

**FACTORS INFLUENCING UTILIZATION OF ENTERAL NUTRITION
GUIDELINES AMONG NURSES WORKING IN TERTIARY
HOSPITALS IN DAR ES SALAAM TANZANIA**

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**Factors Influencing Utilization of Enteral Nutrition Guidelines among
Nurses Working Tertiary Hospitals in Dar es Salaam, Tanzania**

By

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**A dissertation submitted in (partial) Fulfillment of the Requirements for the Degree of
Masters of Nursing (Critical Care and Trauma) of Muhimbili University of Health and
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CERTIFICATION

The undersigned certifies that she has read and hereby recommends for acceptance by Muhimbili University of Health and Allied Science a dissertation entitle **“Factors Influencing Utilization of Enteral Nutrition Guidelines Among Nurses Working Tertiary Hospitals in Dar Es Salaam Tanzania”** in (partial) fulfillment for the requirement for Masters of Science in Nursing (Critical Care and Trauma) of Muhimbili University of Health and Allied Science.

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Date; _____

DECLARATION AND COPYRIGHT

I, **Yunita N. Mtaki** declare that this dissertation is my own work and that it has not been submitted to any other university or academic institution for similar purpose of academic award.

Signature

Date.....

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DEDICATION

I dedicate this dissertation to my beloved parents, Mr. Robert Mtaki Muhongo and Marycean Thadeus Magembe, Also to my only lovely, husband Kasubi Peter Kasubi.

ABSTRACT

Background: Worldwide, 30% to 50 % of critically ill admitted patients are malnourished. A study done in 2017 in Latin America among 1053 patients from 116 hospitals showed that 74.1% of malnourished patients were in critical care units due to nature of their illnesses and hyper-metabolic states. The patients had compromised immune system and therefore, they were at an increased risk of infection and septicemia. Enteral nutrition plays a significant role in improving the critically ill patients' nutrition status and hence, facilitates the healing process. Utilization of enteral nutrition (EN) guidelines may be influenced by nurses' knowledge, education level and years of experience. Also, patients' factors GIT complication, high GRV and coughing up a tube and organisational factors such as motivation, supervision, availability of resources, and cooperation may affect utilization of EN. However, there is limited information regarding factors influencing utilization of enteral nutrition guidelines among nurses in Tanzania.

Broad objective: To assess factors influencing utilization of EN guidelines among nurses at tertiary Hospital in Dar es Salam, Tanzania.

Methods: The study employed a cross-sectional study design with quantitative research approach. A self-administered questionnaire was employed to nurses taking care of critically ill patients in the selected hospitals. Data analysis was done by using SPSS version 23 software. Descriptive statistics such as frequency, percentage and tables were used to summarize the obtained data. Association between the dependent variable (utilization of enteral nutrition guidelines) and independent variables was examined by using chi-square test. A p-value less than 0.05 was considered statistically significant at 95 percent confidence level.

Results: Out of 212 participants, 91.5 % completed the questionnaire. The majority (74.25 %) was aged between 26 and 35 years and they were females (58.2%) with diploma level (62.4%). Utilization of EN guidelines was significantly associated with education level and in-service EN training. Those with Masters and Bachelor's degree were more likely to utilize EN guidelines than Diploma level (p-value 0.027). Regarding patients' factors, EN utilization was significantly influenced by coughing up tube (p-value 0.003). At organizational level, motivation and EN discussion showed significant association with the EN utilization.

Nurses, patients and organizational factors influence utilization of EN guidelines in critical care units. Discussions and training should continue to motivate nurses to utilize the EN guidelines in critical care units.

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LIST OF ABBREVIATION

EMD	Emergency Department
EN	Enteral Nutrition
HDU	High Dependent Unit
ICU	Intensive Care Unit
JKCI	Jakaya Kikwete Cardiac Institute
MICU	Medical Intensive Care Unit
MNH	Muhimbili National Hospital
MOI	Muhimbili Orthopedic Institute
NICU	Neonate Intensive Care Unit
PICU	Pediatric Intensive Care Unit
RN	Registered Nurse
SICU	Surgical Intensive Care Unit
SPSS	Statistical Package for Social Sciences

CONCEPTUAL DEFINITIONS

Enteral Nutrition (EN) is feeding of nutrients beyond the esophagus via feeding tubes for special medical purpose (M.C. Clave *et al.*, 2016).

Critically ill patients are those at high risk of potential life-threatening health problems (Doug Elliott, 2011).

CHAPTER ONE

THE PROBLEM AND ITS SETTING

1.0 Introduction

This chapter presents the Problem and Its Setting. The chapter is composed of the following sections: Background to the Study; Statement of the Problem; Objectives of the Study; Significance of the Study; Scope of the Study; Limitations of the Study; and Conceptual Framework.

1.1 Background to the Study

Nutrition support (NS) in intensive care units (ICUs) is an essential part of comprehensive patient's care (Myrie, Kahwa and Roberts, 2013). Critically ill patients (CIPs) are at a higher risk for developing malnutrition due to nature of their illnesses and their hyper-metabolic state (Mooi and Ncama, 2019). Enteral nutrition is simple, cheaper and less complicated and it includes nasogastric, gastrostomy and jejunostomy (Das, Patra and Pradhan, 2015). The EN is superior to parenteral nutrition due to its cost-effectiveness; prevention of intestinal mucosal atrophy; and support of intestinal immunological function through maintenance of gut-associated lymphoid tissue that contains more than half of the body's immune cells that can prohibit translocation of intestinal bacteria into harmful forms, which ultimately, decrease the infectious complications, and enhance wound healing (Huang *et al.*, 2019; Mooi and Ncama, 2019).

Malnutrition is very common in severely ill patients, happening in 30 percent to 50 percent of admitted patients with higher frequency in critically ill patients (Mooi and Ncama, 2019). In addition, a study done in Latin America (Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Panama, and Peru), which included 1053 patients from 116 hospitals showed that 74.1 percent of Malnutrition happening (Vallejo *et al.*, 2017) was linked with increased complication risk, high healthcare costs and increased mortality (Wischmeyer, 2014; Mooi and Ncama, 2019). This situation is highly serious in critically ill patients due to decreased volitional nutrition intake and therefore, they end up depending completely on health care providers, particularly nurses for their nutritional needs (Mooi and Ncama, 2019). Such

patients continuously receive deprived nutrition for long period as nutritional therapy is often only an addition to care rounds in most severely ill patients (Wischmeyer, 2014).

Factors that affect delivery of enteral nutrition as per guidelines in critically ill patients have been classified as patient-related factors, feeding method factors (feeding formula, feeding tube site), feeding process factors (feeding initiation time, time to meet target goal), under-prescription by physicians, and frequent interruption of enteral nutrition (EN) due to basic nursing procedures (Ahmed *et al.*, 2016; Croix, 2019).

Despite knowledge of Enteral nutrition (EN), inadequate practice of enteral nutrition as per guidelines and protocols has been observed by Hedland in 2014 across different sites internationally, with ICUs delivering only approximately 60 percent of prescribed calories and protein.

The available EN guideline in Tanzania provides standards for operations as follows: -

a) During initiation where the guideline states by starting feeding early within 24 hours post admission, withholding enteral feeding if gastrointestinal tract is not functioning well or if the patient is unstable, considering TPN (total parenteral nutrition) feeding if anticipating NPO (nil per oral) for more than five days and frequency of administration of food five to six times a day at an interval of 3- 4 hourly;

b) Amount of feed whereby health care providers are directed to administer an average of 100 to 300 mills and maximum of 200 to 400 mills per feed over a period of 10 to 30 minutes by bolus feeding without pump, to reduce the risk of aspiration by avoiding large volumes, to set pump at rate between 5 -600 mills per hour (mills/per..) starting with slow rate 25 to 30 mills/hour then increase in stages to 100 – 150 mills/hour in case of infusion;

c) Positioning such that health care providers are instructed to prop up the patient 30 to 45 degrees;

d) Observation whereby health care providers are instructed to regularly aspirate four hourly or before feeding, to administer gastric residue less than 200 mills and 20 mills of water for 1 hour then aspirate;

e) Energy requirement is set at standard 30 kcal/kg/day;

f) Protein requirement encompass 1.2-2.0 g/ kg/ day; f) micronutrients -vitamin supplements are instructed to be given daily; and

g) Fluids and Electrolytes are instructed to be given per age and weight, Average: 25 - 55 years give 32 mills / kg /day.

Malnutrition is very common in severely ill patients, a study conducted in Tanzania suggested to use treatment guidelines in order to improve the quality of health care service delivery in critically ill children (Remtulla, 2020)

EN guidelines and protocol are available in the units in order to improve EN but critically ill patients are still malnourished. Therefore, such stance necessitated to carry out a study on factors influencing utilization of EN guidelines among nurses at tertiary Hospitals in Dar es salaam, Tanzania.

