NURSES' KNOWLEDGE, ATTITUDE, AND PRACTICE ON ENTERAL FEEDING OF CRITICALLY ILL PATIENTS AT KENYATTA NATIONAL HOSPITAL

BY

JOYCE WANGARI NJUGUNA H56/34306/2019
MSCN 11

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DECLARATION

I

I, Joyce Wangari Njuguna, do hereby declare that this is my original thesis and has not been submitted elsewhere by any other person(s) for any award of any degree, research purpose, or otherwise.

Name ..JOYCE WANGARI NJUGUNA.....

Signature..... Date...18/11/2023.....

DEDICATION

This research thesis is dedicated to my dear family and friends.

CERTIFICATE OF APPROVAL

This research thesis has been presented for ethical consideration with my approval as the supervisor.

Dr. Lilian Omondi
Lecturer,
Department of Nursing Sciences,
The University of Nairobi.

Signature ..... Date 22/11/2023

Dr. Dorcas Maina
Lecturer,
Department of Nursing Sciences,
The University of Nairobi.

Signature ..... Date 6-11-2023 .....

Dr. Emma Matheka
HOD,
Department of Nursing Sciences,
The University of Nairobi.

Signature..... Date..22/11/2023..

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LIST OF ABBREVIATIONS

ASPEN	American Society for Parenteral and Enteral Nutrition
CBD	Central Business District
CCPG	Canadian Critical Care Clinical Practice Guidelines
CCUs	Critical care units
df	Degree of freedom
EN	Enteral Nutrition
ESPEN	European Society for Parenteral and Enteral Nutrition
IBM	International Business Machines Corporation
ICUs	Intensive care units
KNH	Kenyatta National Hospital
PI	Principal Investigator
SPSS	Statistical Package for Social Sciences
χ^2	Chi square

DEFINITIONS OF OPERATIONAL TERMS

Enteral nutrition/feeding refers to the delivery of nutrients into the gut by a tube when a critically ill patient is unable to take the nutrient regularly by mouth, but the gut is still functioning.

Attitude refers to a set of emotions, beliefs, and behaviors toward enteral nutrition by critical care nurses.

Knowledge refers to awareness of facts or practical skills of enteral nutrition among critical care nurses attending severely ill patients.

Enteral feeding practices refers to techniques critical care nurses employ to provide enteral nutrition to critically ill patients in critical care units.

ABSTRACT

Background: Enteral feeding/nutrition is the most efficient nutritional support strategy used by critical care nurses to feed patients in critical care units (CCUs) who are unable to meet their dietary demands orally. Enteral feeding promotes intestinal immunological function and prevents intestinal mucosal atrophy. Hence, besides meeting the increased nutritional demand, enteral feeding also reduces deaths and the duration of CCUs stay. According to reports, severely ill patients continue to receive low amounts of calories, proteins, vitamins and minerals in the CCUs. Therefore, there is a necessity to carry out investigations on the levels of knowledge, attitudes and practices of critical care nurses attending extremely ill patients, particularly in hospitals with high numbers of critically ill patients like Kenyatta National Hospital.

Objective: This study's objective was to assess the levels of knowledge, attitudes and practices among critical care nurses on enteral feeding of critically ill patients in Kenyatta National Hospital CCUs.

Methodology: The present investigation adopted a cross-sectional quantitative study design. Using a stratified sampling design and proportionate sampling technique, a sample size of 135 critical care nurses who directly participated in the enteral feeding of severely ill patients at the Kenyatta National Hospitals' CCUs were recruited. Data was collected using a standardized questionnaire while abiding by the established ethical guidelines in February 2023. Data was analyzed using Statistical Package for Social Sciences. Descriptive statistics were expressed as frequencies and percentages. Inferential statistics, Pearson Chi-square (χ^2) or Fisher's exact tests were used to analyze for relationship between independent (gender, age group, terms of service, level of qualification and work experience) and dependent (levels of knowledge, attitudes and practices of enteral feeding) variables. A p-value of <0.05 was set as the significance criterion. The statistical outputs were illustrated in tables.

Results: Most of the critical care nurses were female with a proportion of 63.7%. Approximately 65.9% of the study participants noted adequate level of knowledge on enteral nutrition, followed by moderate (23.0%) and inadequate (11.1%) levels of knowledge. Most of the respondents had positive attitudes toward enteral feeding at 96.3%. About 55.6% of the study subjects had competent enteral feeding practices. The gender, age group, terms of service, level of qualification and work experience were not significantly associated with the levels of knowledge, attitudes and practices on enteral feeding among critical care nurses attending critically ill patients in Kenyatta National Hospital CCUs.

Conclusions: This study concluded that the critical care nurses attending critically ill patients at the KNH CCUs had adequate knowledge, positive attitudes, and competent practices on enteral nutrition. Besides, there was insignificant association between gender, age group, terms of service, level of qualification and work experience with levels of knowledge, attitude, and practices on enteral nutrition.

Recommendations: This study recommends that critical care nurses should be provided with regular continuous medical training on enteral nutrition to maintain the high level of knowledge, positive attitudes and competent practices of enteral nutrition.

CHAPTER ONE: INTRODUCTION

1.1 Introduction

The background information, statement of the problem, study justification, research questions, objectives, and rationale of the study are detailed in this chapter.

1.2 Background Information

Critically ill patients are fed enterally or parenterally to support their dietary needs (Terech-Skóra *et al*., 2023), although enteral feeding is the most recommended route (Hadera *et al*., 2022). Enteral feeding is the practice of ingesting liquid nutrition through feeding tubes (for instance nasoduodenal, nasogastric, jejunostomy and gastrojejunostomy) beyond the esophagus into the stomach (Allen and Hoffman, 2019; Jordan and Moore, 2020). Patients who have a partially functioning gut and cannot take food orally to meet their energy and nutritional needs can only receive nourishment through enteral feeding (Limketkai *et al*., 2019).

It has been demonstrated that enteral feeding can reduce gastrointestinal complication rates, increase gastrointestinal wound healing, maintain gastrointestinal function, and shorten hospital stays in critical care units (CCUs) (Komen, 2020). Since enteral nutrition is more physiological, easier, less expensive, and less complex than parenteral nutrition, it is generally preferred to the latter. Nevertheless, complicated enteral nutrition methods like gastrostomy and jejunostomy require significant interventions (Compher *et al*., 2022).

The American Society for Parenteral and Enteral Nutrition (ASPEN), ESPEN (European Society for Parenteral and Enteral Nutrition) and Canadian Critical Care Clinical Practice Guidelines (CCPGs) have shared evidence-based recommendations for nutritional therapy among patients who are extremely ill (De Lazzaro *et al*., 2022). Various hospitals and healthcare facilities do have policies and standard procedures for enteral feeding practices. According to Lambell *et al*. (2020) and Crossfield *et al*. (2022), these feeding practices may not always adhere to the recommended guidelines.

One of the responsibilities of critical care nurses is the implementation of nursing interventions that contain all necessary components of nursing care, among them the administration of enteral

nutrition (Jordan and Moore, 2020). Critical care nurses' practices are usually influenced by knowledge and attitudes (Stewart, 2014), and attitudes (Khalid *et al*., 2010) towards enteral feeding in the CCUs. According to Koontalay *et al*. (2021), nurses' knowledge regarding enteral feeding is crucial to reduce critically ill patients' morbidity and mortality.

1.3 Problem Statement

In the past, enteral feeding has been viewed as a supporting rather than therapeutic role for patients who are extremely sick. Enteral nutrition, however, has several positive effects, including reduced inflammatory response and preservation of gut integrity, function, and motility. These benefits lessen mortality while enhancing prognosis and quality of life (Bechtold *et al*., 2022; Irving *et al*., 2022).

Nurses play a significant and critical role in enteral feeding of extremely sick patients, which is essential in preventing malnutrition (Ramuada *et al*., 2022). Besides, they are responsible for mastering enteral feeding skills such as tube placement verification and tube flushing (Kim and Chang, 2019). It's also crucial that nurses are knowledgeable about issues related to enteral feeding, such as nausea, vomiting, aspiration pneumonia, and catheter obstruction (Bloomer *et al*., 2018). As a result, nurses' knowledge, attitude, and practices of enteral feeding have a great influence on the clinical outcomes of critically sick patients (Al-Qalah and Alrubaiee, 2020; Metin and Pars, 2020; Ramuadaa *et al*., 2023).

Resistance to change, lack of experience with critical care patients, lack of knowledge about availability of protocols, institutional guidelines and sluggish administrative policies are a few of the challenges that have been identified as impeding optimal clinical practice for enteral feeding (Ramuada *et al*., 2022). It is estimated that over 35% of extremely sick patients in CCUs are malnourished, which increases their risk of infection, slows the healing of wounds, lengthens hospital stays, escalates healthcare costs, increases morbidity and mortality, and worsens their suffering (Huang *et al*., 2019; Crossfield *et al*., 2022).

Researchers at Kenyatta National Hospital (KNH), the country's main referral and teaching hospital, have a big impact on health policy. There are five CCUs in KNH caring for patients

who are critically ill. However, there was a paucity of literature on the level of knowledge, attitudes, and practices of critical care nurses on enteral feeding in KNH CCUs, hence the reason for this study.

1.4 Justification of Study

Nurses are crucial in enteral feeding of extremely sick patients in the CCUs (Kim and Chang, 2019). They support early enteral nutrition initiation, evaluate calorie needs, and initiate, titrate, and provide feed (Koontalay *et al*., 2020). They follow the guidelines and recommendations of the patients. However, malnutrition and underfeeding in critically ill patients can occur due to gaps in nursing expertise, a failure to follow dietary recommendations, and inconsistent practice (Komen, 2020).

Patients who are extremely sick are hypermetabolic and have greater energy needs due to their disease status (Darawad *et al*., 2018). Enteral nutrition remains the most effective nutritional support approach in CCUs (Allen and Hoffman, 2019). Enteral nutrition enhances intestinal immune function and prevents intestinal mucosal atrophy by preserving gut-associated lymphoid tissue (Quiroz-Olguín *et al*., 2021). Also, enteral nutrition lowers morbidity and mortality, reduces the risk of infection, promotes wound healing, lowers healthcare expenses, and shortens the time of stay in CCUs (Crossfield *et al*., 2022; Zheng *et al*., 2022). These benefits raise quality of life, increase prognosis, and lower mortality (Jordan and Moore, 2020). Even though inter-professional cooperation is crucial, nurses continue to lead the way in enteral feeding (Ramuada *et al*., 2022).

1.5 Research Questions

i. What are the levels of knowledge of critical care nurses on enteral feeding of patients who are critically ill at Kenyatta National Hospital CCUs?
ii. What are the attitudes of critical care nurses towards enteral feeding of patients who are critically ill at Kenyatta National Hospital CCUs?
iii. What are the practices of critical care nurses on enteral feeding of patients who are critically ill at Kenyatta National Hospital CCUs?

1.6 Study Objectives

1.6.1 Main Objective

To determine critical care nurses' levels of knowledge, attitudes and practices on enteral feeding of patients who are critically ill at Kenyatta National Hospital CCUs.

