NURSES' KNOWLEDGE, ATTITUDES, AND PRACTICES ON ENTERAL FEEDING PRACTICES FOR PATIENTS ADMITTED TO THE INTENSIVE CARE UNITS OF THE NATIONAL REFERRAL HOSPITAL IN DAR ES SALAAM, TANZANIA

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Department of Clinical Nursing

NURSES' KNOWLEDGE, ATTITUDES, AND PRACTICES ON ENTERAL FEEDING PRACTICES FOR PATIENTS ADMITTED TO THE INTENSIVE CARE UNITS OF THE NATIONAL REFERRAL HOSPITAL IN DAR ES SALAAM, TANZANIA

By

Shamim Abeid

A Dissertation Submitted in (Partial) Fulfillment of the Requirements for the Degree of Master of Science (Nursing Critical Care and Trauma) of

Muhimbili University of Health and Allied Sciences
October, 2024

CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by Muhimbili University of Health and Allied Sciences a dissertation entitled: **‘‘Nurses' knowledge, attitudes, and practices on enteral feeding practices for patients admitted to the intensive care units of the National Referral Hospital in Dar es Salaam, Tanzania’’** in (partial) fulfillment of the requirements for the degree of Master of Science in (Nursing Critical Care and Trauma) of Muhimbili University of Health and Allied Sciences.

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Date

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Date

DECLARATION AND COPYRIGHT

I, **Shamim Abeid**, declare that this **dissertation** is my original work and that it has notbeen presented and will not be presented to any other University for a similar or any other degree award.

Signature……. **Date**……...

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DEDICATION

To my Husband Sungura *'for encouragement and motivation' to my siblings for their support and* to nurses working in the ICUs

'We must always remember that we must feed the patients.

ABSTRACT

Background: Enteral nutrition is a crucial method for providing essential nutrients to critically ill patients who cannot consume food orally. Nurses administer enteral feeds, delivering a balanced mix of carbohydrates, proteins, fats, vitamins, and minerals. However, they face challenges in ensuring they provide these feeds in an individualized manner, despite their other roles in healthcare settings. This places a significant challenge on nurses to ensure that they can provide the prescribed enteral feeds in a manner that is individualized to each patient's needs.

Objective: To assess nurses' knowledge, attitudes, and practices on enteral feeding for critically ill patients admitted to the ICUs of the national referral hospital in Dar es Salaam Tanzania

Methodology: A cross-sectional study was conducted to evaluate nurses' knowledge, attitudes, and practices on enteral feeding for critically ill patients. 122 nurses were recruited randomly from Muhimbili National Hospital, Muhimbili Orthopedic Institute, and Jakaya Kikwete Cardiac Institute. Data were collected using structured questionnaires and analyzed using SPSS version 27. Bivariate and multivariate logistic regression was conducted to determine demographic characteristics associated with KAPs on enteral feeding for critically ill patients. All independent variables with $p \leq 0.2$ in univariate regression models were included in the multivariate logistic model. Independent variables with $p < 0.05$ were considered statistically significant.

Results: The majority of respondents were female 69(56.9%), with a mean age of 34.61 years (SD ± 6.367) and an age range from 25 to 35 years. 56(45.9%) had adequate knowledge of enteral feeding and 68(55.75 %) had positive attitudes toward enteral feeding. 97 (79.5%) were competent to practice enteral feeding. After adjusting for all factors, training for enteral feeding was significantly associated with knowledge (AOR = 0.388, 95% CI: 0.17-0.88, p = 0.024). Also, working position was significantly associated with attitudes towards enteral feeding (AOR = 15.46, 95% CI: 1.98-120.7, p = 0.009). In addition, age was significantly associated with practices of enteral feeding (AOR = 0.13, 95% CI: 0.01-0.98, p = 0.048). Furthermore, marital status was significantly associated with practices of enteral feeding of critically ill patients (AOR = 0.352, 95% CI: 0.14-0.90, p = 0.03).

Conclusion and recommendation: The study shows that despite positive attitudes and competence, most intensive care unit nurses lack knowledge about enteral feeding. To improve care and reduce complications, nurses should regularly attend in-service training, seminars, workshops, and dietitian presentations. Educators should focus on innovative strategies, technologies, evidence-based practices, standardized care guidelines, and appropriate training for ICU staff to enhance patient care and recovery.

Keywords: Nurses, Knowledge, Attitudes, Practices, Enteral feeding, Enteral nutrition, Intensive Care Unit.

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ABBREVIATIONS

AOD: Adjusted odd ratio

ASPEN: American Society of Parenteral and Enteral Nutrition

CCPG'S: Canadian Critical Care Practice Guidelines

CI: Confidence interval

CR: Crude odd ratio

EF: Enteral feeding

EN: Enteral nutrition

GRV: Gastric Residual Volume

ICU: Intensive care unit

JKCI: Jakaya Kikwete Cardiac Institute

KAPs: Knowledge, Attitude, and Practices

LMIC: Low- and middle-income countries

MNH: Muhimbili National Hospital

MOI: Muhimbili Orthopaedic Institute

RN: Registered Nurse

SD: Standard deviation

SPSS: Statistical Package for Social Science

WHO: World Health Organization

OPERATIONAL DEFINITIONS

Enteral Feeding: Enteral feeding is a tube-based method for providing essential nutrients to patients who cannot consume food orally, containing a balanced mix of carbohydrates, proteins, fats, vitamins, and minerals (Ahmed et al., 2024).

Intensive Care Unit (ICU): The ICU is a specialized hospital facility providing comprehensive care for critically ill patients, equipped with advanced technology and skilled healthcare professionals (Christensen & Liang, 2023).

Critically ill patients: Are those patients admitted to the ICU with severe respiratory, cardiovascular, or neurological derangement, are mechanically ventilated and sedated, rendering them unconscious and unable to communicate or eat (Dünser et al., 2024).

Nutrition: Nutrition is the process of acquiring and utilizing nutrients for growth, maintenance, and energy, crucial in healthcare, particularly in ICU settings, to support recovery and maintain optimal health (Linda D. Udern; Kathleen M. Stacy; Mary E. Lough, 2018).

Nurses' Knowledge of Enteral Feeding: The extent of understanding and familiarity demonstrated by nurses regarding the theoretical and practical aspects of Enteral feeding protocols for patients admitted to the Intensive Care Unit (ICU) and those who scored less than 75% was regarded as having inadequate knowledge and those who scored more than 75 % were considered as having adequate knowledge (Wangari et al., 2024).

Nurses' Attitudes towards Enteral Feeding: The assessment of nurses' perspectives, beliefs, and emotional responses concerning the application of enteral feeding practices in the ICU setting who scored >80% of the total score were considered as having positive attitudes, and those who scored <80% were categorized as having negative attitudes (Ahmed et al., 2024).

Nurses' Practices on Enteral Feeding: The observable and documented actions, procedures, and adherence to enteral feeding protocols carried out by nurses in the care of patients within the ICU who scored above 75% were regarded competent while those who scored below 75% were considered incompetent to practice enteral feeding (Wangari et al., 2024).

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

The provision of enteral nutrition to critically ill patients is crucial for their well-being and overall health status while they are in the ICU. According to the American Society of Parenteral and Enteral Nutrition, as well as the Canadian Critical Care Practice Guidelines, it is recommended that critically ill patients with functional gastrointestinal tracts should receive enteral nutrition (EN) within the first 24 to 48 hours of admission. (Boullata et al., 2017; Singer et al., 2019).

Numerous studies have shown that there are discrepancies in the knowledge, attitudes, and practices of ICU nurses worldwide who provide care to critically ill patients on enteral feeding. For instance, a study conducted in Iran involving 101 nurses found that only 25% had sufficient knowledge of enteral feeding. (Jamshidi et al., 2020). Similarly, a study in Iraq showed that 10% of nurses knew EN while 70% had negative attitudes toward EN. (Darawad et al., 2018). Furthermore, a study conducted in Ethiopia revealed that 67.7% and 53.8% of nurses who participated in the study had inadequate knowledge and poor practices, respectively. (Wangari et al., 2024).

Enteral nutrition is crucial for managing critically ill patients as it provides essential nutrients for their recovery, overall well-being, and gut integrity. It also helps to reduce the risk of infections by improving the immune system, which is particularly important for this vulnerable population. Studies have shown that the use of enteral nutrition can reduce mortality rates, shorten hospital stays, promote wound healing, and prevent muscle wasting while preserving lean body mass. (Elmokadem et al., 2023; Hamdan et al., 2022). In addition, it is considered a cost-effective option that is easier to administer than other forms of nutrition. (Mirhosiny et al., 2021).

Studies have highlighted various challenges that arise when providing enteral feeding to critically ill patients in ICUs, as reported by nurses. A study conducted in Malawi underscored the challenges in implementing enteral feeding correctly in ICUs, which include nurses not adhering to guidelines and protocols for conducting nutrition assessments before

feeding, the aspiration of gastric residual volume (GRV), the confirmation of proper tube placement at the bedside, positioning the head at 45 degrees, and a lack of feeding formula (Croix, 2019; Mula, 2014)

It is essential to emphasize the importance of enteral feeding for all critically ill patients in ICUs, who are stable in terms of hemodynamics. This can be achieved by following guidelines and protocols for administering the correct nutrition dosage to the right patient at the right time. Doing so can result in positive clinical outcomes, as demonstrated by various studies. (Alhashemi et al., 2019; Preiser et al., 2021). Additionally, several studies recommend frequent on-the-job training for nurses on enteral feeding to improve their knowledge and practices. (Hamdan et al., 2022; Preiser et al., 2021; Wischmeyer, 2021).

