
There is no dietitian time dedicated to the ICU during regular weekday hours	2.875[a]	0.90
The dietitian coverage is not sufficient during evenings, weekends and holidays	5.716 [a]	**0.017**
I cannot find the dietitian during evenings, weekends and holidays	1.466 [a]	0.226
New orders for enteral feeding are not filled in ICU on weekends/after hours	0.719 [a]	0.397
I have to wait for physician/radiologist to read x-ray and confirm tube placemen	0.127[a]	0.721
There is not enough nursing staff to adequately feed the critically ill patients	0.824 [a]	0.364
A problem of staff shortage	2.369 [a]	0.124
Presence of intensivists/clinical nutrition physicians	1.052 [a]	0.305
Presence dietitians	0.10 [a]	0.919
Lack of palliative care specialists	1.365[a]	0.243
Working service and human resources related barriers	**Chi-square**	**P Value**
The physicians delay in ordering enteral feeding for the patients.	1.22[a]	0.55
I am overworked	2.247 [a]	0.325
I have to wait for the dietitian to assess the patient	4.579 [a]	0.101
The dietitian time dedicated to the ICU is not enough during regular weekday hours	**25.086[a]**	**0.000**
There is no dietitian time dedicated to the ICU during regular weekday hours	**19.674[a]**	**0.000**
The dietitian coverage is not sufficient during evenings, weekends and holidays	2.579 [a]	0.275
I cannot find the dietitian during evenings, weekends and holidays	4.326 [a]	0.115
New orders for enteral feeding are not filled in ICU on weekends/after hours	**21.658[a]**	**0.000**
I have to wait for physician/radiologist to read x-ray and confirm tube placemen	0.959 [a]	0.619
There is not enough nursing staff to adequately feed the critically ill patients	2.955 [a]	0.228
A problem of staff shortage	**7.974[a]**	**0.019**

Presence of intensivists/clinical nutrition physicians	46.766 [a]	0.000
Presence dietitians	54.696 [a]	0.000
Lack of palliative care specialists	5.987 [a]	0.50
Age of participant and human resources related barriers	**Chi-square**	**P Value**
The physicians delay in ordering enteral feeding for the patients.	36.476[a]	0.19
I am overworked	19.653[a]	0.543
I have to wait for the dietitian to assess the patient	4.579[a]	0.276
The dietitian time dedicated to the ICU is not enough during regular weekday hours	32.415[a]	0.53
There is no dietitian time dedicated to the ICU during regular weekday hours	13.658[a]	0.884
The dietitian coverage is not sufficient during evenings, weekends and holidays	18.846 [a]	0.595
I cannot find the dietitian during evenings, weekends and holidays	32.088 [a]	0.57
New orders for enteral feeding are not filled in ICU on weekends/after hours	23.984[a]	0.29
I have to wait for physician/radiologist to read x-ray and confirm tube placemen	24.231 [a]	0.282
There is not enough nursing staff to adequately feed the critically ill patients	21.651 [a]	0.420
A problem of staff shortage	34.071[a]	0.36
Presence of intensivists/clinical nutrition physicians	27.675 [a]	0.150
Presence dietitians	54.696 [a]	**0.000**
Lack of palliative care specialists	69.000[a]	**0.000**
Job title of participant and human resources related barriers	**Chi-square**	**P Value**
The physicians delay in ordering enteral feeding for the patients.	0.470[a]	0.493
I am overworked	0.94[a]	0.760
I have to wait for the dietitian to assess the patient	4.077[a]	0.43
The dietitian time dedicated to the ICU is not enough during regular weekday hours	0.131[a]	0.717
There is no dietitian time dedicated to the ICU during regular weekday hours	0.53[a]	0.818
The dietitian coverage is not sufficient during evenings, weekends and holidays	0.193[a]	0.660
I cannot find the dietitian during evenings, weekends and holidays	0.660 [a]	0.416
New orders for enteral feeding are not filled in ICU on weekends/after hours	1.743[a]	0.186
I have to wait for physician/radiologist to read x-ray and confirm tube placemen	0.871 [a]	0.351
There is not enough nursing staff to adequately feed the critically		0.619

ill patients	0.248 [a]	
A problem of staff shortage	0.68[a]	0.794
Presence of intensivists/clinical nutrition physicians	0.131 [a]	0.717
Presence dietitians	54.696 [a]	**0.000**
Lack of palliative care specialists	0.46[a]	0.830
Qualification of participant and human resources related barriers	**Chi-square**	**P Value**
The physicians delay in ordering enteral feeding for the patients.	4.9320[a]	0.177
I am overworked	0.964[a]	0.810
I have to wait for the dietitian to assess the patient	7.610[a]	0.055
The dietitian time dedicated to the ICU is not enough during regular weekday hours	0.903[a]	0.825
There is no dietitian time dedicated to the ICU during regular weekday hours	3.962[a]	0.266
The dietitian coverage is not sufficient during evenings, weekends and holidays	1.988[a]	0.575
I cannot find the dietitian during evenings, weekends and holidays	5.545[a]	0.136
New orders for enteral feeding are not filled in ICU on weekends/after hours	**13.015[a]**	**0.05**
I have to wait for physician/radiologist to read x-ray and confirm tube placemen	1.954 [a]	0.582
There is not enough nursing staff to adequately feed the critically ill patients	2.505 [a]	0.417
A problem of staff shortage	1.075[a]	0.783
Presence of intensivists/clinical nutrition physicians	2.567 [a]	0.463
Presence dietitians	1.422 [a]	0.700
Lack of palliative care specialists	0.475[a]	0.924

Working experience of participant and human resources related barriers	**Chi-square**	**P Value**
The physicians delay in ordering enteral feeding for the patients.	13.4550[a]	0.19
I am overworked	1.807[a]	0.875
I have to wait for the dietitian to assess the patient	4.291[a]	0.508
The dietitian time dedicated to the ICU is not enough during regular weekday hours	5.727[a]	0.334
There is no dietitian time dedicated to the ICU during regular weekday hours	3.725[a]	0.590
The dietitian coverage is not sufficient during evenings, weekends and holidays	2.790[a]	0.732
New orders for enteral feeding are not filled in ICU on weekends/after hours	9.824[a]	0.80
I have to wait for physician/radiologist to read x-ray and	6.938 [a]	0.225

confirm tube placemen		
There is not enough nursing staff to adequately feed the critically ill patients	2.295 [a]	0.807
A problem of staff shortage	**12.009[a]**	**0.035**
Presence of intensivists/clinical nutrition physicians	6.756 [a]	0.239
Presence dietitians	4.976[a]	0.419
Lack of palliative care specialists	2.486[a]	0.779

4.4.2: Demographic characteristics of the respondents and material resources

The demographic characteristics were further associated with the material resource related factors or barriers and associations were found among the following:

Gender and material resources

Facing problems with small-bore feeding tube such as absence clogged or not approved (0.003)

Access to enteral feeding formula (0.045)

Working service and material resources related barriers

There is no feeding pump in the unit (0.000)

Facing problems with small-bore feeding tube such as absence clogged or not approved (0.009)

Availability enteral pumps (0.000)

Availability of feeding pump set (0.000)

Access to materials for confirming tube placement (0.015)

Age and material resources related barriers

There is no semi-elemental formula available (Only standard formula available) (0.000) and Lack of prokinetic drugs (0.023).

Job tittle and material resources related barriers

Availability of feeding pump set (0.031)

Access to materials for confirming tube placement (0.038)

Qualification of participants and material resources related barriers

Access to materials for confirming tube placement (0.038)

Working experience of participants and material resources related barriers

There is no semi-elemental formula available (Only standard formula available (0.004)

There are no duodenal tubes available (Only gastric tubes) (0.006)

Lack of prokinetic drugs (0.012).

