

**FACTORS INFLUENCING PRACTICE OF ENTERAL NUTRITION BY
NURSES IN HEALTH FACILITIES OF KISUMU COUNTY, KENYA**

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DECLARATION

This thesis is my original work prepared with no other than the indicated sources and support and has not been presented elsewhere for a degree or any other award.

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CERTIFICATION

The undersigned certify that they have read and hereby recommended for acceptance of Masinde Muliro university of Science and Technology a thesis entitled “**Factors Influencing Practice of Enteral Nutrition by Nurses in Health Facilities of Kisumu County, Kenya**”.

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DEDICATION

This work is dedicated to my wife Damaris for encouraging me to pursue my master's program. To my children Lucy, Linda, Sam and Dan who have stood with me throughout this period.

ABSTRACT

Enteral nutrition is a method of providing feeds through the gastrointestinal tract using a tube. It is used in patients; whose oral intake is not possible. Annually, over 3 million people receive enteral nutrition globally. Nurses play a key role in enteral nutrition but despite the progress, studies have demonstrated approaches that are not in line with the approved standards. In Kenya there are few studies on enteral nutrition. Kisumu County is among the regions where minimal studies on enteral nutrition have been done. It is found in western Kenya region. The main objective was to evaluate factors influencing practice of enteral nutrition among nurses in health facilities of Kisumu County. The specific objectives were to assess nurses' factors influencing management of enteral nutrition, to examine patient factors influencing nurses' management of enteral nutrition and to determine health facility factors influencing nurses' management of enteral nutrition. A cross-sectional, analytical study, employing both quantitative and qualitative approaches. It involved four referral hospitals that provide Enteral nutrition, namely; Jaramogi Oginga Odinga Teaching and Referral Hospital, Kisumu County Referral Hospital, Aga Khan Hospital Kisumu and Avenue Hospital Kisumu. They were selected through random sampling. A total of 88 participants were randomly selected from a study population that included all the nurses providing enteral nutrition in Kisumu County. 12 key informants were also interviewed. Data collection tools included a structured questionnaire, observation check list and an interview guide. Ethical approval was sought and given from relevant authorities. A pilot study was conducted in Nyamira County Referral Hospital. Collected data was analysed using statistical package for social sciences version 27. Both descriptive and inferential statistics were used in data analysis including frequencies, percentages, p-value, Bivariate Logistic Regression and Odds ratio. Use of guidelines that are well displayed influences EN (P value 0.03). Nurses' level of knowledge influences enteral nutrition though with minimal significance. Considering the age of the patient and presence of co-morbidity while planning for enteral nutrition had a positive influence in enteral nutrition practice. Use of technology in the management of enteral nutrition was minimal (37.9%) and had minimal influence on EN practice. It was therefore concluded that enteral nutrition is an essential intervention in the healing process and can be influenced by use of guidelines and nurses' knowledge. Co-morbidity and age of the patient can influence planning of care. Use of technology and evaluating enteral nutrition also has a relationship with EN practices. It was recommended that enteral nutrition providers should adhere to the guidelines and should acquire more knowledge. Age of patient and co morbidity should be factored when planning for enteral nutrition. Health facilities should make use of technology in the management of enteral nutrition and there should be consistent audit of the practice.

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LIST OF ABBREVIATIONS AND ACRONYMS

CPG	-	Clinical Practice Guidelines
EN	-	Enteral Nutrition
ETF	-	Enteral Tube Feeding
GIT	-	Gastrointestinal Tract
ICU	-	Intensive Care Unit
JOOTRH	-	Jaramogi Oginga Odinga Teaching and Referral Hospital
KCH	-	Kisumu County Hospital
SPSS	-	Statistical Package for Social Sciences
TF	-	Tube Feeding

OPERATIONALIZATION OF KEY TERMS

Co morbidity: Co morbidity is the presence of one or more additional conditions often co-occurring with another already existing condition in a patient. In this study, co morbidity therefore refers to provision of enteral nutrition to patients who have more than one underlying medical conditions. They can influence planning in EN practice

Enteral Nutrition: Enteral nutrition refers to a way of administering liquid feeds into the gastrointestinal tract by use of a tube. In the study this refers to the delivery of nutrients to the stomach, duodenum or jejunum by use of a specifically designed tube. It refers to the whole process of providing EN by nurses.

Gastric residual volume: This refers to the gastric contents aspirated before feeding. It is meant to confirm whether absorption has taken place or not. It determines if the enteral nutrition will continue or discontinued. In the study, it is taken as a factor that should be taken into consideration while planning for enteral nutrition.

Guidelines: Clinical practice guidelines universally agreed ways of performing procedures that facilitate optimum care. In the study, guidelines refer to universally recommended rules and regulations applied in the administration of enteral nutrition. In the study is considered as a factor that can influence performance at the clinical area when used or not used appropriately

Health facility factors: This refers to the institutional conditions (environment) that can have a direct influence on the effectiveness of enteral nutrition. It includes hospital policies, infrastructure and technology and the whole process of evaluating

enteral nutrition. In the study, they are taken as interventions taken by the hospital to enable service providers to practice EN with minimal interruptions

Illness: Illness is a life-threatening situation when the body systems are under the threat of malfunctions due to acute illness. It can lead to significant morbidity or mortality. In the study, this refers to very sick patients who are unable to feed orally.

Nurse: According to this study, a nurse refers to a qualified and certified professional who provide enteral nutrition to a patient. It is taken as a factor that can influence planning for EN.

Nurses' factors: Nurses' factors involve the characteristics and abilities of the nurse providing enteral nutrition. According to the study, these included socio-demographics, knowledge, use of guidelines and the skills. They are considered as nurses' potentials that can influence service delivery

Patient factors: According to the study, patient factors refer to the condition of the patient or the clinical manifestations that can have an influence while planning for care. This includes the age of the patient, presence of more than one condition (co morbidity), gastric movement disorders and gastric residual volume. It is taken as a factor that if not taken into consideration when planning for EN, it can influence the whole practice of enteral nutrition.

Practice: practice refers to intervention provided by a service provider. In the study this refers to the act of administering the Enteral nutrition contents using a tube that is designed for that particular purpose. It is the actual intervention of EN.

CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter provides the background of the study, statement of the problem, objectives of the study, justification of the study and the conceptual framework.

1.2 Background of the Study

Enteral Nutrition is a way of providing nutritionally complete liquid feeds through the gastrointestinal tract using a tube. It is a nursing intervention that is focused in achieving the dietary and physiological requirements in a sick patient. The patients in most cases are unable to initiate and sustain oral intake because of the disease pathology and associated weaknesses. This leads to altered nutrition, (Alhassan, *et al*, 2019).

During illness, there is increased metabolism and catabolism, which if not adequately addressed can lead to systems dysfunctions like failure of the respiratory system, gastro-intestinal system, renal system, nervous system, cardio-vascular system, immune system and muscle wasting. This will also lead to associated negative outcomes like delayed wound healing, muscle wasting, nasocomial infections, prolonged length of stay and delayed weaning from mechanical ventilation, (Alhassan, *et al*, 2019). Therefore, to promote patient recovery and achieve better outcomes, enteral nutrition is recommended, (Scot, Shaw & Brind, 2014).

Globally, there is a gradual increase on the number of patients receiving enteral nutrition. This can be attributed to the increase in gastrointestinal disorders and the presence of advanced equipments (Daurelle, 2023). Omorogieva (2015), points that in the U.K, a 42.78% increase over a 10- year period in patients receiving enteral

nutrition has been reported, although there is evidence of a yearly increase of 20%-25%.

The procedure is carried out in patients, whose gut is intact and at least partially functional. It is given as a short-term intervention as one recovers from disease, injury or surgery. However, in chronic gastrointestinal complications, it can be used as a long-term intervention, (Marengo, 2018). It is recommended for it protects the integrity and physiology of the GI tract, promotes peristalsis and blood flow, minimises bacterial translocation, hence controlling the risk of systemic infections. This in return improves the overall nutrition and health of patients, (Sara *et al.*, 2016). It is associated with fewer complications and is cheaper. It helps in improving the nutritional state of the patient and thereafter enhancing quick recovery. It also reduces length of stay and will lead to improved physiological processes in the body (Scot *et al.*, 2014).

It can be used to provide nutritionally complete feeds (proteins, carbohydrates, fat, water, minerals and vitamins), down to the stomach, duodenum or jejunum. The feeding tubes can also be used to deliver water and medication to the patient, (Omorogieva, 2015). It is recommended as the first line option because it is more physiological, and protects the gastrointestinal tract and promotes immunity. This leads to better patient outcomes and reduces the general cost of care of the patient, (Mohamed, Igawad, Nadia, Hagam, Nawal & El-Rahim, 2016).

The options include; orogastric, nasogastric, nasojejunal, jejunostomy, and gastrotomy. Nasogastric is through the nose to the stomach, nasointestinal is through the nose to the small intestine, gastrotomy is done surgically through the stomach wall, and jejunostomy is done surgically through the abdominal wall to the small

intestine (Scot, *et al.*, 2014). Nasogastric Tube Feeding is useful for 1 to 3 months and gastrostomy is the appropriate option if feeding problem persists. Nasojejunal tubes are required in patients with gastroparesis (Scott & Bowling, 2015).

After patient assessment, a decision is arrived at on providing nutritional supplementation, after which, nurses independently initiate and manage the whole process to ensure adequacy and consistency is achieved. Enteral nutrition should therefore aim to get patients receive adequate nutrition, while applying evidence-based practices. The whole process should be optimized for efficiency, and should be practiced universally, and be understood by all nurses. In addition, the procedures should be of benefit to the patient (Mula, 2014).

Studies have shown that guidelines aligned to enteral nutrition are either not adhered to or lacking in Sub-Saharan Africa, especially in low to middle income countries like Kenya (Sayed *et al*, 2019). Lack of resources and nursing workforce leads to inadequacy and inconsistency in EN practices in Kenya (Omondi *et al*, 2018). It is also noted that nurses have low adherence to practice guidelines in JOOTRH, Kisumu, (Manyala, Oluchina & Mbithi, 2022). Information on factors that influence this nursing practice is minimal and cannot be generalised.

Effective management of enteral nutrition requires that the service provider (nurse) should demonstrate ability by applying knowledge and skills while adhering to the standardised guidelines, (American Nurses Association, 2013). Patient assessment should be emphasized and individualized because each patient has unique needs. These needs should be considered in the planning phase so that patient outcomes can be maximized (Dickson & Sonya, 2016).

1.3 Statement of the Problem

Enteral nutrition is a practice used to enhance nutritional intake and prevent malnutrition. Physiologically, enteral nutrition regulates the metabolic response of patients to stress and improves blood flow which in turn improves the immune system. It also minimises the effects of physiological stress. When compared with parenteral nutrition, it is of less cost and has been associated with minimal complications, (White & Linsey, 2014).

Efficient and adequate administration of enteral nutrition is associated with positive patient outcomes through minimizing infectious complications, reducing length of stay and reducing the risk for mortality. This will in turn reduce the cost of care, (Elaheh & Nahideh, 2016).

It is an integral nursing intervention that promotes healing and influences the clinical outcome of the patients, (Jordan & Moore, 2019). The procedure should be carried out by a qualified nurse who is registered with a professional body after undergoing training in a nursing school, (Dickinson & Sonya, 2016), Nurses must demonstrate competency in assessing a patient for enteral tube insertion, in actual tube insertion, confirmation of its position, while administering feeds and in monitoring for complications (Mula, 2014). According to Komen *et al* (2017), the nutritional status of critically ill patients is paramount in determining their clinical outcomes.

In actual practice, it has been demonstrated that nurses display approaches and practices which are not in line with the standards of care of patients on EN, (Uysal, Yildirim, Demir and Oznur, 2016). Omorogieva, (2015) also found out that, despite

Enteral nutrition being practiced universally, there are differences in the actual management when comparing developed and developing countries.