1.2 Statement of the Problem

Patients in critical care units are at high risk of malnutrition due to poor utilization of EN by nurses, the nature of their illness and their hyper-metabolic state (Mooi and Ncama, 2019). Recall, the study done in Latin America (Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, Panama, and Peru) that included 1053 patients from 116 hospitals showed that 74.1 % of malnutrition happening (Vallejo *et al.*, 2017) was due to poor utilization of EN by nurses. In turn, it causes delayed healing and recovering of patients thereby increasing hospital stay, mortality, morbidity and treatment costs (Huang *et al.*, 2019).

Proper utilization of enteral nutrition (EN) is essential for critically ill patients as it helps prevent malnutrition and complications (Reignier *et al.*, 2015). Use of enteral nutrition has been documented to improve clinical outcomes of the critically ill patients (Reignier *et al.*, 2015).

Clinical experience shows that there is limited information on utilization of enteral nutrition guidelines in critically ill patients. Studies analyzing factors affecting utilization of EN guidelines have been done in high resource countries such as Belgium as well as China and show good utilization of EN guidelines (Joos *et al.*, 2015; Huang *et al.*, 2019). However, factors for utilization of EN guidelines among nurses for patients admitted in ICU and HDU at tertiary hospitals in Dar as salaam is unknown. Therefore, there was need to assess factors influencing utilization of enteral nutrition guidelines among nurses at tertiary hospitals in Dar as Salam, Tanzania.

1.3. Objectives of the study

1.3.1. Main Objective

The main objective of this study was to assess factors influencing utilization enteral nutrition guidelines among nurses at MNH, MAMC, MOI and JKCI Hospital in Dar es Salam, Tanzania.

1.3.2 Specific Objectives

- i. To determine nurses factor influencing utilization of enteral nutrition guidelines among nurses?
- ii. To determine patients' factors influencing utilization enteral nutrition guidelines among nurses?
- iii. To determine Organizational factors influencing utilization enteral nutrition guidelines among nurses?

1.3.3 Research questions

1.3.3.1 Main research questions

What are factors influencing utilization of enteral nutrition guidelines among nurses at MNH, MAMC, MOI and JKCI Hospital in Dar es Salam, Tanzania?

1.3.3.2 Sub Research questions

- i. What are nurses' factors influencing utilization of enteral nutrition guidelines?
- ii. What are patients' factors influencing utilization of enteral nutrition guidelines among nurses?
- iii. What are organizational factors influencing utilization of enteral nutrition guidelines among nurses?

1.4. Significance of the Study

Nurses spend a lot of time with their patients, their care includes EN, and therefore, findings from this study will help to improve utilization of EN guidelines among nurses working at a tertiary hospital in Dar as salaam. Furthermore, results from this study contribute to the body of knowledge.

1.5 Scope of the Study

The study involves 194 participants who complete a questionnaire within one month, out of 250 nurses taking care of critically ill patients in ICU and HDU for more than one year.

1.6 Limitations of the Study

Nature of the quantitative study may have limited collection of detailed information.

1.7 Conceptual Framework

Utilization of enteral nutrition guidelines may be influenced by multiple factors. They include nurses' factors, patient factors, and organisational factors

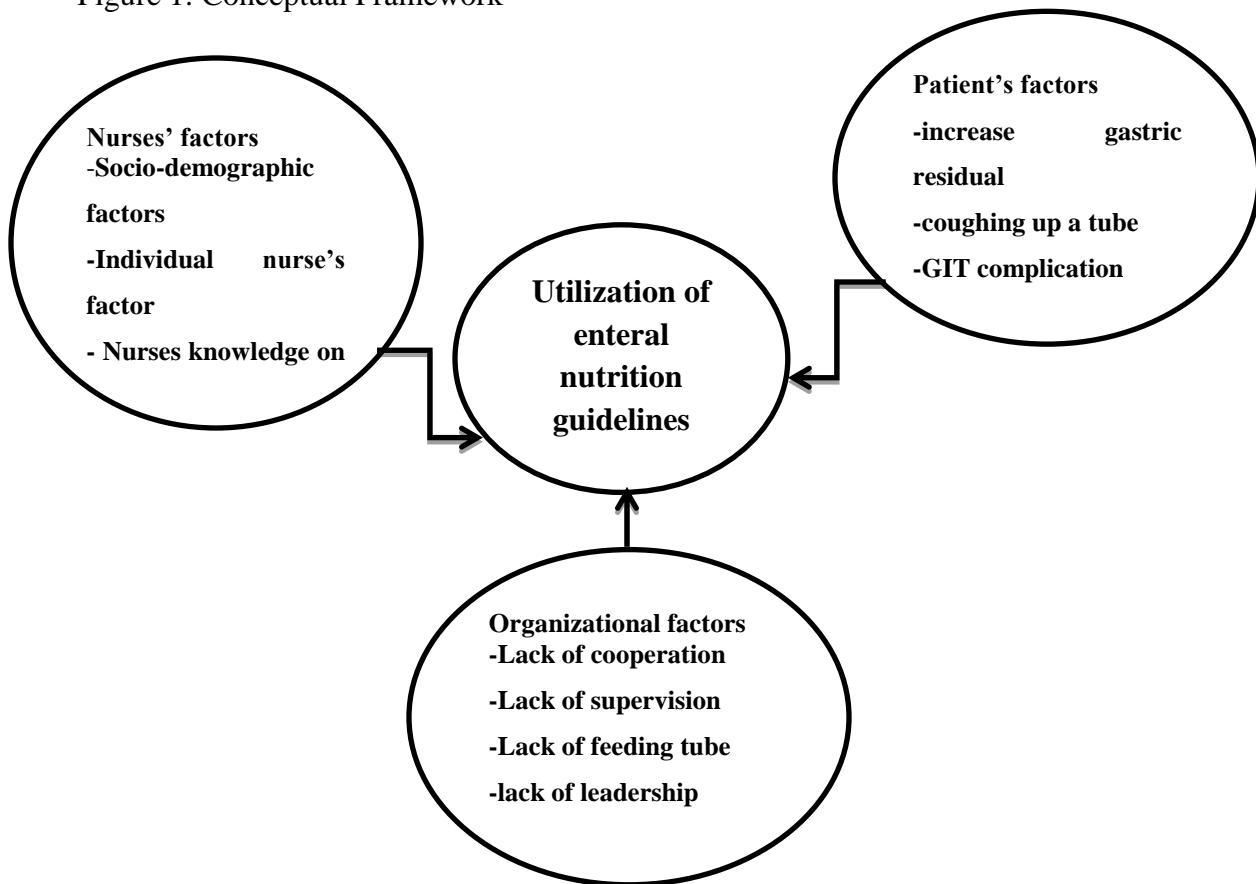
Nurses factors Includes Socio-demographic data and individual factors, nurses with higher education level are more likely to use nutrition guidelines than those with low education level because they understand the benefits (Huang *et al.*, 2019). More experienced nurses tend to have high rates of EN guidelines than those with less time at work (Huang *et al.*, 2019)

Also, EN knowledge, she/he is likely to utilize the EN guidelines (Joos *et al.*, 2015). Influence utilization of EN guidelines

For organizational factor, presence of EN guidelines has a positive influence on EN guidelines (Huang *et al.*, 2019). low motivation from leaders and unfamiliarity with the EN guidelines are shown to be associated with low utilization of EN guidelines (Darawad *et al.*, 2018). The EN discussion also influences on utilization of EN guidelines, establishment of health care providers' team for critically ill patients, including doctors, nutritionists, nurses and pharmacists enable cooperation and may influence on utilization of EN guidelines (Mula, 2014)

In addition, patients' factors like Gastro-Intestinal Tract complications such as abdominal bloating, vomiting, constipation and diarrhea have been seen to be factors associated with low utilization of EN guidelines (Croix, 2019). patients or guardian's rejection and patients removing or coughing up the tube (Mula, 2014). El-regal and colleagues (2016) also identified patient's factors impeding utilization of EN guidelines to be patient's stress, thermic effect of food and GIT complications like high gastric residual volume (GRVs), abdominal bloating, vomiting, constipation and diarrhea (El-Regal *et al.*, 2016).

Figure 1: Conceptual Framework



1.8 Structure of the Study

This dissertation is organized in six chapters as follows: Chapter One offers the Problem and Its Setting; Chapter Two Provides Literature Review; and Chapter Three provides Research Methodology. Chapter Four presents Results; Chapter Five is about Discussion; and finally, Chapter Five presents Summary, Conclusion and Recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter offers Literature Review. It is composed of the following sections: Utilization of Enteral Nutrition Guidelines; Nurses factor; Patients factors; Organizational factors; Synthesis and Research Gap.

2.1 Utilization of Enteral Nutrition Guidelines

Implementation of enteral feeding guidelines is documented to pose beneficial effects on fast accomplishment of target caloric goals, and lessening complications including gastrointestinal bleeding as well as diarrhea (Kim *et al.*, 2017).