Table 4.9: Demographic factors associated with material resources related barriers of enteral feeding

Gender and material resources barriers	Chi -Square	P value
I lose the feeding formula	3.160[a]	0.075
There is no feeding pump in the unit	0.322 [a]	0.570
0There are no duodenal tubes available (Only gastric tubes).	0.15[a]	0.901
Use different tubes for feeding and delivering contrast for critically ill patient	1.078[a]	0.299
Facing problems with small-bore feeding tube such as absence clogged or not approved	**8.814[a]**	**0.003**
Access to enteral feeding formula	**4.013[a]**	**0.045**
Feeding tubes availability	1.532[a]	0.216
Availability enteral pumps	0.277[a]	0.598
Availability of feeding pump set	0.254[a]	0.615
Availability of syringes and cramp	0.887[a]	0.642
Access to materials for confirming tube placement	2.374[a]	0.305
Working service and material resources related barriers	**Chi -Square**	**P value**
I lose feeding tubes, syringes and other needed materials in place	1.452[a]	0.484
I lose the feeding formula	0.788[a]	0.674
There is no feeding pump in the unit	20.932 [a]	**0.000**
There is no semi-elemental formula available (Only standard formula available	0.922	0.631
There are no duodenal tubes available (Only gastric tubes).	5.881[a]	0.053
Use different tubes for feeding and delivering contrast for critically ill patient	1.270[a]	0.530
Lack of prokinetic drugs	3.621[a]	0.164
Facing problems with small-bore feeding tube such as absence clogged or not approved	**9.313[a]**	**0.009**
Access to enteral feeding formula	2.245[a]	0.325
Feeding tubes availability	1.532[a]	0.216
Availability of enteral pumps	**31.971[a]**	**0.000**
Availability of feeding pump set	**19.234[a]**	**0.000**
Availability of syringes and cramp	5.790[a]	0.217
Access to materials for confirming tube placement	**12.313[a]**	**0.015**
Age and material resources related barriers	Chi -Square	P value
I lose feeding tubes, syringes and other needed materials in place	20.780[a]	0.472
I lose the feeding formula	26.525[a]	0.204
There is no feeding pump in the unit	21.825[a]	0.450
There is no semi-elemental formula available (Only standard formula available	56.977[a]	**0.000**
There are no duodenal tubes available (Only gastric tubes).	17.092[a]	0.706

Use different tubes for feeding and delivering contrast for critically ill patient	27.701[a]	0.149
Lack of prokinetic drugs	**35.746**	**0.023**
Facing problems with small-bore feeding tube such as absence clogged or not approved	29.279[a]	0.107
Access to enteral feeding formula	16.596[a]	0.735
Feeding tubes availability	21.627[a]	0.421
Availability enteral pumps	23.991[a]	0.291
Availability of feeding pump set	**34.680[a]**	**0.031**
Availability of syringes and cramp	31.088[a]	0.892
Access to materials for confirming tube placement	**59.650[a]**	**0.038**
Job tittle and material resources related barriers	**Chi -Square**	**P value**
I lose feeding tubes, syringes and other needed materials in place	0.660[a]	0.416
I lose the feeding formula	0.193[a]	0.660
There is no feeding pump in the unit	0.000[a]	1
There is no semi-elemental formula available (Only standard formula available	0.143[a]	0.706
There are no duodenal tubes available (Only gastric tubes).	0.245[a]	0.621
Use different tubes for feeding and delivering contrast for critically ill patient	0.660[a]	0.416
Lack of prokinetic drugs	1.468	0.226
Facing problems with small-bore feeding tube such as absence clogged or not approved	0.23[a]	0.879
Access to enteral feeding formula	16.596[a]	0.736
Feeding tubes availability	21.627[a]	0.421
Availability enteral pumps	23.991[a]	0.294
Availability of feeding pump set	**34.680[a]**	**0.031**
Availability of syringes and cramp	31.088[a]	0.892
Access to materials for confirming tube placement	**59.650[a]**	**0.038**

Qualification of participants and material resources related barriers	Chi -Square	P value
I lose feeding tubes, syringes and other needed materials in place	1.503[a]	0.682
I lose the feeding formula	0.143[a]	0.706
There is no feeding pump in the unit	0.245[a]	0.621
There is no semi-elemental formula available (Only standard formula available	0.660[a]	0.416
There are no duodenal tubes available (Only gastric tubes).	1 .468[a]	0.226
Use different tubes for feeding and delivering contrast for critically ill patient	0.023[a]	0.873
Lack of prokinetic drugs	0.245[a]	0.621
Facing problems with small-bore feeding tube such as absence clogged or not approved	**0.094[a]**	**0.760**
Access to enteral feeding formula	0.319[a]	0.572
Feeding tubes availability	0.40[a]	0.842
Availability enteral pumps	1.107[a]	0.175
Availability of feeding pump set	0.797[a]	0.0671
Availability of syringes and cramp	31.088[a]	0.892
Access to materials for confirming tube placement	**59.650[a]**	**0.038**

Working experience of participants and material resources related barriers	Chi -Square	P value
I lose feeding tubes, syringes and other needed materials in place	6.591[a]	0.253
I lose the feeding formula	7.656 [a]	0.176
There is no feeding pump in the unit	2.305[a]	0.806
There is no semi-elemental formula available (Only standard formula available	**17.514[a]**	**0.004**
There are no duodenal tubes available (Only gastric tubes).	**16.489[a]**	**0.006**
Use different tubes for feeding and delivering contrast for critically ill patient	4.126[a]	0.531
Lack of prokinetic drugs	**14.625**	**0.012**
Facing problems with small-bore feeding tube such as absence clogged or not approved	6.732[a]	0.241
Access to enteral feeding formula	5.462[a]	0.362

Feeding tubes availability	5.046[a]	0.410
Availability enteral pumps	7.053[a]	0.217
Availability of feeding pump set	10.070[a]	0.073
Availability of syringes and cramp	11.385[a]	0.328
Access to materials for confirming tube placement	12.752[a]	0.238

4.4.3: Demographic factors associated with accessibility of protocol and guidelines related barriers of enteral feeding

Demographic characteristics were then associated with factors associated with accessibility of protocols and guidelines and the following associations were significant as demonstrated in table 4.10 below:

Gender and accessibility of protocols and guidelines in relation to:

I cannot find feeding protocol in place to guide me for the initiation and progression of enteral feeding (**0.004)**

Working service and accessibility of protocol and guidelines related barriers

I do not understand the language of the recommendations of the current guidelines for enteral feeding (0.015).

The current guidelines for nutrition are not readily accessible when I want to refer to them (0.050).

Age of participant and accessibility of protocol and guidelines related barriers

I am not familiar with current guidelines of enteral feeding for patients in ICU (0.045).

Table 4.10: Demographic factors to associated accessibility of protocol and guidelines related barriers of enteral feeding

Gender and accessibility of protocol and guidelines related barriers	**Chi Square**	**P value**
I am not familiar with current guidelines of enteral feeding for patients in ICU	0.64[a]	0.800
I do not understand the language of the recommendations of the current guidelines for enteral feeding.	1.075	0.300
The current guidelines for nutrition are not readily accessible when I want to refer to them	0.55	0.814
I cannot find feeding protocol in place to guide me for the initiation and progression of enteral feeding	**8.232**	**0.004**
Outdated feeding protocol	2.506	0.113
Working service and accessibility of protocol and guidelines related barriers	**Chi Square**	**P value**
I am not familiar with current guidelines of enteral feeding for patients in ICU	3.375[a]	0.185
I do not understand the language of the recommendations of the current guidelines for enteral feeding.	**8.365**	**0.015**
The current guidelines for nutrition are not readily accessible when I want to refer to them	**6.002**	**0.050**
I cannot find feeding protocol in place to guide me for the initiation and progression of enteral feeding	3.969	0.137
Outdated feeding protocol	4.579	0.101
Age of participant and accessibility of protocol and guidelines related barriers	**Chi Square**	**P value**
I am not familiar with current guidelines of enteral feeding for patients in ICU	**33.131[a]**	**0.045**
I do not understand the language of the recommendations of the current guidelines for enteral feeding.	23.979	0.294
The current guidelines for nutrition are not readily accessible when I want to refer to them	22.957	0.346
I cannot find feeding protocol in place to guide me for the initiation and progression of enteral feeding	23.363	0.334
Outdated feeding protocol	21.978	0.401
Qualification of participant and accessibility of protocol and guidelines related barriers	**Chi Square**	**P value**

I am not familiar with current guidelines of enteral feeding for patients in ICU	7.492[a]	0.058
I do not understand the language of the recommendations of the current guidelines for enteral feeding.	5.549 [a]	0.136
The current guidelines for nutrition are not readily accessible when I want to refer to them	1.983 [a]	0576
I cannot find feeding protocol in place to guide me for the initiation and progression of enteral feeding	**3.604 [a]**	**0.308**
Outdated feeding protocol	1.154 [a]	0.764
Job title and accessibility of protocol and guidelines related barriers	**Chi Square**	**P value**
I am not familiar with current guidelines of enteral feeding for patients in ICU	0.029[a]	0.865
I do not understand the language of the recommendations of the current guidelines for enteral feeding.	1.192 [a]	0.275
The current guidelines for nutrition are not readily accessible when I want to refer to them	0.871 [a]	0.351
I cannot find feeding protocol in place to guide me for the initiation and progression of enteral feeding	0.595 [a]	0.441
Outdated feeding protocol	0.131 [a]	0.717
Working experience and accessibility of protocol and guidelines related barriers.	**Chi Square**	**P value**
I am not familiar with current guidelines of enteral feeding for patients in ICU	5.701[a]	0.336
I do not understand the language of the recommendations of the current guidelines for enteral feeding.	4.126 [a]	0.531
The current guidelines for nutrition are not readily accessible when I want to refer to them	4.906 [a]	0.427
I cannot find feeding protocol in place to guide me for the initiation and progression of enteral feeding	9.098 [a]	0.105
Outdated feeding protocol	10.132 [a]	0.072

4.4.4 Demographic factors associated with knowledge and attitude related barriers

The demographic data was further associated with the knowledge and attitude category of the questions. The following showed significant associations with knowledge and attitude factors as follows:

Gender of participants

I do not practice enteral feeding because it is hard to implement (0.045)

Poor communication among the ICU team regarding the nutrition management resulting in delays in initiating or provision of enteral (p=0.031)

Work service of respondents

Inadequate knowledge of some nurses (P=0.011)

It is difficult for monitoring (p=0.004)

The nurses fail to restart enteral feeding to patients after an interruption (p=0.010)

Age of respondents

I do not practice enteral feeding because it is hard to monitor (p=0.020)

Delays in initiating motility agents in patients not tolerating enteral nutrition (p=0.035)

Qualification of responders

I do not have training on enteral feeding for critically ill patient (p=0.002)

Inadequate knowledge of some nurses (p=0.002)

It is difficult for monitoring (p=0.030)

The nurses fail to restart enteral feeding to patients after an interruption (p=0.008)

See Table 4.11 below.