Studies show that in Jordan, Enteral nutrition practices fail to provide patients with adequate feeding. More than 35% of ICU patients receive inadequate nutrition and are malnourished, which increases their risk for infection and delayed wound healing leading to prolonged length of stay, and increased cost of health care, (Darawad, Zaki, Sawsan & Osama, 2018).

Enteral nutrition practice can be influenced by many factors. The impact of these factors can have positive response or they can also lead to negative response. For example studies have indicated that the use of enteral nutrition guidelines and protocols have an impact on the enteral nutrition practice and this is associated with clinical outcomes of patients (Ahmed *et al* 2024), It has also been noted that nurses knowledge and information can influence enteral nutrition practice at the clinical area and can have an overall impact in the quality of nursing services (Ambaye *et al* 2024). Improvements in knowledge and technology has enabled accuracy in diagnosing co-morbidities in patients attending health facilities. The presence of co-morbidities has therefore been noted to have an influence in the planning phase in nursing before any intervention (Khan *et al* 2024)

Studies have indicated that nurses are performing poorly in clinical practice when administering enteral nutrition (Moustafa *et al*, 2018). The poor performance could be due to some reasons. The causes can be associated with the service provide (nurses), the service recipient (patient) or it could be due to the working environment (hospital). When factors that influence EN are known and well understood, then service delivery can be improved by focusing support for positive influences and

minimizing the impact of negative influences. This is what prompted the researcher to conduct the study.

In Kenya, there are few studies on determining factors influencing management of enteral nutrition. Therefore, the study is aimed at evaluating factors influencing management of enteral nutrition by nurses in Kisumu County.

Significance of the study

Monitoring of EN practice is vital to reduce complications, and metabolic abnormalities and thus ensure adequate nutrition is delivered, (British Association for Parenteral and Enteral Nutrition, 2016). However, studies have indicated that there are factors that lead to inadequate delivery of EN. The factors include inadequate knowledge and improper use of guidelines (Sayed *et al*, 2019 & Manyala, *et al*, 2022).). The study will promote understanding of EN practice by reducing the knowledge gap and this will strengthen the efforts towards better patient outcomes.

Factors influencing EN practice remains poorly understood because very few studies have been done on this field, with most of the studies being descriptive studies. In this study, the findings will help the reader to understand how nurses' factors, patient factors, and facility factors relate with EN practice and clinical outcomes. It will also help the service provider to understand the rationale for every prescribed intervention.

The institutions will benefit in ensuring appropriate decisions are made in relation to the study findings. The administrators will be guided on what should be emphasized and will help in improving the quality of nursing care. The study will also shed some light to the curriculum developers in nursing schools. The content and process of tube feeding education should be aligned to current studies and technology.

The study will help the researcher to uncover critical areas in practice and education processes that is in line with academic advancements and technology. It also forms the basis on where other related studies can be built.

1.4 Main Objective

The main objective of the study was to evaluate factors influencing management of enteral nutrition among nurses in health facilities of Kisumu County.

1.4.1 Specific Objectives

- i. To assess nurses' factors influencing management of enteral nutrition.
- ii. To examine patient factors influencing nurses' management of enteral nutrition
- iii. To determine health facility factors influencing nurses' management of enteral nutrition.

1.5 Research Questions

- i. Which nurses' factors influence management of enteral nutrition?
- ii. Which patient factors influence nurses' management of enteral nutrition?
- iii. Which health facility factors influence nurses' management of enteral nutrition?

1.6 Justification of the Study

Enteral nutrition is an integral aspect in the healing process of patients. Its impact has been tied to how this nursing intervention is being carried out. However, there is lack of conclusive data to support the same. Despite this observation, studies indicate that effective monitoring of enteral nutrition practice is vital to reduce the incidence

of complications, reduce electrolyte and metabolic abnormalities and ensure adequate nutrition, (BAPEN, 2016).

Conflicting findings about similar studies on EN have also been reported. For example, Njuguna (2024) indicated that most nurses have adequate knowledge in enteral nutrition while Talal & Gamil (2020) indicated that very few nurses have adequate knowledge on EN management. Few studies have been done in Kenya explaining nurses' performance on EN. The studies identified did not focus on factors that influence management of EN. This means that the closest studies done have no augmenting researches that can either support or negate their findings so that generalizations can be made. The findings of the study will benefit nurses in the whole process of planning and managing enteral nutrition, (Sayed *et al*, 2019).

In some studies, methodologies previously employed did not adequately explain factors influencing management of enteral nutrition. The study will therefore employ relevant methodologies that will enable the researcher to get insight into the processes, procedures, practices and responsibilities relating to EN. The study will help to uncover critical areas in EN practices that many researchers were not able to explain. The findings will give a better picture of enteral nutrition to the operational nurses who manage patients. It will provide insight on nurses' factors, patient factors and health facility factors that influence effective management of enteral nutrition. Understanding the whole process of enteral nutrition will help minimize mortality and morbidity, ensure minimal complications and fast recovery of patients.

The institutions will benefit in ensuring appropriate decisions are made in relation to the study findings. The administrators will be guided on what should be emphasized and will help in improving the quality of nursing care. The study will also shed some

light to the curriculum developers in nursing schools. The content and process of tube feeding education should be aligned to current studies and technology.

The study helped the researcher to uncover critical areas in practice and education processes that was in line with academic advancements and technology in enteral tube feeding. It also formed the basis on where other related studies can be built. It gave an opportunity for nurses to appreciate their role in EN practice and gave them a chance to strengthen their involvement in care and assessment of patients. It is therefore necessary to note that studies on enteral nutrition are of much importance especially for nurses. From the study, it was learnt that if nurses do not participate in doing studies related to enteral nutrition, then gaps and needs may not be identified and the practice will be based on tradition rather than evidence based. This will in turn lead to poor quality services and will not be aligned to current technology.

In Kisumu, some studies on enteral nutrition have been done using different methodologies. The study therefore aims at doing an analytical study that may give an insight on the factors influencing enteral nutrition practice. This will help strengthen key areas of service delivery and the end result will be quality enteral nutrition practice and better patient outcomes.

1.7 Limitations of the Study

The sample size used in the study was small because the targeted participants were nurses only. At the same time not all nurses qualified to participate because the inclusion criteria required that the participant should be involved directly in providing enteral nutrition. This was addressed by using probability sampling (systematic sampling) which gave each participant an equal chance to participate in

the study. Sample size was addressed by increasing the number of health facilities to four

The study used a cross sectional study design where data was collected at one point in time. A cross sectional study only gives findings on one specific time, which means that the findings may not be always applicable as time goes by.

1.8 Conceptual Framework of the study

The conceptual framework is a group of related ideas that guide and give direction of related concepts in research. It describes a logical, coherent way of viewing nursing or advanced nursing roles. It also guides in understanding the “bigger picture” of the nursing practice and allows for shared understanding of meaning of concepts. It involves identifying nursing roles that influences nursing practice and quality of healthcare services. (Mula, 2014). It is simple and effective because it entails diagrams that represent the relationship between variables. It therefore helps in explaining complex relationships (Cueva, 2021).

During the process of caring for the patient, an environment must be provided where The nurse is able to achieve the expected goals. The goals include adequate resources, good multidisciplinary relationships, evidence-based practices and professional development, (Mula, 2014). In the study this points to the institution related factors that influence effective management of enteral nutrition.

Graham-garcia, (2017), points out that enteral nutrition practice should be of benefit to the patient. Wrong decisions lead to poor outcomes. It is hoped that describing the practice, patient related factors, nurse related factors and health institution related factors on enteral nutrition focused on improving the EN practice and the outcomes

will lead to reduced length of stay, reduced cost of care and minimize morbidity and mortality.

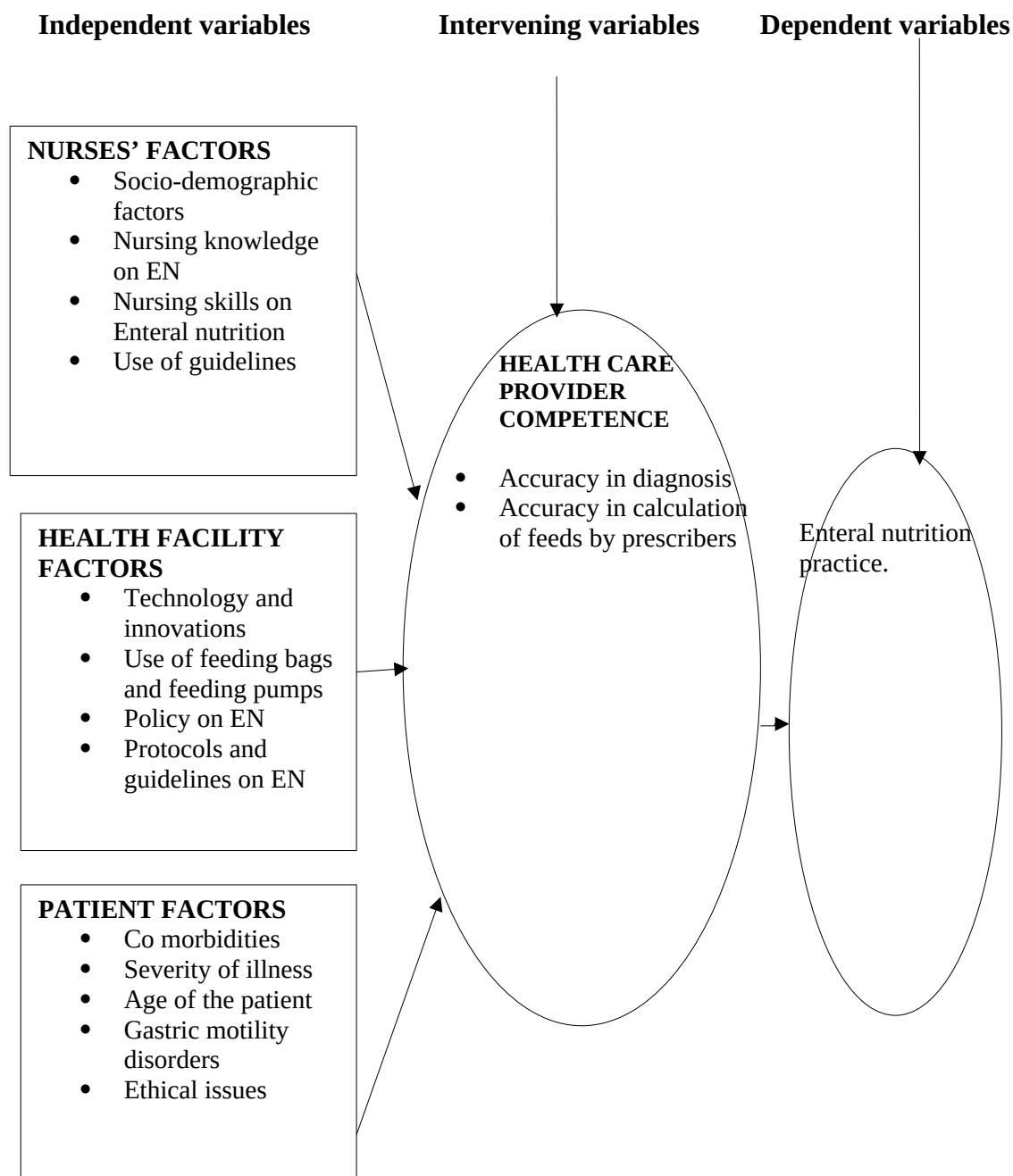


Figure 1.1. Conceptual framework

Source: Researcher 2024

CHAPTER TWO

LITERATURE REVIEW

2.1 Overview

This chapter gives the sequence and general knowledge about the study. Through the guidance of the conceptual framework, this covered nutrition, nurses' factors, patient factors and health facility factors influencing effective management of enteral nutrition.

2.2 Nutrition

Nutrition refers to a life sustaining aspect that facilitates cell production and protection, cell metabolism and energy production, regulation of physiological activities and regulation of the immune system. If nutrition is provided in adequate quantities at the right time, it plays a big role in disease prevention, promoting general health and facilitates recovery from disease (Elaheh & Nahideh, 2016).