1.6.2 Specific Objectives

i. To assess the critical care nurses' levels of knowledge on enteral feeding of patients who are critically ill at Kenyatta National Hospital CCUs.
ii. To determine critical care nurses' attitudes towards enteral feeding of patients who are critically ill at Kenyatta National Hospital CCUs.
iii. To evaluate critical care nurses' practices for enteral feeding among patients who are critically ill at Kenyatta National Hospital CCUs.

1.7 Significance of Study

According to Hadera *et al*. (2022) and Ramuadaa *et al*. (2023), it is vital to recognize barriers and develop solutions in order to affect changes in enteral nutrition knowledge, attitudes, and practices. By identifying critical care nurses' knowledge, attitudes and practices on enteral feeding of patients who are severely ill, the gaps identified help prevent hindrances to effective enteral feeding practices and for further research. The researchers envisage that the present study's findings will also add knowledge on critical care enteral feeding practices by critical care nurses and inform policymakers and health service providers to enact strategies to improve practice as well as increase clinical outcomes for critically ill patients.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

The current literature to support enteral nutrition in severely sick patients anchored on Virginia Henderson's nursing theory that speaks on the special focus of nurses informed by patients' needs is well detailed in this chapter. The empirical literature was obtained using PubMed, Google Scholar, Google Search, and Hinari search engines guided by the study objectives.

2.1.2 Theoretical Framework

According to Virginia Henderson's theory, a nurse's special duty is to assist patients, whether healthy or ill and carry out tasks that will promote their recovery or health, so that they become independent as soon as possible. Henderson's need theory focuses on the unique care requirements of each patient and the responsibility of the nurse in supporting patients with special needs to recover from illness, maintain their health, or die peacefully (Henderson, 1966). Henderson came up with 14 component requirements for effective nursing care as shown in table 2.1.

Table 2.1: Henderson 14 component requirements for effective nursing care

Component	Component requirement
1	Breathe normally
2	Eat and drink adequately
3	Eliminate body wastes
4	Move and maintain desirable postures
5	Sleep and rest
6	Select suitable clothes-dress and undress
7	Maintain body temperature within normal range by adjusting clothing and modifying the environment
8	Keep the body clean and well-groomed and protect the integument
9	Avoid dangers in the environment and avoid injuring others
10	Communicate with others in expressing emotions, needs, fears or opinions
11	Worship according to one's faith
12	Work in such a way that there is a sense of accomplishment
13	Play or participate in various forms of recreation
14	Learn, discover or satisfy the curiosity that leads to normal development and health and use the available health facilities

By Henderson, 1966

Eating and drinking are physiological needs outlined by Virginia Henderson and very important aspects of care among severely ill patients (Ahtisham and Jacoline, 2015). Comprehensive

patient care necessitates nutritional support since critically ill individuals have elevated metabolic demands (Darawad *et al*., 2018). Essential macro- and micronutrients are delivered enteral feeding to patients in CCUs who are unable to satisfy their nutritional requirements through parenteral feeding (Terech-Skóra *et al*., 2023).

Enteral feeding is preferred to enteral nutrition because the latter is linked to more long-term consequences like liver disease and metabolic bone disease, as well as a higher prevalence of severe effects like electrolyte abnormalities, hyperglycemia, and increased rate of infections (Lappas *et al*., 2018; Compher *et al*., 2022). Enteral nutrition promotes gut immunity, preserves gut integrity, and prevents atrophy of the gut (Doley, 2022).

2.2. Enteral Feeding

Enteral nutrition/feeding is the process of delivering nutrients to patients who are critically ill with functional digestive system but are unable to ingest enough food to meet their nutritional needs (Doley, 2022). These people typically have neurological conditions that affect their ability to swallow, such as motor neuron disease, cerebral vascular injury, dementia and multiple sclerosis (Singer *et al*., 2019). Patients who are critically ill have increased protein and calorie needs as well as higher risks of inflammation, stress, and catabolism. Consequently, dietary supplementation is a crucial treatment (Compher *et al*., 2022).

2.3 Knowledge on Enteral Feeding among Critical Care Nurses

A core responsibility for nurses is to recommend enteral nutrition in severely sick patients and those who are unable to meet their nutrients requirements through oral consumption (Al-Qalah *et al*., 2020). It's the best option for critically ill patients as it promotes the digestive system structure and function, thus atrophy of the gastrointestinal tract does not occur (Crossfield *et al*., 2022; Zheng *et al*., 2022).

Nurses' knowledge regarding enteral feeding is crucial to reduce critically ill patients' morbidity and mortality (Ramuada *et al*., 2022). Nurses have the responsibility of mastering skills regarding enteral feeding, including verification of tube placement, tube flushing, and learning about the complications of enteral feeding, such as diarrhea, vomiting, aspiration pneumonia, and

catheter obstruction, among others (Huang *et al*., 2019; Crossfield *et al*., 2022). These complications, if not well addressed can result in high consumption of hospital utilities, and extended hospitalization leading to an overall high cost of the healthcare system (Darawad *et al*., 2018; De Lazzaro *et al*., 2019).

Monitoring input and output to ensure that patients are neither underfed nor overfed is a critical skill for nurses to have when handling issues associated with enteral feeding (Salciute-Simene *et al*., 2021). Also, regular assessment of nostrils to rule out nasal erosion which is a regular occurrence in nasogastric tube-fed patients is recommended. Knowledge of the performance of nutritional assessment identifying malnourished or malnourished-at-risk patients should be done frequently (De Lazzaro *et al*., 2019).

Studies have demonstrated that most bedside nurses feel that nutritional assessment is not their responsibility (Koontalay *et al*., 2020). This has led to variations in enteral feeding practices. The study suggested that nurses' involvement in critically ill patients' assessment is crucial because it will reduce cases of underestimation and identification of patients requiring enteral nutritional support (Kim and Chang, 2019). Critical care nurses are therefore required to be equipped with the above-mentioned skills to ensure efficient performance and optimize results.

The role and nature of nurses' responsibilities require them to understand gastrointestinal functions and the changes that occur during illness (Morton and Thurman, 2023). It is therefore essential for nurses to possess basic knowledge of the components of enteral nutrition support. Nurses who have sound knowledge about nutritional support are in a position to offer assistance in bringing about changes to the provision of enteral feeding in severely sick patients through standardized nutritional practices. Nurses should also feel responsible in the provision of nutritional support for patients who are extremely sick in CCUs (Hadera *et al*., 2022; Ramuada *et al*., 2022).

2.4 Critical Care Nurses Attitudes towards Enteral Feeding

A number of research studies have revealed that nurses express an empathetic attitude towards critically ill patients especially those on enteral feeding (Kolaček *et al*., 2013). Nurses involved

in enteral feeding have shown fewer positive attitudes, more negative attitudes, and less happy emotions in response to care for critically sick patients who require enteral feeding (Khalid, *et al.*, 2010). The presence of less positive attitudes among nursing staff toward extremely sick patients may have effects on the quality of care (El-sol and Mohmmed, 2018). Hossaini *et al*. 2019 suggested improving the attitudes of nursing staff through training towards enteral feeding. Older, more experienced female nurses with a higher educational level tend to have a more positive attitude toward enteral feeding.

2.5 Critical Care Nurses Practices on Enteral Feeding

Nursing practice emphasizes that one of the critical care nurses' tasks is implementing nursing interventions, which encompass every aspect of nursing care, as well as recommended medical or other therapeutic regimes (Schober *et al*., 2020). Nurses are the first clinicians to evaluate a patient's nutritional state and are thus in charge of initiating, monitoring, and progressing enteral feeding (McClave *et al*., 2016). Nurses are also implementers of hospital protocols to improve patients' outcomes.

Enteral feeding protocols in hospitals serve numerous purposes, including directing speedy decision-making, overcoming hurdles, and promoting standardization (Jordan and Moore, 2020). Lack of compliance limits sustainability. Regular chart audits can help identify areas of non-compliance. To detect gaps, it is recommended that checklists be created to increase adherence in addition to care improvement tools. Protocol enforcement is a continuous process of quality improvement.

Several studies have suggested that hands-on practice is different from stipulated guidelines and some practices by nurses could significantly interfere with the enteral feeding of patients who are extremely sick (Ahmed *et al*., 2018). For example, measurement of gastric residual capacity, confirming tube insertion and altering the patient's position (Wang *et al*., 2019). The measurement of stomach residual volume is a common practice by bedside nurses to determine the ability of a patient to tolerate enteral feeding (Yasuda et al., 2021). To avoid aspiration, high stomach volume is used as a signal of impaired gastric emptying, and enteral feeding is stopped.

Intensive care unit nurses routinely check the gastric residual volume to prevent aspiration pneumonia, ventilator-acquired pneumonia, or vomiting (Salciute-Simene *et al*., 2021).

In the absence of other indicators of intolerance, the ASPEN recommends that enteral feeding should not stop if the gastric residual volume is less than five hundred milliliters (Metheny, 2021). The use of the recommended gastric volume of five hundred milliliters to stop enteral nutrition delivery can result in fewer interruptions and prolonged enteral feeding and therefore, more protein and calorie delivery will be delivered to patients who are extremely sick. Thus, nursing practice should embrace techniques that reduce feeding interruptions as a means of improving the outcome of extremely sick patients referred to ICUs. A survey by Kolaček, 2013 suggested that only 10 to 48% of nurses flush enteral feeding tubes before and after administration of enteral feeds.

Procedures and tests in the ICUs have led to feeding interruptions (Salciute-Simene *et al*., 2021). The majority of patients in ICUs have diagnostic tests that require them to go without food for several hours. For fear of aspiration, nurses frequently withhold enteral nutrition when the patient is compelled to lie down in a supine position. Also, interruptions in enteral feeding are caused by changing a patient's body posture (Seron-Arbeloa *et al*., 2013). After surgery or tests, enteral nourishment may not be restarted right away. As a result, procedures and tests are frequently prolonged beyond the scheduled period, causing unnecessary delays in enteral feeding. When nurses interrupt enteral feeding due to gastric residual volume, protein and calorie intake are reduced (Salciute-Simene *et al*., 2021).

Nurses can minimize interruptions during enteral nutrition administration, allowing patients to get the most nutrients possible (Stewart, 2014). Regarding enteral nutrition administration and care, ASPEN recommends creation of protocols for titration, monitoring, complication management and nutritional assessment (Singer *et al*., 2019). Nurse-driven guidelines are especially recommended for volume-based enteral nutrition administration to guarantee the best possible delivery of a daily nutritional goal while accounting for disruptions (Jordan and Moore, 2020). Both ASPEN and ESPEN emphasize that standardization offers guidance for safe and

effective therapy rather than implying uniform treatment for all patients (Jordan and Moore, 2020; De Lazzaro *et al*., 2022).

According to Williams *et al*. (2013), implemented strategies to minimize enteral feeding interruptions develop nursing practices that may reduce avoidable interruptions. Written instructions and formal educational programs were among the strategies employed. Woo *et al*. (2010) recommended that critical care nurses need to understand enteral nutrition nursing care in the intensive care units (ICU). Developing an evidence-based knowledge of individual and organizational characteristics can aid nurses in identifying ways to intervene and improve enteral feeding to fulfill nutritional goals.

According to Adam and Batson (1997), in critically ill patients, nursing practices may result in hypocaloric feeding. When it comes to enteral feeding in extremely ill patients, there exist gaps between actual practices and recommended nursing care (Tatsumi, 2019). The gaps highlighted include knowledge about enteral nutrition, critical care nurses' responsibility for nutritional assessment, and enteral feeding interruptions (Woo *et al*., 2010; Al-Qalah and Alrubaiee, 2020).