Table 4.11: Demographic factors associated to knowledge related barriers

Variables	Chi-square	P-Value
Gender of participants * I think enteral feeding is not good for critically ill patient	1.132[a]	0.287
Gender of participants * I do not have training on enteral feeding for critically ill patient	0.015[a]	0.901
Gender of participants * I do not have enough training on enteral feeding for critically ill patient	2.566[a]	0.109
Gender of participants * I do not practice enteral feeding because it is hard to administer	0.541[a]	0.462
Gender of participants * I do not practice enteral feeding because it is hard to monitor	**4.013[a]**	**0.045**
Gender of participants * There is no scientific evidence supporting enteral feeding practice	1.132[a]	0.287
Gender of participants * I am not familiar with current guidelines of enteral feeding for patients in ICU	0.064[a]	0.800

Gender of participants * Inadequate knowledge of some nurses	2.875[a]	0.090
Gender of participants * It is difficult for monitoring	0.683[a]	0.409
Gender of participants * The nurses fail to restart enteral feeding to patients after an interruption	0.442[a]	0.506
Gender of participants * Delays in initiating motility agents in patients not tolerating enteral nutrition	0.032[a]	0.857
Gender of participants * Delays and difficulties in obtaining small bowel access in patients not tolerating enteral nutrition	1.769[a]	0.183
Gender of participants * Poor communication among the ICU team regarding the nutrition management resulting in delays in initiating or provision of enteral feeding	**4.644[a]**	**0.031**

Variables	**Chi-square**	**P-value**
Service of work for responders * I think enteral feeding is not good for critically ill patient	1.563[a]	0.458
Service of work for responders * I do not have training on enteral feeding for critically ill patient	1.563[a]	0.458
Service of work for responders * I do not have enough training on enteral feeding for critically ill patient	4.088[a]	0.130
Service of work for responders * I do not practice enteral feeding because it is hard to administer	5.298[a]	0.071
Service of work for responders * I do not practice enteral feeding because it is hard to monitor	0.190[a]	0.910
Service of work for responders * There is no scientific evidence supporting enteral feeding practice	1.563[a]	0.458
Service of work for responders * I am not familiar with current guidelines of enteral feeding for patients in ICU	3.375[a]	0.185
Service of work for responders * Inadequate knowledge of some nurses	8.978[a]	0.011
Service of work for responders * It is difficult for monitoring	**11.037[a]**	**0.004**
Service of work for responders * The nurses fail to restart enteral feeding to patients after an interruption	**9.306[a]**	**0.010**
Service of work for responders * Delays in initiating motility agents in patients not tolerating enteral nutrition	2.363[a]	0.307
Service of work for responders * Delays and difficulties in obtaining small bowel access in patients not tolerating enteral nutrition	1.506[a]	0.471
Service of work for responders * Poor communication among the ICU team regarding the nutrition management resulting in delays in initiating or provision of enteral feeding	4.059[a]	0.131

Variables	**Chi-square**	**P-value**
Age of responders * I think enteral feeding is not good for critically ill patient	22.051[a]	0.397
Age of responders * I do not have training on enteral feeding for critically ill patient	22.382[a]	0.378
Age of responders * I do not have enough training on enteral feeding for critically ill patient	20.366[a]	0.498
Age of responders * I do not practice enteral feeding because it is hard to administer	16.812[a]	0.722

Age of responders * I do not practice enteral feeding because it is hard to monitor	**36.433[a]**	**0.020**
Age of responders * There is no scientific evidence supporting enteral feeding practice	22.051[a]	0.397
Age of responders * I am not familiar with current guidelines of enteral feeding for patients in ICU	33.131[a]	0.045
Age of responders * Inadequate knowledge of some nurses	28.573[a]	0.125
Age of responders * It is difficult for monitoring	31.578[a]	0.078
Age of responders * The nurses fail to restart enteral feeding to patients after an interruption	29.638[a]	0.100
Age of responders * Delays in initiating motility agents in patients not tolerating enteral nutrition	**34.137[a]**	**0.035**
Age of responders * Delays and difficulties in obtaining small bowel access in patients not tolerating enteral nutrition	27.366[a]	0.159
Age of responders * Poor communication among the ICU team regarding the nutrition management resulting in delays in initiating or provision of enteral feeding.	29.652[a]	0.099

Variables	**Chi-square**	**P-value**
Job title * I think enteral feeding is not good for critically ill patient	0.245[a]	0.621
Job title * I do not have training on enteral feeding for critically ill patient	0.245[a]	0.621
Job title * I do not have enough training on enteral feeding for critically ill patient	0.354[a]	0.552
Job title * I do not practice enteral feeding because it is hard to administer	0.193[a]	0.660
Job title * I do not practice enteral feeding because it is hard to monitor	0.245[a]	0.621
Job title * There is no scientific evidence supporting enteral feeding practice	0.245[a]	0.621
Job title * I am not familiar with current guidelines of enteral feeding for patients in ICU	0.029[a]	0.865
Job title * Inadequate knowledge of some nurses	2.407[a]	0.121
Job title * It is difficult for monitoring	3.721[a]	0.054
Job title * The nurses fail to restart enteral feeding to patients after an interruption	0.519[a]	0.471
Job title * Delays in initiating motility agents in patients not tolerating enteral nutrition	1.107[a]	0.293
Job title * Delays and difficulties in obtaining small bowel access in patients not tolerating enteral nutrition	0.470[a]	0.493
Job title * Poor communication among the ICU team regarding the nutrition management resulting in delays in initiating or provision of enteral feeding	0.728[a]	0.394

Variables	**Chi-square**	**P-Value**
Qualification of responders * I think enteral feeding is not good for critically ill patient	2.523[a]	0.471
Qualification of responders * I do not have training on enteral feeding for critically ill patient	**15.348[a]**	**0.002**
Qualification of responders * I do not have enough training on enteral feeding for critically ill patient	**10.302[a]**	**0.016**
Qualification of responders * I do not practice enteral feeding because it is hard to administer	0.337[a]	0.953
Qualification of responders * I do not practice enteral feeding because it is hard to monitor	2.523[a]	0.471
Qualification of responders * There is no scientific evidence supporting enteral feeding practice	2.523[a]	0.471
Qualification of responders * I am not familiar with current guidelines of enteral feeding for patients in ICU	**7.492[a]**	**0.058**
Qualification of responders * Inadequate knowledge of some nurses	**14.393[a]**	**0.002**
Qualification of responders * It is difficult for monitoring	**19.462[a]**	**0.000**
Qualification of responders * The nurses fail to restart enteral feeding to patients after an interruption	6.242[a]	0.100
Qualification of responders * Delays in initiating motility agents in patients not	3.221[a]	0.359

tolerating enteral nutrition		
Qualification of responders * Delays and difficulties in obtaining small bowel access in patients not tolerating enteral nutrition	1.071[a]	0.784
Qualification of responders * Poor communication among the ICU team regarding the nutrition management resulting in delays in initiating or provision of enteral feeding	1.359[a]	0.715

Variables	**Chi-square**	**P-Value**
Working experience * I think enteral feeding is not good for critically ill patient	8.124[a]	0.150
Working experience * I do not have training on enteral feeding for critically ill patient	8.627[a]	0.125
Working experience * I do not have enough training on enteral feeding for critically ill patient	7.116[a]	0.212
Working experience * I do not practice enteral feeding because it is hard to administer	4.640[a]	0.461
Working experience * I do not practice enteral feeding because it is hard to monitor	10.363[a]	0.066
Working experience * There is no scientific evidence supporting enteral feeding practice	8.124[a]	0.150
Working experience * I am not familiar with current guidelines of enteral feeding for patients in ICU	5.701[a]	0.336
Working experience * Inadequate knowledge of some nurses	10.701[a]	0.058
Working experience * It is difficult for monitoring	**12.380[a]**	**0.030**
Working experience * The nurses fail to restart enteral feeding to patients after an interruption	**15.552[a]**	**0.008**
Working experience * Delays in initiating motility agents in patients not tolerating enteral nutrition	5.225[a]	0.389
Working experience * Delays and difficulties in obtaining small bowel access in patients not tolerating enteral nutrition	20.770[a]	0.000
Working experience * Poor communication among the ICU team regarding the nutrition management resulting in delays in initiating or provision of enteral feeding	28.318[a]	0.000

4.4.5: Demographic factors associated with treatment related barriers

On associating the demographic data with treatment related barriers, the following associations were revealed**:**

Gender of participants

Being interrupted by Hemodynamic instability or shock (p=0.007)

Interruption of enteral nutrition to perform (p=0.050

Interruption by bathing process (p=0.045)

Work service

Being interrupted by weaning process (p=0.001)

Being interrupted by preparation of surgical interventions (p=0.000)

Procedures that requires enteral feeding nutrition to be interrupted (p=0.000)

Qualification of responders

Interruption of enteral nutrition to perform radiologic procedures (p=0.028)

See table 4.12 below.