Hedland and his colleagues in 2010 conducted a multicenter observational study comparing two sites whereby one site was delivering EN per guidelines, while the other did not do so (Heyland *et al.*, 2010). In their study, it was observed that the site, which delivered EN per guidelines used more EN alone, started EN earlier, and used more motility agents in patients with high gastric residual volume (*ibid.*). Another randomized multicenter study was conducted by Doing and colleagues (2013) on implementation of EN feeding guidelines. In their study, they revealed that the ICUs in which EN was delivered per guidelines fed patients earlier and achieved caloric goals more often (Doig *et al.*, 2013). Nevertheless, there was no significant difference in patients' clinical outcomes in terms of both mortality and ICU duration of stay (*ibid.*).

A study by Rainier and colleagues (2015) showed that Enteral feeding per guideline was associated with improvements in overall caloric and protein intake and in achieving nutritional requirements goals. However, no changes were observed in the duration of mechanical ventilation, length of ICU stay and mortality (*ibid.*). Supplementary studies corroborate these findings (for example, Meyer *et al.*, 2010; Kim *et al.*, 2017). Nonetheless, other reports have revealed conflicting results. Barr and co-authors (2009) reported that in the post implementation group, the mean duration of mechanical ventilation was shorter and the risk of

death was lower in patients who received enteral nutrition. Ireton-Jones in 2009 showed that in the post-implementation group, patients received more days of enteral nutrition, had a shorter mean length of stay in the hospital, and showed a trend towards reduced mortality.

In a study done in South Korea in 2017 by Kim and his colleagues on impact of implementation of an enteral feeding protocol on the improvement of enteral nutrition in critically ill adults showed that overall, enteral nutrition guideline compliance was 72.1 percent. In addition, more patients were started on enteral feeding within 24 hours of admission to the ICU as well as there was statistically significant decrease in complications of EN including gastrointestinal bleeding and diarrhea after implementation of the EN guidelines (Kim *et al.*, 2017). Delivery of enteral nutrition per guidelines may reduce the incidence of diarrhea. Stevens and co-workers 2017 found that diarrhea occurred in more patients and for a longer duration in those not receiving enteral nutrition per guidelines than those receiving it per guidelines.

2.2 Nurses' factors influencing utilization of enteral nutrition guidelines

Few studies have tried to analyze nurses' factors influencing utilization of enteral nutrition. In well resource countries like Belgium and China, these factors include demographic factors, years of experience, nurse's knowledge on enteral nutrition, training on EN and nurse's attitude on enteral nutrition (Huang *et al.*, 2019). Training on EN has been shown to improve delivery of EN (Joos *et al.*, 2015). A multicenter study that was done in China in 2018 by Huang and his colleagues showed that nurses who had relatively high frequency of EN- related training had higher odds for delivering EN per guidelines than those with low frequency of EN-related training (Huang *et al.*, 2019). Their results were consistent with those by Joes and colleagues (2015), which showed that the nurse's lack of knowledge is a vital disruptive factor for delivering EN as per guidelines. Consequently, improving nurse's knowledge can improve clinical practice of the guidelines (Huang *et al.*, 2019). Years of work experience has also been documented to influence delivery of EN per guidelines (Huang *et al.*, 2019). A study by Huang and his colleagues showed that nurses who were more experienced had higher odds for complying with guidelines on delivery of EN than those with less work experience (Huang *et al.*, 2019). The possible explanation given for this association in their

study was that the nurses with more experience have more knowledge about EN than those without such knowledge (*ibid.*).

2.3 Patient factors influencing utilization of enteral nutrition guidelines

Critically ill patients regularly experience complications. Hyperglycemia ought to delay gastric emptying via distressing enteral contraction. Consequently, utilization of EN guidelines is impeded (Chen *et al.*, 2019). Utilization of EN guidelines is reported in patients with gastrointestinal disorders (Chen *et al.*, 2019). A study found that there were more challenges during delivering of EN in patients with increased gastric residuals with abnormal gastrointestinal complications (Pinto *et al.*, 2012). In addition, patient's factors like age, BMI and Gastro-Intestinal Tract complications like abdominal bloating, vomiting, constipation and diarrhea have been seen to be factors influencing delivery of EN per guidelines (Croix, 2019). A study done in Rwanda revealed that critically ill patients who had complication of gastrointestinal tract were underfed (Croix, 2019). Conferring to Mule (2014), patient-related factors associated with utilization of EN guidelines are patients or guardian's rejection and patients removing or coughing up the tube (Mula, 2014). El-regal and colleagues (2016) also identified patient's factors impeding utilization of EN guidelines to be patient's stress, thermic effect of food and GIT complications like high gastric residual volume (GRVs), abdominal bloating, vomiting, constipation and diarrhea (El-Regal *et al.*, 2016).

2.4. Organizational factors influencing utilization of enteral nutrition guidelines

Several studies have analyzed organizational factors influencing delivery of enteral nutrition. Such factors include staff shortage (especially nutritionists), lack of time, absence of EN guidelines and leadership motivation. A study in China shows that nutritionists support is lacking in most hospitals and therefore, leading to low utilization of EN guidelines (Huang *et al.*, 2019). According to recommendations from the study done by Cederholm and colleagues, establishment of health care providers' team for critically ill patients, including doctors, nutritionists, nurses and pharmacists, is crucial to enable multidisciplinary cooperation and to satisfy nutrient supply to the maximum extent (Cederholm *et al.*, 2017).

Absence of EN guidelines is also documented to influence utilization of EN guidelines. A study done in 2018 showed that absence of EN protocols was one of barriers to utilization of EN guidelines (Huang *et al.*, 2019). In that study, it appears that existing nutrition guidelines reflected less clinical practice regarding specific nursing operation process (Darawad *et al.*, 2018).

The study further revealed that practice Guidelines on Clinical Nursing was only a document about nursing operation but not actual evidence- based nursing guidelines (Croix, 2019). For instance, it appears that 500 milliliters of gastric retention were internationally recommended instead of 200 ml, which is the standard (Darawad *et al.*, 2018).

(*ibid.*). In addition, a study done in Rwanda showed that hospitals were facing challenges that impeded delivery of EN per guidelines (Croix, 2019). Such challenges included overworking (84.5%); lack of feeding protocol to guide nurses for the initiation and provision of enteral feeding (82.6%); nutritionists' coverage time was inadequate, especially in evening hours, weekends and holidays (82.5%); insufficient nursing staff to effectively feed the patients (81%); and inaccessible nutrition guidelines [(78%) *ibid.*]. Other researchers corroborate these findings (for instance, Darawad *et al.*, 2018).

2.5 Synthesis and Research Gap

Multicenter study conducted on utilization of EN per guidelines they revealed that Critically ill patients in which EN was delivered per guidelines fed patients earlier and associated with improvements in overall caloric and protein intake and in achieving nutritional requirements goals. Reported that the mean duration of mechanical ventilation was shorter and the risk of death was lower in patients who received enteral nutrition. However, the post-implementation group, patients received more days of enteral nutrition, had a shorter mean length of stay in the hospital, and showed a trend towards reduced mortality. Few studies have tried to analyze nurses' factors, patients' factors and organizational factors influencing utilization of enteral nutrition guidelines (Ahmed,Cederholm,Drawad,Joos,Huang,Al kalaldehy, 2016, 2017, 2018, 2015, 2019, 2011)

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter presents Research Methodology. The chapter has the following sections: Study Design; Study Area; Study Population; Sample Size; Sampling Procedure; Variable of the Study; Data Collection; Data Process; Pre-testing; Validity; Reliability; Data Management and Analysis; Ethical Issue.

3.1. Study design

The study employed descriptive cross-sectional study with quantitative research approach where questionnaires were administered to nurses at their respective site (see Marvasti, 2018). The design was used to identify the gap in utilization of enteral nutrition guidelines and also, to understand factors that lead to poor enteral feeding practices for critically ill patients.

3.2. Study Area

The study was conducted in ICU and HDU, In four tertiary hospitals in Dar es Salaam Tanzania with a total number of 3111 beds that included 198 beds from ICU, HDU and CCU. Muhimbili National Hospital (MNH) located in Upanga, which has a total of 1,500 beds, Muhimbili Orthopedic Institute (MOI) with a total number of 900 beds, and Jakaya Kikwete Cardiac Institute (JKCI) with a total number of 103 beds were all involved in the study, Muhimbili National Hospital wing located at Mloganzila with a total number of 608 beds (Table 1).

Critical care patients bed capacity.

Selection of the site was based on the following reasons: the hospitals receive patients from other zone referral and regional hospitals in the country. Most patients who are referred to tertiary hospitals are in critical stage of their diseases. Because of severity of their diseases, most of such patients are immobile and some of them are admitted in the ICU's and HDU's for a long time such that they require enteral nutritional support.(Table 1)

Table 1 Critical care patients' bed capacity

NUMBER	HOSPITAL	ICU BED	HDU BED	CCU BED	TOTAL
01	MNH	68	9		77
02	MLOGANZILA	65			65
03	MOI	18	16		34
04	JKCI	9	5	8	22
TOTAL		160	30	8	198

3.3. Study population

A total of 250 nurses taking care of 206 critically ill patients in the intensive care units of the tertiary hospitals whereby 112 nurses work at MNH-Upanga, 42 nurses are working at MNH-Mloganzila, 53 nurses work at JKCI and 43 nurses work at MOI were involved in the study. Four selected hospitals are located in Ilala District, Dar es Salaam except MNH-Mloganzila, which is located in Kisarawe District, Coast region (Table 1). The study population included all nurses taking care of critically ill patients in the ICU and HDU at MNH, JKCI, MOI and MAMC hospitals. Such data were obtained from Director of Nursing Services.