2.6 Conceptual Framework

The present study concentrated on the nurses' understanding on the levels of knowledge, attitudes and practices on enteral nutrtition of patients who are critically ill at the Kenyatta National Hospital ICUs. The independent variables included demographics (gender, age group, level of education, terms of service and work experience). The dependent variable was the enteral nutrition outcomes of critically ill patients' practices by nurses. The outcomes include practices (competent, incompetent) of enteral nutrition. Confounding variables include knowledge and attitude. Enteral feeding is highly used in severely sick patients to improve their overall outcome. Lack of using enteral feeding in patients who are severely ill can result in an increased risk for infection and increased mortality. The use of enteral feeding in patients who are extremely sick can lead to improved immunity and tissue healing.

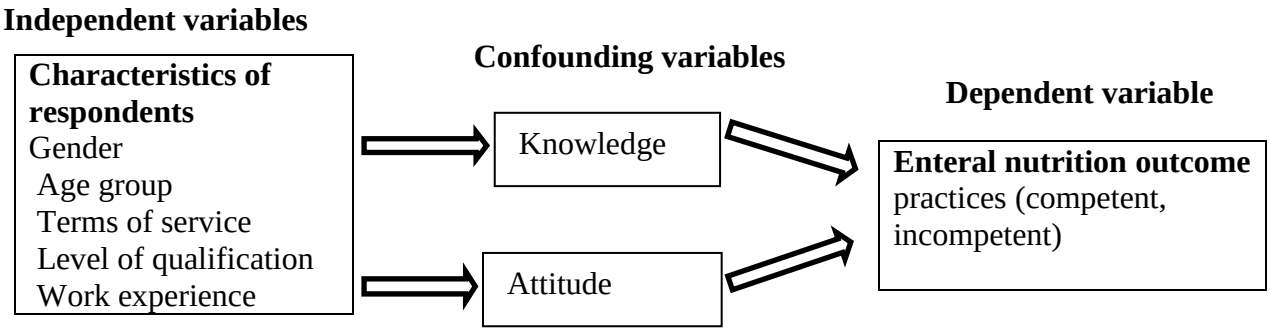


Figure 2.1: Conceptual framework

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter entails the study design, variables of the study, area of the study, study population, eligibility criteria, sampling design and techniques, tools and method of data collection, and statistical analysis.

3.2 Study Design

This research study adopted a cross-sectional quantitative study design. This design collects data at a single instant in time. This study was conduct in February 2023.

3.3 Study Variables

The independent variables of the present study were socio-demographic variables, including gender, age group, terms of service, level of qualification and work experience. The dependent variables were outcomes of enteral nutrition, including levels of knowledge, attitudes and practices.

3.4 Study Area

The Kenyatta National Hospital (KNH) CCUs served as the research area for this study. It is the largest health facility in Nairobi, Kenya under the Ministry of Health. The KNH is also the East and Central Africa's largest teaching and referral public hospital. The hospital is situated approximately 1.5 km from the Central Business District (CBD) in the Upper Hill neighborhood along Hospital Road.

The hospital has an inpatient capacity of 2,000 beds. There are five CCUs in the hospital: the main CCU and four satellite CCUs, two of which are located in medical wards in level seven and eight, and cardiothoracic and neurological CCUs in level four. The total bed capacity is 40, including 21 beds in the main CCU and the remainder in the satellite CCUs. A multidisciplinary approach is usually used when caring for patients who are critically ill in CCUs by nurses, doctors, nutritionists, physiotherapists, occupational therapists, and psychological counselors among others. This study only recruited critical care nurses who were attending extremely sick patients in CCUs of KNH.

3.5 Study Population

This study enrolled critical care nurses who were actively involved in providing enteral feeding to severely ill patients. This study had a target population of 181 nurses who were working in all CCUs, with 104 nurses in the main CCU. This population offered crucial data on enteral feeding compliance.

3.6 Eligibility Criteria

3.6.1 Inclusion Criteria

In this study, critical care nurses who had worked in CCUs for at least six months were eligible to participate as long as they gave their informed consent, volunteered, and made themselves available for data collection.

3.6.2 Exclusion Criteria

Student nurses were not included in this study.

3.7 Sampling Design

3.7.1 Determination of Sample Size

The calculation of sample size used Cochran's (1977) formula, as described by Kotrlik *et al*. (2001).

$$n = \frac{Z^2 pq}{d^2}$$

n = Sample size desired (population exceeds 10,000)

Z = Standard normal distribution is 1.96 (95% confidence level)

p = Target population estimated outcomes of 50% (0.5)

q = 1-p

d = Significance level (0.05)

Therefore:

$$n = \frac{1.96^2 \times 0.5 \times 0.5}{0.05^2} = 384$$

Since there are less than 10,000 critical care nurses, the Crochan formula was modified to:

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Where;

n_0 = Sample size when critical care unit nurses' population is >10,000 (384)

N = Critical care unit nurses population size (181)

n = New, adjusted sample size

$$n = \frac{384}{1 + \frac{(384 - 1)}{181}} = 123$$

An additional 10% to account for non-response resulted in a total sample size of 135 respondents.

3.7.2 Sampling Method and Sampling Frame

A stratified sampling design was adopted in this study using a proportionate sampling technique. The researcher divided critical care nurses into four homogeneous subpopulations (CCUs satellites) and then applied simple random sampling techniques to each subpopulation. Critical care nurses were assigned numbers in ascending order. The nurses with the last digit number ending with 0, 1, 3, 5, 6, 7 and 9 were selected as the study population. More representation was possible with this sampling strategy, which also reduced bias.

A sampling frame was derived from the target population of 181 critical care unit nurses. A proportional allocation technique was adopted to compute for sample size of critical care nurses in each satellite CCU as illustrated in table 3.1.

$$\text{Sampling per satellite CCU} = \frac{\text{Number of nurses per satellite UCU}}{\text{Total number of nurses in all satellites UCUs}} \times \text{sample size}$$

Table 3.1: Sampling frame

Satellite	Target population	Study population
Main ICU	104	78
Medical ICU	39	29
Cardiothoracic	20	15
Neurological	18	13
Total	181	135

3.8. Data Collection Methods

3.8.1 Recruiting Research Assistants

The researcher recruited ten critical care nurses as research assistants. The research assistants had a minimum qualification of a diploma. In order to ensure a smooth data-gathering process, the researcher gave priority to those who had previously taken part in data collection and were trained for data collection for a period of three months. For a successful study process, the principal investigator (PI) trained the chosen research assistants to make sure they grasped the research tools and all concerns surrounding the questionnaire. The research assistant helped in the distribution of questionnaires to study participants in KNH CCUs.

3.8.2 Participant Recruitment and Consent

The critical care nurses were engaged by the PI as well as research assistants. The research assistant guided the study participants through the consent form while outlining the study's goals, confidentiality, and privacy. This was carried out during their shift change after taking a report in the morning. Consenting nurses were issued with the questionnaires and follow-up was done to receive back the completed questionnaires. Data was collected in the month of February 2023.

3.9 Tools of Data Collection

Data collection utilized a structured questionnaire with closed-ended questions. There were four sections in the questionnaires: sections A (socio-demographic variables), B (levels of knowledge questions), C (attitudes questions) and D (practices questions).

3.9.1 Pre-test of Data Collection Tool

A pilot study/pre-test was administered at the medical CCU, one of KNH's satellite CCUs that was excluded from the study's sample. The pilot study was administered to ten critical care nurses who satisfied the inclusion criteria. The pilot test's objectives were to evaluate the validity of the instruments used to collect data and examine the validity of the questionnaire outcomes. According to the outcomes of the study, amendments were made to the questionnaire accordingly.

3.9.2 Validity and Reliability Tools

The questions of the questionnaire were assessed using Cronbach's alpha tool to test for their validity and reliability. The questions were considered reliable at 0.78 and above.

3.10 Data Scoring System

Nurses' knowledge scoring system on enteral feeding was calculated as follows: Each response to a knowledge question received a score of "1" for the correct answer and a score of "0" for the incorrect response. After that, the nine-question total score was translated to a percentage and categorized as follows: A score below 50% was deemed inadequate, 51-75% was considered moderate, and a score above 75% was deemed adequate (Al-Qalah and Alrubaiee, 2020).

The scoring system for nurses' attitudes on enteral feeding had eight Likert scale questions; strongly disagree, disagree, agree, strongly agree. The scores of attitudes on enteral feeding for strongly disagree, disagree, agree and strongly agree were 1, 2, 3, and 4, respectively. However, four questions (4, 5, 7, and 8) were reverse-coded. The maximum score was 4 for each question. The scores were summed up, where the maximum score for all eight questions was 32. The scores were converted to a percentage and those with more than half (≥50%) of the scores were termed positive attitudes, while those with less a half (<50%) of the scores were classified as poor attitudes.

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 incompetent practices had scores of below 75% of all practices (Abdullah *et al*., 2014).

3.11 Management of Data and Statistical Analysis

Raw data from the study participants were entered in Microsoft Excel Spreadsheet, cleaned, organized, and then exported to Statistical Package for Social Science (SPSS) (International Business Machines Corporation (IBM), Armonk, New York, United States) version 26.0 for statistical analysis. Descriptive statistics were represented using percentages and frequencies.

Inferential statistics Pearson Chi-square or Fisher's Exact tests (when a cell's expected count is lower than five) were used to analyze for an association between independent (nurses' characteristics) and dependent (enteral feeding outcomes) variables. The threshold of significance was set at p less than 0.05. Statistical outputs were presented in tables.

3.12 Study Limitations

The study omitted critical care nurses attending critically ill patients in other public and private hospitals in Nairobi.

3.13 Ethical Considerations

The KNH/University of Nairobi Ethical Research Committee (Ref: KNH-ERC/RR/987) approved this study. The KNH administration provided permission to conduct the research. Additionally, the enrollment of critical care nurses was approved by the KNH administration. The study was performed with the utmost confidentiality, rights to withdraw from research, c anonymity, and privacy. Study participants were allowed to fill in the consent form before they were enrolled in the study. The lead researcher provided face masks to the research assistant and the study participated in order to put safety precautions for Covid 19 in place. Also, hand sanitizer was provided.

CHAPTER FOUR: RESULTS

4.1 INTRODUCTION

The study's results, which were informed by the specific objectives, are well reported in this chapter. The current study enrolled 135 critical care nurses with a response rate of 99.9%.

4.2a Socio-Demographic Characteristics of Critical Care Nurses

Among the sampled nurses, female nurses were more than half with a proportion of 63.7%, while male nurses were 36.3%. The study participants were classified into age groups of 20-29, 30-39 and ≥40 years old. The study respondents with 30-39 and ≥40 years old had almost the same proportion of 41.5% and 40.7%, respectively, while those with 20-29 years of age had a proportion of 17.8% (Table 4.1(a)).