Table 4.12: Demographic factors associated to treatment related barriers

Variables	**Chi-square**	**P-Value**
Gender of participants * Increased hospital cost for enterally fed patients	0.501[a]	0.479
Gender of participants * Being interrupted by residual volumes	2.334[a]	0.127
Gender of participants * Being interrupted by weaning process	0.115[a]	0.734
Gender of participants * Being interrupted by preparation of surgical interventions	0.899[a]	0.343
Gender of participants * Being interrupted by Hemodynamic instability or shock	**7.216[a]**	**0.007**
Gender of participants * Procedures that requires enteral feeding nutrition to be interrupted	0.322	0.570
Gender of participants * Interruption of enteral nutrition to perform radiologic procedures	**3.856[a]**	**0.050**
Gender of participants * Interruption by bathing process	**4.013[a]**	**0.045**

Variables	**Chi-square**	**P-Value**
Service of work for responders * Increased hospital cost for enterally fed patients	0.273[a]	**0.872**
Service of work for responders * Being interrupted by residual volumes	3.421[a]	**0.181**
Service of work for responders * Being interrupted by weaning process	**13.334[a]**	**0.001**
Service of work for responders * Being interrupted by preparation of surgical interventions	**16.889[a]**	**0.000**
Service of work for responders * Being interrupted by Hemodynamic instability or shock	3.280[a]	**0.194**
Service of work for responders * Procedures that requires enteral feeding nutrition to be interrupted	15.659[a]	**0.000**
Service of work for responders * Interruption of enteral nutrition to perform radiologic procedures	4.944[a]	0.084
Service of work for responders * Interruption by bathing process	0.190[a]	0.910

Variables	**Chi-square**	**P-Value**
Age of responders * Increased hospital cost for enterally fed patients	24.538[a]	0.268
Age of responders * Being interrupted by residual volumes	16.367[a]	0.749
Age of responders * Being interrupted by weaning process	23.621[a]	0.312
Age of responders * Being interrupted by preparation of surgical interventions	25.864[a]	0.212
Age of responders * Being interrupted by Hemodynamic instability or shock	23.570[a]	0.314
Age of responders * Procedures that requires enteral feeding nutrition to be interrupted	11.112[a]	0.961
Age of responders * Interruption of enteral nutrition to perform radiologic procedures	32.205[a]	0.056
Age of responders * Interruption by bathing process	19.076[a]	0.580

Variables	**Chi-square**	**P-Value**
Job title * Increased hospital cost for enterally fed patients	1.025[a]	0.311
Job title * Being interrupted by residual volumes	0.143[a]	0.706
Job title * Being interrupted by weaning process	0.431[a]	0.512
Job title * Being interrupted by preparation of surgical interventions	0.248[a]	0.612
Job title * Being interrupted by Hemodynamic instability or shock	0.003[a]	0.957
Job title * Procedures that requires enteral feeding nutrition to be interrupted	0.555[a]	0.456
Job title * Interruption of enteral nutrition to perform radiologic procedures	4.953[a]	0.032
Job title * Interruption by bathing process	0.245[a]	0.621

Variables	**Chi-square**	**P-Value**
Qualification of responders * Increased hospital cost for enterally fed patients	2.753[a]	0.431
Qualification of responders * Being interrupted by residual volumes	1.468[a]	0.690
Qualification of responders * Being interrupted by weaning process	4.649[a]	0.199
Qualification of responders * Being interrupted by preparation of surgical interventions	1.498[a]	0.683

Qualification of responders * Being interrupted by Hemodynamic instability or shock	2.925[a]	0.403
Qualification of responders * Procedures that requires enteral feeding nutrition to be interrupted	1.154[a]	0.764
Qualification of responders * Interruption of enteral nutrition to perform radiologic procedures	**9.081[a]**	**0.028**
Qualification of responders * Interruption by bathing process	2.523[a]	0.471

Variables	**Chi-square**	**P-Value**
Working experience * Increased hospital cost for enterally fed patients	6.475[a]	0.263
Working experience * Being interrupted by residual volumes	9.594[a]	0.088
Working experience * Being interrupted by weaning process	7.386[a]	0.193
Working experience * Being interrupted by preparation of surgical interventions	4.437[a]	0.633
Working experience * Being interrupted by Hemodynamic instability or shock	6.250[a]	0.283
Working experience * Procedures that requires enteral feeding nutrition to be interrupted	**9.974[a]**	**0.076**
Working experience * Interruption of enteral nutrition to perform radiologic procedures	5.250[a]	0.386
Working experience * Interruption by bathing process	6.206[a]	0.287

4.4.6: Demographic factors associated to patient related barriers

Finally demographic characteristics were associated with patient related barriers and the following associations were revealed as demonstrated in Table 4.13

Working experience

Some patients remove or cough up tube (p=0.038)

Work service of respondents

A problem of patients or guardian refusal (p=0.019), a problem of ignorance of guardians (p=0.023) and Injury stress p=(0.010).

Age of respondents

A problem of ignorance of guardians Injury stress (p=0.010)

A problem of ignorance of guardians (p=0.038)

Low level of physical activity/reduced bowel movement (p=0.046)

Job title

A problem of ignorance of guardians (p=0.030)

Qualification of respondents

A problem of ignorance of guardians (p=0.000)

Some patients remove or cough up tube (p=0.004)

Working experience

A problem of ignorance of guardians (p=0.006)

The thermic effects of food (p=0.0005)

4.4.6: Demographic factors associated to patient related barriers

Variables	Chi-square	P-Value
Working experience * A problem of patients or guardian refusal	0.012[a]	0.914
Working experience * A problem of ignorance of guardians	0.115[a]	0.734
Working experience * Some patients remove or cough up tube	**4.314[a]**	**0.038**
Working experience * Low level of physical activity/reduced bowel movement	1.819[a]	0.177
Working experience * Injury stress	0.113[a]	0.736
Working experience * The thermic effects of food	1.769[a]	0.183
Working experience * Gastro -intestinal track complications like abdominal bloating, vomiting ,constipation and diarrhea	0.006[a]	0.940

Variables	Chi-square	P-Value
Service of work for responders * A problem of patients or guardian refusal	**7.913[a]**	**0.019**
Service of work for responders * A problem of ignorance of guardians	**7.527[a]**	**0.023**
Service of work for responders * Some patients remove or cough up tube	0.712[a]	0.700
Service of work for responders * Low level of physical activity/reduced bowel movement	1.452[a]	0.484
Service of work for responders * Injury stress	**9.307[a]**	**0.010**
Service of work for responders * The thermic effects of food	2.320[a]	0.313
Service of work for responders * Gastro -intestinal track complications like abdominal bloating, vomiting ,constipation and diarrhea	2.828[a]	0.243

Variables	Chi-square	P-Value
Age of responders * A problem of patients or guardian refusal	25.732[a]	0.217
Age of responders * A problem of ignorance of guardians	33.758[a]	0.038
Age of responders * Some patients remove or cough up tube	30.717[a]	0.078
Age of responders * Low level of physical activity/reduced bowel movement	**32.987[a]**	**0.046**
Age of responders * Injury stress	29.325[a]	0.106
Age of responders * The thermic effects of food	17.667[a]	0.670
Age of responders * Gastro -intestinal track complications like abdominal bloating, vomiting ,constipation and diarrhea	25.574[a]	0.223

Variables	Chi-square	P-Value
Job title * A problem of patients or guardian refusal	0.599[a]	0.439
Job title * A problem of ignorance of guardians	**4.692[a]**	**0.030**
Job title * Some patients remove or cough up tube	2.559[a]	0.110
Job title * Low level of physical activity/reduced bowel movement	0.193[a]	0.660
Job title * Injury stress	1.257[a]	0.262
Job title * The thermic effects of food	0.470[a]	0.493
Job title * Gastro -intestinal track complications like abdominal bloating, vomiting ,constipation and diarrhea	0.660[a]	0.416

Variables	Chi-square	P-Value
Qualification of responders * A problem of patients or guardian refusal	**7.784[a]**	**0.051**