However, there is limited documentation in Tanzania regarding the knowledge, attitude, and practices of nurses in ICUs regarding enteral feeding. Therefore, the current study aims to assess the knowledge, attitude, and practice of enteral feeding among nurses in ICUs for critically ill patients. The findings of this study provided insight into areas of weakness and suggested to the National referral hospitals management in Dar es Salaam to initiate ongoing programs to improve, the provision of enteral feeding in ICUs.

1.2 Problem Statement

Enteral feeding can sustain gastrointestinal function, lower the risk of gastrointestinal complications, promote wound healing in the gastrointestinal tract, and shorten hospital stays in intensive care units (Komen, 2020). To achieve this, effective nursing procedures are required; these include the use of prokinetic medications, adjusting the feeding tube, evaluating the gastric residual volume, and ensuring that patients are positioned correctly at 45 degrees to prevent aspiration of gastric contents (Hadera et al., 2022). However, complex enteral feeding techniques such as gastrostomy and jejunostomy necessitate substantial interventions (Compher et al., 2022).

Policies and standard operating procedures for enteral feeding practices are in place in several hospitals and healthcare institutions. The enteral feeding of critically ill patients is a major responsibility of nurses who work in intensive care units (Ramuada, Veldsman, Livhuwani, Blaauw, et al., 2023). First, they must confirm that the tubes are inserted and flushed. (Claire L. Crossfield, Philip L. Russo, 2021). However, it's possible that these feeding procedures don't always follow the suggested standards, as stated by (Lambell et al., 2020) which has increased the potential risks associated with enteral feeding, including but not limited to nausea, vomiting, diarrhoea, aspiration pneumonia, and catheter blockage.

Moreover, when giving enteral feeding nurses are obliged to adhere to guidelines and standards. Malnutrition and underfeeding are commonly resulting from inadequate nursing care, disregard for enteral feeding guidelines, negative attitudes, and inept procedures (Komen, 2020) and consequently has led to higher rates of morbidity, mortality, and longer stays in the intensive care unit in Dar es salaam. In addition, nutritional deficiencies can have a significant impact on muscle protein turnover, causing muscle breakdown and malnutrition, particularly in the early stages of severe illnesses.

The clinical outcomes of critically sick patients are therefore significantly impacted by the enteral feeding practices, attitudes, and expertise of nurses. (Ramuada, Veldsman, Livhuwani, Blaauw, et al., 2023). A study conducted in Kenyatta Hospital Nairobi indicated that an estimated 35% of critically ill patients in intensive care units were malnourished, which raised their risk of infection, prolonged hospital stays, delayed wound healing, increased healthcare expenses, morbidity, and death, and made their suffering worse (Wangari et al., 2024).

Furthermore, insufficient enteral feeding knowledge, inadequate practices surrounding enteral nutrition, and a negative attitude toward enteral nutrition can negatively impact patient care and outcomes, particularly for critically ill individuals (Singer et al., 2019; Zhang et al., 2016). Even though approximately three thousand people were admitted to intensive care units (ICUs) in the selected three national referral hospitals in Dar es Salaam there wasn't research on critical care nurses' levels of enteral feeding knowledge, attitudes, and practices, which added a room for conducting this study.

1.3 Justification for the study

Currently, there are no studies that report on the knowledge, attitudes, and practices of nurses regarding enteral feeding for critically ill patients who are admitted to ICUs in Tanzania. Therefore addressing the nurses' knowledge, attitudes, and practices on enteral feeding provides valuable information that is vital in the recovery process of critically ill patients in the ICU, and greatly contributes to improved outcomes (Abdul Ameer Atiyah et al., 2023).

By assessing nurses' knowledge, attitudes, and practices on enteral feeding, the study pinpointed specific areas where additional training or development of local protocols, and guidelines tailored to address identified gaps and promote best practices in enteral feeding to ICU patients. This cemented the necessity of doing a study in the context of critical care among nurses on knowledge, attitudes, and practices because enteral feeding is a critical component of patient care in ICUs.

Thus, positive attitudes and knowledge among nurses have a direct impact on patient safety and result in reducing the risk of complications related to enteral feeding practices. Also, this study offered significant perspectives on the present condition of enteral feeding

practices among nurses working in Tanzanian ICUs, highlighting areas of strength and improvement. Moreover, the findings directly show a clear picture of the national referral hospitals administration's local hospital policies and procedures, guiding efforts to optimize enteral feeding practices and improve patient outcomes within Tanzanian ICUs.

1.4 Research question

1.4.1 Broad research question

What is the nurses' knowledge, attitudes, and practices on enteral feeding for critically ill patients admitted to the ICUs of the national referral hospital in Dar es Salaam Tanzania?

1.4.2 Specific Research Questions

1. What is the level of nurses' knowledge regarding enteral feeding for critically ill patients admitted to the ICU at the National Referral Hospitals in Dar es Salaam?
2. What are nurses' attitudes on enteral feeding for critically ill patients admitted to the ICU at the National Referral Hospitals in Dar es Salaam Tanzania?
3. What are the nurse's practices regarding enteral feeding to critically ill patients in the ICU at the National Referral Hospitals in Dar es Salaam Tanzania?
4. What is the association between the knowledge, attitude, and practice dimensions and the Demographic Variable of ICU Nurses at the national referral hospitals in Dar es Salaam Tanzania?

1.5 Objectives

1.5.1 Broad objective

To assess nurses' knowledge, attitudes, and practices on enteral feeding for critically ill patients admitted to the ICUs of the national referral hospitals in Dar es Salaam Tanzania.

1.5.2 Specific Objective

1. To determine the level of nurses' knowledge in enteral feeding for patients admitted to the intensive care units of the national referral hospital in Dar es Salaam Tanzania.
2. To determine the attitudes of nurses on enteral feeding for critically ill patients admitted in the ICU at a national referral hospital in Dar es Salaam Tanzania,
3. To assess practices regarding enteral feeding to critically ill patients in the ICU at a national referral hospital in Dar es Salaam Tanzania.
4. To determine the association between the KAPs score and selected demographic variables.

1.6 Conceptual Framework

The KAP theory applied to nurses focuses on comprehending and assessing the knowledge, attitudes, and practices of nurses involved in providing enteral nutrition to critically ill patients in the context of enteral feeding for patients admitted to intensive care units (ICUs). Knowledge describes the nurses' comprehension of the concepts, practices, and guidelines of enteral feeding, including dietary needs, tube placement, medicine administration, and problem-solving techniques.

The enteral feeding of critically ill patients is a major responsibility of nurses who work in intensive care units (Ramuada, Veldsman, Livhuwani, Blaauw, et al., 2023). This depends on the nurse's level of education, attitude and years of experience in the proper provision of enteral feeding nutrition to critically ill patients. First, they must confirm that the tubes are inserted and flushed (Claire L. Crossfield, Philip L. Russo, 2021). However, it's possible that these feeding procedures don't always follow the suggested standards, as stated by (Lambell et al., 2020). Hence nurses must understand the potential risks associated with enteral feeding, including but not limited to nausea, vomiting, diarrhoea, aspiration pneumonia, and catheter blockage.

However, when giving enteral feeding, they are obliged to adhere to guidelines and standards. Nurses with negative attitudes towards enteral feeding of critically ill patients are not motivated to follow the standards which can also result to inadequate nursing care, underfeeding and malnutrition (Komen, 2020) and consequently lead to higher rates of morbidity, mortality, and longer stays in the intensive care unit. The clinical outcomes of critically sick patients are therefore significantly impacted by the enteral feeding practices, attitudes, and expertise of nurses (Ramuada, Veldsman, Livhuwani, Blaauw, et al., 2023).

Insufficient enteral feeding knowledge, inadequate practices surrounding enteral nutrition, and a negative attitude toward enteral nutrition can negatively impact patient care and outcomes, particularly for critically ill individuals (Singer et al., 2019; Zhang et al., 2016). The significance of enteral feeding, perceived obstacles, self-assurance in handling duties linked to enteral feeding, and readiness to follow set procedures are influenced by knowledge and attitudes towards enteral feeding of critically ill patients.