In terms of service, the study participants were grouped into permanent, contract and locum categories. The nurses who were permanently employed were about two-thirds (68.1%), followed by those who were on contract and locum with proportions of 29.6% and 2.2%, respectively. The level of qualification was assigned three levels: diploma, bachelor's degree and master's degree. The study participants with diploma qualification were more than half with a proportion of 52.6%, followed by those who had bachelor's degrees with a proportion of 41.5%, while those with master's degrees had the least proportion of 5.9%. The work experience of the study subjects was categorized into <1, 1-3 and >3 years. The working experience of more than three years had a higher proportion of 63.7%, followed by those who had experience of 1-3 years with a proportion of 21.5%, while those who had experience of less than one year had the least proportion of 14.8% (Table 4.1(a)).

Table 4.1(a): Critical care nurses Socio-demographic characteristics

Variables	Frequency	Percentage
Gender		
Male	49	36.3
Female	86	63.7
Total	135	100
Age group (years)		
20-29	24	17.8
30-39	56	41.5
≥40	55	40.7
Total	135	100
Terms of service		
Permanent	92	68.1
Contract	40	29.6
Locum	3	2.2
Total	135	100
Level of qualification		
Diploma	71	52.6
Degree	56	41.5
Master	8	5.9
Total	135	100
Work experience (years)		
<1	20	14.8
1-3	29	21.5
>3	86	63.7
Total	135	100

4.2b Other Characteristics of Critical Care Nurses

The study participants reported that half of the respondents were receiving continuous medical education regarding enteral feeding (Table 4.1(b)). The most used device to deliver enteral feed by the critical care nurses was the nasogastric tube at 88.1%, followed by jejunostomy and percutaneous endoscopic gastrostomy at 7.4% and 4.4%, respectively (Table 4.1(b)).

Table 4.1(b): Other characteristics of critical care nurses

Variables	Frequency	Percentage
CME regarding enteral nutrition		
No	67	49.6
Yes	68	50.4
Total	135	100
Highly used devices to deliver enteral feed		
Jejunostomy tube	10	7.4
Nasogastric tube	119	88.1
Percutaneous endoscopic gastrostomy	6	4.5
Total	135	100

4.2a Scores of Knowledge on Enteral Feeding among Critical Care Nurses

The respondents were asked to answer nine questions about enteral feeding in the CCUs to assess their enteral feeding knowledge. Among the nine questions on knowledge of enteral nutrition, the question "How often do you perform a nutritional assessment on critically ill patients in the CCUs?" had the most correct answers at 96.3% (130). In addition, 45.9% (62) of the respondents had the highest incorrect answers for two questions on knowledge of enteral feeding. These questions were "Do you check the gastric residual volume before initiating feed?" and "Do you conduct daily inspections of nostrils?" (Table 4.2a).

Table 4.2(a): Scores of knowledge on enteral feeding among critical care nurses

	Answers (Frequency and %)	
Questions	**Correct**	**Incorrect**
1. Are you aware of complications associated with enteral tube feeding?	123 (91.1%)	12 (8.9%)
2. Do you perform a nutritional assessment on patients in the unit?	130 (96.3%)	5 (3.7%)
3. Do you view nutritional assessment as a nursing responsibility?	111 (82.0%)	24 (17.8%)
4. Do you confirm tube placement prior to feed delivery?	96 (71.1%)	39 (28.9%)
5. Do you flush the tube before and after the feed administration?	123 (91.1%)	12 (8.9%)
6. Do you check gastric residual volume before commencement of enteral feeding?	73 (54.1%)	62 (45.9%)
7. Do you conduct daily nostrils inspections?	73 (54.1%)	62 (45.9%)
8. Do you document any complication or nutritional support regarding your patient?	120 (88.9%)	15 (11.1%)
9. Do you take part in decision-making about enteral feeding of critically ill patients in the unit?	99 (73.3%)	36 (26.7%)
Total	65.9% (89)	34.1% (46)

4.2b Relationship Between Levels of Knowledge on Enteral Feeding and Socio-demographic Characteristics of Critical Care Nurses

Most of the critical care nurses had adequate level of knowledge (65.9%), followed by moderate (23.0%) and inadequate (11.1%) levels of knowledge (Table 4.2). There was insignificant association between gender, age group, terms of service, level of qualification and work experience with the levels of knowledge on enteral feeding among critical care nurses attending critically ill patients in Kenyatta National Hospital CCUs ($p>0.05$; Table 4.2b).

Table 4.2(b): Relationship between level of knowledge on enteral feeding and socio-demographic characteristics among critical care nurses

		Level of Knowledge (%)					
Variables	**n**	**Inadequate (<50%)**	**Moderate (50-75%)**	**Adequate (>75%)**	**Chi square**	**df**	**p value**
Gender							
Male	49	26.3% (8)	20.4% (10)	63.3% (31)	2.184	2	0.706
Female	86	8.1% (7)	24.4% (21)	67.4% (58)			
Total	135	11.1% (15)	23.0% (31)	65.9% (89)			
Age group (years)							
20-29	24	12.5% (3)	25.0% (6)	62.5% (15)	2.184	2	0.336
30-39	56	10.7% (6)	23.2% (13)	66.1% (37)			
≥40	55	10.9% (6)	21.8% (12)	67.3% (37)			
Total	135	11.1% (15)	23.0% (31)	65.9% (89)			
Terms of service							
Permanent	92	10.9% (10)	21.7% (20)	67.4% (62)	-	-	0.547
Contract	40	12.5% (5)	22.5% (9)	65.0% (26)			
Locum	3	0.0% (0)	66.7% (2)	33.3% (1)			
Total	135	11.1% (15)	23.0% (31)	65.9% (89)			
Level of qualification							
Diploma	71	12.7% (9)	25.4% (18)	62.0% (44)	-	-	0.858
Degree	56	10.7% (6)	19.6% (11)	69.6% (39)			
Master	8	0.0% (0)	25.0% (20)	75.0% (6)			
Total	135	11.1% (15)	23.0% (31)	65.9% (89)			
Work experience (years)							
<1 year	20	13.8% (4)	31.0% (9)	55.2% (16)	-	-	0.600
1-3 years	29	5.0% (1)	25.9% (5)	70.0% (14)			
>3 years	86	11.6% (10)	19.8% (17)	68.6% (59)			
Total	135	11.1% (15)	23.0% (31)	65.9% (89)			

n = sample size; df= degree of freedom

4.3(a) Scores of Attitudes Towards Enteral Feeding among Critical Care Nurses

In assessing the attitudes toward enteral feeding, the study participants were asked eight questions (Table 4.3(a)). Although questions 4, 5, 7, and 8 were reverse-coded, the questions which had the highest number of respondents for strongly agree, agree, disagree and strongly agree were 3 (84.4%), 1 (44.4%), 4 (59.3%) and 8 (45.9%) respectively (Table 4.3(a)).

Table 4.3(a): Scores of attitudes towards enteral feeding among critical care nurses

	Answers (Frequency and percentage)			
Questions	**Strongly agree**	**Agree**	**Disagree**	**Strongly disagree**
1. Do you believe enteral feeding is the first feeding option in critically ill patients?	56 (41.5%)	60 (44.4%)	14 (10.4%)	5 (3.7%)
2. Do believe it is crucial for critical care nurses to understand how to administer enteral feeding?	113 (83.7%)	20 (14.8%)	1 (0.7%)	1 (0.7%)
3. Do you feel responsible for the adequate provision of nutrition through enteral feeding to your critically ill patients?	114 (84.4%)	20 (14.8%)	1 (0.7%)	0 (0.0%)
4. Do you believe enteral feeding increases workload?	9 (6.7%)	19 (14.1%)	80 (59.3%)	27 (20.0%)
5. Do you believe it is difficult to administer enteral feeding?	8 (5.9%)	4 (3.0%)	67 (49.6%)	56 (41.5%)
6. Do you believe enteral feeding reduces hospital stay?	41 (30.4%)	60 (44.4%)	21 (15.6%)	13 (9.6%)
7. Do you believe enteral feeding causes unnecessary discomfort to your critically ill patients?	10 (7.4%)	21 (15.6%)	77 (57.0%)	27 (20.0%)
8. Do you believe tube feeding in critically ill patients is expensive and offer no benefits?	3 (2.2%)	2 (2.2%)	67 (49.6%)	62 (45.9%)

4.3b Relationship between Attitudes Towards Enteral Nutrition and Socio-demographic Characteristics of Critical Care Nurses

Most of the respondents had positive attitudes towards enteral feeding at 96.3% (Table 4.3(b)). The gender, age group, terms of service, level of qualification and work experience noted no significant relationship with attitudes towards enteral feeding among critical care nurses attending critically ill patients in KNH CCUs ($p>0.05$; Table 4.3(b)).

Table 4.3(b): Relationship between attitudes towards enteral feeding and socio-demographic characteristics among critical care nurses

		Attitude (%)				
Variables	**n**	**Positive**	**Negative**	**Chi square**	**df**	**p value**
Gender						
Male	49	98.0% (48)	2.0% (1)	-	1	0.653
Female	86	95.3% (82)	4.7% (4)			
Total	135	96.3 (130)	3.7% (5)			
Age group (years)						
20-29	24	95.8% (23)	4.2% (1)	-	2	0.991
30-39	56	96.4% (54)	3.9% (2)			
≥40	55	96.4% (53)	3.6% (2)			
Total	135	96.3 (130)	3.7% (5)			
Terms of service						
Permanent	92	95.7% (88)	4.3% (4)	-	2	0.717
Contract	40	97.5% (39)	2.5% (1)			
Locum	3	100.0% (3)	0.0% (0)			
Total	135	96.3 (130)	3.7% (5)			
Level of qualification						
Diploma	71	97.2% (69)	2.8% (2)	-	2	0.746
Degree	56	94.6% (53)	5.4% (3)			
Master	8	100.0% (8)	0.0% (0)			
Total	135	96.3 (130)	3.7% (5)			
Work experience (years)						
<1 year	20	95.0% (19)	5.0% (1)	-	2	0.822
1-3 years	29	96.6% (28)	3.4% (1)			
>3 years	86	96.5% (83)	3.5% (5)			
Total	135	96.3 (130)	3.7% (5)			

df = degree of freedom; n = sample size

4.4a Scores of Practices on Enteral Feeding of Critical Care Nurses

In the determination of practices on enteral feeding, this study used eight questions. The question "Do you give hospital kitchen feeds like soups and milk to patients on tube feeding?" had the highest competent practices of 100% (135), followed by the question "Do you verify tube placement at least once in a day before commencing tube feeding in the unit?" with 99.3% competent practices (Table 4.4a). The question with the highest incompetent enteral feeding practices at 43.7% (37) was "Do you perform nutritional assessment on patients in the unit at least once a week?" (Table 4.4a).