Qualification of responders * A problem of ignorance of guardians	**25.063[a]**	**0.000**
Qualification of responders * Some patients remove or cough up tube	**13.267[a]**	**0.004**
Qualification of responders * Low level of physical activity/reduced bowel movement	1.988[a]	0.575
Qualification of responders * Injury stress	**11.341[a]**	**0.010**
Qualification of responders * The thermic effects of food	4.845[a]	0.184
Qualification of responders * Gastro -intestinal track complications like abdominal bloating, vomiting ,constipation and diarrhea	1.921[a]	0.589
Variables	Chi-square	P-Value
Working experience * A problem of patients or guardian refusal	**10.103[a]**	**0.072**
Working experience * A problem of ignorance of guardians	**16.313[a]**	**0.006**
Working experience * Some patients remove or cough up tube	**15.508[a]**	**0.008**
Working experience * Low level of physical activity/reduced bowel movement	8.455[a]	0.133
Working experience * Injury stress	9.793[a]	0.081
Working experience * The thermic effects of food	**16.826[a]**	**0.005**
Working experience * Gastro -intestinal track complications like abdominal bloating, vomiting ,constipation and diarrhea	7.355[a]	0.196

4.5 Conclusion

This chapter has described the distribution of nurses according to the demographic characteristics. Demographic characteristics included the selected departments as well the allocated services, the age, the sex, the level of education, and the work experience the participants had.

The respondents were asked about factors that influence them when they are feeding critically ill patients enterally and most of them agreed to several items as barriers that they faced during their daily practice of enteral feeding.

The factors that can affect enteral feeding practices to critically ill patients were identified and most responders reported lack of materials and feeding formula, lack of guidelines and staff shortage as mostly factors that hinder the good provision of enteral feeding. Associations between demographic factors and barriers to enteral feeding were identified. The absence of personnel specialized in the care of a critically ill patients in terms of nutrition such as intensivist, dietician in emergency and PICU, clinical pharmacist, palliative care specialist and permanent physical therapist were identified. Finally absence of feeding formula and nutrition bag /container were mostly identified by nurses as lack of resources to effective provision of enteral feeding practice.

CHAPTER FIVE: THE DISCUSSION OF RESULTS

5.0 Introduction

This chapter will discuss on different findings about the demographics of participants, which include their respective services and services of provenance. In addition, the chapter discusses the findings on the barriers faced by nurses, demographic factors affecting the provision of enteral feeding practice to critically ill patients and the availability of resources for enteral feeding practice in their services. The chapter will end up with the conclusion**.**

5.1 Discussion of demographic findings

In this study, a total number of 69 nurses, were working in the three services of CHUK, in which the study was conducted. The respondents were from three services, namely adult ICU with rate of 47.8%, pediatric ICU rating 14.5%, Emergency with percentage of 37.7%.

The majority of nurses, 58%, were females against 42% male colleagues. The female predominance in nursing is also found in other countries like in United States, whereby a survey has found that only 9.1 % of nurses were men, and the same result was reported in United Kingdom, where only 11.4% of nurses were men (SPC, 2015; Williams, 2017). The reason behind was found to be that women were the ones traditionally started to provide care to patients since the beginning of nursing, when the religious sisters were creating organizations for taking care of sick (Marshall,1999). Thereafter, entrance of men in nursing was progressive. However, integration of gender roles and improvement of gender relations was effective, even in female dominated occupations like nursing, there is still high valuation of males to give them place to administrative and elite positions (Evans, 1997).

The percentages of their levels of education were, respectively, 1.4 %, 68.1%, 24.6% and 5.8% of A2, A1, A0 and master's level. The majority of nurses had an education level of advanced diploma, who are registered nurses with a rate of 68. %. Comparatively, in US, 69.6% of Asian Registered Nurses entered the profession with a bachelors or higher degree, though only 14.6% of black American nurses are holders of masters or doctoral degrees (SPC, 2015).

The respondents experience was as follows: 23.2% had less than 1 year experience, 28.9% were experienced between one and three years, 24.6% were experienced between four to six years, 4.3% were experienced between seven to nine years, 11.6% were experienced between ten to

fourteen years and 7.2% were experienced fifteen years and above. This study found that only three, among the four roles of nurses in different services were played. A study done in South Africa found that the roles of nurses as caregivers, health educators and managers of administration of health settings (Ugochukwu et al., 2013 p. 130). However, these studies did not mention the research role of the nurses in health care settings.

5.2 Discussion on barriers associated with enteral feeding practice among ICU and Emergency nurses.

The majority of nurses are aware of the barriers they faced while caring for critically ill patients in terms of enteral feeding. They rated them differently and the most barriers rated at high percentage are as follows: losing the feeding formula rated at 91.3%, overworking: 84.5%, lack of feeding protocol in place to guide nurses for the initiation and provision of enteral feeding: 84%,losing feeding tubes, syringes and other needed materials in place: 82.6%, dietician coverage time not sufficient during evenings, weekends and holidays: 82.5%, insufficient nursing staff to adequately feed the critically ill patients: 81%, the current guidelines for nutrition are not readily accessible when nurses want to refer to them: 78%. The same barriers were also reported by several other researchers (Darawad *et al.*, 2018). On the other hand, the least rated as barrier to enteral feeding among ICU nurses are physicians do not want to order enteral feeding for the patients: 100% responded negatively meaning that physicians always considered enteral feeding when prescribing care to a critically patient. Belief that provision of enteral feeding does not impact patient outcomes was 100% negatively responded by nurses showing their awareness to the impact of nutrition to patient outcomes. Finally, thinking that enteral feeding is not good for a critically ill patient negatively responded by nurses at rate of 92.8%. This was showing that they have good will to perform enteral feeding to critically ill patients but only the problem are those identified barriers.

In Jordan, a study done on ICU nurses' perceived barriers to effective enteral nutrition practices revealed that the most important barrier was “Not enough nursing staff to deliver adequate nutrition” followed by Fear of adverse events due to aggressively feeding patients (Darawad *et al.*, 2018).

A study done in USA about ICU and process related barriers to optimizing enteral nutrition in a tertiary medical intensive care unit have found that initiation and advancement of EN was

identified as the most common reason for <90% prescribed intake. Top 5 interruption reasons were (1) extubating (2) fasting for bedside procedure (3) loss of enteral access and (4) gastric residual volume 0–499 mL and (5) radiology suite procedure (Kozeniecki *et al.*, 2016).

In this study, many factors were associated with EN guideline recommendations and implementations strategies as unfamiliarity with guidelines, inadequacy and inaccessibility of the guidelines to support the care. This was also found in the study done by Darawad *et al.*, (2018).

5.3 Discussion on factors that affect enteral feeding practice among ICU and Emergency nurses

The majority of responders identified about fourteen factors among 29 factors presented in the questionnaire. The most frequent factor mentioned by nurses was rated at 95.7% and 68.1% for the least rate among those fourteen factors. Those fourteen factors found to be the most factors that hinder enteral feeding to critically ill patient are as follows: (1) No semi-elemental formula available (Only standard formula available): 95.7% (2) Being interrupted by residual volumes: 95.7%. There are no duodenal tubes available (Only gastric tubes) (92.8%), Lack of prokinetic drugs (68.1%, Increased hospital cost for enterally fed patients (75.4), Being interrupted by weaning process (81.2), Being interrupted by preparation of surgical interventions (78.3%). Procedures that require enteral nutrition to be interrupted (82.3%). A problem of staff shortage (78.3%), Lack of guidelines (82.6%), Low level of physical activity/reduced bowel movement (94.2%), Gastro-Intestinal Tract complications like abdominal bloating, vomiting, constipation and diarrhea (84%), Delays and difficulties in obtaining small bowel access in patients not tolerating enteral nutrition (87%), Poor communication among the ICU team regarding the nutrition management resulting delays in initiating or progression of enteral feeding (81.2%).

The findings from this study are similar to other deferent studies done in different areas for example, a study done in Egypt “Enteral Nutrition in Intensive Care Units: Factors that Hinder Adequate Delivery” found that nurses are challenged by some factors also identified by nurses in our study. They found that EN interruption was the common in critically ill patients until emergent medical problems are stabilized; often it is not started or restarted for days. They revealed that diagnostic and therapeutic procedures accounted for 38% of EN interruption causes in the current study which can be avoidable. Diagnostic and therapeutic procedures preparations as supine position and fasting were done routinely due to fear of aspiration (El-regal *et al.*,

2016).They also stated six conditions that lead mostly to EN interruption with their percentage :Severity of patient Condition (42%), Therapeutic Interventions (24%), Diagnostic procedures (14%), Gastrointestinal complications (64%), Mechanical complications of tube Feeding (16%) and Basic nursing care which account for 72% of all EN interruptions (El-regal *et al.*, 2016).

Another study done in USA about ICU and process related barriers to optimizing enteral nutrition in a tertiary medical intensive care unit was found that delaying in initiation and advancement of EN was identified as the most common reason for <90% prescribed intake (Kozeniecki *et al.*, 2016).