Dependent variables

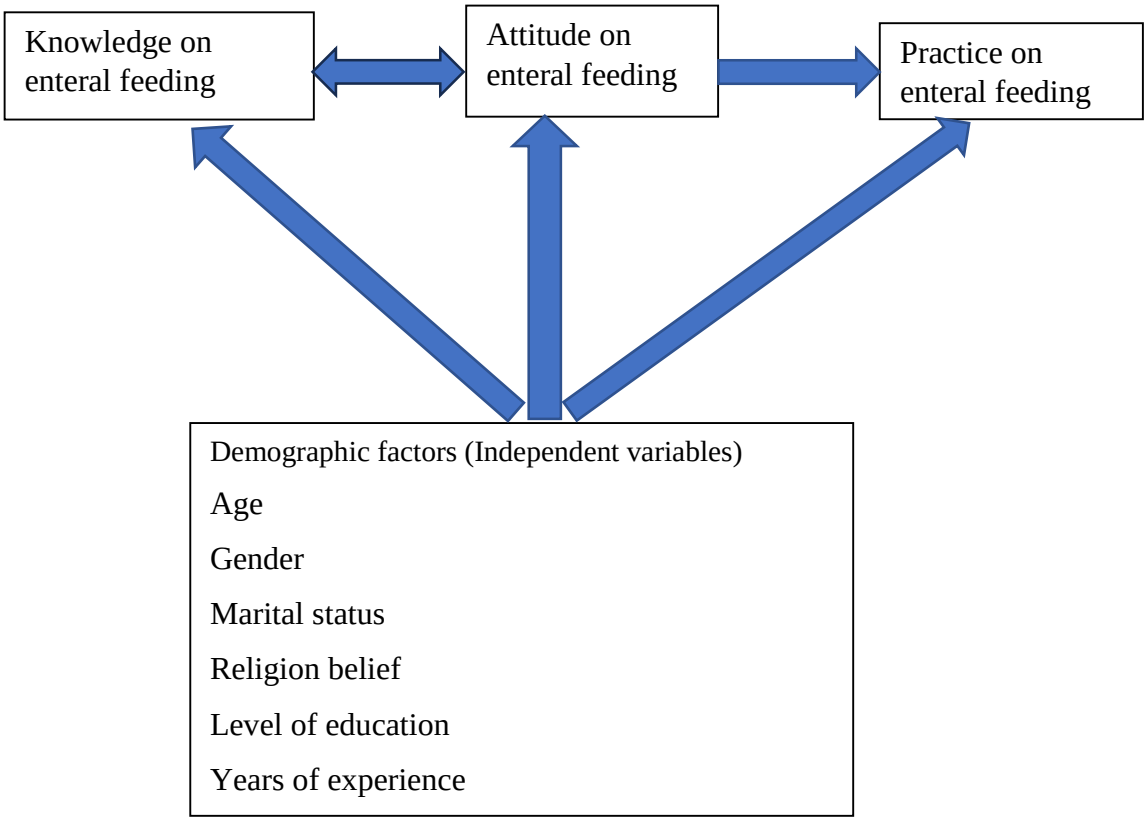


Figure 1: Conceptual framework showing the relationship between independent variables (age, gender, education level, and years of experience) and dependent variable enteral feeding practice.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Nurses' Knowledge Regarding Enteral Feeding for Critically Ill Patients

In critically ill patients, enteral feeding at optimal levels is crucial to improving clinical outcomes, reduce hospital stay and lowering malnutrition-related consequences. A careful balance must be established between delivering adequate nutrition to prevent injury from overfeeding or incorrect feeding practices (Wangari et al., 2024). Healthcare teams managing critically sick patients will need to ensure that members of the team receive continual education and follow updated guidelines as research in this area progresses (Abdulrahman Thiab Ahmed & Huda Baker Hassan, 2022).

Nurses who work in intensive care units need to be familiar with enteral nutrition to prevent malnutrition. Patients who are critically sick frequently have significant dietary needs and run the danger of malnourishment (Pan et al., 2024). Providing for these demands and promoting healing and recovery are made possible by appropriate enteral feeding. When enteral feeding is managed correctly, knowledgeable nurses can reduce difficulties like aspiration, infections, and gastrointestinal complications (Bhosale & Dani, 2021).

Numerous studies have been conducted in Iran and Africa to investigate the knowledge of nurses on enteral feeding. A study in Iran revealed that only 26.4% of nurses had inadequate knowledge in this area. (Yaghoubi et al., 2015). However, studies conducted in Africa showed that 67.7% of nurses in Ethiopia (Hadera et al., 2022)and 53.7% of nurses in South Africa (Ramuada, Veldsman, Livhuwani, & Blaauw, 2023) had poor knowledge of enteral feeding. In Egypt, a study was conducted to assess nurses' knowledge of enteral feeding, which recommended ongoing training for nurses with less experience and those aged below 25 years to enhance their knowledge (Ahmed et al., 2018).

However, there is limited documentation on the knowledge of nurses on enteral feeding in Tanzania. A study in Kenya showed that only 11.1% of nurses had inadequate knowledge of enteral feeding (Wangari et al., 2024). It is important to evaluate nurses' knowledge of enteral feeding for critically ill patients and identify areas that require improvement, such as training programs on enteral feeding in ICUs.

2.2 Attitudes of Nurses Towards Enteral Feeding for Critically Ill Patients

Nurses can greatly enhance patient outcomes by adopting proactive strategies and having positive attitudes. Malnutrition, which is frequent in critically sick patients and is linked to worse clinical outcomes, can be avoided if enteral feeding is delivered properly(Zaher et al., 2024). However, the attitudes of nurses may have an impact on the identification and management of enteral feeding obstacles. For instance, nurses must effectively handle typical hurdles such as delayed initiation of motility agents and feeding tube displacement frequently (Zaher et al., 2024).

In addition, a proactive attitude toward on-job education and training makes nurses more capable of managing complications and issues related to enteral feeding in ICUs (Pan et al., 2024). This entails being aware of the causes and effects of enteral feeding complications as well as actively finding a solution. According to Pan (2024) data show that empathic and encouraging nurses can make patients feel more comfortable when delivering enteral feeding, which will enhance adherence and improve the patient’s health.

Moreover, different studies conducted worldwide support this claim. In South Korea, a study was conducted on nurses' perception of enteral feeding. The finding on the Likert scale showed that only 25.7% of ICU nurses refused the use of enteral feeding (Seol et al., 2020). This indicates that most ICU nurses have a positive attitude towards enteral feeding. Similarly, the study conducted in Palestine also reported that nurses have a positive attitude towards enteral feeding for critically ill patients (Hamdan et al., 2022).

In Africa, a study conducted in South Africa revealed that the majority of nurses believe that enteral feeding reduces long hospital stays and is cost-effective. (Ramuada, Veldsman, Livhuwani, & Blaauw, 2023). Moreover, another study in Kenyatta Hospital revealed that 96.3% of study participants' nurses had a positive attitude toward enteral feeding for critically ill patients in the ICUs(Wangari et al., 2024). Therefore, the reported studies show that nurses` perceptions of enteral feeding differ region-wise. Then it is important to assess nurses' attitudes towards enteral feeding and come up with a general overview of the status of enteral feeding practices in our Tanzanian ICUs.

2.3 Practice of enteral feeding among ICU nurses

For critically ill patients who are unable to eat by mouth, enteral feeding is crucial because it delivers necessary nutrients straight to the gastrointestinal system. This promotes healing and keeps them in a nutritional state (Ahmed et al., 2024). Compared to parenteral nutrition, early enteral nutrition has been demonstrated to improve patient outcomes and decrease septic complications. Moreover, it aids in preserving the integrity of the gut and inhibits bacterial translocation. Better clinical results, such as lower death rates and shorter stays in the intensive care unit, can result from using enteral feeding techniques correctly (Zaher et al., 2024).

However, when it comes to administering and monitoring enteral nutrition, intensive care unit nurses are essential. They are in charge of making sure feeding tubes are positioned correctly, keeping an eye out for issues, and modifying feeding schedules as necessary (Orinovsky & Raizman, 2018). Global guidelines recommend early initiation of enteral feeding for critically ill patients within 24 to 48 hours of admission to the ICU (Preiser et al., 2021). However, a study conducted in Sana'a, Yemen, identified critical gaps, such as the lack of comprehensive guidelines, standard protocols, and specialized nutritional support (Moustafa et al., 2018; Seferoğlu et al., 2021).

According to recent studies conducted in Ethiopia and Kenya, a significant percentage of nurses exhibited poor practices when it came to enteral feeding. In Ethiopia, 53.8% of nurses had poor practices, with 60.9% failing to confirm tube placement before feeding, 67.2% not inspecting the nostril, and 65.1% neglecting to check the gastric residual volume before feeding. (Hadera et al., 2022). In Kenya, the percentage of nurses with incompetent practices was 45.3% (Wangari et al., 2024). These results highlight the need for improvement in enteral feeding practices for critically ill patients admitted to the ICU. The current study aims to identify gaps in practices and share the findings with the MNH administration to improve EF practices in ICUs.

2.4 The Association between the KAPs score and selected Demographic Variables

It is crucial to assess the association between KAPs (knowledge, attitudes, and practice) and demographic factors, such as age, gender, level of education, religious belief, and years of experience. This association implies the effect of KAP on enteral feeding to critically ill

patients admitted to the ICU. Studies conducted in Iraq, Kenya, and China show that there is a significant association between some of the demographic data and KAP regarding enteral feeding to the critically ill.

The study conducted in Iraq and Kenya by (Faris & Abed, 2022)and (Wangari et al., 2024)Respectively, revealed that there is a significant association between some demographic factors and KAP on enteral feeding. Additionally, a study conducted in China on the interruption of enteral feeding revealed that KAP is affected by a nurse's high level of knowledge, number of training on enteral feeding, and hospital-level (Yuanyuan, 2023). These studies imply that nurses with advanced knowledge and training have a higher probability of properly implementing and following guidelines on enteral feeding than those with a low level of knowledge. On the other hand, nurses working in high-level hospitals adhere to guidelines and observe good practices regarding enteral feeding.

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 Study Design

The hospital-based analytical cross-sectional study (Ahmed et al., 2024) was conducted in Dar es salaam. The cross-sectional study design was used to gather data from ICU nurses working at tertiary hospitals regarding their knowledge, attitudes, and practices related to enteral feeding. A quantitative research approach was appropriate for this study as it allows for the measurement of variables, statistical analysis, and identification of patterns and relationships (Rana et al., 2021).