3.3.1. Inclusion

Nurses caring for critically ill patients with a minimum of one year working in the intensive care unit were included for the study.

3.3.2 Exclusion

The nurses who perform administrative role were excluded in the study.

3.4. Sample size and selection

The sample size was calculated using a formula adopted from Yamane (1967) and Stephanie (2013):

$$n = \frac{N}{1 + N(e)^2}$$

Whereby

n= is the sample size,

N= is the total population of nurses taking care of critically ill patients from tertiary hospitals.

e= is the level of precision.

Therefore, the sample size for this study was 212 nurses taking care of critically ill patients from the selected hospitals (Table 2).

Table 2 Sample size for each Hospital

HOSPITAL	POPULATION	DATA	FORMULA	REQUIRED SAMPLE SIZE
MNH	112	n=? N=112 e=0.05	$1+112(0.05)^2$	88
MAMC	42	n=? N=42 e=0.05	$1+42(0.05)^2$	38
JKCI	53	n=? N=53 e=0.05	$1+53(0.05)^2$	47
MOI	43	n=? N=43 e=0.05	$1+43(0.05)^2$	39
TOTAL	250			212

Table 3 Sample size for each Hospital**3.5. Sampling procedure**

In this study, participants were selected through purposive sampling procedure. Participants were selected based on characteristics of a population and the main objective of the study, which was to find factors influencing utilization of enteral nutrition guidelines in ICU and HDU from MNH, JKCI, MOI and MAMC.

3.6. Variables of the study**3.6.1. Dependent variable**

The dependent variable that was measured on the following scale was utilization Enteral nutrition guidelines (Nurses' knowledge on enteral nutrition guideline): good, moderate and poor.

3.6.2. Independent variables

The following were independent variables in the study:

1. Nurses' factors
 - Socio-demographic factors
 - Individual nurses' factor
2. Patients' factors
 - Amount of gastric residual
 - GIT complication (Vomiting, Constipation, Diarrhea)
 - Coughing up the tube
3. Organizational factors
 - Resources
 - Supervision
 - Cooperation
 - Leadership

3.7. Data collection tool

The principal investigator using the enteral nutrition guideline developed a data collection tool. A structured questionnaire was used to collect data on enteral nutrition practices for critically ill patients and its associated factors. The structured questionnaire included the following four sections:

- (1) Questions regarding nurses' factors (socio-demographic background and individual factors);
- (2) Questions assessing organizational factors on utilization EN guidelines;
- (3) Questions assessing patient factors on utilization EN guidelines; and
- (4) Questions assessing the knowledge of utilization EN guideline among nurses.

3.8. Data collection process

A self-administered questionnaire was provided to participants who met the criteria and were present during data collection. The questionnaire took approximately 30 minutes to fill per participant. The completed questionnaire was collected on a daily basis.

3.9. Pre-testing

A pre-test was conducted among 25 nurses, which is 10 percent of the expected sample size. It involved registered nurses working at ICU and HDU for more than one year from Lugalo Hospital. The participants from pre-testing were not included in the final study. The results from pre-testing were used to modify unclear questions and some of the questions were removed before the actual data collection. For example, the question like "how many times do you provide EN per shift?" The question was modified to read, "how many times do you provide EN per shift of twelve hours?" That was modified because in the study area, the shifts are for twelve hours.

3.10. Validity

Content validity of the instrument was examined by three intensive care nurses who work at ICU and Master of Science (MSc.) students in Critical Care and Trauma Nursing program. They checked if the instrument covered objectives, literature and anticipated time to fill the questionnaire.

3.11. Reliability

Although the questionnaire was developed by the researcher, most of the contents were derived from the standard components of the Enteral Nutrition guideline/protocol. Other studies also have used a similar process to construct questionnaire for a comparable purpose.

3.12. Data management and analysis

In this study, data analysis was done by using Statistical Package for Social Sciences (SPSS) version 23.0 software. Descriptive statistics were used to analyze frequency as well as percentage and tables were used to summarize obtained data. The association between the independent variables and dependent variable (utilization of enteral nutrition guidelines) was examined with use of chi-square test. A p-value less than 0.05 was considered statistically significant at the 95 percent confidence level. Multinomial regression was used to control for confounders.

3.13. Ethical issues

Ethical clearance to conduct this study was obtained from Muhimbili University of Health and Allied Sciences (MUHAS) Institution Review Board [(IRB) see Appendix IV]. In addition, permission to conduct the research was granted from the Executive Directors of MNH, MAMC, MOI and JKCI (see Appendices VI, VII, IX). Informed consent, which explained the purpose and procedure of the study, was obtained from all potential participants. The participants were informed about their right to withdraw from the study. Privacy and confidentiality were achieved by identifying participants through coded numbers during data collection to ensure anonymity. All collected data were kept in the researcher's locked cabinet.

Submission and dissemination of the findings

The research findings from this study provide useful information on the current practice on EN by nurses caring for critically ill patients in ICU and HDU. This will have an impact on improving the patients' safety and the quality of care they receive as well as influencing quality in utilization of EN. Therefore, copies of results from this research will be

disseminated to the School of Nursing- MUHAS where it will be submitted for the award of Master's Degree in Critical Care and Trauma Nursing, the Muhimbili National Hospital, and the Ministry of Health, Community Development, Gender, Elderly and Children. For the sake of spreading knowledge, the results will be published in academic and professional journals as well as professional conferences inside and outside Tanzania.

CHAPTER FOUR.

RESULTS

4.0 Introduction

This chapter presents Results. The chapter is composed of the following sections: Nurses factor; Respondents' Socio-demographic Characteristics; Nurses EN knowledge; Patients factors; Organizational factors; Association between EN knowledge with Socio-demographic Characteristics; Association between EN knowledge with patients' factors; Association between EN knowledge with Organizational factors.

4.1. Respondents' Socio-Demographic Characteristics

A total of 212 participants were expected to participate in this study. However, 194 (91.5%) completed the questionnaire. The majority (144, 74.25 %) of participants were aged between 26 and 35 years, females (113, 58.2%) and diploma holders were 62.4 % (Table 3). For details, see Table 3.

Table 4 Respondents' Socio-Demographic Characteristics

Variable	Frequency (n)	Percent (%)
Age group		
20-25	13	6.7
26-30	72	37.1
31-35	72	37.1
>36	37	19.1
Sex		
Male	81	41.8
Female	113	58.2
Level of education		
Diploma	121	62.4
Bachelor	69	35.6
Master	4	2.1

4.2. Nurses' knowledge on utilization of EN guidelines

The level of knowledge of nurses on EN utilization was graded using the scoring method adopted from a study done by Yoom (2015). It was found that only a few (17, 8.8%) participants had good knowledge, while 70 (36.0%) had poor knowledge on EN utilization (Table 4).

Table 5 Knowledge of utilization on EN guidelines among nurses

Variable	Frequency (n)	Percent (%)
Good (7-9)	17	8.8
Moderate (4-6)	107	55.2
Poor (3-1)	70	36.0
Total	194	100

4.2.1. Nurses' knowledge on utilization of EN guidelines according to enteral nutrition feeding steps

Several questions were asked to understand knowledge of participants on EN feeding components and their respective use. Few participants (67, 34.5%) correctly mentioned that bolus feeding without pump should take a period of 10 to 30 minutes, whereas most participants (127, 65.5%) incorrectly mentioned that (table 5). On the same issue, 59(30.4%) participants mention correctly that bolus feeding without pump should take maximum average of 200-400 mls, whereas 135(65.9%) mentioned incorrectly (Table 5). Also, when asked about when to start EN post-admission, most of them (78.4%) answered incorrectly (Table 5). In addition, when asked about Gastric residue, 65(33.5%) participants mentioned correctly that it should be less than 200mls, whereas majority mentioned incorrectly [(64.49%) However, start feeding 24 hours post-admission accounted for 78.4 percent (Table 5). For more detail, see Table 5.