Table 4.4(a): Scores of practices on enteral feeding among critical care nurses

	Answer (Frequency and percentage)	
Question	**Yes**	**No**
1. Are critically ill patients on enteral nutrition interrupted from their feed more than once on a typical day?	50 (37.0%)	85 (63.0%)
2. Is fear of aspiration the most common nursing intervention that leads to enteral feeding interruption?	98 (72.6%)	37 (27.4%)
3. Do you perform nutritional assessment on patients in the unit at least once a week?	76 (56.3%)	59 (43.7%)
4. Is teamwork embraced in enteral nutrition of patients who are critically ill in the unit?	131 (97.0%)	4 (3.0%)
5. Do you confirm proper tube placement when inserting a nasogastric tube through auscultation of abdomen for air?	88 (65.2%)	47 (34.8%)
6. Do you provide enteral nutrition at a rate prescribed by the physician?	105 (77.8%)	30 (22.2%)
7. Do you give hospital kitchen feeds like soups and milk to patients on tube feeding?	135 (100.0%)	0 (0.0%)
8. Do you verify tube placement at least once in a day before commencing tube feeding in the unit?	134 (99.3%)	1 (0.7%)
Total	54.7 (75)	44.4% (60)

4.4b Relationship between Practices on Enteral Feeding and Sociodemographic Characteristics among Critical Care Nurses

Approximately 55.6% of the study participants had competent enteral feeding practices, whereas 44.4% had incompetent enteral feeding practices (Table 4.4b). The gender, age group, terms of service, level of qualification and work experience were not significantly associated with levels

of practices of enteral feeding among critical care nurses attending critically ill patients in KNH CCUs (p>0.05; Table 4.4).

Table 4.4(b): Relationship between practices on enteral feeding and Socio-demographic characteristics among critical care nurses

		Practices (%)				
Variables	**n**	**Competent**	**Incompetent**	**Chi square**	**df**	**p value**
Gender						
Male	49	59.2% (29)	40.8% (20)	0.410	1	0.591
Female	86	53.5% (46)	46.5% (40)			
Total	135	54.7 (75)	44.4% (60)			
Age group (years)						
20-29	24	45.5% (11)	54.2% (13)	1.191	2	0.556
30-39	56	58.9% (33)	41.1% (23)			
≥40	55	56.4% (31)	43.6% (24)			
Total	135	54.7 (75)	44.4% (60)			
Terms of service						
Permanent	92	54.3% (50)	45.7% (42)	-	2	0.413
Contract	40	55.0% (22)	45.0% (18)			
Locum	3	100.0% (3)	0.0% (0)			
Total	135	54.7 (75)	44.4% (60)			
Level of qualification						
Diploma	71	60.6% (43)	39.4% (28)	-	2	0.424
Degree	56	50.0% (28)	50.0% (28)			
Master	8	50.0% (8)	50.0% (8)			
Total	135	54.7 (75)	44.4% (60)			
Work experience (years)						
<1 year	20	50.0% (10)	50.0% (10)	0.777	2	0.822
1-3 years	29	62.1% (18)	37.9% (11)			
>3 years	86	54.7% (47)	45.3% (39)			
Total	135	54.7 (75)	44.4% (60)			

df = degree of freedom; n = sample size

CHAPTER FIVE: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This study discussion as per specific objectives, including conclusions and recommendations are well described in this chapter.

5.2 Discussion

The present study evaluated the critical care nurses' levels of knowledge, attitudes and practices on enteral feeding at KNH CCUs. This study demonstrated that about two-thirds of the critical care nurses noted an adequate level of knowledge on enteral nutrition (EN). According to the findings, the nurses were equipped with adequate knowledge of EN. This could be attributed to the fact that critical care nurses received sufficient fundamental knowledge throughout their basic nursing education and in-service refresher training sessions, or it could be because KNH maintained a concise and up-to-date guideline that CCUs nurses could quickly access and adhere to while at work (Ahmed *et al*., 2018; Mohamed *et al*., 2021). Similar studies have also reported adequate knowledge of enteral nutrition among critical care nurses attending extremely sick patients in CCUs. For instance, a study conducted by AlOtaibi and Abdelavi (2022) demonstrated that critical care nurses had adequate knowledge of enteral nutrition in the CCUs of Buraidah Central Hospital in Qassim, Saudi Arabia. Also, a study by Mahmoodpoor *et al*. (2021) revealed adequate knowledge of enteral nutrition among critical care nurses attending severely sick patients in two hospitals at Tabriz University, Iran.

Most critical care nurses had a yes response at 65.9% of the questions asked regarding knowledge, which means that they were carrying out interventions that support or improve enteral feeding thereby minimizing complications. This could be explained by the fact that 68% of the critical care nurses attended continuous medical education on enteral feeding. 91.1 % of the respondents were aware of complications associated with enteral tube feeding. This is in agreement with Ramuada (2017) who stipulates that nurses have the responsibility of mastering skills regarding enteral feeding, including learning about complications of enteral feeding such as diarrhea, vomiting, aspiration pneumonia and catheter obstruction, among others.

In this study, there was statistically insignificant association between gender, age group, and terms of service, level of qualification and work experience with knowledge of enteral feeding among critical care nurses attending critically ill patients in Kenyatta National Hospital CCUs. These findings agreed with a study by Al-Qalah and Alrubaiee (2020), who reported that critical care nurses' gender, age and working experience were not significantly associated with knowledge of enteral nutrition in the CCUs of public hospitals in Sana'a, Yemen. In addition, a study by AlOtaibi and Abdeldafie (2022) reported that critical care nurses' age, gender, level of qualification, and years of experience had no significant association with knowledge of EN at CCUs of Buraidah Central Hospital in the Qassim, Saudi Arabia.

On the other hand, other similar studies reveal an association between critical care nurses' knowledge of enteral feeding with gender, age group, level of qualification, terms of service and working experience of nurses attending critically ill patients in the CCUs. For instance, a study by Mohamed *et al*. (2021) documented a significant association between level of qualification and working experience with the level of knowledge of enteral nutrition among nurses attending critically ill patients in the CCUs of Ain-Shams University Hospitals, Cairo, Egypt. Besides, a study by Hadera *et al*. (2022) also noted that the level of qualification was significantly associated with knowledge of critical care nurses in the CCUs of Public Hospitals in Addis Ababa, Ethiopia.

The present study also assessed the attitude of critical care nurses towards enteral nutrition in CCUs of KNH. Overall, the critical care nurses had a positive attitude towards enteral nutrition with a proportion of 96.3%. Most of the respondents felt that it was their responsibility to provide adequate nutrition through enteral nutrition to severely ill patients. In addition, they believed it was important to understand how to administer enteral feeding. These findings concurred with a previous study by Mahmoodpoor *et al*. (2021) that documented critical care nurses had a positive attitude regarding enteral feeding in two hospitals of Tabriz University, Iran. Besides, according to Hamdan *et al*. (2022), critical care nurses had a positive attitude toward enteral feeding in private and governmental hospitals in West Bank, Palestine. Further, a study by Ramuada *et al*. (2022) noted that critical care nurses had a positive attitude regarding enteral feeding at one Military Hospital, Thaba Tshwane, Pretoria, South Africa. A study by

Mohamed *et al*. (2021) disagreed with the findings of attitudes toward enteral nutrition. The study reported that critical care nurses had a negative attitude towards enteral nutrition in the CCUs of Ain-Shams University Hospitals, Cairo, Egypt.

This study also reported that the critical care nurses revealed nonsignificant association between gender, age, level of qualification, terms of service and years of experience with attitude towards EN in Kenyatta National Hospital CCUs. The results of this study on attitudes toward enteral nutrition are supported by similar research studies. For instance, a study by Mohamed *et al*. (2021) found that age and year of experience were insignificantly associated with the critical care nurses' attitude toward EN in the CCUs in Ain-Shams University Hospitals, Cairo, Egypt. Nevertheless, a study by Mahmoodpoor *et al*. (2021) noted that the critical care nurses' attitude toward enteral feeding was significantly associated with the age and level of qualification in the CCUs of the two hospitals of Tabriz University, Iran.

This study also reported that about 55.6% of the critical care nurses had competent enteral feeding practices. Competent practices regarding enteral nutrition can assist in minimizing the associated complications such as aspiration, diarrhea and blocking tubes (Ramuada *et al*., 2022). These findings corroborated with those of earlier studies, which assessed practices of enteral feeding. According to a study by Margrate *et al*. (2018), critical care nurses had satisfactory practices on enteral nutrition at Tertiary Care Hospitals, Lahore, Pakistan. In addition, a study by Mohamed *et al.* (2021) found that critical care nurses had competent practices of enteral nutrition in the CCUs of Ain-Shams University Hospitals, Cairo, Egypt. The findings contradicted with those of Hedera *et al*. (2022), who reported that critical care nurses had incompetent practices of enteral feeding in adult ICUs of Public Hospitals in Addis Ababa, Ethiopia. Mahmoodpoor *et al*. (2022) also revealed that critical care nurses attending to critically ill patients in two hospitals of Tabriz University, Iran, had incompetent practices of enteral nutrition.

There was insignificant relationship between the critical care nurses' gender, age group, and terms of service, level of qualification and work experience with the practices of enteral nutrition in KNH CCUs. The study findings were inconsistent with those of Mohamed *et al*. (2021), who documented that critical care nurses' age, level of qualification and work experience were

significantly associated with practices of enteral nutrition at paediatric ICUs in Ain-Shams University Hospitals, Cairo, Egypt. Also, Mahmoodpoor *et al*. (2022) revealed that nurses' practices had a significant association with age and work experience in the CCUs of two hospitals at Tabriz University, Iran. Further, a study by Hedera *et al*. (2022) reported that critical care nurses were significantly associated with practices of enteral feeding in adult CCUs of Public Hospitals in Addis Ababa, Ethiopia.

5.3 Conclusions

The present study concluded that the critical care nurses attending critically ill patients had:

i. Adequate level of knowledge of enteral feeding. The gender, age group, terms of service, level of qualification and work experience had nonsignificant association with critical care nurses' levels of knowledge of enteral feeding in KNH CCUs.
ii. A positive attitude towards enteral nutrition. There was insignificant relationship between critical care nurses' attitudes towards enteral feeding and gender, age group, terms of service, level of qualification and work experience in KNH.
iii. Competent practices of enteral nutrition in KNH CCUs. Critical care nurses' practices of enteral feeding in KNH ICUs were not significantly influenced by gender, age group, terms of service, amount of education, or work experience.

The responses to the research questions were well answered.

5.4 Recommendations

5.4.1 Study Recommendations

The current study recommends that:

i. Critical care nurses in KNH CCUs should be encouraged to continue building and enhancing their knowledge on enteral nutrition via educational programs and participation in educational seminars, as well as on how to safely administer enteral feeding. This will ensure continuity of care given that the respondents had adequate knowledge.
ii. The KNH management must train and periodically update critical care nurses on enteral nutrition in order to maintain a positive attitude toward enteral nutrition. Further, to guarantee quality care delivery, enhance attitude, and maintain the motivation of critical

care nurses, a systematic program of orientation and continuous education/refresher program should be developed on enteral nutrition. Similarly, further training may also be carried out addressing issues like minimizing feed interruptions and the importance of embracing teamwork while at work. This, if put in place, will sustain nurses' level of competence in care delivery.

iii. Critical care nurses in CCUs should be encouraged to participate in continuous nutrition education programs in order to maintain current enteral nutrition practices, particularly monitoring and managing enteral nutrition intolerance.

5.4.2 Recommendations for Further Study

i. Conduct additional in-depth investigations on enteral nutritional care-related topics.
ii. Investigate the function of multidisciplinary studies, which is also important to better understand how doctors and nutritionists evaluate patients' nutritional conditions while they are in intensive care units.
iii. Study and compare critical care nurses in private and public hospitals on enteral feeding of critically ill patients.
iv. Instead of employing questions that have been predefined and are based on assumptions, future research methodologies can consider direct observation of enteral nutrition practices and qualitative interviews to investigate potential reasons for the adoption and execution of clinical practice recommendations.