In a study done by Darawad et al, 2018 emphasized the role of having protocols and guidelines about enteral feeding to critically ill patients. In this study, nurses reported many defects in the "Guidelines Recommendations and Implementations" subscale. Such shortcomings of the guidelines and protocols make nurses uncertain about the management, consequences, and the complications of EN (Darawad et al, 2018).

The role of communication for effective enteral feeding to critically ill patients was established in this study: poor communication among the ICU team regarding management resulted in delaying the initiation or progression of EN. Instead of discussing these fears, nurses decided to delay or stop feeding.

5.4: Discussion on the availability of resources for enteral feeding in the service.

About the available resources, the findings are showing that they are available but not completely. For medical staff, they rated the availability in the following ways: Presence of intensivists/Clinical Nutrition Physicians: was rated at 40.6% by all nurses against 59.4% of all nurses who responded negatively. This means that there is no permanent intensivist in the emergency and PICU which can a negative on enteral feeding practice as an intensivist is more specialized in the care of critically ill patient. Presence of Dieticians in the service: 56.5% nurses accepted that are available for the patient management and 43.5% reported that couldn't find them for the patient interest. This could constitute a barrier to effective enteral feeding for critically patients as a dietician is mostly needed to determine and calculate patient nutritional needs based on the body demands. Clinical pharmacists in the services: 44.9% is available but 55.1% nurses can't find them when they want to refer to them. This also is a barrier and factor as

some drugs in critically ill patients may interfere with some nutritional products. The role of a clinical pharmacist is crucial when dealing with a critically ill patients. Nurses are always available at a rate of 100% which is good indicator for good provision of enteral feeding to critically ill patients if all conditions are met.

For materials necessary to provision of enteral feeding practice only feeding tube can be found easily in all services at a rate of 97.1%, other materials were reported to be found occasionally, and feeding formula is not available at a rate of 92.8%. This could negatively affect the enteral feeding practice as nurses always need resources to be available in place.

The findings from this study are similar to some findings from other studies done in different areas. A study done in Jordan about ICU Nurses' Perceived Barriers to Effective Enteral Nutrition practices revealed that unavailability of dietitians during evening shifts, weekends, and holidays was the third barrier rated by nurses in this study. They also stated that even if the dietitians were available, it seems that they have not dedicated enough time to discuss the issues of individualized patients' problems. They concluded that nutritional support must be a multidisciplinary task and the dietitian availability is vital for the delivery of safe and optimal Care to critically ill patients as most importantly the dietitian's role is to prepare the EN formula (Darawad *et al.*, 2018).

The same study also explained the role of feeding formula in the provision of enteral feeding practice. They stated that Unavailability of special formulas forces nurses to hold the feeding and predispose patients to underfeeding status. There is an individualized response of critically-ill patients to the feeding formula so management of these problems requires collaboration between nurses, physicians, and dietitians.(Darawad *et al.*, 2018).

5.5 Conclusion

This chapter discussed the findings about demographic data of nurses and their health services allocation, age, gender, their respective qualification and their level of experiences. There were similarities in countries like USA for gender predominance, South Africa, for the education, age and experiences. The findings on barriers associated to protocols and guidelines of enteral feeding practice among ICU and Emergency nurses were also discussed. Similarities were also found in Jordan and USA .Factors that affect enteral feeding practice among ICU and

Emergency nurses were discussed and similarities with other studies done in different areas were identified such as Egypt, Jordan and USA. Finally, there was discussion on the availability of resources for enteral feeding in the service where particularities for this study were identified but also similarities with others studies were found in Jordan.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

As previously mentioned in chapter one, this study was aimed to identify the factors associated with barriers to enteral feeding among ICU and Emergency department nurses at one referral hospitals in Kigali and targeted the determination of the barriers associated with enteral feeding practice among ICU and Emergency nurses and identification of demographic factors associated with enteral feeding practice for critically ill patients. This chapter will draw the conclusion of this study and provide recommendations that are needed, with regard to the objectives that were intended.

6.1 Conclusion

To summarize this study, Patients in intensive care units (ICUs) often have different degrees of inflammation that may result in reduced energy and protein intake, increased energy expenditure, and protein catabolism. This exposes critically ill patients to be vulnerable to under feeding and malnutrition with its occurrence estimated between 30%–50% of patients during their hospitalization. All countries and organizations elaborated protocols and guidelines to mitigate this problem. Nutrition support in terms of enteral feeding protocols and guidelines are effective in promoting nutritional goals in a wide variety of intensive care patients. Nurses are in a unique position to take an active role in promoting the best nutritional outcomes for their patients by using and evaluating nutrition support protocols. However, numerous factors contribute to incomplete delivery of enteral nutrition, including insufficient nutrition risk screening in critically ill patients, underutilization of enteral feeding protocols, fixed rate-based enteral infusion targets with frequent enteral interruption, and suboptimal provider practices regarding nutrition support therapy. Disease condition and patient status is believed to be a primordial factor to effectiveness of the enteral feeding. In addition, nurses who are the frontline workforce, play a big role in managing critically ill patients as caregivers, educators, managers and researchers. Therefore, they need empowerment to maximize their potential, through enhancing education, regular trainings and professional development, and proper working environment in the daily tasks of providing care to patients. Finally, they should participate in decisions that are made in setting guidelines and protocols for health programs specifically enteral feeding practice.

This study assessed factors perceived by CHUK ICU and emergency nurses that affected enteral feeding practice, and examined these barriers based on nurses' demographics. The study found that lack of feeding formula, overworking for nurses, lack of feeding protocol and guidelines in place to guide nurses in the provision of enteral feeding, staff shortage and lack of training on enteral feeding are the most barriers faced by nurses while providing this practice to critically ill patients. Barriers to EN were moderately perceived with more focus on barriers regarding resources in ICU and availability of healthcare providers. Such barriers to EN are modifiable and manageable, making their identification and management crucial for optimal patient care.

The current study also aimed to identify demographic factors associated with enteral feeding practice for critically ill patient and found that lack of semi-elemental formula, feeding interruption by different circumstances, absence of duodenal tubes in place ,Lack of prokinetic drugs, increased hospital cost for enteral feeding patients, a problem of staff shortage, lack of guidelines about the provision of enteral feeding practice to critically ill patient, Low level of physical activity/reduced bowel movement, gastro-intestinal tract complications like abdominal bloating, vomiting, constipation and diarrhea, delays and difficulties in obtaining small bowel access in patients not tolerating enteral nutrition and poor communication among the ICU team regarding the nutrition management resulting in delays in initiating or progression of enteral feeding are the most factors identified by nurses to impede the provision of enteral feeding practice to critically ill patient.. Unscheduled basic nursing procedures followed by gastrointestinal complications (GICs) were the most frequent reasons for enteral feeding interruption. Whereas, interruptions due to diagnostic procedures or airway management were the lowest frequent reasons for enteral feeding interruption.

This study confirms that EN is a multidisciplinary responsibility and delaying this vital care will predispose patients to underfeeding and malnutrition. The impact of this situation will be reflected in the quality of care, treatment costs, and disease process. This study also highlights the need for institution specific investigation and mitigation of process related barriers to achieving adequate delivery of prescribed EN. Additionally, research is needed to identify clinically meaningful outcomes associated with feeding strategy, such as impact on length of intensive care unit stay and morbidities such as the development of malnutrition and new infections. Because findings cannot be generalized to other referral hospitals due to low sample

size, there is a need to do further research on barriers to effective enteral feeding for critically ill patients at national level.

6.2 Recommendations of the study

In this study, identification of barriers and factors associated with practice of enteral feeding like lack of protocols and guidelines in place to refer to, staff shortage and lack of sufficient equipment, lack of training about nutrition support to critically ill patients were identified as the most barriers associated to poor feeding practice among ICU and Emergency department at CHUK. Therefore, we recommend to:

6.2.1. The regulatory bodies of nurses

In education: The knowledge of nurses should be empowered by continuous trainings for professional development regarding the management of critically ill patients. In addition, in collaboration with Ministry of health, nurses should be facilitated to update their level of education with specialization in different areas of critical care.

In practice: Advocating that, the knowledge acquired from schools of nursing should be used, in parallel with a conducive environment for nurses that allow them to implement all protocols and guidelines as it should be.

6.2.2. To the Ministry of health:

Guidelines and protocols that are used in health care settings, should be developed in consideration of multidisciplinary teams, in which nurses are represented effectively.

Elaborate and provide strategic plan that allows the implementation of enteral feeding practice in different services in CHUK that care for critically ill patients.

6.2.3. To the University of Rwanda and other researchers

There is a need to do wide research on ICU nurse's perceived Barriers to effective enteral feeding for critically ill patients at national level.

Integration of ICU components in the curriculum for undergraduate level that allow students to be equipped effectively to care of critically ill patients holistically by emphasizing on enteral feeding practice.