The main purpose of nutritional supplementation is to alleviate the metabolic and catabolic effects that arise during illnesses. This will influence the outcome of disease process and promote healing (Chowdhury & Lobaz, 2018).

Nurses play an active role in managing patients on Enteral nutrition. They identify nutritional deficits during patient assessment and plan for focused and timely nutritional intervention by applying the universally accepted nutrition protocols. This necessitates proper understanding of the basics of Enteral nutrition supplementation, (Boeykens, 2021).

Options of nutritional support include;

1. Oral nutrition support: this includes fortified food and additional snacks to the diet.
2. Enteral tube feeding: feeding directly into the gut by use of a tube.
3. Parenteral nutrition: nutrition through intravenous route.

2.3 Enteral Nutrition

Enteral nutrition is a medical procedure used to therapeutically administer nutritionally balanced feeds to patients who are unable to feed orally or for some reasons cannot receive adequate nutrition by mouth. It is safe, cost effective and easy to administer, (Mula, 2014).

During illnesses, patients are unable to initiate or sustain the normal feeding process. This leads to inadequate nutrition, which also leads to detrimental disease outcomes. This is so because the normal enteral feeding plays a big role in protecting the GIT, prevents erosion of the gastric lining and promotes immunity. To prevent this, an artificial nutrition by use of enteral tubes is the best option, (Alhassan, *et al.*, 2019).

Enteral feeding tubes can be used to perform other activities like gastric lavage, diagnostic procedures and administration of drugs. This necessitates that proper tube size selection, proper tube position and proper ways of securing the tube can facilitate best outcomes and minimize complications, (Meshal *et al*, 2018). Objective prescription and ideal access must be determined and maintained at all times, (Seres *et al.*, 2019).

Inadequate use of recommended guidelines and performing procedures according to tradition can lead to unpredictable and negative outcomes like aspiration,

regurgitation, vomiting and mechanical blockage. This will prolong duration of stay, lead to higher morbidity and mortality rates, (Meshal *et al.*, 2018).

2.4 Practice of Enteral Nutrition

Effective management of Enteral nutrition refers to nurses' ability to perform the procedure while applying the recommended skills and judgement, (American Nurses Association, 2013). To make enteral nutrition effective, the provider should be skilled and dedicated, focuses on patient centred and personalized care, in an environment that is friendly to the patient and the service provider. This should be done according to the standards and the code of ethics. There should be proper utilization of resources in a cost-effective manner, and be capable of withstanding demands associated with enteral nutrition, (Stephenson, 2017).

To ensure timely and adequate provision of enteral nutrition, the care providers should narrow their target to improving the quality and safety of the service by exploring circumstances and opportunities that enhance adequate delivery. Issues arising from the intervention should be handled appropriately. This will help minimize complications, (Hoffmann *et al*, 2021).

When assessing the efficiency of enteral nutrition, clinical practice protocols and codes of practice should be followed closely. These will guide in comparing whether the intervention is in line with the universal guidelines and any deviation from the normal will be identified and addressed at the right time, (Dickinson & Sonya, 2016).

The effectiveness of enteral nutrition is affected by a number of factors, which lead to inefficient or incomplete delivery of nutrition. They expose patients to nutrition

deficits that they may experience prolonged hospital stay and increasing morbidity and mortality (Muvandimwe, 2019).

The recommended management of Enteral nutrition involves assessing for tube placement and patency, administration of tube feeding contents, flushing the tube when clogged and monitoring for complications. Before every feeding, the nurse must ensure that the tube is in the right position. This prevents aspiration of gastric contents. Patients should be monitored on daily basis for feeding intolerance such as bloating, nausea, vomiting, diarrhoea and constipation (Lei *et al*, 2017).

2.5 Factors Influencing Management of Enteral Nutrition

These factors are discussed as nurses' factors, patient factors and health facility factors.

2.5.1 Nurses' Factors Influencing Management of Enteral Nutrition

2.5.1 .1 Use of Clinical Guidelines in Enteral Nutrition

Clinical practice guidelines are universally agreed recommendation that guide nurses in performing prescribed procedures in a systematic way. They are more helpful in resource limited areas or when there are multiple options. They are applied during planning, in actual feeding practice and in evaluating outcome. When used appropriately, they facilitate good patient outcomes, (Royal Children's Hospital Melbourne, 2016).

Management of patients on enteral nutrition has evolved over the years. Clinical advancement and care of patients who are well informed, in an information sensitive environment dictates that nurses must adhere to the guidelines so as to provide relevant and safe enteral nutrition, (Lee-Anne, *et al*, 2021).

Use of professionally proved guidelines enables nurses to provide, relevant, current and evidence- based nursing care by using the best possible options, (American Gastroenterology Association, 2022). These clinical practice guidelines enforce use of best approaches, promote safety and excellence in nursing, (Bourgault, *et al*, 2014). They help in bridging the gaps in clinical management of patients, they guide in formulating hospital policies and form the basis for quality assessment of Enteral nutrition assessment. They also assist policy makers in making recommendations aimed at improving the quality of care, (Kredo,*et al*, 2016).

Clinical guidelines help nurses to minimize variations in care and decrease occurrence of complications. This helps nurses to understand that enteral nutrition is of therapeutic target that should not be thought as being a supportive intervention. It should therefore be well coordinated and be in line with current updates, (O’Leary-Lelley & Bawel-Brinkley, 2017). They provide direction for best care, enhance safety and excellence. They give direction and assurance and facilitate minimization of complications that may arise, (Bourgault, *et al.*, 2014). They provide evidence-based guidance for nurses on how to insert and care for enteral tube (Dickinson & Sonya, 2016).

Padar, Gerli, Starkopt, Joel and Reinten (2017), report that guidelines make enteral nutrition a universally standardised practice that can be practiced independently by nurses without involving other cadres. This facilitates evaluation and accountability in the whole practice of EN. They help to standardize the clinical nutrition practice, provide reasonable and effective nutrition support, and further improve the prognosis and quality of life (Zhonghua, 2017).

Guidelines are of much value when uncertainties crop up and when resources are not sufficient. They bring order and hasten decision making, thus improving the quality of care and instilling confidence among patients, (Fischer, Kerstin, Klose, Greiner and Kraemer, 2016).

The Nursing Council of Kenya practice Guidelines, (2021), facilitates standardization of enteral nutrition practice by designing teaching curriculum in training schools. The guidelines are purposely designed to guide students and qualified nurses on which procedures to be done, and how they are done in relation to international standards (Nursing Council of Kenya Practice Guidelines, 2021).

It has also been determined that nurses display approaches and practices which do not conform to standards of care. These inappropriate practices lead to various complications and put patient safety at risk. This has however been associated to the majority of nurses who do not read research studies on tube feeding (Uysal *et al*, 2016).

Fischer *et al*, (2016), demonstrates that, despite the usefulness of the guidelines, their implementation has been erratic, inadequate and unpredictable. This leads to inadequate diagnosing and inadequate treatment. Implementation should therefore be based on current studies and by understanding the barriers to effective intervention.

Standards of nursing care are of necessity and should be emphasised at any given time. They form the backbone for the nursing profession and nursing standards. They guide the formulation of hospital policies, rules and regulations in nursing, (Cashin, *et al*, 2017).

2.5.1.2 Nursing Knowledge on Enteral Nutrition

With current trends, nursing is highly specialized, which means that hospitals have modern facilities, equipments and staff expertise required to manage patients with life-threatening conditions. At the same time, patient outcome on enteral nutrition is affected by the quality of the nursing service. Adequate knowledge equates with quality care, meaning that much attention should focus on education on enteral nutrition. Wide knowledge base means putting the needs of the patient first. This coupled with experience improves one's competence, (Nagla, 2017).

Current nursing standards are complex in the presence of well-informed patients. This health care environment requires nurses who are well informed on current trends. Specialization in health and availability of multidisciplinary teams that are outcome oriented necessitates that nurses be of knowledgeable standards and be ready to contribute to the high standards of care. Patient-centred care and evidence-based practice pushes nurses to go through advanced education, (Gina, 2015).

Modern hospitals have advanced in technology and communication. This means that the quality of care should be scaled to high standards. Nurses should therefore advance in knowledge and technology, so that they provide relevant interventions, (Ortega, Barbera, Cecagno, Seva, Hedi, Montesinos and Soler, 2015).

Professional development and education advancement is necessary for nurses to remain relevant. It puts one on top of the chart in service delivery and makes it easy to address the needs of the patient, (Amira *et al*, 2018). Well informed nurses are in a position to prevent and manage complications related to enteral nutrition. It also promotes the total performance of the nurse, (Nabila, Amal, El-Ala and Shehas, 2016).

Advancing in knowledge facilitates understanding on social, political and technology requirements. It also opens highways for nurses to advance to graduate levels and diversify in specialization. Low education standards and insufficient knowledge can lead to clinical mistakes that otherwise can be prevented, (Wilson, 2019). Nurses who have advanced in Enteral nutrition related trainings, have less hiccups in service delivery and this strengthens the quality of care, (Meshal *et al*, 2018).

Nursing education in Enteral nutrition enable nurses to understand the science behind the intervention. It helps in exposing the pros and cons of the practice, and this pronounces the rationale for taking responsibility. Nurses should make decision of EN in relation to research findings and expected outcomes. This indicates the need for expanding knowledge on patient nutrition, (Ozyurek & Kisacik, 2021).

Advanced knowledge has been demonstrated to have an impact on clinical management of patients and is of much significance when applying current technology. It promotes communication between multidisciplinary teams and instils confidence in nurses, (University of Saint Mary, 2019). Well implemented training programs facilitate adherence to practice guidelines, helps in minimizing errors in nursing and affects clinical outcome of patients, (Ozyurek & Kisacik, 2021).

2.5.1.3 Nursing Skills on Enteral Nutrition

Nursing profession is dynamic in the presence of changing needs and expanding knowledge. If professionalism in nursing is to be maintained, then nurses should aim at acquiring skills necessary in the changing needs in society. This will satisfy the needs of patients and health care, (Strong, 2016). It is therefore the responsibility of the nursing profession to impart skills and knowledge to service providers so that

they can be good team players in the ever-changing health care environment, so that they can be individually accountable and responsible (ANA, 2013).

Nurses are key players in the whole process of enteral nutrition. They actively participate in planning, implementing and evaluating care. They are responsible for accessing the gastrointestinal tract, for the maintenance of this route, dietary administration, and response to problems inherent in these. Therefore, to improve nursing practice in enteral nutrition, to promote safer care and to disseminate the experience of evidence-based practice requires some commitment (Mula, 2014).

2.5.1.4 Nutritional Assessment of Patients on Enteral Nutrition

Nutritional assessment is an organized way of gathering and analysing information related to enteral nutrition. It is a continuation of nursing process which includes conducting a comprehensive and systematic assessment. A nutrition focused physical examination assists the nurse in gathering information about the patient's nutritional status. This involves history taking, general visual inspection of the patient from head to toe. This is so because the goal of nutritional assessment is to evaluate for the presence of malnutrition as well as identifying patients that are nutritionally at risk. This incorporates data from anthropometric measurements, biochemical studies, clinical examination, and dietary intake. It involves subjective information from the patient as well as the available objective medical data (Kesari & Noel).

Before introducing nutrition feeds to patients, nurses should perform a comprehensive assessment, taking into consideration the risks and benefits associated with the intervention. Patients should be evaluated individually, taking into account clinical manifestation, nutritional state in relation to the treatment goals, (Dickson & Sonya, 2016). Comprehensive assessment takes into account ethical,

psychological, and environmental factors, (Nursing and Midwifery Council, London, 2015). It is the responsibility of the nurses to make decisions as to when to initiate or stop tube feeding. This is so because nurses are present at prescription, initiation, continuous assessment and stoppage or postponement of feeding (Mula, 2014).