REFERENCES

Abdullah, M., Mohammed, W., & Ismail, M. (2014). Nurses' knowledge and practices about administration of medications via nasogastric tube among critically ill patients. *Journal of Education and Practice*, *5*(1), 147-159.

Adam, S., & Batson, S. (1997). A study of problems associated with the delivery of enteral feed in critically ill patients in five ICUs in the UK. Intensive care medicine, 23(3), 261-266.

Ahmed, F. A. H. M., Ahmed, O. A. E., Abd, E., Albitar, E., & Ghoneim, S. E. S. (2018). Effect of educational nursing guidelines regarding enteral feeding on nurses' knowledge and practices at critical care units. *IOSR Journal of Nursing and Health Science (IOSR-JNHS)*, *7*(5), 69-75.

Ahtisham, Y., & Jacoline, S. (2015). Integrating Nursing Theory and Process into Practice; Virginia's Henderson Need Theory. *International Journal of Caring Sciences*, 8(2), 443-450.

Allen, K., & Hoffman, L. (2019). Enteral nutrition in the mechanically ventilated patient. *Nutrition in Clinical Practice*, *34*(4), 540-557.

AlOtaibi, M. S., & Abdeldafie, S. Y. (2022). ICU Nurses' Knowledge About Enteral Nutrition At Buraidah Central Hospital In Qassim, Saudi Arabia. *Journal of Pharmaceutical Negative Results*, 13(9), 3096-3103.

Al-Qalah, T. A. H., & Alrubaiee, G. G. (2020). Intensive care nurses' knowledge of enteral nutrition at public hospitals in Sana'a, Yemen: a cross-sectional survey. Research, 9(759), 759.

Attia, F. M., Mahmoud, M. H., & El–Fadl, N. M. A. (2021). Effect of Implementing Nursing Guidelines on Nurses' Performance Regarding Complications of Nasogastric Tube among Critically ill Patients. *Journal of Nursing Science Benha University*, *2*(2), 586-600.

Bechtold, M. L., Brown, P. M., Escuro, A., Grenda, B., Johnston, T., Kozeniecki, M., ... & ASPEN Enteral Nutrition Committee. (2022). When is enteral nutrition indicated?. Journal of Parenteral and Enteral Nutrition, 46(7), 1470-1496.

Bloomer, M. J., Clarke, A. B., & Morphet, J. (2018). Nurses' prioritization of enteral nutrition in intensive care units: a national survey. *Nursing in Critical Care*, *23*(3), 152-158.

Compher, C., Bingham, A. L., McCall, M., Patel, J., Rice, T. W., Braunschweig, C., & McKeever, L. (2022). Guidelines for the provision of nutrition support therapy in the adult critically ill patient: The American Society for Parenteral and Enteral Nutrition. *Journal of Parenteral and Enteral Nutrition*, *46*(1), 12-41.

Crossfield, C. L., Russo, P. L., & Bucknall, T. K. (2022). Enteral nutrition feeding practices by intensive care nurses: A retrospective evaluation. *Nursing in Critical Care*, *27*(5), 676-681.

Darawad, M. W., Alfasfos, N., Zaki, I., Alnajar, M., Hammad, S., & Samarkandi, O. A. (2018). ICU nurses' perceived barriers to effective enteral nutrition practices: a multicenter survey study. *The Open Nursing Journal*, 12, 67-75.

De Lazzaro, F., Alessandri, F., Tarsitano, M. G., Bilotta, F., & Pugliese, F. (2022). Safety and efficacy of continuous or intermittent enteral nutrition in patients in the intensive care unit: Systematic review of clinical evidence. *Journal of Parenteral and Enteral Nutrition*, 46(3), 486-498.

Doley, J. (2022). Enteral Nutrition Overview. Nutrients, 14(11), 2180.

El-sol, A. E. S. H., & Mohmmed, R. G. A. (2018). Assessment of nurse's knowledge, attitudes, and practice regarding physical restraints among critical ill patients. *Assessment*, 4(1), 15-22.

Hadera, T., Worku, T., & Tuli, W. (2022). Nurses Knowledge, Practice, and Associated Factors with Enteral Nutrition in Adult Intensive Care Units of Public Hospitals. *Ethiopian Journal of Health Sciences*, *32*(2), 423-432.

Hamdan, M., Zidan, S., Badrasawi, M., Shweikeh, H., Al-Masri, R., & Al-Khateeb, R. (2022). Palestinian nurses' knowledge, attitudes, and practices regarding enteral nutrition: Cross-sectional study. *Applied Nursing Research*, *63*, 151545.

Henderson, V. (1966). *The nature of nursing a definition and its implications for practice, research, and education*. Macmillan.

Hossaini S., Ghorbani, R., & Vazin, A. (2019). Improving knowledge, attitudes, and practice of nurses in medication administration through enteral feeding tubes by clinical pharmacists: a case–control study. *Advances in Medical Education and Practice*, 10, 493-500.

Huang, J., Yang, L., Zhuang, Y., Qi, H., Chen, X., & Lv, K. (2019). Current status and influencing factors of barriers to enteral feeding of critically ill patients: A multicenter study. Journal of clinical nursing, 28(4), 677-685.

Irving, S. Y., Albert, B. D., Mehta, N. M., & Srinivasan, V. (2022). Strategies to optimize enteral feeding and nutrition in the critically ill child: a narrative review. *Pediatr Med*, *5*.

Jordan, E. A., & Moore, S. C. (2020). Enteral nutrition in critically ill adults: Literature review of protocols. *Nursing in Critical Care*, 25(1), 24-30.

Khalid, I., Doshi, P., & DiGiovine, B. (2010). Early enteral nutrition and outcomes of critically ill patients treated with vasopressors and mechanical ventilation. American journal of critical care, 19(3), 261-268.

Kim, H., & Chang, S. J. (2019). Implementing an educational program to improve critical care nurses' enteral nutritional support. *Australian Critical Care*, 32(3), 218-222.

Kolaček, S. (2013). Enteral nutrition. *Evidence-Based Research in Pediatric Nutrition*, 108, 86-90.

Komen, D. (2020). Assessing Nursing Enteral Nutrition Practices and Perspectives in An Intensive Care Unit of A Level Six Hospital in Kenya. *Asian Journal of Pharmacy, Nursing and Medical Sciences*, 8(6), 84-91.

Koontalay, A., Sangsaikaew, A., & Khamrassame, A. (2020). Effect of a clinical nursing practice guideline of enteral nutrition care on the duration of mechanical ventilator for critically ill patients. *Asian Nursing Research*, *14*(1), 17-23.

Koontalay, A., Suksatan, W., & Teranuch, A. (2021). Early enteral nutrition met calories goals led by nurse on improve clinical outcome: a systematic scoping review. *Iranian Journal of Nursing and Midwifery Research*, *26*(5), 392.

Kotrlik, J. W. K. J. W., & Higgins, C. C. H. C. C. (2001). Organizational research: Determining appropriate sample size in survey research appropriate sample size in survey research. *Information Technology, Learning, and Performance Journal*, *19*(1), 43.

Lambell, K. J., Tatucu-Babet, O. A., Chapple, L. A., Gantner, D., & Ridley, E. J. (2020). Nutrition therapy in critical illness: a review of the literature for clinicians. *Critical Care*, *24*, 1-11.

Lappas, B. M., Patel, D., Kumpf, V., Adams, D. W., & Seidner, D. L. (2018). Parenteral nutrition: indications, access, and complications. *Gastroenterology Clinics*, *47*(1), 39-59.

Limketkai, B. N., Shah, N. D., Sheikh, G. N., & Allen, K. (2019). Classifying enteral nutrition: tailored for clinical practice. *Current Gastroenterology Reports*, *21*, 1-7.

Mahmoodpoor, A., Sanaie, S., Momen, F., Pourmoghaddam, M. A., & Saghaleini, S. H. (2021). Knowledge, attitudes and practices of intensive care unit nurses towards nutritional care in critically ill patients: A descriptive cross-sectional study. *Journal of Research in Clinical Medicine*, *9*(1), 35-35.

Margrate, M., Khan, S., Mukhtar, F., & Asmat, K. (2018). Knowledge and Practices among Nurses of Tertiary Care Hospitals, Lahore Regarding Nasogastric Tube Feeding in Adult Patients. *Saudi Journal of Medical and Pharmaceutical Sciences*, *4*(7), 798-801.

McClave, S. A., Taylor, B. E., Martindale, R. G., Warren, M. M., Johnson, D. R., Braunschweig, C., ... & Compher, C. (2016). Guidelines for the provision and assessment of nutrition support therapy in the adult critically ill patient: Society of Critical Care Medicine (SCCM) and American Society for Parenteral and Enteral Nutrition (ASPEN). *Journal of Parenteral and Enteral Nutrition*, 40(2), 159-211.

Metheny, N. A. (2021). CE: Monitoring Adult Patients for Intolerance to Gastric Tube Feedings. *American Journal of Nursing*, *121*(8), 36-43.

Metin, Z. G., & Pars, H. (2020). Knowledge and Clinical Competence of Nurses Regarding Enteral Nutrition: A Descriptive, Cross-sectional, and Comparative Study. *Topics in Clinical Nutrition*, *35*(2), 104-115.

Mohamed Abo Elezz, H., Mohamed Adly, R., & Refaat Tantawi, H. (2021). Assessment of Nursing Performance toward Enteral Feeding at Pediatric Critical Care Units. *Egyptian Journal of Health Care*, *12*(4), 1159-1178.

Morton, P. G., & Thurman, P. (2023). *Critical care nursing: a holistic approach*. Lippincott Williams & Wilkins.

Quiroz-Olguín, G., Gutiérrez-Salmeán, G., Posadas-Calleja, J. G., Padilla-Rubio, M. F., & Serralde-Zúñiga, A. E. (2021). The effect of enteral stimulation on the immune response of the intestinal mucosa and its application in nutritional support. *European Journal of Clinical Nutrition*, *75*(11), 1533-1539.

Ramuada, L. G. (2017). Assessment of knowledge, attitude and practice of nurses regarding Enteral Nutrition at a Military hospital (Doctoral dissertation, Stellenbosch: Stellenbosch University).

Ramuada, L., Veldsman, L., Livhuwani, N., & Blaauw, R. (2022). Assessment of knowledge, attitude and practice of nurses regarding Enteral Nutrition at a Military hospital. *South African Journal of Clinical Nutrition*, 1-7.

Ramuadaa, L., Veldsmana, L., Livhuwanic, N., & Blaauw, R. (2023). Assessment of knowledge, attitude and practice of nurses regarding enteral nutrition at a military hospital. *South African Journal of Clinical Nutrition*, *36*(2), 63-69.

Rezaei, F., Savadi, M. H., Douki, M. F., & Shiadeh, F. S. A. (2018). Comparison of Enteral Feeding Implementation with Standards in Educational Centers, Selected Therapeutics in Babol University of Medical Sciences. *International Journal of Ayurvedic Medicine*, *9*(2), 106-110.

Salciute-Simene, E., Stasiunaitis, R., Ambrasas, E., Tutkus, J., Milkevicius, I., Sostakaite, G., ... & Kekstas, G. (2021). Impact of enteral nutrition interruptions on underfeeding in intensive care unit. *Clinical Nutrition*, 40(3), 1310-1317.