3.2 Study Setting

The study was conducted at Muhimbili National Hospital (MNH Upanga and Mloganzila), Jakaya Kikwete Cardiac Institute (JKCI), and Muhimbili Orthopaedics Institute (MOI) which are National Referral Hospitals in Dar es Salaam. The focus was on the Intensive Care Unit (ICU), where patients receive specialized treatment. These referral hospitals have been selected due to their excellent reputation as medical facilities in Tanzania, and they serve a large number of severely ill patients who require exceptional care from the hospital's extensive ICU.

According to unpublished data obtained from the patient registry, approximately 660 patients get admitted annually to MNH. At JKCI, around 530 patients get admitted, while approximately 840 patients get admitted at MOI. In addition to the patient data, 107 nurses are working in ICUs at MNH (Upanga and Mloganzila). Muhimbili Orthopaedics Institute has 40 nurses in the ICU, while JKCI has 22 nurses.

3.3 Study Population

This study involved all nurses working in the ICU because critically sick patients in need of sophisticated and intensive care are attended to by ICU nurses (Šabanė et al., 2022). However, the gap between scientific evidence and clinical practice is filled by research.

Maintaining high standards of patient care guarantees that ICU nurses are providing care using the most up-to-date and efficient techniques (Šabanė et al., 2022). Moreover, best practices and evidence-based care that can dramatically improve patient outcomes, reduce complications, and increase recovery are identified through research.

3.3.1 Inclusion criteria

All full-time ICU nurses who were present when the data was being collected.

Those who were willing to participate in the study and signed informed consent.

3.3.2 Exclusion criteria

Student nurses who were on practical attachment in intensive care units.

Intern nurses who were rotating in intensive care units.

3.4 Sampling Method and Sample Size

The simple random sampling technique was utilized to get the necessary sample size for this study whereby study participants were chosen at random by lottery method from each ICU. Initially, I compiled a list of every research participant from every ICU department. I prepared a piece of paper that is the same size, shape, and color and number from one to the last number. The paper fragments were combined and put within a box. Following the participant's request to pick up a piece of paper, members were chosen randomly.

As a result, I employed suitable data-gathering instruments and had in mind the study's inclusion criteria. This approach reduces selection bias and improves the generalizability of the results to the full population, ensuring fairness in participant selection.

Table 1: Summary of the study population

Institute	**Total number of nurses available**	**Total number of nurses selected**
JKCI	22	17
MOI	40	31
MNH-Upanga	79	60
MNH-Mloganzila	28	21
Total	**169**	**129**

Sample size calculation by using finite formulae for the finite population.

Sample size calculation using a finite formula, for a finite population.

$$n = \frac{N * X}{(X + N - 1)} \qquad X = \frac{Z_{\alpha/2}^2 * p * (1-p)}{MOE^2}$$

Where,

- $Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$(e.g. for a confidence level of 95%, αis0.05and the critical value is1.96),
- MOE is the margin of error,
- P is the sample proportion (50%) which is derived from the study done in Ethiopia by (Hadera et al., 2022).
- N is the population size.

MOE was set at 5% and the population size was 129 as stated in Table 1 above.

Using these numbers in the formula:

$$X = \frac{(1.96)^2 * 0.5 * (1-0.5)}{(0.05)^2} = 384.16$$

$$n = \frac{169 * 384.16}{(384.16 + 169 - 1)} = 117 + 10\% \text{ of non-response rate } (11.7) = 129$$

Therefore, the sample size for this study was 129 nurses.

3.5 Data Collection Methods and Procedure

3.5.1 Data Collection Tools

A structured questionnaire consisting of multiple-choice questions (MCQ) was adapted from (Wangari et al., 2024) & (Mahmoodpoor et al., 2021) and modified to suit data collection in this study. The data collection tool had four sections whereas section A for demographic characteristics consisted of seven items, section B for knowledge consisted of ten items, section C for attitudes consisted of six items, and section D for practices consisted of seven items.

To collect data, a structured questionnaire consisting of closed-ended questions was used. The researcher guided the critical care nurses through the consent form and explained the

study's objectives, confidentiality, and privacy. Data collection was done for a period of one month, from February 2024 to March 2024 whereas the consenting nurses were given the questionnaires, and a follow-up was conducted to ensure that the completed forms were returned.

3.5.2 Outcome measures and variables

Independent variables were socio-demographic characteristics including age, gender, education level, marital status, working position, training in enteral feeding, and years of experience. This consisted of seven closed-ended questions.

Dependent variables include nurses' knowledge, attitude, and practices on enteral feeding. Nurses' knowledge consisted of eight multiple-choice questions. The enteral feeding knowledge assessment system for nurses was computed using the following formula. Each correct response rated a score of "1" and an incorrect response rated a score of "0". Following that, a percentage was calculated and the ten-question total score was categorized as follows: A score of less than 75% was regarded as inadequate knowledge and a score of more than 75 % was considered adequate knowledge (Wangari et al., 2024).

Nurse's attitudes consisted of six questions on a Likert scale with item options as strongly disagree, disagree, agree, and strongly agree were used to score nurses' opinions on enteral feeding. The scores of attitudes on enteral feeding for strongly disagree, disagree, agree, and strongly agree were 1, 2, 3, and 4, respectively except for questions number 5 and 6 which were coded vice versa. The scores were transformed into a percentage, the individuals who scored >80% of the scores were referred to as having positive attitudes, and those who scored <80% were categorized as having negative attitudes (Ahmed et al., 2024).

For the nurse's practice, a checklist with eight items labeled "Yes" or "No" was used to gauge nurses' enteral feeding practices. The scoring system for nurses' practice on enteral feeding was calculated as follows: each competent practice was assigned a score of "1", and incompetent practice was assigned a score of "0". The scores for the eight questions were summed up and then expressed as percentages. The competent practices had scores of 75% or more of all practices, while the incompetent practices had scores of below 75% of all practices. (Wangari et al., 2024).

3.5.3 Validity and Reliability of data collection tools

3.5.3.1 Validity

To ensure the content validity of the data collection tool, the questionnaire was translated from English to Swahili version and then from Swahili to back to English version by linguistics and statisticians. Comments given about the complexity of the questions, mistakes, clarity, and ambiguity were addressed and modified before actual data collection.

To maintain face validity, a questionnaire was given to the six specialized critical care nurses who work in the intensive care units (ICUs) (Ramuada, Veldsman, Livhuwani, Blaauw, et al., 2023). Their feedback helped to establish coding and revise the tool based on the difficulties observed and comments provided on the clarity of the questions to ease understanding.

3.5.3.2 Reliability

The data collection tool was used in the study conducted in Kenya by Wangari which showed internal consistency of Cronbach's alpha of 0.78 (Wangari et al., 2024). Given the comparable socio-cultural environment in Kenya and Tanzania, the tool was deemed to be reliable in the current study context.

3.6 Data Management and Analysis

Before analysis, we screened and cleaned the data for consistency issues and missing data to check for consistency and completeness and then coded and entered into the computer with the use of Statistical Package for Social Science (SPSS) version 27. Descriptive analysis was conducted to establish frequencies and percentages of demographic characteristics, level of knowledge, level of attitude, and level of practice.

Furthermore, the multivariable logistic regression model was done to control for potential confounding effects and included all independent variables from the bivariate logistic regression model with a p-value < 0.25 (Ahmed et al., 2024). Variables with an adjusted odd ratio and a p-value of <0.05 at a 95% CI were deemed to have a significant association with the knowledge, attitudes, and practices of enteral tube feeding (Ahmed et al., 2024).

3.7 Ethical Considerations

Ethical approval was obtained from the MUHAS Senate of Research and Ethical Committees with reference number DA.282/298/01.C/20162 before conducting the study after submission of the proposal. The permission to conduct this study was attained from the hospital research committee at MNH Upanga, MOI, JKCI, and MNH Mloganzila. The written informed consent was obtained from each study participant voluntarily and they were free to withdraw from the study at any time. Each study participant was told about the aims of the study, procedures regarding the questionnaire, the benefits of the study, and any risks.

Participants were identified by code number which appeared on the top of the questionnaire paper to ensure confidentiality. In addition, data collection took place in a private room consisting of a researcher and one study participant to maintain privacy. The study participants were told that the risk of this study was the time consumed while filling out a questionnaire. The complete filled questionnaires were collected, arranged, and stored well in the file to which only the principal investigator was the one who had access to ensure confidentiality.

CHAPTER FOUR

4.0 RESULTS

4.1 Socio-demographic characteristics of respondents

A total of 122 nurses (with 94.6% response rate) included in this study were aged between 25 to 35 years with a mean age of 34.61 years and standard deviation (SD) of ± 6.367 years, the majority 69 (56.6%) were women. Regarding education level, only 60 (49.2%) had a bachelor's degree. More than half of the respondents 70(57.4%) had a mean age working experience of 7.59 years and a standard deviation (SD) of ± 6.031 years in the intensive care unit. In addition, more than half 69 (56.6%) of the study respondents attained training on enteral feeding (Table 2).