2.5.1.5 Socio-demographic information

Sociodemographic information of nurses providing enteral tube feeding is important when it comes to assessing the care that they provide. These include; age of the nurse, gender, level of training, and years of experience in tube feeding.

2.5.1.5.1 The Age of the Nurses

The age of nurses providing enteral tube feeding is an area of diverse opinions and needs careful discussions. This is because current studies have not had conclusive findings as to which age group is more suited to provide this care.

However, studies have indicated that nursing involves shift work, physical care, frequently missed breaks and interaction with very ill patients, notwithstanding the need for critical thinking skills and technical skills to care for complex patient population. This means that older nurses may not be well suited to do the tasks because they are more vulnerable to physical and mental demands of nursing. Despite their expertise and skill, older nurses have a reduced capacity to perform physical tasks compared to younger nurses (Uthaman *et al.*, 2015).

Other studies have indicated that one important factor that contributes to nursing quality is the nurses' years of experience. More years in practice are associated with confidence and experience. When nurses have a good comprehension about necessary concepts in nursing skills, it helps in promoting nursing practices.

Experienced nurses will respond differently to the needs of a patient as compared to novice nurses because of past experiences. This is because novice nurses tend to learn through formal training while expert practitioners supplement formal learning with mature knowledge base that they have developed over a period of years (Amira *et al.*, 2018). This necessitates that more studies be done to establish the relationship between years of experience and performance at the clinical area.

2.5.1.5.2 Nurses' Gender

In most studies' female nurses have been identified to be the majority of service providers when it comes to enteral tube feeding. This is because women have for a long time dominated the nursing profession (Mula, 2014). Women dominate professions involving care because social stigma renders male nurses in a vulnerable situation when providing intimate care (Zhang & Liu, 2016). Nurses' gender has been found to be a barrier since female nurses have been recognized for their perception of responsibility toward provision of enteral nutrition more frequently than male nurses (Muhammad *et al.*, 2018).

According to Men in Nursing (2019), it has however been noted that more men are enrolling in the field of nursing. This is because nursing is not a gender, it is a profession. Men have the capacity to build a strong relationship among his clients or patients and as well as perform the task which requires physical power more efficient.

2.5.2 Patient Factors Influencing Management of Enteral Nutrition

These factors are discussed in reference to the way the patient is presenting at the time of performing enteral feeding. Findings from the patient assessment are used to plan for nursing care. These findings that include the age of the patient, severity of

illness, co morbidities and gastric motility disorders may have an influence in enteral nutrition practice.

2.5.2.1 Enteral Nutrition During Illness

During illness, there is increased metabolism and cell breakdown. This leads to an increase in nutritional requirements. On the other hand, ill patients may not be in a position to take adequate nutrition. This in turn causes nutritional deficits that end up compromising the physiological processes that are required for normal healing process. For this reason, enteral nutrition is given the first option so as to correct the nutritional deficits and in return promote quick healing. It has been proved that early feeding, (within 24 to 48 hours after admission) of critically ill patients, improves tolerance, reduces complications and minimizes the length of stay in hospital. This necessitates proper understanding of enteral nutrition protocols so as to improve patient outcomes and scale the quality of care in hospitals, (Marengo & Megan, 2018)

Nurses play a big role in implementation of enteral nutrition. They coordinate and monitor multidisciplinary approach, thus facilitating holistic care. They also assess the process until the patient is discontinued or discharged. The physical assessment therefore makes the foundations upon which planning of care is derived from. However, in daily practice, challenges have been identified while planning for adequate care of patients with different clinical manifestations (Jordan & Moore, 2019).

2.5.2.2 Indications for Enteral Nutrition

Enteral nutrition care is practiced in patients who are unable to receive adequate amounts of feeds due to disease process. Inadequate intake on the other hand leads to

malnutrition which manifests with weight loss, and delayed healing process. This happens mostly in patients who have impaired swallowing, cancers that cause difficulty in swallowing and patients who cannot safely use oral route or are on mechanical ventilation. The enteral feeding tube will then be placed depending on the diagnosis, size of tube required, duration of feeding and the ability of the patient to digest the feeds (Marengo & Megan, 2018).

2.5.2.3 Contraindications of Enteral Nutrition

Use of enteral nutrition is sometimes not applicable to all patients presenting with altered nutrition. They may not be used in patients who could be at risk of severe complications. These include; absence of peristalsis, gastrointestinal obstruction and when the gut cannot be accessed as in burns and severe face trauma or surgery. It also applies as ethical consideration where support nutrition is declined by patient or family especially in terminally ill patients (Ginger & Stacy, 2016).

These contraindications can be divided into two sections: absolute contraindication and relative contraindication. In absolute contraindication, it simply means the procedure should be avoided as much as possible because it can be life threatening. It happens in severe face trauma, ear/nose/ throat surgeries and in severe congenital birth defects of the GIT. Relative contraindication means the procedure should be used with a lot of caution because it can lead to an adverse event. They include use of enteral tube in patients with bleeding disorders, narrowing of the oesophagus and alkaline ingestion (Ginger & Stacy, 2016).

Patients and families need to be fully informed of risks as well as benefits before a feeding tube is placed. Nurses should also evaluate a patient's medical history to

assess his or her individual risks and determine if there is any contraindication or reasons against having this procedure (Mula, 2014).

This confirms the fact that aggressive nutritional feeding is not always the option. Patients should be assessed separately and appropriate care initiated. Timing of feeding and family wishes should be given priority. Potential benefits should be considered against potential complications. Therefore, enteral nutrition should be considered as a therapeutic intervention and should be planned adequately. The nutrition assessment helps the nurses to have goals to achieve and be able to do an objective evaluation of care (Suzie F., Suzie D., Oragon, Katja, Nocola, Amanda and Nazy, 2018).

Presence of contraindication of enteral nutrition enables the service provider to fine tune patient assessment skills and improves patient safety. This in turn promotes the quality of care in health institutions providing enteral nutrition, (White and Linsey, 2014).

2.5.2.4 Complications of Enteral Nutrition

During enteral nutrition, close monitoring is necessary. This enables the service provider to efficiently monitor the success or complications related to the procedure and make necessary adjustments. The assessment is based on patient needs in relation to the diagnosis, presentation and the duration for feeding. This is done in line with the hospital policies and competence of the nutrition provider, (Mula, 2014).

Complications related to enteral nutrition is affected by the efficiency of the gastrointestinal tract. This occurs when the smooth muscles lining the GI tract are

compromised due to inflammation, electrolyte imbalance, sepsis, increased intracranial pressure and use of opioids (Ginger & Stacy, 2016).

Despite enteral nutrition being safe and cost effective, it can be associated with multiple complications. These complications can be classified as gastrointestinal, mechanical and metabolic. They include aspiration, tube dislodgement, fluid imbalance, re-feeding syndrome and infection. They can lead to a very severe condition and even death (Blumestein, Shastri & Stein, 2014).

Feeding intolerance is a more severe complication where a patient manifests with vomiting, high gastric residual volume, diarrhea, abdominal pains and gastrointestinal bleeding. It can lead to poor outcomes in c patients and even death. This implies that nurses providing enteral nutrition should make an objective assessment of the patient at all times and monitor progress. Sedated patients, those on mechanical ventilation and those with altered mental status may not verbalize their symptoms, hence the provider should anticipate and manage these complications at the right time. This facilitates trust, competence and professionalism (Lei, Wang, Ting, Yang, Liang & Jing-Ci, 2017).

2.5.2.5 Age of the Patient

Enteral nutrition in old age is associated with several challenges. These challenges can be witnessed right from patient assessment, during tube placement, at feeding and at the time of evaluation of care. While performing EN, nurses therefore need to act to the best interest of the patient as this will potentiate positive outcomes (Chauhan, Varma, Dani, Fertleman & Kuizia, 2021).

Old age affects all body systems in terms of function and response, leading to a slowdown of physiological processes. Aging slows down digestion and peristalsis and this will delay gastric emptying. In addition to presence of two or more condition and administration of multiple drugs, complications can be more frequent with worse outcomes (Huntsberry-Lett Ashley, 2021).

Aging slows down swallowing and elimination of feeds. This is associated with altered nervous system, stroke and mechanical blockage. This increases the risk for constipation, aspiration and delayed digestion. It can lead to serious complications and delayed recovery, (Chauhan, Varma, Dani, Fertleman & Kuizia, 2021).

2.5.2.6 Gastric Motility Disorders

Gastric motility disorders refer to uncoordinated and unexpected movements in the gastrointestinal tract. Intestinal contractions can be slowed down or sometimes paralysed. At the same time, there can be increased movements which can lead to altered absorption of nutrients. The causes can be of endogenous origin or can be as a result of exogeneous factors (Manabat & Casir 2020).

The causes of these disorders can be of hormonal origin or a problem with the nervous system. These alterations cause uncoordinated gastric movements. Coordination of gastric and intestinal movements lead to the smooth movement of feeds in line with stages of digestion, (Manabat & Casir 2020).

Gastric motility disorders in patients is associated with pre-existing disease conditions like muscle weakness, diabetes mellitus, pancreatitis and surgery. Electrolyte imbalance and drugs like sedatives and opioids are often the victims, (Yasud, *et al*, 2021). These disorders can affect a specific area or it can involve the

entire gut. They can be classified as upper GI disorders and lower GI disorders. The manifestation will therefore depend on the magnitude of damage. The symptoms may include abdominal pains, vomiting and diarrhoea (Farsi, *et al*, 2020).

Delayed gastric emptying (DGE) is more frequent in the elderly and in patients with spinal cord injury. It is common in trauma and patients with chronic illnesses. It often leads to food intolerance and inadequate nutrition, (Farsi *et al*, 2020).

GI dysmotility may lead to a variety of GI symptoms that may cause complications and the outcome will be inadequate nutrition. This can cause an obstruction to adequate nutrition administration, and lead to discontinuation of feeding (Krasaelap, Kovacil, & Goday 2019).

2.5.2.7 High Gastric Residual Volume

Gastric residual volume is the amount feeds that remain unabsorbed after a specified duration of feeding. High gastric residual volume is associated with delayed gastric emptying related to factors like sedation, reduced metabolism and reduced movement. Aspirating less than 500mls of feeds is considered safe and feeding should not be stopped, (Nickson Chris, 2020). It is a way of monitoring feeding intolerance so that more complications can be prevented, (Yasuda *et al*, 2021).

High gastric residual volume means that there is delayed absorption. Therefore, if more feeds are administered, then there will be increased pressure in the stomach which will in turn predispose the patient to aspiration and circulatory failure, (Yasuda *et al*, 2021). Interventions associated with high GRV, like delaying feeding and discarding the gastric contents can lead to inadequate nutrition which is

associated with poor patient outcomes (Chan, 2019). Thus, high GRVs is a confounding factor in Enteral nutrition administration (Atias, 2020).

Close monitoring of patients is crucial so that complications can be minimized and to ensure adequate nutrition is provided. The frequency of monitoring is determined by the clinical condition of the patient, the hospital policy and the expertise of the service provider, (Krasaelap, Kovacil, & Goday 2019).

2.5.2.8 Effect of Co- morbidity in Enteral Nutrition

The co-morbid conditions mostly seen in Enteral nutrition among critically ill patients may influence the type and intensity of treatment options and outcomes, Co-morbidities have significant impact on the clinical course, complications and outcomes in the ICU (Simpson, Puxty, & McLoone, 2021).

Patients with co- morbidity and are on tube feeding have complex health care needs, and have many challenges, meaning that they require an intensive assessment and planning in order to balance the conflicting priorities and improve the overall well-being of the patient (Moffat & Mercer, 2015).

In illnesses, patients can manifest with multiple conditions that lead to conflicting interventions. This magnifies the magnitude of care and can influence health outcomes. This needs different management strategies that are in line with the clinical manifestation of the multiple conditions. Indications and contraindications of every action should be taken into account, failure of which can lead to complications and even death (Atias, 2020).