Table 6 Nurses' knowledge on utilization of EN guidelines according to use of enteral nutrition feeding steps

Variable	Correct	Incorrect	Total
During feeding patient position should be 30-45 degree	128(65.98.02%)	66 (34.02%)	194
Frequency of enteral nutrition 12hrs 3-4	163 (84.02%)	31 (15.98%)	194
Interval of enteral nutrition 3-4hrs	163 (84.02%)	31 (15.78%)	194
Bolus feeding without pump give maximum average of 200-400mls	59(30.04%)	135 (65.9%)	194
Bolus feeding without pump will take period of minute 10-30	67 (34.5)	127(65.5%)	194
Before feeding aspiration is recommended	71 (36.9%)	123(63.4%)	194
Gastric residue should be less <200mls	65 (33.5%)	129 (64.49%)	194
If GIT is not function well withhold EN	155(79.9%)	39(20.4%)	194
Start feeing 24 hour post admission	43(22.2 %)	151(77.8 %)	194

4.3 Patients' factors

Findings indicated that patients' factor affecting utilization of EN guidelines, based on measurements of Gastric residual volume, majority of them a bit over two-thirds (66.5%) indicated that they did not measure GRV (Table 6). For further details, see Table 6.

Table 7; Distribution of Patients' factors

Variable	Yes	No	Total
Increase GRV	65(33.5%)	129(66.5%)	194
Abnormal GIT functions	155(79.9%)	39(20.1%)	194
If coughing/rejecting up a tube	163(84.0%)	31(16.0%)	194

4.5 Organizational factors

Close to three quarters (71%) of participants indicated that there was no supervision, while 98(50.5%) indicated that there was no motivation (Table 7). Furthermore, 117 (60.3%) indicated that feeding charts were available in their wards and 138 (71.1%) indicated that they did not have feeding equipment in their wards (Table 7). A bit over two-thirds (67%) of the participants reported that there were no EN guidelines at the patients' bedsides (Table 7). Results also showed that there is no EN discussion done that accounted for 120 (61.9%) respondents (Table 7). For more detail, see Table 7.

Table 8 Distribution of Organizational factors

Variable	Yes	No	Total
Availability of EN supervision?	51(26.3%)	143(73.7%)	194
Availability of EN motivation?	96(49.5%)	98(50.5%)	194
Availability of duodenal/gastric feeding tube?	56(28.9%)	138(71.1%)	194
Availability of feeding Chart?	117(60.3%)	77(39.7%)	194
Availability of EN guideline?	64(33.0%)	130(67%)	194
Availability of EN discussion?	74(38.1%)	120(61.9%)	194

4.6 Bivariate analyses

4.6.1 Association between nurses' EN knowledge and socio-demographic data

The results highlighted that education level and in-service training showed significant association with nurse's knowledge of EN utilization (Table 8). Those nurses with Masters and Bachelor's degree showed a higher level of knowledge on EN utilization than those with diplomas only (Table 8). This association was statistically significant with a p-value of 0.027 (Table 8). Furthermore, despite the fact that only few participants had in-service training on EN utilization, such nurses had a significant association with level of knowledge on EN utilization (p-value of 0.042) compared to those who never underwent any in-service training (Table 8).

Table 9 Association of Nurses EN knowledge with socio-demographic data

Variable	EN guideline utilization			Frequency (n)	Percent (%)	p-value
	Good	Moderate	Poor			
Demographic factor						
Age						
20-25	1 (7.7%)	5 (38.5%)	7 (53.8%)	13	6.7	0.54
26-30	6 (8.3%)	44 (61.1%)	22 (30.6%)	72	37.1	
31-35	4 (5.6%)	43 (59.7%)	25 (34.7%)	72	37.1	
>36	6 (16.2%)	15 (40.5%)	16 (43.2%)	37	19.1	
Sex						
Male	4 (4.9%)	48 (59.3%)	29 (35.8%)	81	41.8	
Female	13 (11.5%)	59 (52.2%)	41 (36.3%)	113	58.2	0.75
Level of education						
Diploma	10(8.3%)	59(48.8%)	52(42.9%)	121	62.4	
Degree	4(5.8%)	42(60.9%)	23(33.3%)	69	35.6	0.027
Masters	2(50%)	0(0.0%)	2(50%)	4	2.0	
Working experiences						
1-5	9(7.1%)	77(61.1%)	40(31.7%)	126	65.0	
6-10	5(9.6%)	23(44.2%)	24(46.2%)	52	26.8	0.06
>10	3(18.8%)	7(43.8%)	6(37.5%)	16	8.2	
Individual factors						
EN Training						
Yes	11(12.8%)	44(51.2%)	31(36.0%)	87	44.3	0.57
No	6(5.6%)	63(58.9%)	38(35.5%)	107	55.7	
In service EN training						
Yes	4(12.1 %)	17(51.5 %)	12(36.4%)	33	17.0	
No	13(8.1%)	90(55.99%)	58(36.0 %)	161	83.0	0.042

4.6.2. Association of nurses' EN knowledge with patients' factors

As seen in Table 9, there is a significant association between participants who agreed (said yes) to coughing up of the tube and their knowledge on utilization of EN guidelines with p-value of 0.003.

Table 10 Association of patients' factors with knowledge of EN utilization.

Variable	EN guideline utilization			Frequency (n)	Percent (%)
	Good	Moderate	Poor		
Increase GRV					
Yes	4(6.2%)	36(55.4%)	25(38.5%)	65	0.072
No	13(10.1%)	71(55.0%)	45(34.9%)	129	
Abnormal GIT function					
Yes	15(9.7%)	83(53.5%)	57(36.8%)	155	0.116
No	2(5.1%)	24(61.5%)	13(33.3%)	39	
Coughing up tube					
Yes	15(9.2%)	97(59.5%)	51(31.3%)	163	0.003
No	2(6.5%)	10(32.3%)	19(61.3%)	31	

4.6.3. Association of nurses' EN knowledge with organizational factors

Results from this study showed that among organizational factors, motivation and EN discussion showed significant association with knowledge of EN utilization (Table 10). Participants who agreed that there is motivation showed more knowledge on EN utilization than those who disagreed on availability of motivation (Table 10). The p-value was statistically significant at 0.015 (Table 10). Participants who agreed that there were EN discussions had good knowledge of EN utilization compared to those who did not, and this association was statistically significant with p-value of 0.005 (Table 10).

Table 11 Association of nurse's EN knowledge with organizational factor

Variable	EN guideline utilization			Frequency (n)	Percent (%)
	Good	Moderate	Poor		
Supervision					
Yes	5(9.8%)	28(54.9%)	18(35.3%)	51	0.102
No	12(8.4%)	79(52.2%)	12(8.4%)	143	
Motivation					
Yes	10(10.4%)	58(60.4%)	28(29.2%)	96	0.015
No	7(7.1%)	49(50.0%)	42(42.9%)	98	
Duodenal/Gastric tube					
Yes	6(10.7%)	29(51.8%)	21(37.5%)	56	0.102
No	11(8.0%)	78(56.5%)	49(35.5%)	138	
Feeding chart					
Yes	9(7.7%)	64(54.7%)	44(37.6%)	117	0.073
No	8(10.4%)	43(55.8%)	26(33.8%)	77	
Guideline					
Yes	7(10.9%)	32(50.0%)	7(10.9%)	64	0.098
No	10(7.7%)	75(57.7%)	10(7.7%)	130	
EN discussion					
Yes	9(12.2%)	46(62.2%)	19(25.7%)	74	0.005
No	8(6.7%)	61(50.8%)	51(42.5%)	120	

CHAPTER FIVE

DISCUSSION

5.0 Introduction

The study was designed to assess factors influencing utilization of EN guidelines among nurses working in tertiary hospitals in Dar as Salaam Tanzania. From this study, it was found that majority of participants had poor knowledge on the utilization of EN guidelines and multiple factors include demographic characteristics, nurses' factors (on job EN training, EN training, level of knowledge), patients' factors (Gastric residual volume, GIT complication and coughing NGT) and organisational factors (poor supervision, poor motivation, lack of cooperation, lack bed side EN guidelines, lack of feeding tube) were identified as factors influencing utilization of EN guidelines among nurses working in tertiary hospital in Dar-es-Salaam, Tanzania.

5.1 Socio-demographic characteristics

A study done by Mula (2014) shows similar findings concerning gender whereby majority of surveyed groups were females. However, different to this study, the education level in a study by Al kalalkeh (2011) reported that more than half of the participants in that study had only a certificate in nursing. In this study, nurses' working experience had an influence on utilization of EN whereby participants with more than 10 years working experience showed good utilization on EN 18.8 percent. This finding is similar to results from the study done by Huang and colleagues (2019) in which nurses who were more experienced at job had higher odds for complying with guidelines on delivery of EN. This study revealed that the only source of EN training was from nursing schools (72.5%), similar to a study done by Mula (2014). In-service EN training results showed that 83% of the participants in this study had not attended EN training. Such disclosure from this study is almost equal to results from the study done by Mula (2014) who reported that 96.1 % participants had never got in-service training. This similarity may be due to the fact that EN training is not considered as vital care to critically ill patients. Additionally, bivariate analysis showed that there was significant association between EN utilization and education level. Those with masters and bachelor's degree were more likely

to utilize EN and furthermore, those who had received in-service training had better knowledge on EN utilization than those who did not have any in-service training.