Schober, M., Lehwaldt, D., Rogers, M., Steinke, M., Turale, S., Pulcini, J., ... & Stewart, D. (2020). *Guidelines on advanced practice nursing.* International Council of Nurses.

Seron-Arbeloa, C., Zamora-Elson, M., Labarta-Monzon, L., & Mallor-Bonet, T. (2013). Enteral nutrition in critical care. *Journal of Clinical Medicine Research*, 5(1), 1-11.

Shakhshir, M., & Alkaiyat, A. (2023). Healthcare providers' knowledge, attitude, and practice on quality of nutrition care in hospitals from a developing country: a multicenter experience. *Journal of Health, Population and Nutrition*, *42*(1), 1-14.

Singer, P., Blaser, A. R., Berger, M. M., Alhazzani, W., Calder, P. C., Casaer, M. P., ... & Bischoff, S. C. (2019). ESPEN guideline on clinical nutrition in the intensive care unit. *Clinical Nutrition*, 38(1), 48-79.

Stewart, M. L. (2014). Interruptions in enteral nutrition delivery in critically ill patients and recommendations for clinical practice. *Critical Care Nurse*, 34(4), 14-22.

Tatsumi, H. (2019). Enteral tolerance in critically ill patients. *Journal of Intensive Care*, 7(1), 1-10.

Terech-Skóra, S., Kasprzyk-Mazur, J., Leyk-Kolańczak, M., Kruk, A., Piotrkowska, R., Mędrzycka-Dąbrowska, W., & Książek, J. (2023). Assessment of Oral Health in Long-Term Enteral and Parenteral Nutrition Patients: Significant Aspects of Nursing Care. *International Journal of Environmental Research and Public Health*, *20*(4), 3381.

Wanden-Berghe, C., Patino-Alonso, M. C., Galindo-Villardón, P., & Sanz-Valero, J. (2019). Complications associated with enteral nutrition: CAFANE study. *Nutrients*, 11(9), 2041.

Wang, X., Sun, J., Li, Z., Luo, H., Zhao, M., Li, Z., & Li, Q. (2022). Impact of abdominal massage on enteral nutrition complications in adult critically ill patients: A systematic review and meta-analysis. *Complementary Therapies in Medicine*, *64*, 102796.

Wang, Z., Ding, W., Fang, Q., Zhang, L., Liu, X., & Tang, Z. (2019). Effects of not monitoring gastric residual volume in intensive care patients: A meta-analysis. *International Journal of Nursing Studies*, *91*, 86-93.

Williams, T. A., Leslie, G. D., Leen, T., Mills, L., & Dobb, G. J. (2013). Reducing interruptions to continuous enteral nutrition in the intensive care unit: a comparative study. Journal of clinical nursing, 22(19-20), 2838-2848.

Woo, S. H., Finch, C. K., Broyles, J. E., Wan, J., Boswell, R., & Hurdle, A. (2010). Early vs delayed enteral nutrition in critically ill medical patients. Nutrition in Clinical Practice, 25(2), 205-211.

Yasuda, H., Kondo, N., Yamamoto, R., Asami, S., Abe, T., Tsujimoto, H., ... & Kataoka, Y. (2021). Monitoring of gastric residual volume during enteral nutrition. *The Cochrane Database of Systematic Reviews*, *9*(9), 013335.

Zheng, C., Ge, Q., Luo, C., Hu, L., Shen, Y., & Xue, Q. (2022). Enteral nutrition improves the prognosis and immune nutritional status of patients in the cardiothoracic surgery recovery unit: A propensity score–matched analysis. *Clinical Nutrition*, *41*(12), 2699-2705.

APPENDICES

Appendix I: Participants information document

TITLE OF THE STUDY: Nurses' Knowledge, Attitude, and Practice on Enteral Feeding of Critically Ill Patients at Kenyatta National Hospital

PRINCIPAL INVESTIGATOR: Joyce Wangari Njuguna

INSTITUTION OF AFFILIATION: The University of Nairobi

SUPERVISORS: Dr. Lilian Omondi and Dr. Dorcas Maina

INTRODUCTION: My name is Joyce Wangari Njuguna, a Master's of Science student in critical care at the University of Nairobi. I am perusing an academic study on "Nurses' Knowledge, Attitude, and Practice on Enteral Feeding of Critically Ill Patients at Kenyatta National Hospital". You are hereby invited to take part in a volunteer study that will be carried out in KNH's main ICU.

PURPOSE OF THE STUDY: To evaluate nurses' levels of knowledge, attitudes, and practices on enteral feeding of critically ill patients in KNH ICU.

CONFIDENTIALITY: Your participation in this study will be treated with utmost confidentiality. Furthermore, all information provided will be utilized solely for this research purposes. Your name will not be mentioned in this research study.

VOLUNTARY PARTICIPATION: Your participation in this study is entirely voluntary. You can withdraw at any point while the data collection process is underway, and there won't be any repercussions if you choose not to participate. However, since your input is essential to the outcome of the study, we much appreciate your participation.

STUDY BENEFITS: This study is an academic study. There will be no monetary or other compensation for taking part in the study. The study will help fill gaps in enteral nutrition practices among critical care nurses.

RISKS: Participating in this study will not do any harm to you or your family. However, in view of the Covid-19 pandemic, the researcher and participants will follow the provided Covid-19 preventive guidelines during the data collection exercise, which includes wearing face masks.

CONTACTS: Kindly contact us if you have any questions about this study:
Principal investigator: Joyce Wangari, mobile number: 0726209460
Supervisors: Dr. Lilian Omondi, Phone number: 0720861317
Dr. Dorcas Maina, Phone number: 0724440843

OR

Secretariat, KNH/UoN Ethics and Research Committee, tel, 020 2726300, Ext 44355.

Appendix II: Consent form

DECLARATION OF RESPONDENTS

I am aware of the benefits of the study, that there is no risk associated, and that I have been fully informed about its aim. I thus give my approval to take part in this research.

Participant signature …….…… Date …….

RESEARCHERS DECLARATION

All relevant information about this study has been fully disclosed to the study participants.

Researcher signature ……..…… Date ……

Appendix III: Questionnaire

INSTRUCTIONS
Kindly do not write your name or personal information in the questionnaire.
Kindly answer all of the questions comprehensively and honestly.
The data provided in this study will be kept with utmost confidentiality.
Tick [√] where appropriate

Section A: Demographic Data
How old are you?
21-29 years [ ]
30-39 years [ ]
40 years and above [ ]

What is your gender?
Male [ ]
Female [ ]

What are your term of service in KNH?
Permanent [ ]
Contract [ ]
Locum [ ]

What is your level of education?
Certificate [ ]
Diploma [ ]
Degree [ ]
Masters [ ]

How long have you been working in ICU?
1 year [ ]
1-3 years [ ]
Above 3 years [ ]

SECTION B: KNOWLEDGE
Are CMEs regarding enteral feeding held in the unit?
Yes [ ]
No [ ]

If yes, how often……

Are you aware of complications associated with enteral tube feeding?
Yes [ ]
No [ ]

If yes, explain…….....

Do you perform nutritional assessment on patients in the unit?
Yes [ ]
No [ ]

Do you view nutritional assessment as a nursing responsibility?
Yes [ ]
No [ ]

If No, please explain……

Do you confirm tube placement prior to feed delivery?
Yes [ ]
No [ ]

Do you flush the tube before and after the feed administration?
Yes [ ]
No [ ]

Do you check gastric residual volume before commencement of enteral feeding?
Yes [ ]
No [ ]

Do you conduct daily nostrils inspections?
Yes [ ]
No [ ]

Do you document any complication or nutritional support regarding your patient?
Yes [ ]
No [ ]

Do you take part in decision-making about enteral feeding of critically ill patients in the unit?
Yes [ ]
No [ ]

ATTITUDE

Do you believe enteral feeding is the first feeding option in critically ill patients?
Strongly [ ]
Agree [ ]
Disagree [ ]
Strongly disagree [ ]

Do believe it is crucial for critical care nurses to understand how to administer enteral feeding?

Strongly agree [ ]
Agree [ ]
Disagree [ ]
Strongly disagree [ ]

Do you feel responsible for the adequate provision of nutrition through enteral feeding to your critically ill patients?
Strongly agree [ ]
Agree [ ]
Disagree [ ]
Strongly disagree [ ]

Do you believe enteral feeding increases workload?
Strongly agree [ ]
Agree [ ]
Disagree [ ]
Strongly disagree [ ]

Do you believe it is difficult to administer enteral feeding?
Strongly agree [ ]
Agree [ ]
Disagree [ ]
Strongly disagree [ ]

Do you believe enteral feeding reduces hospital stay?
Strongly agree [ ]
Agree [ ]
Disagree [ ]
Strongly disagree [ ]

Do you believe enteral feeding causes unnecessary discomfort to your critically ill patients?
Strongly agree [ ]
Agree [ ]
Disagree [ ]
Strongly disagree [ ]

Do you believe tube feeding in critically ill patients is expensive and offer no benefits?
Strongly agree [ ]
Agree [ ]
Disagree [ ]
Strongly disagree [ ]

PRACTICE

Are there hospital guidelines/protocols regarding enteral feeding in your unit?

Yes [ ]
No [ ]

Are critically ill patients on enteral nutrition interrupted from their feed more than once on a typical day?
Yes [ ]
No [ ]

Is fear of aspiration the most common nursing intervention that leads to enteral feeding interruption?
Yes [ ]
No [ ]

Do you perform nutritional assessment on patients in the unit at least once in a week?
Yes [ ]
No [ ]

Is teamwork embraced in enteral nutrition of patients who are critically ill in the unit?
Yes [ ]
No [ ]

Do you confirm proper tube placement when inserting a nasogastric tube through auscultation of abdomen for air?
Yes [ ]
No [ ]