Table 2: Socio-demographic characteristics of respondents (N=122)

Variable	Frequency (n)	Percentage (%)
Age(years) Mean (SD) = 34.61 ± 6.367		
25-35	82	67.2
36-45	31	25.4
>45	9	7.4
Gender		
Male	53	43.4
Female	69	56.6
Marital status		
Married	76	62.3
Single	46	37.7
Education		
Diploma	50	41
Degree	60	49.2
Masters	12	9.8
Working position		
In charge	2	1.6
Assistant in charge	8	6.6
Staff Nurses	112	91.8
Experience		
<5	70	57.4
>5	52	42.6
Training on enteral feeding		
Yes	69	56.6
No	53	43.4

4.2 Level of knowledge on enteral feeding among respondents

The findings highlight that among 122 study respondents involved in this study, more than half 66 (54.1%) had inadequate knowledge of enteral feeding of critically ill patients. Only twenty-two (18.0%) respondents get information about enteral nutrition from journals. More than half of the respondents 76(62.3%) were aware of any guidelines on enteral nutrition. Also, the majority of the study respondents 112(91.8%) know enteral feeding as the most preferred method of nutrition in the ICU. In addition, the majority of the study respondents 115(94.3%) know the timing of starting enteral nutrition. The majority of study respondents 114(93.4%) confirm the placement of the tube before feeding. Furthermore, eighty-seven (71.3%) know the complications related to enteral feeding among critically ill patients (Table 3).

Table 3: Level of knowledge on enteral feeding among respondents (N=122)

Variables	Frequency (%)
Source of information about enteral nutrition from	
Journals	22(18.0%)
Articles	37(30.3%)
Colleagues	45(36.9%)
Online resources	38(31.1%)
Training on enteral feeding	30(24.6%)
Aware of any guidelines on enteral nutrition	
Yes	76(62.3%)
No	46(37.7%)
The most preferred method of nutrition in ICUs	
Enteral feeding	112(91.8%)
Parenteral feeding	10(8.2%)
Timing of starting enteral nutrition	
Within 24-48 hours	115(94.3%)
after 1 week	3(2.5%)
after 15 days	3(2.5%)
after 1 month	1(0.8%)
Flushing the tube before and after tube feeding	
Yes	120(98.4%)
No	2(1.6%)
Passage of flatus is a must before initiating enteral nutrition	83(68.0%)
Yes	39(32.0%)
No	

Amount of residual gastric volume for GI tube feeding to be withheld	
50 ml	48(39.3%)
100ml	24(19.7)
200ml	37(30.3%)
500 ml	13(10.7%)
Confirming the placement of the tube before feeding	
Yes	114(93.4%)
No	8(6.6%)
Aware of complications related to enteral feeding	
Yes	113(92.6%)
No	9(7.4%)
Complications related to enteral feeding	
Aspiration	87(71.3%)
Infection	2(1.6%)
Vomiting	26(21.3)
Overall level of knowledge	
Inadequate	66(54.1%)
Adequate	56(45.9%)

4.3 Socio-demographic factors associated with knowledge of enteral feeding of critically ill patients

After adjusting for all factors training for enteral feeding remained significantly associated with knowledge. Nurses who didn't attain training were 39% less likely to have adequate knowledge of enteral feeding compared to those who attained training about enteral feeding for critically ill patients (AOR = 0.388, 95% CI: 0.17-0.88, p = 0.024). Other factors like age, gender, marital status, education level, working position, and working experience were not statistically significantly associated with knowledge of enteral feeding of critically ill patients (Table 4).

Table 4: Socio-demographic factors associated with knowledge of enteral feeding of critically ill patients (N = 122

Variable	COR	p-value	95%CI		AOR	p-value	95%CI	
			Low	High			Low	High
Age(years)								
25-35	0.315	0.165	0.062	1.608	0.325	0.274	0.04	2.43
36-45	0.305	0.176	0.054	1.706	0.359	0.342	0.04	2.97
>45 **(Ref)**								
Gender								
Male	1.8	0.114	0.87	3.73	1.829	0.137	0.83	4.05
Female **(Ref)**								
Marital status								
Married	0.984	0.966	0.472	2.052	0.820	0.665	0.33	2.02
Single **(Ref)**								
Education								
Diploma	0.659	0.522	0.184	2.359	0.917	0.926	0.15	5.62
Degree	1.00	1.00	0.284	3.315	1.18	0.859	0.19	7.10
Masters **(Ref)**								
Working position								
In charge	Deleted	0.66	0.318	6.114	1.079	0.929	0.20	5.70
Assistant in charge	1.393							
Staff nurses **Ref**								
Experience								
<5	0.89	0.750	0.432	1.83	0.661	0.34	0.28	1.55
>5 **(Ref)**								
Training on enteral feeding								
Yes **(Ref)**								
No	3.14	0.003	0.147	0.67	0.388	0.024	0.17	0.88

4.4 Attitudes towards enteral feeding among respondents

The results highlight that among 122 study respondents involved in this study, more than half 68 (55.75%) had positive attitudes about enteral feeding of critically ill patients. The majority of the study respondents scored 3.32(83%) on the item about feeling accountable for ensuring your critically ill patients receive enough nourishment through enteral feeding. The findings uncovered that many study respondents scored 3.30(82.5%) on the item about the first feeding option for critically ill patients being enteral feeding. Regarding having a nutritional support staff at the hospital will enhance the nutritional condition and treatment of the patient's item, the majority had a positive attitude with a score of 3.43 (85.75%). In

addition, on items accepting the cessation of enteral feeding during medical procedures or complications related to their gastrointestinal system majority of the study respondents' score was 3.33(83.25%) (Table 5).

Table 5: Attitudes toward enteral feeding among respondents (N=122)

Variables	Score	Score (%)
The first feeding option for critically ill patients is enteral feeding	3.30	82.5
Feeling accountable for ensuring your critically ill patients receive enough nourishment through enteral feeding	3.32	83
Having a nutritional support staff at the hospital will enhance the nutritional condition and treatment of the patients	3.43	85.75
Accepting the cessation of enteral feeding during medical procedures or complications related to the gastrointestinal system	3.33	83.25
Enteral feeding does not reduce long hospital stays	1.85	46.25
Enteral feeding does not cause discomfort to critically ill patients	2.37	59.25
The overall level of attitude		
Positive attitude		68(55.75%)
Negative attitude		54(44.26%)

4.5 Socio-demographic factors associated with attitudes towards enteral feeding of critically ill patients

After controlling all factors working position remained significantly associated with attitudes towards enteral feeding of critically ill patients. Nurses who were assistants in charge were fifteen times more likely to have negative attitudes towards enteral feeding of critically ill patients compared to staff nurses (AOR = 15.46, 95% CI: 1.98 - 120.7, p = 0.009). Moreover, other factors like age, gender, marital status, education level, working

experience, and training on enteral feeding were not significantly associated with attitudes towards enteral feeding of critically ill patients (Table 6).

Table 6: Socio-demographic factors associated with attitudes towards enteral feeding of critically ill patients (N = 122)

Variable	COR	p-value	95%CI		AOR	p-value	95%CI	
			Low	High			Low	High
Age(years)								
25-35	0.865	0.897	0.096	7.83	0.517	0.657	0.03	9.55
36-45	0.857	0.900	0.078	9.41	0.685	0.817	0.03	16.84
>45 **(Ref)**								
Gender								
Male	2.89	0.099	0.82	10.17	3.691	0.081	0.85	16.21
Female **(Ref)**								
Marital status								
Married	0.832	0.766	0.248	2.79	0.474	0.343	0.10	2.22
Single **(Ref)**								
Education								
Diploma	0.957	0.970	0.097	9.426	3.23	0.456	0.15	70.32
Degree	1.453	0.739	0.162	13.03	3.83	0.388	0.18	80.97
Masters **(Ref)**								
Working position								
In charge	Deleted							
Assistant in charge	0.305	0.176	0.054	1.706	15.46	0.009	1.98	120.7
Staff nurses **(Ref)**								
Experience								
<5	0.719	0.588	0.22	2.37	0.583	0.462	0.14	2.45
>5 **(Ref)**								
Training on enteral feeding								
Yes								
No **(Ref)**	0.146	0.017	0.03	0.71	0.612	0.489	0.15	2.46

4.6 Practices of enteral feeding among respondents

The results revealed that among 122 study respondents involved in this study, one hundred and seventeen (95.9%) flush the tube before and after administration of food for critically ill patients. Also, one hundred and sixteen (95.1%) respondents assess risk and confirm tube placement before feeding. In addition, the majority of the study respondents 105(86.1%) use the guideline or protocol of enteral feeding available in the intensive care units. In addition,

one hundred and twelve respondents (91.8%) aspirate gastric residual volume before feeding. Also, one hundred fifteen respondents (94.3%) position the head of the bed at 45 degrees whereas the majority 113(92.6%) feed the critically ill patients 3-4 times per day (Table 7).

Table 7: Practices of enteral feeding among respondents

Variables	N	(%)
Presence of ICU protocol or guideline	105	86.1
Risk assessment and confirming tube placement before feeding	116	95.1
Flushing of the tube before and after administration of food	117	95.9
Aspiration of gastric residual volume before feeding	112	91.8
Positioning the head of the bed at 45 degrees	115	94.3
Use of prokinetic medication	73	59.8
Frequency of feeding (3-4 times per day)	113	92.6
Overall level of practices		
Competent to practice		97(79.4%)
Incompetent to practice		25(20.5%)

4.7 Socio-demographic factors associated with practices of enteral feeding of critically ill patients

After adjusting for all factors age and marital status remained significantly associated with practices of enteral feeding of critically ill patients. Nurses with an age range from 25 to 35 years were 13% times less likely incompetent to practice enteral feeding of critically ill patients compared to nurses whose ages were above 45 years (AOR = 0.13, 95% CI: 0.01-0.98, p = 0.048). Also, nurses who were married were almost 35% times less likely incompetent to practice enteral feeding of critically ill patients compared to single nurses (AOR = 0.352, 95% CI: 0.14-0.90, p = 0.03). Other factors like gender, education level, working position, working experience, and training on enteral feeding were not statistically significantly associated with practices of enteral feeding of critically ill patients (Table 8).