5.2 Nurses' factors

Regarding nurses' factors on utilization of EN guidelines, this study revealed that high number of participants 36.0% had poor knowledge and only 8.8% had a good knowledge on the utilization of EN guideline. This means that most of patients admitted in ICU are under fed and this, in turn, may increase the risk of malnutrition for ICU and HDU patients. This finding is parallel with the study done by Heyland and colleagues (2010), which showed 39.7 % had poor knowledge. This similarity may be due to nature of participants who work in ICU and HDU.

To determine the knowledge level on utilization of EN, questions asked to assess knowledge included Interval of EN, Frequency of EN and Withholding EN feeding. The results found in this study were similar to those from the study done by Heyland and colleagues (2010) that revealed most of the participants answered correctly. Patient's position during EN feeding should be 30-45 degree and results from this study found that most 65 (98%) of the participants answered correctly. Such results are similar to the study done by Mula (2014), which reported that 31(60.8%) participants answered correctly that patients should be in a semi-fowler sitting/sitting position during tube feeding. In this study, 36.9 percent of the participants stated that before feeding, aspiration is recommended. This is similar to a study done by Mula (2014), which showed that 29(56.9%) participants aspirate gastric residue before feeding. Furthermore, only 33.5 % of participants in this study measure GRV, an aspect similar to the study done by Mula (2014), which reported that only 16(31.4%) check for GRV before feeding.

5.3 Patients' factors

From the study, poor digestion was the factor identified to be influencing utilization of EN. This may be due to the fact that critically ill patients in ICU are confined to the beds and they may have reduced intestinal motility. In this study, 35.5 % of patients in the ICUs and HDUs

were reported to have a high residual volume. This result is nearly similar to the study done by Mula (2014), which reported that only 16(31.4%) check gastric residual volume.

Gastro-Intestinal Tract complications like abdominal bloating, vomiting, constipation and diarrhea may be influencing utilization of EN per guidelines. In this study, results showed that 79.9 % were underfed due to abnormal complication. A study done in Rwanda revealed near similar results that 64.0 percent of critically ill patients who had complication of gastrointestinal tract were underfed (Croix, 2019). In addition, results found that some patients coughing up/guarding and refusal of feeding tube may interfere with utilization of EN per guidelines. These results are similar to the study done by Mula (2014).

5.4 Organizational factors

Poor supervision may influence on utilization of EN among nurses. In this study, it was found that no one is assigned to do follow-up on utilization of enteral nutrition and therefore, majority of nurses provide EN according to their knowledge. Additionally, poor motivation in the organization could influence on EN knowledge among nurses. In this study, most respondents appeared to need it in order for them to have good knowledge of EN utilization. These results reflect similar findings from the study done by Al kalaldehy (2011), which showed too poor supervision and motivation among nurses regarding utilization of EN guidelines. This similarity may be due to poor consideration of nutritional needs of critically ill patients as an essential nursing intervention. The EN discussion also influences on utilization of EN guidelines, establishment of health care providers' team for critically ill patients, including doctors, nutritionists, nurses and pharmacists enable cooperation and may influence on utilization of EN guidelines. Results found out that 38 percent only agreed to have EN discussion on their departments. Such results are similar to those from the study done at Malawi reported that always discussion done to 20 or 39.2 % (Mula, 2014). Bed side EN guidelines are also documented to influence on utilization EN guidelines. In this study, 33.0 % of the participants reported that EN guidelines are available in the unit but kept in the office and not bed side where EN procedures are performed. This is different from a study done in

Rwanda, which reports that 82.6 % of nurses reported that there are no EN guidelines in their units.

Availability of gastrostomy and jejunostomy feeding tube may influence on utilization of EN guideline, in this study. Results showed that 71.1 % of participants reported lack of duodenal and gastric feeding tube. Such results reflect similarly to findings from the study done by Al kalaldehy (2011), which reported that 35(68.6%) participants revealed shortage of feeding tube. Also, in the performed bivariate analysis, it is reflected that there is an association between motivation and utilization of EN guidelines as well as an association between discussion of EN and its utilization. However, when further multivariate analysis was done, it was seen that none of the factors had any significant association with the nurse's knowledge on EN utilization.

CHAPTER SIX

SUMMARY, CONCLUSION AND RECOMMENDATIONS

6.0 Introduction

This chapter provides Summary, Conclusion and Recommendations. Recommendations are in two parts: General recommendations and Suggestions for Further Research.

6.1 Summary

Malnutrition is very common in severely ill due to the nature of their illness and their metabolic state. Enteral nutrition plays a significant role in improving the critically ill patients' nutrition status and hence, facilitates the healing process. Utilization of enteral nutrition (EN) guidelines may be influenced by nurses' knowledge, education level and years of experience. Also, patients' factors GIT complication, high GRV and coughing up a tube and organisational factors such as motivation, supervision, availability of resources, and cooperation may affect utilization of EN.

6.2. Conclusion

The study found that poor motivation and supervision, poor digestion, lack of duodenal and gastric tube, lack of EN discussion, bed side EN guidelines, GIT complication, high GRV and coughing up a tube appear to hamper utilization EN guidelines.

6.3 Recommendations

6.3.1 General Recommendations

1. Hospital administration should develop EN training for ICU and HDU nurses to ensure effective utilization of EN guidelines.
2. Hospital administration should improve supervision of nurses to ensure utilization of EN guidelines.
3. Hospital administration should also ensure that EN discussion should include doctors, pharmacists, nutritionists and nurses.

6.3.2 Suggestions for Further Research

Nurses spend a lot of time with their patients, their care includes EN, and therefore, further studies should be done in order to improve utilization of EN guidelines among nurses

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APPENDICES

Appendix: I Questionnaire guide

FACTORS INFLUENCING UTILIZATION OF ENTERAL NUTRITION GUIDELINES AMONG NURSES AT SELECTED HOSPITALS IN DAR ES SALAM TANZANIA

Part A: Introduction, consent and rapport building:

Part B: Participant's background information

Start time...

Introduction/summary of the study

Interviewer: My name is Yunita N. Mtaki. Thank you again for your willingness to be part of this discussion. I look forward to hearing your thoughts. I am going to give you a questionnaire that will help me understand more about the factor influencing utilization of enteral nutrition guidelines of caring critically ill patients and in particular meeting their nutritional needs using Enteral Nutrition. Your answers will help to identify the gaps in utilization enteral nutrition guidelines. The identification of these gaps and the associated factors will be helpful in determining the determinants for non-use of EN guidelines at MNH and this may guide improvement utilization of EN to critically ill patients.

Before we begin, I'd like to confirm that you have given your voluntary consent to participate in this interview. Do you agree freely? Do you have any questions?

OK then, I'd like to begin.

Structured questionnaire guide on determines the factor influencing utilization of enteral nutrition guidelines of caring critically ill

Appendix II: Questionnaire

Choose correct answer and write in small box provided

Section A: Background characteristics

1. Age (yrs).....

- 1. 20–25
- 2. 26–30
- 3. 31–35
- 4. ≥ 36 years

2. Sex

- 1. Male
- 2. Female

4. Marital status

- 1. Single
- 2. Married
- 3. Cohabited
- 4. Widow/widower

5. Name of ICU.....

- 1. Medical ICU
- 2. Surgical ICU
- 3. Maternity ICU
- 4. Maternity HDU
- 5. Pediatric ICU
- 6. Neonate ICU

7. General ICU

8. General HDU

6. Name of Hospital

1. MNH

2. MAMC

3. MOI

4. JKCI

Section B. Individual factor influencing utilization of EN guideline

7. Level of education

1. Diploma

2. Bachelor

3. Master

8. Working experience as a nurse (years)

1. 1-5

2. 6-10

3. >10

9. Have received any training courses on enteral nutrition

1. Yes

2. No

Section C; Organizational factor influencing utilization of EN guideline

10. Supervision from the leader of the Organization on utilization of EN guidelines

1. Yes

2. No

11. Motivation regarding utilization of EN guidelines

1. Yes

2. No

12. Availability of gastrostomy and jejunostomy feeding tube

1. Yes

2. No

13. Availability of feeding chart

1. Yes

2. No

14. Discussion of providing EN from doctors, nutritionists pharmacists and nurse

1. Yes

2. No

Section D; Patient factor influencing utilization of EN guideline

15. Do you measure gastric residual before providing EN?

1. Yes

2. No

16 . Patient coughing up or rejecting feeding tube interfere utilization of EN?

1. Yes

2. No

17. GIT complication patient vomiting, diarrhea, constipation or abdominal bloating interfere utilization of EN

1. Yes

2. No

Section Nurses knowledge utilization of EN guidelines

18. How many times do you provide enteral nutrition per shift for twelve hours?

1. 2

2. 3-4

3. >4

19. Start feeding early within..... hours post admission

1. 48 hrs.

2. 24hrs

3. 12hrs

20. Feeding should be at a frequency of 5-6 times a day at an interval of...

1. 3-4 hrs

2. 1-2 hrs

3. Every 30min

4. at any time

21. Bolus feeding without pump give maximum average of.....mills

1. 100-200

2. 200-400

3.300-400

4.400-600

22. Bolus feeding without pump will take period ofminutes

1. 10-20

2. 10-30

3. 10-40

4. 20-30

23 .How do you aspirate?