2.5.2.9 Ethical Issues in Enteral Nutrition

The International Council of Nurses (ICN) Code of Ethics (2012) asserts that respect for human rights is of much significance. It promotes a good relationship between nurses and patients. This might extend to the families and even the community. Treating human beings correctly promotes a lasting relationship and reduces complications that arise from decision making.

Enteral nutrition is a medical treatment which the patient and the family can accept or decline. At the same time, enteral nutrition has a legal implication which calls for proper understanding before implementation. It is always safe to remember that informed consent should be factored in any nursing intervention (Mula, 2014).

While managing patients on EN, nurses should apply appropriate knowledge and skill that is recommended at that particular moment and should be in line with psychological and social state of the patient. Nurses who provide Enteral nutrition should therefore recognize and treat each individual differently. This helps to enrich lives of patients and our own lives as well. Nurses should avoid making assumptions and should acknowledge diversity of patients by involving them in making informed choices and be non-judgemental, (Nursing and midwifery Council of London, 2015).

Before nurses make a decision to initiate enteral nutrition, thorough assessment should be done to determine whether the intervention will be of benefit to the patient or not. The benefits should outweigh the risks and this should be communicated to the patient, (Nigel & McQueen, 2015).

Ethical issues like living wills and advance directives associated with older generation can influence enteral nutrition practice. These legal directives target

decision to initiate, delay or withhold feeding. Life prolonging interventions can be accepted or declined according to the wishes of the patient or family. These must be taken into account and be well documented. However, these wishes can conflict with the goals of care. This means that nurses should be conscious and well informed about the outcomes, (Schneider Stephanie ,2015).

2.5.2.10 Severity of Illness

Nutritional support in the acutely ill is a complex subject and it poses a clinical challenge. This means that enteral nutrition in severely ill patient should be addressed with caution and needs more consultation at all times (Preiser *et al*, 2015).

There is a significant association between severity of illness and timing of enteral feeding initiation. In more severe illness, early feeding is associated with improved nutritional outcomes. However, early introduction of tube feeding in severely ill patients is associated with more feeding complications and compared to late feeding. This makes clinical understanding and expected outcome more important. Despite the benefits associated with enteral nutrition, its initiation in patients with hemodynamic failure is controversial since it may trigger intestinal ischemia, (Lasierra *et al*, 2016).

2.5.3 Health Facility Factors Influencing Management of Enteral Nutrition

2.5.3.1 Technology and Innovations in Enteral Nutrition

Over the years, use of enteral nutrition has increased tremendously. This is accompanied by advancement in technology that has witnessed better equipments and options for EN, improved infusion systems, patient specific diets, radiological and endoscopic procedures. The result has been better patient outcomes and improved quality of care (O’Leary-Lelley & Bawel-Brinkley, 2017).

Advancements in tube feeding involves the presence of radio-sensitive feeding tubes that are more flexible, use of tube that can be inserted from the nasal opening to the jejunum, and by use of percutaneous endoscopic gastrostomy (PEG). This can be inserted by the help of radiological or ultrasound guided equipments. There are varieties of nutritional formula that can be administered through feeding bags and feeding pumps. This makes enteral nutrition a safe and cost-effective intervention, (White & Linsey, 2014).

Technology makes enteral nutrition measurable and achievable. This is made possible by using modern equipments that have been tested and proved to comply with the internationally approved guidelines. This necessitates that nurses be technology-sensitive and be innovative. The end result is better client satisfaction, reduction in cost of care, reduced length of stay and reduced mortality, (Singer & Elia, 2019). Use of complex tools and constantly changing updates on nutrition, may be a challenge to care providers who cannot cope with technology for they may lose sight of basic care requirements, (O’Leary-Lelley & Bawel-Brinkley, 2017).

2.5.3.2 Formulation of Protocols and Policies on Enteral Nutrition

Without well-coordinated and complimentary efforts of different health care workers, patient outcomes may be poor, even if individual disciplines excel. Everybody should therefore focus on excellence. The management of a health institution should identify which members of staff are required to undertake various aspects of feeding and management of naso-gastric feeding tubes. They should monitor standards of practice and facilitate audit of naso-gastric feeding as agreed, ensure training and assessment of competence is undertaken and action plans formulated across the clinical area. Development and application of nursing

standards are an important part of protecting the public and also leads to achieving quality nursing practice outcome. They convey professional standing and assist in defining practice and behavior for regulation purposes. Adherence to policy is critical because patient safety could be compromised when procedures being used in hospitals vary (Cashin, *et al.*,2017).

2.6 Summary of Literature Review and Knowledge Gap

Enteral Nutrition is an essential aspect in terms of disease management and nursing care in the hospital setting. It plays a big role in minimizing complications and promotes recovery from illness. Administering enteral nutrition correctly and adequately may positively affect patients' outcome by reducing incidences of infectious complications, reduces duration of hospital stay in hospital and lower risk of mortality, (Jordan & Moore, 2019).

The practice of enteral nutrition is implemented by nurses, who are the main facilitators in identifying nutritional problems and ensuring that nutrition as a therapeutic intervention is successful. During the enteral nutrition intervention, nurses should therefore be knowledgeable, have adequate skills and should adhere to the recommended guidelines (American Nurses Association, 2013).

However, despite nurses being key facilitators of enteral nutrition, their interventions have been associated with gaps that lead to inadequate delivery of feeds which finally leads to poor patient outcomes, (Muhamad, *et al*, 2018). Inappropriate use of guidelines has led to adverse outcomes which have been associated with prolonged stay in hospital, increased cost of care and even mortality, (Meshal *et al* 2018). Use of guidelines minimizes guess work in nursing. It also reduces variability in enteral nutrition, (Fischer *et al*, 2016).

While planning for enteral nutrition, all nurses must do a comprehensive patient assessment so as to get adequate information. This is so because patients come with varied clinical manifestations. Factors that should be considered include the age of the patient, co morbidities, severity of illness and gastric motility disorders. These factors influence the management of enteral nutrition right from the planning phase (Chauhan *et al*, 2021).

The institution should also align their target towards providing the best care in enteral nutrition by providing a conducive environment for both nurses and patients, (American Nurses Association, 2013). Current trends dictate that health institutions should embrace technology and formulate universal guidelines targeting quality enteral nutrition practice. This will facilitate better patient outcomes and reduce the cost of care (Singer & Elia, 2019).

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Overview

This chapter focused on the methodology that was applied in achieving the objectives of the study and the time available. It involved the research design, study area, population of the study, sample size, sampling techniques, and instruments for data collection, validity of the instruments, reliability of the instruments, administration of the instruments, method of data analysis and presentation. The study aimed at evaluating enteral tube feeding practices among nurses.

3.2 Research Design

The study employed a cross-sectional, analytical research design, using both quantitative and qualitative approaches. Quantitative data deals with numbers while qualitative is descriptive, using words and meanings (Wang & Cheng, 2020). After collecting descriptive data, the researcher finds the relationship between variables and how they influence one another. It aims at establishing why a phenomenon is happening, (Sebunje, 2015).

3.3 Study Area

The study was carried out in Kisumu County which is found in western Kenya region. Kisumu County is among the 45 Counties of Kenya where studies on Enteral nutrition have not been done. Studies on Enteral nutrition have only been done in Nairobi and Uasin Gishu Counties. To get the County, purposeful sampling was used.

Four hospitals were sampled to participate in the study. The four hospitals are all referral hospitals that provide enteral tube feeding. Jaramogi Oginga Odinga

Teaching and Referral Hospital, is situated about three kilometres from the city center, along Kisumu –Kakamega highway. It is a government facility.

Kisumu County Referral Hospital is found within the city centre, and is also a government institution that also acts as a learning institution for students. Avenue Hospital is a private referral hospital found along the Kisumu-Kakamega road, about two and half kilometres from the city centre. Aga Khan Hospital is also a private referral hospital within the city centre.

Table 3.1 Average number of patients on EN per facility (2017 Hospital Nursing Reports)

	Average annual Total Number of patients on EN in the hospital	Average annual Enteral tube feeding in Critical Care	Percentage of patients on EN In critical Care
JOOTRH	1,570	157	10%
Kisumu County Referral Hosp.	1,015	100	9.8%
Aga Khan Hosp.	331	25	7.6%
Avenue Hospital	270	30	11.1%

3.4 Study Population

A purposive sample included all the nurses caring for patients who were on EN in Kisumu County. A study population is any well-defined set of units of analysis that is determined largely by the research questions, (Christopher Johnson, 2016). For the study, these included all the nurses caring for patients who were on enteral tube feeding, in Kisumu County. They were certified nurses, (certificate, diploma, graduate and post graduate).

Table 3.2 Breakdown of nurses in the four health facilities

	Nurses who practice tube feeding per facility	Sample of nurses to participate per facility
JOOTRH	75	49
Kisumu County Hospital	34	22
Aga Khan Hospital	60	39
Avenue Hospital	38	25
TOTAL	207	135

3.5 Inclusion Criteria and Exclusion Criteria

3.5.1 Inclusion Criteria

- Qualified nurses providing EN
- These nurses have provided EN for not less than six months
- Gave consent and were available during data collection period

3.5.2 Exclusion criteria

- Those who met the criteria but were not available during the period of the study.

3.6 Sampling Techniques and Sample Size Determination

3.6.1 Sample Size Determination

A smaller number was calculated to represent the population. Out of the population, 135 nurses were used as the sample size. The sample size was calculated using the Taro Yamane Scientific formula, (Uniproject materials, 2016),

Where

N is the population (total number of nurses in the selected departments), found

to be 207. 1 is the constant

e is the degree of error expected (0.05)

n is the sample size

$$n = 207 / 1 + 207(0.05)^2$$

$$n = 207 / 1 + (0.0025)$$

$$= 135$$

To get the study participants from each hospital, a formula was used since not everybody may get a chance to participate. The formula was; sample size divided by study population and then multiplied by the number of nurses in the hospital, who provide Enteral nutrition, i.e. sample size divide by total population, and then multiplied by the number of nurses in the associated departments in each hospital.

JOOTRH is $136/207$ multiplied by 75 = 49.28 = 49 nurses

KCH is $136/207$ multiplied by 34 = 22.34 = 22 nurses

Aga khan is $136/207$ multiplied by 60 = 39.42 = 39 nurses

Avenue is $136/207$ multiplied by 38 = 24.97 = 25 nurses

Total= 135 Nurses

A total of 12 key informants were also sampled to participate in the study.

3.6.2 Sampling Procedures

As the researcher attempted to answer study questions, participants and hospitals were sampled because it was not possible to study the whole population. The study employed both probability and non-probability sampling techniques. In identifying the hospitals, only those that practice Enteral nutrition were identified, and among these are; Jaramogi Oginga Odinga Teaching and referral Hospital, Aga Khan

Hospital Kisumu, Kisumu Specialists Hospital, Nightingale Hospital, Nyabondo Mission Hospital, Ahero Sub County Hospital, Muhoroni Sub County Hospital, Nyakach Sub County Hospital, Kisumu County Referral Hospital and Avenue Hospital Kisumu. These are level 4 and level 5 hospitals.

To select the hospitals that participated in the study, random sampling was used, and four hospitals were selected namely; Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH), Kisumu County Referral Hospital (KCH), the Aga Khan Hospital Kisumu and Avenue Hospital Kisumu.

Purposive sampling was used in identifying the wards. The wards were selected according to departments and the services they provide. Only those providing EN were selected.

Systematic sampling was applied when identifying study participants in each department/ward. Here the researcher had a complete list of all the nurses working in the departments as per the duty roster. Then the participants were systematically identified from the rota. In this technique, each member of the population had an equal chance of participating in the study.

Key informants were selected using purposive sampling. After permission was sought from the administration, the hospital nurse manager was requested to provide a list of unit in-charges working in the identified departments. The unit managers were the key informants to give the required information. This is a non-probability sample that is selected in line with study goals and characteristics of the population being studied. It involved interviewing people who are conscious of the phenomenon

being investigated. Only nurses who provide administrative duties and are responsible in the provision of ETF were allowed to participate in the study.