Table 8: Socio-demographic factors associated with practices of enteral feeding of critically ill patients (N = 122)

Variable	COR	p-value	95%CI		AOR	p-value	95%CI	
			Low	High			Low	High
Age group								
25-35	0.286	0.132	0.056	1.458	0.13	0.048	0.01	0.98
36-45	0.347	0.229	0.062	1.944	0.21	0.151	0.02	1.77
>45 **(Ref)**								
Gender								
Male	0.969	0.931	0.473	1.985	0.951	0.903	0.43	2.12
Female **(Ref)**								
Marital status								
Married	0.811	0.577	0.388	1.693	0.352	0.03	0.14	0.90
Single **(Ref)**								
Education								
Diploma	0.724	0.617	0.205	2.561	1.335	0.747	0.23	7.74
Degree	1.727	0.391	0.496	6.014	4.044	0.122	0.69	23.73
Masters **(Ref)**								
Working position								
In charge	Deleted	0.237	0.52	13.9	2.79	0.256	0.48	16.42
Assistant in charge	2.695							
Staff nurses **(Ref)**								
Experience								
<5	0.840	0.635	0.409	1.726	0.643	0.307	0.28	1.50
>5 **(Ref)**								
Training on enteral feeding								
Yes	0.789	0.519	0.384	1.621	1.149	0.742	0.50	2.63
No **(Ref)**								

CHAPTER FIVE

5.0 DISCUSSION

This study entailed assessing nurses' level of knowledge, attitudes, and practices on enteral feeding for critically ill patients admitted to intensive care units in Dar es Salaam. In this study, training for enteral feeding was significantly associated with knowledge. Nurses who were not trained in enteral feeding were 38% less likely to have adequate knowledge compared to those who were trained in enteral feeding for critically ill patients. The findings highlight that more than half 66 (54.1%) had inadequate knowledge of enteral feeding of critically ill patients. Also, only respondents 68 (55.75%) had a positive attitude toward enteral feeding. Findings highlight that working position was significantly associated with attitudes towards enteral feeding of critically ill patients. In addition, results revealed that ninety-seven respondents (79.4%) were competent to practice enteral feeding for critically ill patients. Results show that age and marital status were significantly associated with practices of enteral feeding of critically ill patients.

The findings revealed that the majority of the study respondents 66 (54.1%) had inadequate knowledge of enteral feeding. Knowledge of enteral feeding is important to provide quality care to critically ill patients in intensive care units. This implies that the majority of nurses would make errors in administering enteral feedings such as improper tube placement which could compromise patient safety and increase the risk of complications such as aspiration pneumonia. In addition, enteral feeding to critically ill patients provides essential nutrients for their recovery, overall well-being, and gut integrity (Wangari et al., 2024).

It also reduces the risk of infections, reduces mortality rates, shortens hospital stays, promotes wound healing, prevents muscle wasting, and is cost-effective (Elmokadem et al., 2023; Hamdan et al., 2022; Mirhosiny et al., 2021). The results were similar to the study conducted in Ethiopia and Iran which suggest that 67.7% and 75% had inadequate knowledge (Hadera et al., 2022; Jamshidi et al., 2020) respectively. This could be due to a lack of strong strategies to establish sustainable targeted training programs and to have access to evidence-based guidelines to enhance nurses' proficiencies in practicing enteral feeding.

On the other hand, these results are different from that of the study conducted in Egypt and Kenya whereas 65.9% and 67% of study participants had adequate knowledge (Mohamed Abo Elezz et al., 2021; Moustafa et al., 2018; Wangari et al., 2024). The observed differences could be due to job training received by nurses working in intensive care units about enteral feeding. This implies that capacity building on enteral feeding to nurses working in intensive care units is important to deliver quality care. These nurses should consistently be equipped with updated knowledge about the enteral feeding of critically ill patients to reduce complications related to enteral feeding like aspiration which is one of the leading causes of mortality in intensive care units due to aspiration pneumonia and to promote patient quality of life.

This study shows that sixty-eight study respondents 68 (55.75%) had positive attitudes towards enteral feeding for critically ill patients. This indicates that nurses with positive attitudes towards enteral feeding would be proactive in starting and monitoring patient comfort in intensive care units. These findings are similar to the study conducted in South Africa and Kenya whereby about 89% and 96.3% of study participants had positive attitudes (Ramuada et al., 2023; Wangari et al., 2024) respectively.

Therefore, positive attitudes towards enteral feeding among nurses working in intensive care units have benefits in minimizing the risk of complications and improving patient outcomes and overall healthcare well-being. However, the findings are contrary to the study conducted in Egypt (Moustafa et al., 2018). This could be probably explained by the variation culture and religion influence in the previous study.

This study shows that ninety-seven respondents (79.4%) of the study participants were competent to practice enteral feeding during the provision of care for critically ill patients. This implies that being competent to practice enteral feeding may help to ensure proper administration of food, ensuring proper tube placement, prompt early initiation, and monitoring of emerging complications. These findings are similar to the study done in Kenya which indicated that about 55.6% of the study participants had competent practice on enteral feeding (Wangari et al., 2024). However, these results are contrary to the study done in Egypt by Moustafa (2018) which demonstrated that 60% of the study participants were not competent to practice on enteral feeding. The observed differences could be due difference

in working experience and on-going training for nurses working in intensive care units about enteral feeding. Therefore, it is important to practice enteral feeding according to the standards because it helps to provide essential nutrients for recovery, overall well-being, and gut integrity, reduces the risk of infections, reduces mortality rates, shortens hospital stays, promotes wound healing, and prevent muscle wasting, and is cost-effective.

On the other hand, the study reveals that enteral feeding practice was significantly associated with participants' age groups of 25 to 35 and marital status. This is because people are more focused on their careers and are more physically and cognitively active. Married are more competent in practice probably due to dedication to providing patient-centered care. This study is similar to that carried out in Ethiopia by (Hadera et al., 2022).

Findings indicated that the majority of nurses working in the intensive care unit were female 69(56.6%). This indicates that the nature of nursing professionals involved more females than males at colleges and universities which result in more females in the working force. Therefore, the nursing profession has evolved and we expect the number of males in the workforce will rise in the future. These results line up with the study conducted in Addis Ababa, Egypt, and India whereby data indicated that 60%, and 63.7% of study participants were females (Bhosale & Dani, 2021; Hadera et al., 2022) respectively. The probable reasons could be due to historical, social, and educational factors and the overall composition of the nursing workforce in the health care system. This mismatch with the findings of the study conducted in Iraq whereby data show that the majority of nurses 87.5% were males (Abdulrahman Thiab Ahmed & Huda Baker Hassan, 2022). This difference could probably be attributed to social-cultural disparities between Tanzania and Iraq and, the evolution of the nursing profession whereby males have already joined in the healthcare system in Iraq.

Also, the study highlights that more than half of the study respondents 69(56.6%) were trained in enteral feeding. The implication is to increase knowledge and skills, improve patients’ outcomes, and have consistency in care for critically ill patients. These results are not so new because they match with data from different studies conducted in Iraq, Ethiopia, and Egypt (Abdulrahman Thiab Ahmed & Huda Baker Hassan, 2022; Moustafa et al., 2018).

5.1 Limitations of the study

A limitation of this study was selection bias due to small number of ICUs MNH (Upanga &Mloganzila) MOI, and JKCI which could have affected the sample size and the ability to generalize the results to the entire population of all Tanzanian healthcare facilities. Also this study cannot establish causal effect of the findings.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATION

6.1 Conclusion

The study reveals that most intensive care unit nurses lack knowledge about enteral feeding, despite having positive attitudes and competence. It suggests enhancing training for critically ill patients to ensure quality care and healthy well-being. Nursing staff must regularly attend in-service training, seminars, workshops, and dietitian presentations in order to stay current with enteral feeding standards and nutrition-related knowledge, attitude and practices to enhance quality of care and minimize complications.

6.2 Recommendation

The study suggests that critical care nurses working at national referral hospitals in Dar es Salaam should continuously learn about enteral feeding through seminars and educational programs to ensure continuity of nursing care. Nurses in intensive care units should regularly update their knowledge to enhance recovery and minimize complications. In addition, nursing educators should put much efforts on innovative strategies, technologies, and evidence-based practices, usage of standardized care guidelines, and appropriate training of ICU staff so as to improve nurses' knowledge, attitudes and practices of enteral feeding to improve patient care and enhance recovery.

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APPENDICES

Appendix I: Questionnaire

SECTION A: DEMOGRAPHIC INFORMATION

1. Gender

    Male

    Female

2. Age in years……
3. Years of experience as a nurse……
3. What is your marital status…….
4. Which institution are you working?
5. What is your level of education?

    a. Diploma

    b. Degree

    c. Masters

6. What is your position/role in ICU?

    a. In charge

    b. Assistance in charge

    c. Staff Nurses

7. Have you ever had any training on enteral feeding after graduation?

    1. Yes

    2. No

SECTION B: KNOWLEDGE OF ENTERAL FEEDING

1. Where did you get your information about enteral nutrition from?

    a. Journals

    b. Articles

    c. Colleagues

    d. Online resources

    e. Other mention…….