Improve the curriculum of nurses by emphasizing the knowledge on early detection of high risks patients for malnutrition and use of protocols/or guidelines that are set by the Ministry of Health, in order to improve the quality of care provided to critically ill patients.

6.2.4. To the administrators and nurse leaders of CHUK

Administration:

-There is a need to empower and encourage nurses to update their knowledge on the use of enteral feeding protocols and guidelines, which will help them to improve their practice.

-Availing and updating those protocols will help nurses to refer to them in case of need.

-Put in place the mechanism that checks and provides all necessary resources for the provision of enteral feeding practice.

In Practice:

There is a must, to advocate for nurses, in matters of challenges encountered in their workplace; which are the staff shortage, lack of adequate resources/equipment and insufficient knowledge in terms of update training about enteral feeding practice to critically ill patients. In consideration of that, those challenges are the limitations to the quality of health care provided by nurses, and could undermine the important role of nurses in health care, and particularly in ICU and Emergency.

Encourage the multidisciplinary team that foster early screening and initiation of enteral feeding as soon as possible to critically ill patients on admission to mitigate the process of high catabolism always observed among ICU patients during their time of stay in hospital.

REFERENCES

Abad-jorge, A. (2013) 'Nutrition Management of the Critically Ill Pediatric Patient Minimizing Barriers to Optimal Nutrition Support', 5(4), pp. 221–230. doi: 10.1177/1941406413492821.

Administration, V. *et al.* (2008) 'NIH Public Access', 17(4), pp. 1–13.

Article, R. (2011) 'Malnutrition in the acutely ill patient : is it more than just protein and energy ?', 24(3), pp. 1–7.

Binnekade, J. M. *et al.*(2005) 'Daily enteral feeding practice on the ICU : attainment of goals and interfering factors', 9(3). doi: 10.1186/cc3504.

Bolderston, A. (2018) 'Writing an Effective Literature Review Writing an Effective Literature Review', (June 2008). doi: 10.1016/j.jmir.2008.04.009.

Cahill, N. E. *et al.*(2012) 'Barriers to feeding critically ill patients: A multicenter survey of critical care nurses', *Journal of Critical Care*. Elsevier Inc., 27(6), pp. 727–734. doi: 10.1016/j.jcrc.2012.07.006.

Cahill, N. E. *et al.*(2014) 'The validation of a questionnaire to assess barriers to enteral feeding in critically ill patients : a multicenter international survey'.

Cober, M. P. *et al.*(2015) 'American Society for Parenteral and Enteral Nutrition (A . S . P . E . N .) Definition of Terms , Style , and Conventions Used in A . S . P . E . N . Board of Directors – Approved Documents', (May), pp. 1–21.

Cooper, A. S., Nursing, C. and Field, C. (2018) 'Cochrane Review Summary Postpyloric Versus Gastric Tube Feeding for Preventing Pneumonia and Improving Nutritional Outcomes in Critically Ill Adults Relevance to Critical Care Nursing', 38(6), pp. 75–76.

Darawad, M. W. *et al.*(2018) 'ICU Nurses ' Perceived Barriers to Effective Enteral Nutrition Practices : A Multicenter Survey Study', pp. 67–75. doi: 10.2174/1874434601812010067.

El-regal, M. E. *et al.*(2016) 'Nutritional Medicine and Diet Care ClinMed', 2(2).

Enteral, C. J., Stavroulakis, T. and Mcdermott, C. J. (2016) *This is a repository copy of Enteral feeding in neurological disorders . White Rose Research Online URL for this paper : Version : Accepted Version Article : Enteral feeding in neurological disorders*.

Houston, B. A., Fuldauer, P. and Nutrition, E. (no date) 'Enteral feeding : Indications , complications , and nursing care', 12(1).

Kozeniecki, M. *et al.* (2016) 'HHS Public Access', 31(1), pp. 80–85. doi: 10.1177/0884533615611845.ICU.

Kozeniecki, M. and Pitts, H. (2018) 'Barriers and Solutions to Delivery of Intensive Care Unit', 33(1), pp. 8–15. doi: 10.1002/ncp.10051.

Kozeniecki, M., Pitts, H. and Patel, J. J. (2018) 'Barriers and Solutions to Delivery of Intensive Care Unit Nutrition Therapy', *Nutrition in Clinical Practice*, 33(1), pp. 8–15. doi: 10.1002/ncp.10051.

Kreymann, K. G. *et al.*(2006) 'ESPEN GUIDELINES ESPEN Guidelines on Enteral Nutrition : Intensive care $', pp. 210–223. doi: 10.1016/j.clnu.2006.01.021.

Kuragano, T. *et al.* (2014) 'Association between hemoglobin variability , serum ferritin levels , and adverse events / mortality in maintenance hemodialysis patients', *Kidney International*. Elsevier Masson SAS, 86(4), pp. 845–854. doi: 10.1038/ki.2014.114.

Mula, C. (2014) 'Nurses ' Competency and Challenges in Enteral feeding in the Intensive Care Unit (ICU) and High Dependency Units (HDU) of a referral hospital , Malawi', 26(September), pp. 55–59.

Ojo, O. (2015) 'The Challenges of Home Enteral Tube Feeding: A Global Perspective', pp. 2524–2538. doi: 10.3390/nu7042524.

P, F. P. *et al.* (2016) 'Early versus delayed enteral nutrition support for critically ill adults (Protocol)', (9). doi: 10.1002/14651858.CD012340.www.cochranelibrary.com.

Pichard, C., Berger, M. M. and Pradelli, L. (2018) 'Supplemental parenteral nutrition in intensive care patients : A cost saving strategy', 37, pp. 573–579. doi: 10.1016/j.clnu.2017.01.009.

Project, R. (2008) 'of Humanitarian Terms', (August).

Scott, R. (2015) 'Enteral tube feeding in adults', pp. 49–54.

Seres, D. S., Valcarcel, M. and Guillaume, A. (2013) 'Advantages of enteral nutrition over parenteral nutrition', *Therapeutic Advances in Gastroenterology*, 6(2), pp. 157–167. doi:

10.1177/1756283X12467564.

Shunda, N. (2007) ‘What is a Literature Review ? (and How Do I Write One ?!) Today ’ s Agenda’, (February).

Skeie, E. *et al.* (2018) ‘A positive association between nutritional risk and the incidence of surgical site infections : A hospital-based register study’, 66, pp. 1–10.

Topic, D. (2015) ‘Literature Review ’, (626).

APPENDIXES

Questionnaire designed for assessing the factors affecting implementation of enteral feeding among ICU and Emergency nurses in one of the referral hospitals in Kigali, Rwanda

Q_1. Fill with X or √ in the box or complete where is …….

1. Gender:

Male ☐

Female ☐

2. Age: …….

3. Working service:

Adult ICU ☐

Pediatric ICU ☐

Emergency ☐

4. Job title:

Nurse ☐

Manager of the service ☐

Nurse unit manager ☐

5. Qualification:

Doctoral degree ☐

Master's degree

Bachelor's degree ☐

Advanced Diploma/Certificate ☐

Diploma/Certificate (A2) ☐

Other (Specify)……

6. Experience:

Less than 1 year ☐

1 – 3 years ☐

4-6 years ☐

7-9 years ☐

10-14 years ☐

15 years or more ☐

Q_2. Human resource related barriers of enteral feeding (Select **Yes** if it is a barrier or **No** if it is not**)**

1. The physicians delay in ordering enteral feeding for the patients.	**Yes**	**No**
2. The physicians do not want to order enteral feeding for the patients.	**Yes**	**No**
3. I am overworked.	**Yes**	**No**
4. I have to wait for the dietitian to assess the patient.	**Yes**	**No**
5. The dietitian time dedicated to the ICU is not enough during regular weekday hours.	**Yes**	**No**
6. There is no dietitian time dedicated to the ICU during regular weekday hours.	**Yes**	**No**
7. The dietitian coverage is not sufficient during evenings, weekends and holidays.	**Yes**	**No**
8. I cannot find the dietitian during evenings, weekends and holidays.	**Yes**	**No**
9. New orders for enteral feeding are not filled in ICU on weekends/after hours.	**Yes**	No
10. I have to wait for physician/radiologist to read x-ray and confirm tube placement	**Yes**	**No**
11. There is not enough nursing staff to adequately feed the critically ill patients.	**Yes**	**No**
12. A problem of staff shortage.	**Yes**	**No**
13. Existence of intensivists/clinical nutrition physicians	**Yes**	**No**
14. Existence of dietitians	**Yes**	**No**
15. Existence of clinical pharmacists	**Yes**	**No**
16. Existence of physical therapists	**Yes**	**No**
17. Existence of palliative care specialists	**Yes**	**No**

Q3. Material related factors of enteral feeding (Select **Yes** if it is a barrier or **No** if it is not**)**

1. I lose feeding tubes, syringes and other needed materials in place.	**Yes**	**No**
2. I lose the feeding formula.	**Yes**	**No**