3.7 Data Collection Instruments

The instruments were developed by the researcher with the purpose of standardizing the process of data collection in the four facilities that participated in the study. The researcher used three tools to collect data in line with the study objectives. These included structured questionnaire (Appendix IV), interview guide (Appendix VI), and observation check list (Appendix V).

3.7.1 Structured Questionnaire

A questionnaire is a tool containing systematically organized questions that participants are to answer in line with study objectives. They should be simple and should relate to the current state of affairs. Participants are to understand it well before responding, (Cheung Adam, 2014).

In the study, data was collected through a carefully designed questionnaire that was administered to study respondents by the research assistants. The questionnaire contained different sections that will include: section A, socio- demographic information, section, section B, patient factors, section C, nurse related factors, section D, knowledge assessment, section E, clinical practice, and section F, health facility related factors.

The structured questionnaire was designed to gather information on enteral tube feeding practice as reported by nurses. The researcher designed a questionnaire since there was no relevant questionnaire with similar methodologies that could be applicable.

3.7.2 Observation Check List

An observation check list contains screened items that could be observed in a given procedure or behaviour in a subject of study. This was a chart designed in regard to the Nursing Council of Kenya Practice Manual, (2021). An observation was made as to how each participant followed the steps of tube feeding as outlined in the practice manual. Each item was scored as either performed or not performed. The checklist allowed the researcher to get information that could not be captured in the questionnaire, hence improving the quality of data collected.

3.7.3 Interview Schedule

It contained open ended questions that were administered after the research assistants had explained the aim of the interview. The interview process was also explained and confidentiality assured. Socio-demographic information was captured and contacts. This involved face to face interview with key informants and it targeted nurses who play administrative role in the provision of ETF. They provided key information on the institution related factors that affect nurses' competency on enteral tube feeding. It was meant to collect information on the managerial responsibilities related to enteral tube feeding. The informants were unit in charges and ward nurse manager. Purposive sampling was applied in selecting them. They were selected as follows;

JOOTRH= 3 informants

Kisumu County hospital= 3 informants

Aga Khan Hospital = 3 informants

Avenue Hospital = 3 informants

TOTAL = 12 key informants

3.8 Validity of the Data Collection Instruments

To ensure validity, the researcher incorporated key items from the literature review and linked them to the specific objectives. The questionnaire was designed and reviewed by the two supervisors. Senior nurses from the four facilities were given a chance to review the questionnaires and gave their inputs where necessary. Proposed adjustments were implemented and the tools were aligned to the nursing council manual. All the data collection tools were tuned to the expectations captured in the conceptual framework. The checklist was confirmed by nurse managers in reference to the current recommendations on Enteral nutrition. The items on the data collection tools were clear and easy to understand and therefore enabled the researcher to draw relevant conclusions.

3.9 Reliability of the Instruments

Reliability is the extent to which the outcomes are consistent when the exercise is repeated more than once, meaning it is the repeatability or replication of research findings, (Kobai, 2019).

After the validation of data collection tools, their practicability was established by subjecting them to a pilot study, where twelve participants were involved. This was used to help measure consistency of the instruments in identifying targeted responses of the participants that can be of help in answering research questions. A pilot study was done to test the data collection instruments. It was noted that two questions had similar responses, so one had to be deleted. Timing was also done, and it took approximately twenty minutes to fill the questionnaire, which was in line with the targeted time. The interview guide was noted to have too many questions, so they were reduced from seven to five, to avoid repetition. It was noted that availability

and use of guidelines on Enteral nutrition was inconsistent, hence impacting on nurses' competence. The influence of patient factors like co morbidity, were not given enough emphasis. The facility did not have education programs specific to Enteral nutrition.

On the eve of data collection, the research instruments were pre-tested on twelve respondents, three from each hospital, before the actual data collection. They were analyzed and found to relevant to answer the research questions.

3.10 Data Collection Procedures

The process of data collection started in August 2019 and ended in June 2020. This took long time because it happened during the Covid 19 pandemic when most of the processes were stalled.

Research assistants were identified, two from each institution. These were qualified nurses from government approved nursing schools. The research assistants were required to have good communication skills, be well oriented to hospital set up and be able to communicate in both English and Kiswahili. They were trained for two days on the major aims of the study, how to approach participants professionally, how to maintain privacy, how to assess nursing skills and the presentation of the questionnaire. Then the questionnaire was administered by the research assistants to the respondents during the official hours.

Interview of key informants was done personally by the principal researcher during the official working hours. Key informant respondents were nursing officers in charges and nurses doing administrative duties.

Observation check list was filled a week after the questionnaires had been all filled. This was meant to reduce the Hawthorne Effect. The Hawthorne Effect is the inclination of study participants to change or modify their behaviour simply because they are being observed (Estevez, 2020).

Supervision and monitoring were facilitated throughout the data collection period. The researcher ensured that appropriate tools were applied and consistency in data collection maintained. This helped in collecting quality data.

3.11 Data Management

During the data collection, identification numbers were given to each participant, thus avoiding their names and personal identity. The institutions were also given specific numbers for purposes of identification.

When the process of data collection was completed, the duly filled questionnaires, observation check lists, and interviewed data were checked, labelled as per facility and stored, awaiting the next stage.

The completed data collection instruments were transferred from the field to the custody of the researcher where access was minimized.

Data cleaning was done to check for errors incurred during data entry to improve the quality of data.

3.12 Data Analysis

In objective one and two, data was collected quantitatively. In objective three data was collected both quantitatively and qualitatively. Data was then coded and entered in statistical computer package; SPSS version 27. Data was analysed using various techniques depending on the variables. Descriptive statistics was used to obtain

frequency, mean and standard deviation. Nurse's effectiveness in managing EN was evaluated by adding up all the scores on the nine (9) items that were observed and scored '1' if the procedure was performed or '0' if not performed. The overall score was converted into percent score. A one sample t-test was conducted to test whether a sample mean effectiveness score (from a normally distributed interval variable) significantly differs from a hypothesized value of 50%. A participant with an overall score of at least 80% and above was considered as competent in clinical management of a critically ill patient on ETF. Bivariate analysis was conducted to assess the relationship between independent variables (socio-demographic, knowledge, health-facility and patient related factors) and the dependent variable (effectiveness in the management of ETF) with the outcome being effective (score of $\geq 80\%$) or not effective ($< 80\%$). Odds ratios with 95% confidence interval were calculated to test the significance of association between each independent and the dependent variable. P value less than 0.05 was considered statistically significant.

Qualitative data was managed by use of thematic analysis approach where data was organized into themes in relation to the study objectives.

3.13 Ethical Consideration

Permission was sought from Institutional Research and Ethics Committee (IREC): Appendix, VI, Masinde Muliro University of Science and Technology (MMUST): Appendix V and NACOSTI (Appendix VII). Administrative permission was sought from the health facilities where the study was carried out.

Respect for persons was maintained by use of informed consent (Appendix I), participants were allowed to voluntarily participate in the study without coercion.

Privacy was also maintained. They were informed about the aim of the study, the processes, their responsibility, risks and benefits of the study.

The questionnaires were administered right at the work place, and were given enough time so that they could fill them at their free time. The tools were also collected at an agreed time.

Beneficence- do no harm, was adhered to. The researcher promoted and maintained the welfare of the study participants. Possible benefits were maximized. Intentional harm was avoided and potential harm was minimized. The researcher ensured that participants benefited from the study.

Participants were made to understand that the benefits of the study could apply to all nurses and not for the study participants only. The study could improve the quality of nursing care on tube feeding and at the same time benefit patients by receiving the right and timely service.

Confidentiality was maintained throughout the study. Anonymity was observed. No information was shared during the study. Identity of the subjects would not be linked with personal responses. Justice prevailed as study participants were given a chance to withdraw from the study at any stage in the research process. The views of participants were respected.

The researcher did not allow deceptive practices to be employed during the time of research process. Information was communicated as it is without any alteration.

CHAPTER FOUR

RESULTS

4.1 Overview

This chapter gives a summary of the study findings on nurses' factors influencing management of enteral nutrition, patient factors influencing management of enteral nutrition, and health facility factors influencing management of enteral nutrition.

4.2 Response Rate

Data was collected from October 2019 to October 2020. A total of 88 nurses of different cadres took part in the study out of the 135 that were sampled giving a response rate of 65.2%. Data was collected during the peak period of COVID-19, making it difficult to reach 100% of the sample. Strict rules were followed during this period like screening for Covid 19 in each visit, controlled movement, and limited contact with study participants.

4.3 Nurses' Factors Influencing Management of Enteral Nutrition

This was analysed under four sub topics namely; socio demographic characteristics, nurses' knowledge, use of clinical guidelines, clinical practices and effective management of Enteral nutrition.

4.3.1 Socio-demographic Characteristics of Respondents

This was analysed as information of participants, work station of participants and the trainings undertaken.

4.3.1.1 Socio-demographic characteristics of the Participants

As seen in table 4.1, most of the participants were female (68.2%) compared to 31.8% males. An equal proportion were aged between the ages of 20 – 29 and 30 –

39 years (36.4%) with overall mean age of 34.2 and a standard deviation of ± 8.4 ranging from 20 to 59 years. Two-thirds (67.1%) had attained diploma level of nursing education with less than a third (31.8%) having had undergraduate degrees.

Table 4.1: Respondents' socio-demographic characteristics of respondents

Variables	Categories	N	%
Gender	Male	28	31.8
	Female	60	68.2
Age groups in years	20 – 29	32	36.4
	30 – 39	32	36.4
	40 – 49	17	19.3
	≥ 50	7	7.9
Mean age $\pm$ SD (Range) in years		34.2 $\pm$ 8.4 (20.0 – 59.0)	
Highest level of training	Certificate	1	1.1
	Diploma	59	67.1
	Degree	28	31.8
Work station	Medical	44	50.0
	Surgical	25	28.4
	ICU	19	21.6
Length of time worked in unit in years	0 – 2	53	60.2
	3 – 5	18	20.4
	> 5	17	19.3
Name of health facility	Aga Khan Hospital	29	32.9
	Jaramogi Oginga Odinga Teaching and Referral Hospital (JOOTRH)	32	36.4
	Kisumu County Hospital	13	14.8
	Avenue Hospital	14	15.9
Undergone tube feeding in training school	Yes	87	98.9
	No	1	1.1
Undergone any other ETF training/refresher course	Yes	47	53.4
	No	41	46.6
Main source of knowledge on enteral nutrition practice	Nursing School	62	70.4
	In-service training	14	15.9
	Journals	3	3.4

Unit guidelines and protocols	9	10.2
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4.3.1.2 Bivariate Analysis on Socio-demographic Characteristics and Management of Enteral Nutrition

Table 4.2 shows the findings on the relationship between nurses' socio-demographic characteristics and effective management of EN. Although none of the three independent variables had any statistically significant association with management of EN, nurses who were younger (20 – 29 years of age) were up to 7.7 more likely to have effectively managed EN (OR: 2.2; 95% CI: 0.6 – 7.7; $p = 0.21$).

Table 4.2 Bivariate analysis on socio-demographic characteristics and management of EN

Independent variables	N	ETF Performance		OR	95% CI	P value
		≥ 80% Score	< 80% Score			
Gender						
Male	28	82.1	17.9	0.7	0.2 – 2.4	0.75
Female	60	86.7	13.3			
Age group in years						
20 – 29	41	90.2	9.8	2.2	0.6 – 7.7	0.21
> 30	47	80.9	19.1			
Level of education						
Certificate / Diploma	60	85.0	15.0	0.9	0.3 – 3.4	0.93
Degree	28	85.7	14.3			

4.4.2 Nurses' Knowledge on Enteral Nutrition

This section was analysed from two perspectives namely; the general knowledge of the participants and the relationship between general knowledge and effective management of Enteral nutrition.