2. Are you aware of any guidelines on enteral nutrition?

a. Yes

b. No c.

3. Which is the preferred method of nutrition in ICUs? (Unless contraindicated) ……

4. When should enteral nutrition be started? (Unless contraindicated)

a. Within 24-48 hours

b. after 1 week

c. after 15 days

d. after 1 month

5. Do you flash the tube before and after tube feeding?

a. Yes

b. No

6. Is the passage of flatus a must before initiating enteral nutrition?

a. Yes

b. No

7. Amount of residual gastric volume for GI tube feeding to be withheld?

a. 50 ml

b. 100ml

c. 200ml

d. 500 ml

8. Do you confirm the placement of the tube before feeding?

a. Yes

b. No

9. Are you aware of complications related to enteral feeding?

a. Yes

b. No

10. If yes mention…….

SECTION C: ATTITUDE

1. Enteral feeding is the first feeding option for critically ill patients
    1. Strongly Disagree
    2. Disagree
    3. Agree
    4. Strongly Agree

2. You feel accountable for ensuring your critically ill patients receive enough nourishment through enteral feeding
    1. Strongly Disagree
    2. Disagree
    3. Agree
    4. Strongly Agree

3. Having a nutritional support staff at the hospital will enhance the nutritional condition and treatment of the patients
    1. Strongly Disagree
    2. Disagree
    3. Agree
    4. Strongly Agree

4. Accept the cessation of enteral feeding in specific circumstances, such as during medical procedures or when patients encounter complications related to their gastrointestinal system
    1. Strongly Disagree
    2. Disagree
    3. Agree
    4. Strongly Agree

5. Enteral feeding does not reduce long hospital stays
    1. Strongly Disagree
    2. Disagree
    3. Agree
    4. Strongly Agree

6. Enteral feeding does not cause discomfort to critically ill patients
    1. Strongly Disagree

2. Disagree
3. Agree
4. Strongly Agree

SECTION D: PRACTICE ENTERAL FEEDING

(Please mark the checkbox for each applicable item).

SN	Items	Yes	No
01	Presence of ICU protocol or guideline		
02	Risk assessment and Confirming tube placement before feeding		
03	Flushing of the tube before and after administration of food		
04	Aspiration of gastric residual volume before feeding		
05	Positioning the head of the bed at 45 degrees		
06	Use of prokinetic medication		
07	Frequency of feeding (3-4 times per day)		

Appendix II: Dodoso

SEHEMU A: TAARIFA ZA KIDEMOGRAFIA

1. Jinsia

Mwanaume

Mwanamke

2. Umri katika miaka ……

3. Uzoefu wa miaka mingi kama muuguzi ……

3. Hali yako ya ndoa ikoje…….

4. Unafanya kazi taasisi gani?

5. Kiwango chako cha elimu ni kipi?

a. Diploma

b. Shahada

c. Mabwana

6. Nini nafasi/jukumu lako katika ICU?

a. Katika malipo

b. Msaada katika malipo

c. Muuguzi wa wafanyikazi

7. Je, umewahi kupata mafunzo yoyote kuhusu ulishaji chakula baada ya kuhitimu mafunzo?

1. Ndiyo

2. Hapana

Kama ndio taja mafunzo uliofanya ----------

SEHEMU B: UJUZI WA ULISHAJI NDANI

13. Ulipata wapi taarifa zako kuhusu lishe bora?

a. Majarida

b. Makala

c. Wenzake

d. Rasilimali za mtandaoni

e. Matangazo mengine …….

21. Je, unafahamu miongozo yoyote kuhusu lishe bora?

a. Ndiyo b. Hapana

32. Je, ni njia gani ya lishe inayopendekezwa katika ICUs? (Isipokuwa imepingana)

4. Lishe ya matumbo inapaswa kuanza lini? (Isipokuwa imepingana)

a. Ndani ya masaa 24-48 b. baada ya wiki 1 c. baada ya siku 15 d. baada ya mwezi 1

5. Je, unamulika bomba kabla na baada ya kulisha mirija?

a. Ndiyo b. Hapana

6. Je, upitishaji wa flatus ni jambo la lazima kabla ya kuanzisha lishe?

a. Ndiyo b. Hapana

7. Kiasi cha mabaki ya ujazo wa tumbo kwa ulishaji wa mirija ya GI kitazuiwa?

a. 50 ml b. 100 ml c. 200 ml d. 500 ml

18. Je, unathibitisha kuwekwa kwa bomba kabla ya kulisha?

a. Ndiyo b. Hapana

9. Je, unafahamu matatizo yanayohusiana na ulishaji wa matumbo?

a. Ndiyo

b. Hapana

10. Kama ndiyo taja…….

MTAZAMO C

1. Je, unaamini kuwa kulisha enteral ndio chaguo la kwanza la kulisha kwa wagonjwa mahututi

1. Usikubali kabisa
2. Usikubali
3. Kubali
4. Kubali Sana

2. Je, unahisi kuwajibika kwa kuhakikisha wagonjwa wako mahututi wanapata lishe ya kutosha kupitia ulishaji wa chakula?

1. Usikubali kabisa
2. Usikubali
3. Kubali
4. Kubali Sana

3. Je, unaamini kuwa kuwa na wahudumu wa lishe hospitalini kutaimarisha hali ya lishe na matibabu ya wagonjwa?

1. Usikubali kabisa
2. Usikubali
3. Kubali
4. Kubali Sana

4. Je, unakubaliana kwa kiasi gani na kukoma kwa ulishaji wa matumbo katika hali maalum, kama vile wakati wa taratibu za matibabu au wakati wagonjwa wanapokumbana na matatizo yanayohusiana na mfumo wao wa utumbo?

1. Usikubali kabisa
2 . Usikubali
3. Kubali
4. Kubali Sana

5. Je, unaamini kuwa kulisha chakula kitapunguza kukaa hospitalini kwa muda mrefu?

1. Usikubali kabisa
2 . Usikubali
3. Kubali
4 . Kubali sana

6. Je, unaamini ulaji wa chakula husababisha usumbufu kwa wagonjwa mahututi

1. Usikubali kabisa
2 . Usikubali
3. Kubali
4 . Kubali sana

SEHEMU YA D: JIZOEZE KULISHA NDANI (Tafadhali weka alama kwenye kisanduku unapoona inafaa tumika).

Namba	**Vipengele**	**Ndiyo**	**Hapana**
01	Uwepo wa itifaki au mwongozo wa ICU		
02	Tathmini ya hatari na Kuthibitisha uwekaji wa mirija kabla ya kulisha		
03	Kusafisha mirija kabla na baada ya kumeza chakula		
04	Kuvuta pumzi ya kiasi cha mabaki ya tumbo kabla ya kulisha		
05	Kuweka kichwa cha kitanda digrii 45		
06	Matumizi ya dawa ya prokinetic		
07	Mzunguko wa kulisha (mara 3-4 kwa siku)		

Appendix III: Consent Form – English Version

RESEARCHER: SHAMIM ABEID
NURSING OFFICER
0766728777
22nd JANUARY 2024

Title of the Study

"NURSES' KNOWLEDGE, ATTITUDES, AND PRACTICE IN ENTERAL FEEDING FOR PATIENTS ADMITTED TO THE INTENSIVE CARE UNIT. A HOSPITAL-BASED CROSS-SECTIONAL STUDY"

Introduction:

I, SHAMIM, am conducting a research study as part of my master's degree in science in critical care and trauma. The purpose is to investigate nurses' knowledge, attitudes, and practices regarding enteral feeding for ICU patients at Muhimbili National Hospital. Participation in this study is voluntary.

Study Procedures:

You are invited to complete a questionnaire addressing your experiences in enteral feeding within the ICU. Your responses will be confidential and used solely for research purposes.

Risks and Benefits:

Minimal risks are associated with participation. The study aims to enhance understanding of nurses' roles in enteral feeding practices.

Confidentiality:

Your responses will be anonymized and stored securely. Only authorized personnel will have access to the data.

Voluntary Participation:

Participation is voluntary. You may withdraw at any time without affecting your relationship with Muhimbili National Hospital or associated institutions.

Contact Information:

For questions, contact Shamim Abeid at +255766728777.

Consent:

I voluntarily agree to participate in the research study described above.

Participant's Name: _____

Signature: _____

Date: _____

Appendix IV: Consent Form Swahili Version

FROM YA RUHUSA

SHAMIM ABEID

NURSING OFFICER

0766728777

22 JANUARY 2024

KICHWA CHA UTAFITI "UFUNDISHAJI, MITAZAMO, NA VITENDO VYA WAUGUZI KATIKA KULISHA KIINI KWA WAGONJWA WALIOINGIZWA KATIKA KITUO CHA UTUNZAJI MAALUM. UTAFITI KATIKA HOSPITALI YA KITAIFA "

Utangulizi:

Mimi, Shamim Abeid ninatekeleza utafiti kama sehemu ya masomo yangu shahada ya uzamili ya *critical care and trauma*. Lengo ni kuchunguza ufahamu, mitazamo, na vitendo vya wauguzi katika kulisha kiini kwa wagonjwa wa ICU katika Hospitali ya Taifa ya Muhimbili. Kushiriki katika utafiti huu ni hiari.

Taratibu za Utafiti:

Unakaribishwa kujaza maswali katika utafiti yanayohusu uzoefu wako katika kulisha kiini ndani ya ICU. Majibu yako yatahifadhiwa kwa siri na kutumika kwa madhumuni ya utafiti pekee.