3. There is no feeding pump in the unit. **Yes** **No**
4. There is no semi-elemental formula available (Only standard formula available) **Yes** **No**
5. There are no duodenal tubes available (Only gastric tubes). **Yes** **No**
6. Use different tubes for feeding and delivering contrast for critically ill patient. **Yes** **No**
7. Lack of prokinetic drugs. **Yes** **No**
8. Facing problems with small-borefeeding tube such as absence clogged/not approved. **Yes** **No**
9. Existence of enteral feeding formulas **Yes** **No**
10. Existence of feeding tubes **Yes** **No**
11. Existence of enteral pumps **Yes** **No**
12. Existence of nutrition bag/Container **Yes** **No**
13. Existence of pump set **Yes** **No**
14. Existence of syringes and cramps **Yes** **No**
15. Existence of materials for confirming tube placement **Yes** **No**

Q4. Accessibility of protocol and guidelines related barriers of enteral feeding

1. I am not familiar with current guidelines of enteral feeding for patients in ICU. **Yes** **No**
2. I do not understand the language of the recommendations of the current guidelines for enteral feeding. **Yes** **No**
3. Current guidelines for nutrition are not readily accessible when I want to refer to them. **Yes** **No**
4. I cannot find feeding protocol in place to guide me for the initiation and progression of enteral feeding. **Yes** **No**
5. Outdated feeding protocol. **Yes** **No**

Q5. Knowledge related barriers of enteral feeding (Select **Yes** if it is a barrier or **No** if not**)**

1. I believe that that provision of enteral feeding does not impact patient outcomes.	**Yes**	**No**
2. I think enteral feeding is not good for a critically ill patient.	**Yes**	**No**
3. I do not have training on enteral feeding for critically ill patient.	**Yes**	**No**
4. I do not have enough training about enteral feeding for critically ill patients.	**Yes**	**No**
5. I do not practice enteral feeding because it is hard to administer.	**Yes**	**No**
6. I do not practice enteral feeding because it is hard to monitor.	**Yes**	**No**
7. There is no scientific evidence supporting enteral feeding practice.	**Yes**	**No**
8. Inadequate knowledge of some nurses.	**Yes**	**No**
9. The nurses fail to restart enteral feeding to patients after an interruption.	**Yes**	**No**
10. Delays in initiating motility agents in patients not tolerating enteral nutrition.	**Yes**	**No**
11. Delays and difficulties in obtaining small bowel access in patients not tolerating enteral nutrition.	**Yes**	**No**
12. Poor communication amongst the ICU team regarding the nutrition management resulting in delays in initiating or progression of enteral feeding.	**Yes**	**No**

Q6. Treatment related barriers of enteral feeding (Select **Yes** if it is a barrier or **No** if not**)**

1. Increased hospital cost for enterally fed patients.	**Yes**	**No**
2. Being interrupted by residual volumes.	**Yes**	**No**
3. Being interrupted by weaning process.	**Yes**	**No**
4. Being interrupted by preparation of surgical interventions	**Yes**	**No**
5. Being interrupted by hemodynamic instability or shock	**Yes**	**No**
6. Procedures that require enteral nutrition to be interrupted.	**Yes**	**No**
7. Interruption of enteral nutrition to perform radiological procedures.	**Yes**	**No**

8. Interruption by bathing process. **Yes** **No**

Q7. Patient related barriers of enteral feeding (Select **Yes** if it is a barrier or **No** if it is not**)**

1. A problem of patients or guardians refusal. **Yes** **No**
2. A problem of ignorance of guardians. **Yes** **No**
3. Some patients remove or cough up tube. **Yes** **No**
4. Low level of physical activity/reduced bowel movement. **Yes** **No**
5. Injury stress. **Yes** **No**
6. The thermic effect of the food. **Yes** **No**
7. Gastro-Intestinal Tract complications like abdominal bloating, vomiting, constipation and diarrhea. **Yes** **No**

UNIVERSITY OF RWANDA

COLLEGE OF MEDICINE AND HEALTH SCIENCES

CMHS INSTITUTIONAL REVIEW BOARD (IRB)

Kigali, 12/02/2019
Ref: CMHS/IRB/**085**/2019

MUVANDIMWE Jean de la Croix
School of Nursing and Midwifery, CMHS, UR

Dear MUVANDIMWE Jean de la Croix

RE: ETHICAL CLEARANCE

Reference is made to your application for ethical clearance for the study entitled ***Perceived Barriers To Protocols And Guidelines Of Enteral Feeding Among Nurses Of ICU And Emergency department At One Referral Hospital In Kigali".***

Having reviewed your protocol and found it satisfying the ethical requirements, your study is hereby granted ethical clearance. The ethical clearance is valid for one year starting from the date it is issued and shall be renewed on request. You will be required to submit the progress report and any major changes made in the proposal during the implementation stage. In addition, at the end, the IRB shall need to be given the final report of your study.

We wish you success in this important study.

Professor Jean Bosco GAHUTU
Chairperson Institutional Review Board,
College of Medicine and Health Sciences, UR

Cc:
- Principal College of Medicine and Health Sciences, UR
- University Director of Research and Postgraduate studies, UR

CENTRE HOSPITALIER UNIVERSITAIRE
UNIVERSITY TEACHING HOSPITAL

Quality Health Care
Training & Research

Ethics Committee / Comité d'éthique

March 15th, 2019 **Ref.: EC/CHUK/048/2019**

Review Approval Notice

Dear Jean de la Croix MUVANDIMWE,

Your research project: "**Perceived barriers to protocol and guidelines of enteral feeding among ICU and Emergency at CHUK"**

During the meeting of the Ethics Committee of University Teaching Hospital of Kigali (CHUK) that was held on 15th March, 2019 to evaluate your request for ethical approval of the above mentioned research project, we are pleased to inform you that the Ethics Committee/CHUK has approved your research project.

You are required to present the results of your study to CHUK Ethics Committee before publication.

PS: Please note that the present approval is valid for 12 months.

Yours sincerely,

ETHICS COMMITTEE CHUK

Mr.MUNYANEZA Emmanuel
The Secretary, Ethics Committee,
University Teaching Hospital of Kigali

<<University teaching hospital of Kigali Ethics committee operates according to standard operating procedures (Sops) which are updated on an annual basis and in compliance with GCP and Ethics guidelines and regulations>>

Certificate of Completion

NIH National Institutes of Health
Office of Extramural Research

Appendix B- Information document

Introduction

The study seeks to inform about factors to enteral feeding practice and improve care for critically ill patients through effective enteral nutrition and support needs from critical illness.

Purpose of the Study

This study aims to identify the factors associated with barriers to enteral feeding among ICU and Emergency department nurses.

Voluntary Participation

Your participation in this research is entirely voluntary. It is your choice whether to participate or not. All the services you receive in this context of care will continue, and nothing will change. If you choose not to participate in this research project, you may withdraw at any time without risk of penalty. May change your mind later and stop participating even if you agreed earlier.

Confidentiality

The information that we collect from this research project will be kept confidential. Information about you that will be collected during the research will be put away, and no-one but the researchers will be able to see it. Any information about you will have a number on it instead of your name. Only the researchers will know what your number is and we will lock that information up with a lock and key. It will not be shared with or given to anyone except who will have access to the information

The knowledge that we get from doing this research will be shared with you through in job training/workshops and morning staff in your services. Confidential information will not be shared. There will be small meetings in your setting, and these will be announced.

If you have any questions, you may ask them now or later, even after the study has started. If you wish to ask questions later, you may contact any time on: 0788434347/0783249492.

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it, and any questions that I have asked to, have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

Name of Participant_____

Signature of Participant _____

Date _____ Witness_____

Appendix C- Individual Informed Consent Form

My name is MUVANDIMWE Jean de la Croix, a student in Masters of Science in Nursing, University of Rwanda, School of Nursing and Midwifery. My master's research dissertation is **"Factors affecting implementation of enteral feeding among ICU and Emergency nurses in one of the referral hospitals in Kigali, Rwanda** "as partial fulfillment of my studies. This study will help to increase the knowledge and enhance support through identification of the barriers and factors that interfere with the practice of enteral feeding among ICU and Emergency nurses in Rwandan context. The study seeks to inform about barriers/factors that hinder enteral feeding practice and improve care for critically ill patients through effective and early provision of enteral nutrition.

This study aims to identify the factors associated with barriers to enteral feeding and provide strategies which can help nurses in the improvement of care to critically ill patient. With your permission, I kindly request you to give as much information as possible seek by responding to the questions in the questionnaire will be addressed to you. There are no anticipated risks associated with this study. Your decision whether or not to participate in this study will not affect you at all. The participation in this study is voluntary, and there is no penalty for early withdrawal.

The information you provide will be confidential. Your identity will not be disclosed in any published and written material resulting from the study and will be shared only with the research team.

I agree to participate in this study.

Signature_____

Date and Signature of Participant __/___/_____

Witness_____