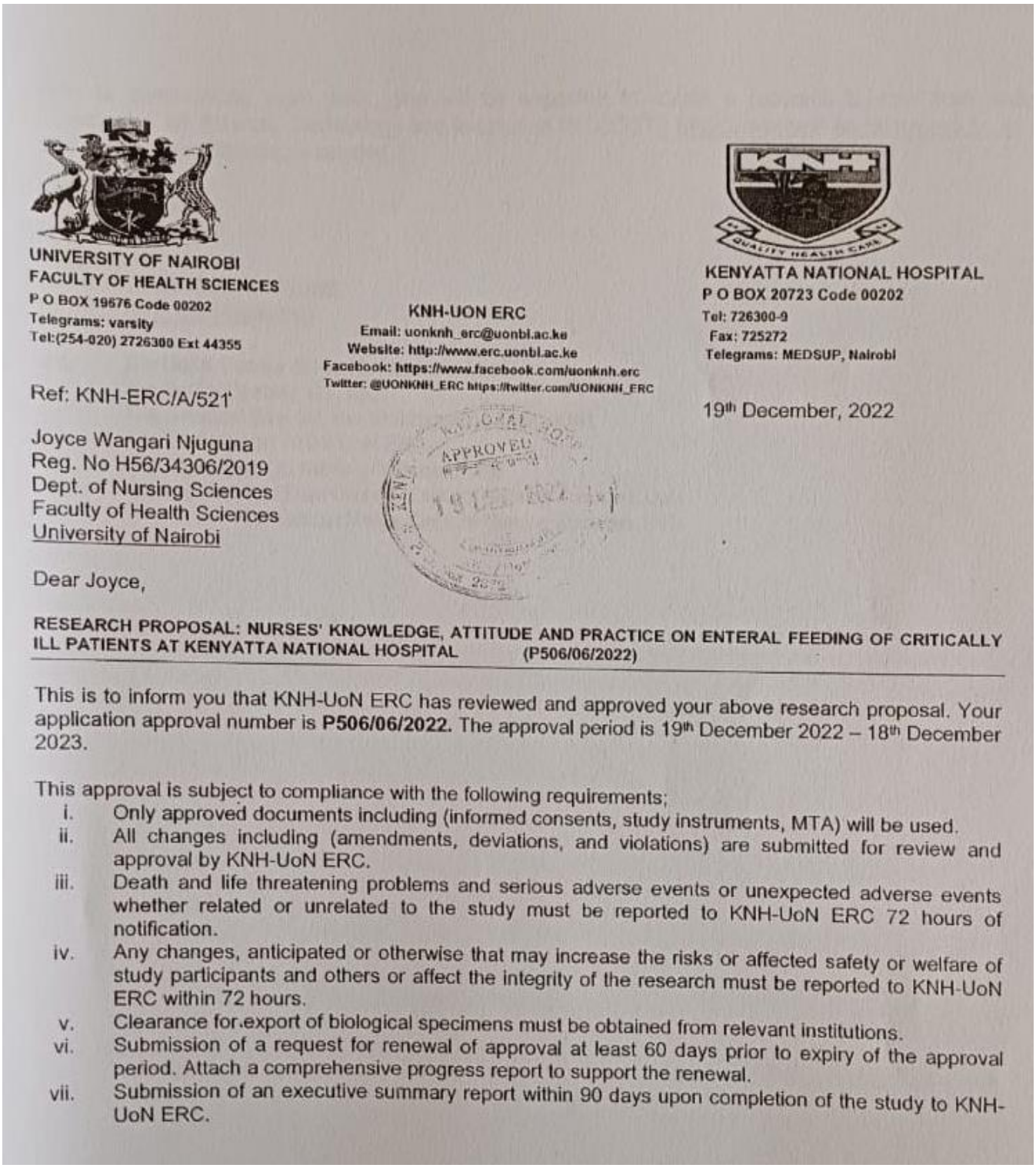
Do you provide enteral nutrition at a rate prescribed by the physician?
Yes [ ]
No [ ]

Do you give hospital kitchen feeds like soups and milk to patients on tube feeding?
Yes [ ]
No [ ]

Do you verify tube placement before commencing tube feeding in the unit at least once in a day?
Yes [ ]
No [ ]

Thank you for your time and participating in answering questions this questionnaire.

Appendix IV: Research approval by Ethical Research Committee



UNIVERSITY OF NAIROBI
FACULTY OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
Tel:(254-020) 2726300 Ext 44355

KNH-UON ERC
Email: uonknh_erc@uonbi.ac.ke
Website: http://www.erc.uonbi.ac.ke
Facebook: https://www.facebook.com/uonknh.erc
Twitter: @UONKNH_ERC https://twitter.com/UONKNH_ERC

KENYATTA NATIONAL HOSPITAL
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

Ref: KNH-ERC/A/521

19th December, 2022

Joyce Wangari Njuguna
Reg. No H56/34306/2019
Dept. of Nursing Sciences
Faculty of Health Sciences
University of Nairobi

APPROVED

Dear Joyce,

RESEARCH PROPOSAL: NURSES' KNOWLEDGE, ATTITUDE AND PRACTICE ON ENTERAL FEEDING OF CRITICALLY ILL PATIENTS AT KENYATTA NATIONAL HOSPITAL (P506/06/2022)

This is to inform you that KNH-UoN ERC has reviewed and approved your above research proposal. Your application approval number is **P506/06/2022.** The approval period is 19th December 2022 – 18th December 2023.

This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments, MTA) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by KNH-UoN ERC.
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to KNH-UoN ERC 72 hours of notification.
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH-UoN ERC within 72 hours.
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to KNH-UoN ERC.

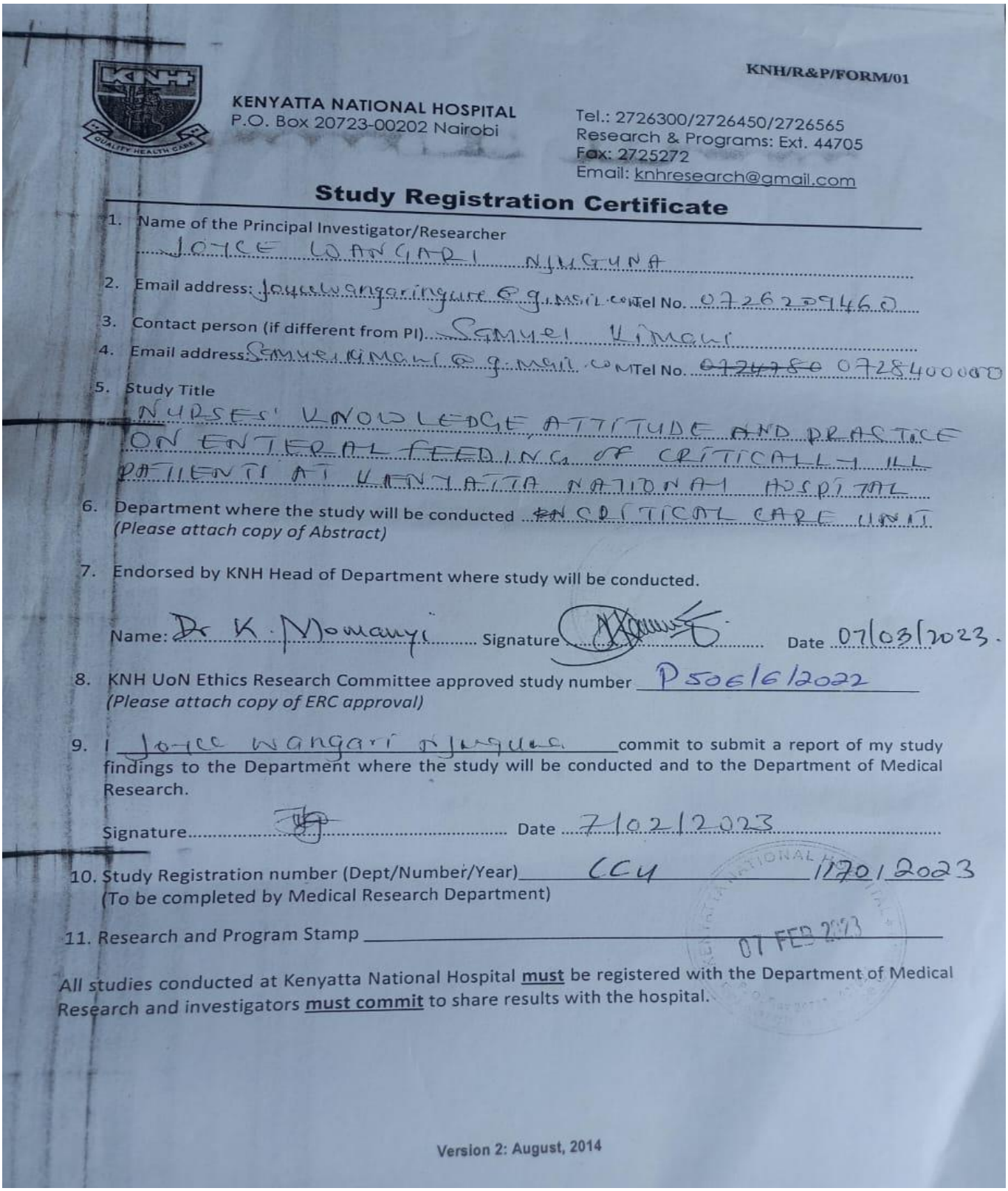
Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://research-portal.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely,

DR. BEATRICE K.M. AMUGUNE
SECRETARY, KNH-UoN ERC

c.c. The Dean, Faculty of Health Sciences, UoN
The Senior Director, CS, KNH
The Assistant Director, Health Information Dept., KNH
The Chairperson, KNH- UoN ERC
The Chair, Dept. of Nursing Sciences, UoN
Supervisors: Dr. Lillian Omondi, Dept. of Nursing Sciences, UoN
Dr. Dorcas Maina, Dept. of Nursing Sciences, UoN

Appendix v:approval letter from KNH



KNH/R&P/FORM/01

KENYATTA NATIONAL HOSPITAL
P.O. Box 20723-00202 Nairobi

Tel.: 2726300/2726450/2726565
Research & Programs: Ext. 44705
Fax: 2725272
Email: knhresearch@gmail.com

Study Registration Certificate

1. Name of the Principal Investigator/Researcher
   JOYCE WANGARI NJUGUNA
2. Email address: joycewangarinjuguna@gmail.com Tel No. 0726209460
3. Contact person (if different from PI) SAMUEL KIMANI
4. Email address: SAMUELKIMANI@gmail.com Tel No. ~~0724780~~ 0728400000
5. Study Title
   NURSES' KNOWLEDGE, ATTITUDE AND PRACTICE ON ENTERAL FEEDING OF CRITICALLY ILL PATIENTS AT KENYATTA NATIONAL HOSPITAL
6. Department where the study will be conducted ~~EN~~ CRITICAL CARE UNIT
   (Please attach copy of Abstract)
7. Endorsed by KNH Head of Department where study will be conducted.
   Name: Dr K. Momanyi Signature [signature] Date 07/03/2023.
8. KNH UoN Ethics Research Committee approved study number P506/6/2022
   (Please attach copy of ERC approval)
9. I Joyce Wangari Njuguna commit to submit a report of my study findings to the Department where the study will be conducted and to the Department of Medical Research.
   Signature [signature] Date 7/02/2023
10. Study Registration number (Dept/Number/Year) CCU 1170/2023
    (To be completed by Medical Research Department)
11. Research and Program Stamp 07 FEB 2023

All studies conducted at Kenyatta National Hospital **must** be registered with the Department of Medical Research and investigators **must commit** to share results with the hospital.

Version 2: August, 2014

APPENDIXI VI:PLAGIARISM REORT

22/11/2023.

Appendix vi :plagiarism report

NURSES' KNOWLEDGE, ATTITUDE, AND PRACTICE ON ENTERAL FEEDING OF CRITICALLY ILL PATIENTS AT KENYATTA NATIONAL HOSPITAL

ORIGINALITY REPORT

14%	12%	6%	4%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	erepository.uonbi.ac.ke Internet Source	1%
2	www.coursehero.com Internet Source	1%
3	Submitted to Kenyatta University Student Paper	1%
4	etd.aau.edu.et Internet Source	1%
5	Londolani Ramuada, Lizl Veldsman, Nedzingahe Livhuwani, Renée Blaauw. "Assessment of knowledge, attitude and practice of nurses regarding enteral nutrition at a military hospital", South African Journal of Clinical Nutrition, 2022 Publication	1%
6	Submitted to Harrisburg University of Science and Technology Student Paper	<1%

Dr. E. Mathenge
C.O.D
22/11/2023

DEPARTMENT OF NURSING SCIENCES
CHAIRMAN
22 NOV 2023
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P.O. Box

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