4.3.2.1 General Knowledge on Enteral Nutrition

As shown in **Table 4.3** on nurses' knowledge on EN, majority (85.2%) correctly cited enteral tube feeding as the recommended route of feeding patient who cannot

swallow. Similarly, more than three-quarters (86.4%) were knowledgeable on appropriate technique for administering enteral tube formula which is through a continuous feeding pump, intermittent gravity drip and by use of a large bore syringe. Most of the respondents (92%) rightly said that financial background is an irrelevant point to consider during initial assessment of patient for EN. Slightly more than half (54.6%) were aware that complications of EN are classified as mechanical, gastrointestinal and metabolic, and that adverse is not considered as a complication of EN. Majority (98.9%) were correct in stating the reasons of elevating head of bed while feeding through EN as to avoid aspiration. 62.5% of the participants indicated that they check for bubbles in the tube by use of water and cup.

4.3.2.2 Bivariate Analysis on Nurses' Knowledge on EN and Management of EN

Table 4.3 presents results on Bivariate analysis on nurses' knowledge and effective management of EN. Nurses who would not consider patient's financial background during initial assessment of patient for ETF were up to 14.8 times more likely to have effectively managed EN as opposed to those who did not consider suitability of tube insertion / equipment to be used (OR: 2.5; 95% CI: 0.4 – 14.8; $p = 0.28$). Knowledge on recommended route of ETF, wrong classification of ETF complication and recommended method of confirming tube placement did not yield any statistically significant association with nurses' effectiveness in managing EN.

Table 4.3 Bivariate analysis on nurses' knowledge on EN and management of EN

Independent variables	N	ETF Performance		OR	95% CI	P value
		≥ 80% Score	< 80% Score			
Recommended route of feeding						
ETF	75	84.0	16.0	0.4	0.1 – 3.7	0.68
Parenteral / Normal oral intake	13	92.3	7.7			
What should not be considered during initial assessment of patient for ETF						
Financial background	81	86.4	13.6	2.5	0.4 – 14.8	0.28
Suitability of tube insertion / Equipment to be used	7	71.4	28.6			
Wrong classification of ETF complication						
Adverse	48	83.3	16.7	0.7	0.2 – 2.4	0.58
Mechanical / Gastrointestinal / Metabolic	40	87.5	12.5			
Recommended method of confirming tube placement						
Checking for bubbles in the tube by water and cup	48	83.3	16.7	0.7	0.2 – 2.4	0.58
X-ray of the chest / Checking for pH of gastric content	40	87.5	12.5			

4.3.3 Enteral Nutrition Guidelines at the Workplace

4.3.3.1 Clinical Application of the Guidelines

Table 4.4 shows study findings on nurses' use of enteral nutrition guidelines at the workplace. Almost ninety percent (89.8%) of the study participants reported adhering to guidelines of EN while performing the procedure. More than half (54.6%) had used such guideline / protocol on EN one month prior to the study.

However, less than a third (27.3%) had had a chance to participate in technical or scientific education on EN.

Table 4.4 Nurses' use of ETF guidelines at the workplace

Variable	Categories	N	%
Adheres to guidelines of EN while performing the procedure	Yes	79	89.8
	No	9	10.2
The last time I used guideline / protocol on EN	One month ago	48	54.6
	Six months ago	23	26.1
	> 1 year ago	12	13.6
	Never used before	5	5.7
Had a chance to participate in technical or scientific education on EN	Yes	24	27.3
	No	64	72.7

4.3.3.2 Bivariate Analysis on Nurses' Use of EN Guidelines at Workplace and Management of EN

Table 4.5 shows study findings on Bivariate analysis results on nurses' use of EN guidelines at workplace and effective management of EN. Results indicate that nurses who used a guideline one month ago were up to 2.4 times more likely to have effectively managed EN in contrast to those that had used the guidelines more than one month prior to the study although the results were not statistically significant (OR: 0.7; 95% CI: 0.2 – 2.4; $p = 0.58$).

Table 4.5 Bivariate analysis on nurses' use of EN guidelines at workplace and management of EN

Independent variables	N	EN Performance		OR	95% CI	P value
		≥ 80% Score	< 80% Score			
Adheres to guidelines of EN while performing the procedure						
Yes	79	84.8	15.2	0.7	0.1 – 6.1	1.00
No	9	88.9	11.1			
Last time I used a guideline on EN						
One month ago	48	83.3	16.7	0.7	0.2 – 2.4	0.58
More than one month ago	40	87.5	12.5			
Guidelines are well displayed for easy reading						
Yes	51	92.2	7.8	3.8	1.1 –	0.03
No	37	75.7	24.3		13.4	
Participated in technical or scientific education on EN						
Yes	24	87.5	12.5	1.3	0.3 – 5.2	1.00
No	64	84.4	15.6			

4.4 Patient Factors Influencing Management of Enteral Nutrition

Table 4.6 shows results on nurse's views on patient factors influencing effective management of Enteral nutrition. Most of the respondents (88.6%) in daily practice had a chance to provide tube feeding to patient with co morbidity. Most of the hospitals where respondents worked in provide guidelines for provision of tube feeding in patients with co morbidity (62.5%). Less than half of the respondents (40.9%) work in units where patients are classified according to age groups with more than half (61.4%) providing ETF for patients of all age groups. Majority (92%) consider severity of illness while designing a nursing care plan on a patient receiving

tube feeding. Nearly three-quarters (73.9%) do not hold the view that gender impacts on planning and patient outcome.

Table 4.6 Nurses' views on patients Factors Influencing Management of Enteral nutrition

Variable	Categories	N	%
In daily practice had a chance to provide tube feeding to patient with comorbid	Yes	78	88.6
	No	10	11.4
The hospital provides guidelines for provision of tube feeding in patients with comorbid	Yes	55	62.5
	No	33	37.5
In unit are patients classified according to age groups	Yes	36	40.9
	No	52	59.1
Age limit of the patients on tube feeding that I nurse	Neonates	3	3.4
	Children below age of 12 years	6	6.8
	Adults	25	28.4
	All age groups	54	61.4
Consideration while designing a nursing care plan on a patient receiving tube feeding	Financial Status	5	5.7
	Severity of illness	81	92.0
	Educational level	2	2.3
View on gender impacting on planning and patient outcome	Yes	23	26.1
	No	65	73.9

4.4.1 Bivariate Analysis on Patient Factors Influencing EN and Management of EN

Results on the relationship between patient factors influencing EN and effective management of EN is presented in **Table 4.7**. None of the independent variables examined had any statistically significant association with the outcome. In spite of the non-significant results, nurses work in hospitals that provide guidelines on ETF in patient with co morbid conditions were up to 7.2 times more likely to have effectively managed EN (OR: 2.2; 95% CI: 0.7 – 7.2; p = 0.19) similar to nurses who

work in units where patients are classified according to age groups who were up to 10.3 more likely to have effectively managed EN (OR: 2.6; 95% CI: 0.7 – 10.3; p = 0.16).

Table 4.7 Bivariate analysis on patient factors and effective management of EN

Independent variables	N	EN Performance		OR	95% CI	P value
		≥ 80% Score	< 80% Score			
Has had a chance to provide tube feeding to a patient with co morbid condition						
Yes	78	85.9	14.1	1.5	0.3 – 8.1	0.62
No	10	80.0	10.0			
Hospital provides guidelines for provision of tube feeding in patients with co morbid condition						
Yes	55	89.1	10.9	2.2	0.7 – 7.2	0.19
No	33	78.8	21.2			
In my unit patients are classified according to age groups						
Yes	36	91.7	8.3	2.6	0.7 – 10.3	0.16
No	52	80.8	19.2			
Age limit for patients I nurse who are on tube feeding						
Adults	25	76.0	24.0	0.39	0.1 – 1.3	0.12
Neonates / Children below 12 years / All age groups	63	88.9	11.1			
Gender can impact on planning and patient outcome						
Yes	23	87.0	13.0	1.2	0.3 – 4.8	0.78
No	65	84.6	15.4			

4.5 Health Facility Factors Influencing Practice of Enteral Nutrition

In this section, the analysis focused on use of technology, formulation and availability of enteral nutrition guidelines.

4.5.1 Use of Technology in Enteral Nutrition

Table 4.8 presents results on health facility factors influencing enteral nutrition practice. Slightly more than half (52.3%) of the nurses interviewed confirmed that enteral nutrition is the recommended method of feeding in patients in their hospital. A smaller proportion (23.9%) use X-ray to confirm feeding tube position in their hospital with 37.5% agreeing that the hospital provides feeding bags for patients on tube feeding. More than half (52.3%) said that their hospital provides pumps that can be used in EN in contrast to 67% who work in hospitals that provide guidelines on tube feeding. However, a smaller proportion of the respondents (58%) agreed that the guidelines are well displayed for easy reading. Less than half (48.9%) work in hospitals that have regular program that check on nurses' implementation of guidelines on EN.

Table 4.8 Use of technology in Enteral Nutrition

Variable	Categories	N	%
Recommended method of feeding in critically ill patients in our hospital	Enteral nutrition	46	52.3
	Parenteral nutrition	42	47.7
We use X-ray to confirm feeding tube position in your hospital	Yes	21	23.9
	No	67	76.1
The hospital provides feeding bags for patients on tube feeding	Yes	33	37.5
	No	55	62.5
The hospital provides pumps that can be used in EN	Yes	46	52.3
	No	42	47.7
The hospital provides guidelines on tube feeding	Yes	59	67.0
	No	29	33.0
The guidelines well displayed for easy reading	Yes	51	58.0
	No	37	42.0
The hospital has regular program check on nurses' implementation of guidelines on EN	Yes	43	48.9
	No	45	51.1

4.5.2 Bivariate Analysis on Use of Technology and Enteral Nutrition Practice

Table 4.9 shows study findings on Bivariate analysis results on health facility-related factors and effective management of EN. Positive association between health-related factors and effective management of EN was found among nurses who work in hospitals that provides feeding that can be used in enteric tube feeding (OR: 4.5; 95% CI: 1.1 – 17.6; $p = 0.02$), hospitals that provide guidelines on tube feeding (OR 4.1; 95% CI: 1.2 – 14.0; $p = 0.02$), health facilities where the guidelines are well displayed for easy reading (OR: 3.8; 95% CI: 1.1 – 13.4; $p = 0.03$), and hospitals that have a regular programme to check on nurses' implementation on EN (OR: 3.8; 95% CI: 1.0 – 15.0; $p = 0.04$). Nurses working in such hospitals had higher odds of being effective in the management of EN.

Table 4.9 Bivariate analysis on health facility factors and effective management of EN

Independent variables	N	EN Performance		OR	95% CI	P value
		≥ 80% Score	< 80% Score			
Recommended method of feeding in critically ill patients in the hospital						
Parenteral nutrition / Oral intake	42	78.6	21.4	0.3	0.1 – 1.2	0.09
Enteral nutrition	46	91.3	8.7			
We use X-ray in our hospital to confirm feeding tube position						
Yes	21	85.7	14.3	1.0	0.3 – 4.2	1.00
No	67	85.1	14.9			
Hospital provides feeding bags for patients on tube feeding						
Yes	33	87.9	12.1	1.4	0.4 – 5.0	0.76
No	55	83.6	16.4			
Hospital provides feeding that can be used in enteric tube feeding						
Yes	46	93.5	6.5	4.5	1.1 –	0.02
No	42	76.2	23.8		17.6	
Hospital provides guidelines on tube feeding						
Yes	59	91.3	8.5	4.1	1.2 –	0.02
No	29	72.4	27.6		14.0	
Guidelines are well displayed for easy reading						
Yes	51	92.2	7.8	3.8	1.1 –	0.03
No	37	75.7	24.3		13.4	
Hospital has a regular programme to check on nurses' implementation on EN						
Yes	43	93.0	7.0	3.8	1.0 –	0.04
No	45	77.8	22.2		15.0	

4.5.3 Work-related Characteristics in Hospitals Concerning Enteral Nutrition

Table 4.10 presents Bivariate analysis results on work-related characteristics and effective management of EN. Two independent variables, namely type of hospital and source of knowledge on EN were statistically significantly related with effective management of EN. Nurses working public hospitals were 70% less likely to have better practice compared with their counterparts in the two private hospitals (OR: 0.3; 95% CI: 0.1 – 1.0; $p = 0.04$). Equally, nurses from the main teaching and referral hospital compared to the rest of the hospitals that were sampled were 70% less likely to have effectively managed EN though the results were marginally statistically significant (OR: 0.3; 95% CI: 0.1 – 1.0; $p = 0.06$). On the other hand, nurses whose source of knowledge on EN was nursing schools were 3.4 more likely to have effectively managed EN than those whose source was in-service, journals or guidelines (OR: 3.4; 95% CI: 1.0 – 11.5; $p = 0.05$).