1. 2 hourly or before feeding

2. 3 hourly or before feeding

3. 4 hourly or before feeding

4. 5 hourly or before feeding

24. Gastric residue should be less than....mls.If more than....mls do not feed.

1. 100

2. 200

3. 300

4. 400

25 .If GIT is not function well or patient is unstable, you should

1. Withhold enteral feeding

2. Feed slowly

3. Call other nurses to help you

4. Continue feeding

26. During feeding, patient is positioned at

1. 30-45degrees

2. Upright

3. Flat on the back

4. on the side

27. If enteral feeding withholds how many days will take to consider TPN

1. 3 days

2. 5 days

3. 6 days

4. 7 days

Appendix III: Informed Consent (English version)

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES (MUHAS)



DIRECTORATE OF RESEARCH AND PUBLICATIONS

MUHAS INFORMED CONSENT FORM

ID NO: HD/MUH/T.510/2019

Consent to participate in a study: Title: FACTORS INFLUENCING UTILIZATION ENTERAL NUTRITION GUIDELINES AMONG NURSES AT MUHIMBILI NATIONAL HOSPITAL IN DAR ES SALAM TANZANIA

NAME: YUNITA NYANGABHO MTAKI

Purpose of the Study: The purpose of the study is to find the gap of missing information on Enteral Nutrition practice by assessing determination to utilization of Enteral Nutrition at Muhimbili National Hospital.

What Participation Involves: If you agree to join the study, you will be interviewed in order to answer a series of questions in the interview guide prepared for the study.

Confidentiality: The information from the study will be kept in a safe place with access to authorized personnel only and will be used for research purposes only. No names will be used instead identification number will be used to represent the participants.

Risks: For this study we do not expect any risk while participating in this study.

Rights to withdraw and Alternatives: To participate in this study is completely your choice. You are free to choose either to participate in this study or not. You can decide to stop participating in this study at any time you wish even if you have already given your consent. Refusal to participate or withdrawal from the study will not involve penalty or loss of any benefits to which you are otherwise entitled.

Benefits: If you agree to take part in this study there are no direct benefits that you will get from this study but we believe the information you will provide will help in improving nurse’s practice regarding factor influencing utilization to nutrition guidelines among nurses at Muhimbili National Hospital.

Compensation: There will be no compensation of any kind for participating in this study.

Whom to contact:

In case of any questions about this study, don’t hesitate to contact the principal investigator YUNITA NYANGABHO MTAKI Muhimbili University of Health and Allied Sciences School of Nursing P.O. Box. 65004 Dar es Salaam, through Mobile +255 767310008, research co-supervisor Dr. Menti Ndile, Muhimbili University of Health and Allied Sciences School of Nursing P.O. Box. 65004 Dar es Salaam, Mobile Number +255 714890015. Or research supervisor Prof. Edith Tarimo, Muhimbili University of Health and Allied Sciences School of Nursing P.O. Box. 65004 Dar es Salaam, Mobile Number +255 784 917100. If you ever have questions about your rights as a participant, you may contact the Director of Research and Publications Committee Dr. Bruno Sunguya Muhimbili University of Health and Allied Sciences P.O. Box 65001 Dar es Salaam Tel + 255 222150302 -6/ 2152489

Do you agree?

Participant agrees..... Participant does not agree.....

I read the content in this form. My questions have been answered. I agree to participate in this study.

Signature of participant

Signature of principal investigator

Date of signed consent.....

Appendix IV: Kiambatanisho Fomu ya ridhaa (Toleo la lugha ya Kiswahili)

CHUO KIKUU CHA AFYA NA SAYANSI SHIRIKISHI MUHIMBILI



KURUGENZI YA TAFITI NA UCHAPISHAJI.

FOMU YA RIDHAA.

Nambari ya usajili : HD/MUH/T.510/2019

Naitwa YUNITA NYANGABHO MTAKI, mimi ni mwanafunzi wa mwaka wa pili katika shahada ya uzamili ya huduma kwa wagonjwa mahututi na majeruhi katika chuo kikuu cha afya na sayansi shirikishi Muhimbili. Ninafanya utafiti kuhusu “SABABU ZINAZOATHILI MIONGOZO YA LISHE KAMILI KWA WAUGUZI KATIKA HOSPITALI YA KITAIFA MUHIMBILI”. Utafiti huu unawahusu wauguzi wanaofanya kazi katika vitengo maalumu vya wagonjwa mahututi katika Hospitali Taifa Muhimbili, Dar es Salaam, Tanzania.

Umuhimu wa utafiti huu.: Utafiti huu unalenga kuchunguza sababu zinazosababisha wauguzi kutofuata miongozo ya lishe kamili katika kutimiza mahitaji ya lishe bora ya wagonjwa mahututi kwa kutumia mipira maalumu ya kulishia chakula katika Hospital ya Taifa Muhimbili, tawi la Mloganzila

Jinsi ya kushiriki: Ukikubali kushiriki katika utafiti huu, utasailiwa ili kuweza kujibu maswali kutoka kwenye dodoso lililoandaliwa kwa ajili ya utafiti huu ambapo utaulizwa na matafiti nae ataandika maelezo yako.

Usiri: Majibu yote yatakusanywa kutoka katika eneo la utafiti na yatahifadhiwa sehemu maalum ambapo wahusika tuu ndio wataruhusiwa kuzipata taarifa hizo. Pia majina

hayatatumika badala yake tutatumia nambari ya utambulisho Tu. Hakuna jina la mshiriki litakalochapishwa.

Madhara: Hatutegemei madhara yeyote kukutokea kwa kushiriki kwako katika utafiti huu.

Haki ya kutoshiriki au kusitisha kushiriki na mbadala: Kushiriki katika utafiti huu ni chaguo lako, na una uhuru wa kukubali au kukataa kushiriki katika utafiti huu. Pia unaweza kusitisha kushiriki katika utafiti huu muda wowote utakapojisikia hivyo hatakama umeshakubali kushiriki. Kukataa kushiriki au kusitisha kushiriki katika utafiti huu hakutakufanya upoteze haki zako za msingi au kupata adhabu yoyote.

Faida: Ikiwa unakubali kushiriki katika utafiti huu hakuna faida moja kwa moja ambayo utapata kutoka kwa utafiti huu lakini tunaamini habari utakayotoa itasaidia kuboresha kufuata miongozo lishe kamili kwa wauguzi kuhusu kutimiza mahitaji ya lishe ya wagonjwa mahututi kwa njia ya kulisha kwa mpira katika Muhimbili National Hospitali- Tawi Mloganzila, Dar es Salaam.

Fidia: Hakuna fidia yoyote itakayotolewa katika utafiti huu, uko huru kushiriki au kutoshiriki katika utafiti huu. Pia unaweza kujitoa /kujiengua wakati wowote.

Mawasiliano: Kama utakuwa na swali lolote kuhusu utafiti huu unaweza kuwasiliana na mkuu wa utafiti huu YUNITA NYANGABHO MTAKI, Shule ya Uuguzi ya Chuo Kikuu cha Afya na Sayansi Shirikishi Muhimbili, S.L.P. 65004, Dar es Salaam, namba ya simu +255 767 310008 au unaweza kuwasiliana na msimamizi msaidizi wa utafiti huu Dr Menti Ndile, Shule ya Uuguzi Chuo Kikuu cha Afya na Sayansi Shirikishi Muhimbili, S.L.P. 65004, Dar es Salaam namba ya simu +255 714 890015. unaweza kuwasiliana na msimamizi mkuu wa utafiti huu Prof.Edith Tarimo, Shule ya Uuguzi Chuo Kikuu cha Afya na Sayansi Shirikishi Muhimbili, S.L.P. 65004, Dar es Salaam namba ya simu +255 784 917 100

Na ukiwa na swali lolote kuhusu haki zako kama mshiriki, unaweza kuwasiliana na Mkurugenzi wa Utafiti wa Chuo Kikuu cha Afya na Sayansi Shirikishi Muhimbili, Dr Bruno Sunguya S.L.P. BOX 65001, Dar es Salaam. Tel + 255 222150302 -6/ 2152489.

Je unakubali?

Mshiriki kakubali.....Mshiriki hajakubali.....



Mimi, nimesoma na nimeelewa maelezo ya fomu hii. Maswali yangu yote yamejibiwa na nakubali kushiriki katika utafiti huu.

Sahihi ya mshiriki

Sahihi ya mtafiti.....