Hatari na Faida:

Hatari ni chache. Utafiti huu unalenga kuboresha ufahamu wa majukumu ya wauguzi katika vitendo vya kulisha kiini.

Usiri:

Majibu yako yatahifadhiwa bila kutambulishwa na kuhifadhiwa kwa usalama. Watu walioruhusiwa pekee watapata ufikiaji kwenye data.

Kushiriki kwa Hiari:

Kushiriki ni hiari. Unaweza kujiondoa wakati wowote bila kuathiri uhusiano wako na Hospitali ya Taifa ya Muhimbili au taasisi zinazohusiana.

Mawasiliano:

Kwa maswali, wasiliana na Shamim Abeid +255766728777

Ruhusa:

Ninakubali kushiriki katika utafiti ulioelezewa hapo juu Kwa hiari yangu.

Jina la Mshiriki: _____

Saini: _____

Tarehe _____

Appendix V: Approval for ethical clearance

UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES

OFFICE OF THE DIRECTOR – RESEARCH, PUBLICATIONS AND INNOVATION

Ref. No.DA.282/298/01.C/2162 Date: 09/04/2024

MUHAS-REC-04-2024-2162
SHAMIM ABEID
School of Nursing
MUHAS

RE: APPROVAL FOR ETHICAL CLEARANCE FOR A STUDY TITLED: NURSES' KNOWLEDGE, ATTITUDES, AND PRACTICE IN ENTERAL FEEDING FOR PATIENTS ADMITTED TO THE INTENSIVE CARE UNITS OF THE NATIONAL REFERAL HOSPITAL IN DAR ES SALAAM, 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: 09/04/2024
EXPIRATION DATE OF APPROVAL: 09/04/2025

STUDY DESCRIPTION:
Purpose:

To assess nurses' knowledge, attitudes, and practices on enteral feeding for critically ill patients admitted to the ICUs of the national referral hospital in Dar es Salaam Tanzania.

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-%2015363.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. Apply for and obtain permission to publish the results from National Institute for Medical Research. The application should be before submitting to a publisher and not concurrently through the email publications@nimr.or.tz.
9. 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)
10. The PI is required to ensure that the findings of the study are disseminated to relevant stake holders.
11. 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/.

4th April 24

Dr. Kasusu Nyamuryekung'e.

Muhimbili University of Health and Allied Sciences
DIRECTOR
Research, Publications & Innovations
Box 65001

Chairperson, MUHAS Research and Ethics Committee

Appendix VI: 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/T.439/2022

16th April, 2024

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

RE: INTRODUCTION LETTER OF SHAMIM ABEID

We would like to inform you that the carrier of this letter is Shamim Abeid with registration number HD/MUH/T.439/2022 a student at Muhimbili University of Health and Allied Science (MUHAS), pursuing MSc. Critical Care and Trauma in Nursing.

As part of her studies, she will be doing an elective research titled **"Nurses' Knowledge, Attitudes, and Practice in Enteral Feeding for Patients Admitted to the Intensive Care Units of the National Referral Hospital in Dar es Salaam, Tanzania.** she is being supervised by Dr. Masunga Iseselo from MUHAS and Mr. Peter Shirima from Mloganzila.

The Ethical Clearance for doing the said research has been given by the University.

Kindly request your assistance and cooperation to our student.

Yours Sincerely,

Mr. Sebe Mohamed
For: DIRECTOR, POSTGRADUATE STUDIES
cc: Shamim Abeid

9 United Nations Road; Upanga West; P.O. Box 65001, Dar Es Salaam: Tel. G/Line: +255-22-2150302/6; Ext. 1015; Direct Line:+255-22-2151378;Telefax:+255-22-2150465;E-mail:dpgs@muhas.ac.tz;Web:https://www.muhas.ac.tz

Appendix VII: Permission letter

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH

MUHIMBILI NATIONAL HOSPITAL

In reply please quote;

Ref. No.: MNH/CRTCU/Perm/2024/171 Date: 17th April, 2024

Block Manger,
ICU
Muhimbili National Hospital

RE: PERMISSION TO COLLECT DATA AT MNH

Name Student	**Shamim Abeid**
Title	**"Nurses Knowledge, Knowledge, Attitude and Practice in Enteral Feeding for Patients Admitted to the Intensive Care Units of the National Referral Hospitals Dare es Salaam".**
Institution	Muhimbili University of Health and Allied Sciences
Supervisor	Dr. Masunga Iseselo (MUHAS)
Co – supervisor	Mr. Rashid Heri (MUHAS) Mr. Erasto Kalinga (MNH)
Period	17th April, 2024 to 30th June, 2024

Approval has been granted to the above principal investigators to collect data at MNH. Dissemination of study findings at MNH shall be overseen by **Mr. Erasto Kalinga (**MNH) supervisor.

Kindly ensure the named principal investigator abide to the ethical principles and other conditions of the research approval.

Sincerely,

HEAD, TEACHING, RESEARCH & CONSULTANCY UNIT
P. O. Box 65000
DAR-ES-SALAAM

Dr. Charles K. Pallangyo
For: Head of Clinical research, Training and Consultancy Unit

c.c DNS
c.c Mr. Erasto Kalinga
c.c **Shamim Abeid**

Upanga West, Kalenga Street, Plot No. 10480/3, P.O. BOX 65000, Dar es Salaam, Tanzania.
Telephone: +255-22-2151367-9, Telephone: +255-22-2151351-2
Email: info@mnh.or.tz, Website: www.mnh.or.tz

UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH

JAKAYA KIKWETE CARDIAC INSTITUTE (JKCI)

JAKAYA KIKWETE CARDIAC INSTITUTE

In reply please quote;
Ref No: AB.123/307/01K/32 30/04/2024

Shamim Abeid
Reg. HD/MUH/T.439/2022
MSc. Critical Care and Trauma in Nursing - MUHAS

RE: PERMISSION TO CONDUCT RESEARCH AT JKCI

Reference is made to your letter requesting to do a research study entitled **"Nurses' Knowledge, Attitude, and Practice in Enteral Feeding for Patients Admitted to the Intensive Care Units of the National Referral Hospitals in Dar es Salaam"** here at JKCI.

This letter serves as an official document that permits you to do the above-mentioned task as requested. However, in accordance with your request, your designated JKCI co-supervisor will be **Robert Aloyce**.

It is our sincere hope that you will adhere strictly to the rules and regulations governing good clinical practice. Your compliance with these standards will ensure the integrity and ethical conduct of your study.

Best Regards,

JAKAYA KIKWETE CARDIAC INSTITUTE
P. O. Box 65141
Dar-es-Salaam
JKCI

Dr. Pedro Pallangyo
Head of Research, Training and Consultancy.
CC: ALL DIRECTORATES & Head of Units; Robert Aloyce

UNITED REPUBLIC OF TANZANIA
MINISTRY OF HEALTH

MUHIMBILI ORTHOPAEDIC INSTITUTE (MOI)

MUHIMBILI ORTHOPAEDIC INSTITUTE

Ref.PA. 290/338/01/95 **17th April, 2024**

Muhimbili University of health allied sciences

Department of clinical nursing

Dar -es Salaam

Tanzania.

RE: APPROVAL FOR CONDUCTING RESEARCH STUDY

Reference is made to your letter with reference number **HD/MUH/T.439/2022** dated on the 16th April 2024 for conducting research study **about *''Nurses' Knowledge attitude, and practice in enteral feeding for patients admitted to the intensive care units of the National Referral Hospitals in Dar es salaam''***

On behalf of the Management I would like to officially inform you that, permission has been granted to your student **SHAMIM ABEID** to conduct study at Muhimbili Orthopaedic Institute (MOI). Supervisor Mr. Moses Moses

It's my hope that your stay at MOI will be fruitful. For any clarification contact CRTM +255713764522.

Dr. Joel J Bwemelo, CRTM

For: MOI Executive Director

MUHIMBILI ORTHOPAEDIC INSTITUTE P. O. Box 65474 DAR-ES-SALAAM

Cc: Director of postgraduate studies - MUHAS

Cc: Supervisors

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH

MUHIMBILI NATIONAL HOSPITAL
MLOGANZILA

In reply please quote
Ref. No.: JA.294/428/01B/181

02/05/2024

Head of Department,
OPD, Emergency and Critical Care
Muhimbili National Hospital-Mloganzila

RE: PERMISSION TO COLLECT DATA AT MNH - MLOGANZILA

Name of Principal Investigator	**Shamim Abeid**
Title	**"Nurses' knowledge, Attitudes, and Practice in Enteral Feeding for Patients Admitted to the Intensive Care Units of the National Referral Hospital in Dar es Salaam, Tanzania".**
Institution	Muhimbili University of Health and Allied Sciences
Supervisors	Dr. Masunga Iseselo Mr. Peter Shirima
Period	02nd May 2024-30th June 2024

Approval has been granted to the above principal investigator to collect data at MNH-Mloganzila. Kindly ensure the named principal investigator abide to the ethical principles and other conditions of the research approval.

HEAD, TEACHING, RESEARCH & CONSULTANCY UNIT
P. O. Box 65000
DAR-ES-SALAAM
MUHIMBILI NATIONAL HOSPITAL-MLOGANZILA

.....

Ng'amilo Mbwalila

Ass. Head Clinical Research, Training and Consultancy Unit

c.c. DNS
cc. Shamim Abeid

Appendix VIII: Digital Receipt

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Digital Receipt

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