Tarehe

Appendix IV: Letter for Ethical Clearance

	<p>UNITED REPUBLIC OF TANZANIA MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES OFFICE OF THE DIRECTOR - RESEARCH AND PUBLICATIONS</p>	
Ref. No.DA.282/298/01.C/	Date: 08/06/2021	
MUHAS-REC-06-2021-663		
Yunita Mtaki, MSc. in Critical Care and Trauma, School of Nursing MUHAS		
RE: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED: FACTORS INFLUENCING UTILIZATION OF ENTERAL NUTRITION GUIDELINES AMONG NURSES AT SELECTED HOSPITALS IN DAR ES SALAM TANZANIA		
Reference is made to the above heading.		
I am pleased to inform you that the Chairman has on behalf of the University Senate, approved ethical clearance of the above-mentioned study, on recommendations of the Senate Research and Publications Committee meeting accordance with MUHAS research policy and Tanzania regulations governing human and animal subjects research.		
APPROVAL DATE: 08/06/2021 EXPIRATION DATE OF APPROVAL: 07/06/2022		
STUDY DESCRIPTION:		
Purpose:		
The purpose of this quantitative observational cross-sectional study is to assess factors influencing the utilization of enteral nutrition guidelines among nurses at selected hospitals in Dar es Salaam in order to identify the gaps in utilization of enteral nutrition guidelines.		
The approved protocol and procedures for this study is attached and stamped with this letter, and can be found in the link provided: https://irb.muhas.ac.tz/storage/Certificates/Certificate%20-%20659.pdf and in the MUHAS archives.		

The PI is required to:

1. Submit bi-annual progress reports and final report upon completion of the study.
2. Report to the IRB any unanticipated problem involving risks to subjects or others including adverse events where applicable.
3. Apply for renewal of approval of ethical clearance one (1) month prior its expiration if the study is not completed at the end of this ethical approval. You may not continue with any research activity beyond the expiration date without the approval of the IRB. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.
4. Obtain IRB amendment (s) approval for any changes to any aspect of this study before they can be implemented.
5. Data security is ultimately the responsibility of the investigator.
6. Apply for and obtain data transfer agreement (DTA) from NIMR if data will be transferred to a foreign country.
7. Apply for and obtain material transfer agreement (MTA) from NIMR, if research materials (samples) will be shipped to a foreign country.
8. Any researcher, who contravenes or fail to comply with these conditions, shall be guilty of an offence and shall be liable on conviction to a fine as per NIMR Act No. 23 of 1979, PART III section 10 (2)
9. The PI is required to ensure that the findings of the study are disseminated to relevant stake holders.
10. PI is required to be versed with necessary laws and regulatory policies that govern research in Tanzania. Some guidance is available on our website <https://drp.muhas.ac.tz/>.




Dr. Bruno Sunguya
Chairman, MUHAS Research and Ethics Committee




Cc: Director of Postgraduate Studies

Appendix V: Introduction letter



UNITED REPUBLIC OF TANZANIA
 MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY
 MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
**OFFICE OF THE DIRECTOR – POSTGRADUATE
 STUDIES**



In reply quote;
 Ref. No. HD/MUH/S.10/2019

11th June, 2021

The Executive Director,
 Muhimbili National Hospital,
 P.O. Box 65000,
DAR ES SALAAM


Re: INTRODUCTION LETTER

The bearer of this letter is Yunita Mtaki, a student at Muhimbili University of Health and Allied Sciences (MUHAS) pursuing MSc. Critical Care and Trauma Nursing.

As part of her studies she intends to do a study titled: *“Factors Influencing Utilization of Enternal Nutrition Guidelines Among Nurses at Selected Hospitals in Dar es Salaam, Tanzania.*
 The research has been approved by the Chairman of University Senate.

Kindly provide her the necessary assistance to facilitate the conduct of her research.

We thank you for your cooperation.


Ms. Victoria Mwanilwa
For: DIRECTOR, POSTGRADUATE STUDIES

cc: Dean, School of Nursing, MUHAS
 cc: Yunita-Mtaki

9 United Nations Road, Upanga West; P.O. Box 65001, Dar Es Salaam; Tel. G/Line: +255-22-2150302/6; Ext. 1015;
 Direct Line:+255-22-2151376,Telefax:+255-22-2150465,E-mail:dpgs@muhas.ac.tz;Web:https://www.muhas.ac.tz

Appendix VI: Permission to collect (JCKI)



UNITED REPUBLIC OF TANZANIA
 MINISTRY OF HEALTH, COMMUNITY DEVELOPMENT,
 GENDER, ELDERLY AND CHILDREN
JAKAYA KIKWETE CARDIAC INSTITUTE (JKCI)



In reply, please quote; Ref: AB.123/307/01E/19

Date: 21/06/2021

Yunita Mtaki
 Msc. Critical Care and Trauma
MUHAS

RE: PERMISSION TO CONDUCT RESEARCH

Reference is made to your letter. Your request to conduct a study titled, "Factors Influencing Utilization of Nutrition Guidelines Among Nurses at Selected Hospitals in Dar es Salaam, Tanzania". Has been granted institutional permission.

This letter serves as an official document that permits you to collect your data at JKCI for the prescribed duration as per your ethical clearance. It is our sincere hope that you will abide to the rules and regulations of good clinical practice and the declaration of Helsinki. We wish you the very best and hope that your stay at JKCI will be fruitful.

You are required to provide a copy of your final project upon completion and submit it to Department of Research and Training JKCI.

In addition, your local contact person at JKCI will be Sr. Salma Wibonela (lease with her before you start your data collection).

Best Regards,

Dr. Naizimu M. Mwakikwiri
 Head of Research, Training & Consultancy
 CC: DIRECTOR NURSING SERVICES



Appendix VII: Permission to collect (MLOGANZILA)



THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH, COMMUNITY
DEVELOPMENT, GENDER, ELDERLY
AND CHILDREN



**MUHIMBILI NATIONAL HOSPITAL
MLOGANZILA**

In reply please quote;

Ref. No.: JA.294/428/01A/15

Date: 25/06/2021

Ass. Ag. DNS
MNH-Mloganzila

RE: PERMISSION TO COLLECT DATA AT MNH - MLOGANZILA

Name of Principal Investigator	Ms. Yunita Mtaki
Title	"Factors Influencing Utilization of Enternal Nutrition Guidelines Among Nurses at Selected Hospitals in Dar es Salaam, Tanzania"
Institution	MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES
Supervisor	Dr. Prof. Edith Tarimo
Period	2 months

Permission has been granted to **Ms. Yunita N. Mtaki** to collect data for the above study.

Please ensure that the researcher abide to the ethical principle and other condition.


Miriam K. Herman
FOR: EXECUTIVE DIRECTOR
MUHIMBILI NATIONAL HOSPITAL - MLOGANZILA



c.c. Head of Unit, Nutrition
c.c. Ms. Yunita N. Mtaki

Appendix VIII: Permission to collect data at MNH



In reply please quote;

Ref. No.: MNH/TRCU/Perm/2021/193

Date: 11th June, 2021

Director of Nursing Services
Muhimbili National Hospital

RE: PERMISSION TO COLLECT DATA AT MNH.

Name of Student	Yunita Mtaki
Title	"Factors Influencing Utilization of Eternal Nutrition Guidelines Among Nurses at Selected Hospital in Dar es Salaam, Tanzania".
Institution	Muhimbili University of Health and Allied Sciences
Supervisor	Prof. Edith Tarimo
Co – Supervisor	Dr. Menti Ndile
Period	11 th June 2021, to 30 th August, 2021

Approval has been granted to the above mentioned student to collect data at MNH.

Kindly ensure that the student abide to the ethical principles and other conditions of the research approval.

Sincerely,

Reid B. Mchome

Coordinator –Teaching, Research and Consultancy



c.c **Yunita Mtaki**

Appendix IX Permission to collect data at (MOI)



P.O. Box 65474; DAR ES SALAAM, TANZANIA, MUHIMBILI COMPLEX

Executive Director: +255-022-2153359

General lines: +255-022-2151298/2152937/2152938

FAX: +255-022-2151744

E-Mail: info@moi.ac.tz

Website: www.moi.ac.tz

OFFERING SERVICES IN ORTHOPAEDICS, NEUROSURGERY AND TRAUMATOLOGY

AB.145/146/02/103

2nd July, 2021

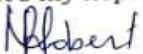
Director,
Postgraduate studies,
Muhimbili University of Health and Allied Sciences,
P.O.Box 65001,
Dar es Salaam

RE: APPROVAL FOR PERMISSION TO CONDUCT A RESEARCH AT MOI

Reference is made to your letter dated 11th June, 2021 regarding the above heading.

On behalf of the management of the institute (MOI), I would like to officially inform you that permission has been granted for your request for **Yunita Mtaki** to conduct a study titled '**Factors Influencing Utilization of External Nutrition Guidelines Among Nurses at selected Hospitals in Dar es Salaam, Tanzania**'. Therefore, you are kindly requested to inform her to start data collection as requested.

It's my hope that you will extend enough cooperation's regarding this matter.


Mary Robert

For: Executive Director.

Cc: Medical Doctor-MOI

Cc: Director of Nursing- MOI

Cc: Dean, School of Nursing-MUHAS

All correspondences to be addressed to the Executive Director