Table 4.10 Bivariate analysis on work-related characteristics and management of EN

Independent variables	N	EN Performance		OR	95% CI	P value
		≥ 80% Score	< 80% Score			
Where works						
Medical	44	90.9	9.1	2.6	0.7 – 9.1	0.13
Surgical	44	79.6	20.4			
Duration of practice in years						
0 – 2	53	84.9	15.1	0.9	0.3 – 3.1	0.92
≥ 3	35	85.7	14.3			
Hospital						
Teaching & Referral Hospital	32	75.0	25.0	0.3	0.1 – 1.0	0.06
Other hospitals	56	91.1	8.9			
Training in EN						
Yes	47	89.4	10.6	2.0	0.6 – 6.8	0.24
No	41	80.5	19.5			
Type of hospital						
Public Owned	45	77.8	22.2	0.3	0.1 – 1.0	0.04
Private Owned	43	93.0	7.0			
Source of knowledge on EN						
Nursing Schools	62	90.3	9.7	3.4	1.0 – 11.5	0.05
In-service, journals, unit guidelines	26	73.1	26.9			

4.6 Enteral Nutrition Practice as Reported by Key Informants

As observed from the study, all the participants agreed that it is the responsibility of the administration to provide adequate staffs, and resources related to enteral nutrition. They also agreed that it is the responsibility of the administration to provide guidelines and standard operating procedures. Only 25% of the participants noted that the administration should do monitoring and evaluation for tube feeding, and these were from private facilities.

All the participants from the four facilities did not emphasize that staff development is the responsibility of the administration.

Only facility 1 pointed that for proper resource management, resources should be issued per patient. Facility 1 and 4 agreed that proper documentation can contribute to proper resource management.

Facility 1 only noted that frequent stock taking and issuing only what is needed adds to proper resource management.

Guidelines were available and well displayed in facility 1 and 4 (i.e. 25%). In facility 2 and 3 guidelines were not available. Only facility 1 had guidelines on co morbidity. 75% of the respondents reported that nursing education on tube feeding was inadequate. Only facility 1 reported of adequate education programs. However, on job training was common to all facilities.

It was agreed by participants that availability of resources (100%), use of guidelines (25%), and co morbidities (41%), can influence the quality of EN practice. None reported that skilled personnel and use of technology can have an impact on tube feeding practice. Only facility 1 emphasized that co morbidities can influence the quality of EN, while it was less emphasised in facility 2, 3 and 4.

4.7 Management of Enteral Nutrition at the Clinical Area

4.7.1 Clinical Performance on Enteral Nutrition

This marked the climax of Enteral nutrition practice. At this level, the participants were expected to compliment knowledge, skills and use of recommended guidelines while providing Enteral nutrition. Various observations were made and were presented accordingly.

Table 4.11 shows results on nurses' clinical practice regarding EN. More than three-quarters (78.4%) seek consent before feeding a patient on EN. Majority (89.8%) check tube position before every feeding while 79.6% check for gastric residual

volume every 4 hours. Three-quarters (75%) normally flush with room temperature water if feeding formula is not flowing into the tube. Nearly all the respondent before and after feedings (96.6%) keep head of bed elevated at 30° for about 30 minutes. Similarly, majority (94.3%) check for complications related to EN before and after feeding.

Table 4.11 Clinical Performance on Management of Enteral Nutrition

Variable	Categories	N	%
I seek consent before feeding a patient on EN	Yes	69	78.4
	No	19	21.6
Frequency in checking tube position	After insertion only	9	10.2
	Before every feeding	79	89.8
Frequency in checking for gastric residual volume	Every 4 hours	70	79.6
	Every shift	10	11.4
	Daily	6	6.8
	Never checks	2	2.3
What I normally do if feeding formula is not flowing into the tube	Flush tube with room temperature water	66	75.0
	Push with large syringe to unblock tube	14	15.9
	Stop feeding and raise the issue during ward round	8	9.1
What I practice after feeding	Let patients do abdominal exercises to improve digestion	3	3.4
	Keep head of bed elevated at 30° for about 30 minutes	85	96.6
How often I check for complications related to EN	During ward rounds	3	3.4
	During time for report	2	2.3
	Before and after feeding	83	94.3

4.7.2 Conclusions Derived from Clinical Performance on Effective Management of Enteral Nutrition

Effective management of enteral nutrition was measured at the clinical area. Here, knowledge, skill, application of practice guidelines, patient factors and working environment (health facility factors), were all incorporated and put into practice. At this level the enteral nutrition practice was assessed and conclusions derived. The whole process was then quantified into figures and presented in Figure 4.1.

Figure 4.1 shows how nurses performed in managing patients on enteral nutrition.

The findings were derived from **Table 4.11** where participants who performed according to the standard guidelines were compared to those who did not. The scores for each of the six (6) assessed areas were added up and converted to percent scores. Respondents with scores of at least 80% or more were considered as able to effectively manage Enteral nutrition. Results indicate that 85% of the nurses effectively managed Enteral nutrition as compared with 15% who were not.

A one sample t-test was conducted to test whether the sample mean score (from a normally distributed interval variable) significantly differs from a hypothesized value that the mean scores significantly differed from 50%. The mean of effectiveness scores for this particular sample of 88 nurses was 91.7%, which is statistically significantly different from the test value of 50 (44.4% - 100%) ($t = 32.7$; $df = 87$; $p < 0.0001$). Thus, the study participants had a significantly higher mean on their level of effectiveness in clinical management of patients on EN than 50% hypothesized mean.

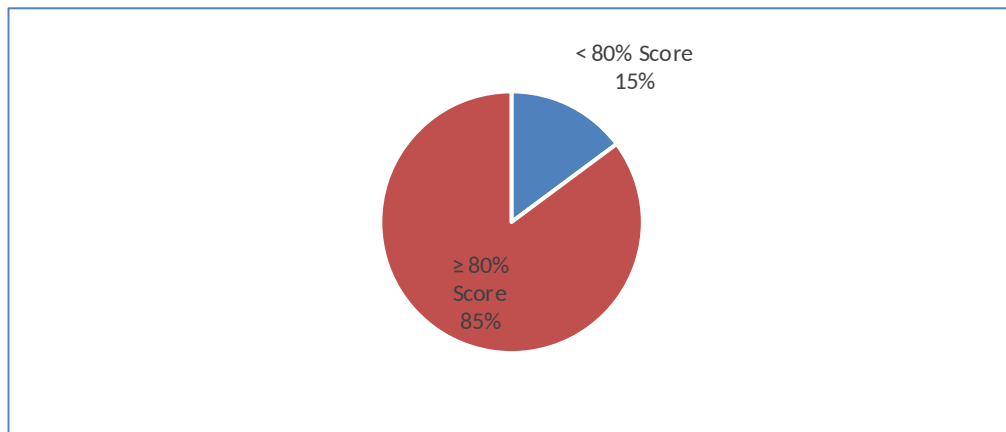


Figure 4.1 Clinical Performance on Enteral Nutrition

CHAPTER FIVE

DISCUSSION

5.1 Overview

In this chapter, results from the study were interpreted and described in relation to literature review. Significance of the findings were outlined and put into context, and unexpected results were explained. Deductions and recommendations were proposed where necessary. The aim of the study was to evaluate factors influencing management of enteral nutrition among nurses in health facilities of Kisumu County.

The guiding objectives are as follows;'

1. To assess nurses' factors influencing management of enteral nutrition.
2. To examine patient factors influencing management of enteral nutrition
3. To determine health facility factors influencing management of enteral nutrition.

5.2 Practice of Enteral Nutrition

In effective management of enteral nutrition, nurses' knowledge, skill, application of practice guidelines, patient factors and working environment (health facility factors) were taken into consideration. The findings yielded significant conclusions. Results indicated that 85% of the participants effectively managed enteral nutrition as compared to 15% who did not. The mean of effectiveness was 91.7% and was statistically significant.

5.3 Nurses' Factors Influencing Management of Enteral Nutrition

This was discussed with much focus on nurses' knowledge and use clinical practice guidelines.

5.3.1 General Knowledge for Participants

General performance on nurses' knowledge was good (80.7%), meaning that the information on EN was well understood. 85% of the study participants scored 80% and above in clinical performance. 40% of the key informants agreed that knowledge level can influence clinical practice of EN. These findings indicate that knowledge level can influence EN practice. However, association between knowledge and clinical assessment did not yield significant findings.

The findings agree with Njuguna (2024), who noted that 65.9% of nurses had adequate level of knowledge on EN. It also agreed with Ata *et al*, (2021), who indicated that 73.6% of the participants had high knowledge on nutritional care.

These findings were not in line with the findings of Maher *et al* , (2023), who found out that 63.3% of the participants were poorly informed on nasogastric tube feeding. It also disagreed with Talal & Gamil, (2020), who found that only 10.9% of the nurses had adequate knowledge on EN management.

This shows that clinical performance on EN may not be directly influenced by knowledge level. The effect that existed was negligible. Most of the participants had learnt EN in training school (98.9%). This could also mean that nursing schools provide adequate knowledge on.

This necessitates more studies be done to evaluate factors that can influence EN and experimental and qualitative studies are best recommend with a larger sample size. Most of the participants had undergone enteral tube feeding in training school (98.9%). This shows that learning institutions provide and teach the basics of enteral tube feeding practice as a requirement for graduation. Results from the present study

indicate that training on enteral tube feeding in nursing institutions is adequately provided. This is supported by Nagla, (2017), who says that adequate knowledge prepares one to provide efficient care to patients.

Less than a third (27.3%) had a chance to participate in technical or scientific education conference on enteral nutrition. This also shows that a good percentage of nurses are not active on attaining updates. Institutional initiation of trainings was minimal with low inter hospital coordination.

5.3.2 Use of EN Guidelines

Nurses who used guidelines that were well displayed had a significant influence on EN practice at the clinical area. This was in line with the universal recommendations. This added value to the high knowledge level and good clinical performance witnessed from the study.

The findings agreed with Hyeon-Hua, *et al*, (2023), who found that guidelines and protocols were associated with improved EN practices. The same was documented by Halim, (2021), who noted that implementation of guidelines had an impact on EN practice. This was similar to Attia *et al* (2021), who noted an improvement in practice in nurses who used guidelines in EN.

This finding brings out the idea that guidelines on EN should be available and well displayed at the clinical area. This enables quick reference and assurance, meaning there will be minimal guess work and the practice is not based on tradition but on scientific evidence. It enables participants use international updates, hence providing adequate nutrition. Good management of EN leads to faster healing and this reduces accumulation of patients in hospitals and reduces the cost of care.

Clinical practice guidelines are designed to regulate professional expectations in nursing. They give direction on how and when to initiate care with the purpose of protecting both the patient and the service provider. They are also meant to define a profession by making the foundations upon which the codes of practice are formulated (Cashin *et al*, 2017).

Despite the high score, the basic information at the practice level, however indicate that the use of the guidelines is not universal and not promising since some of the participants used the guidelines six months ago and some up to one year ago, an indication that follow up on use of guidelines is not persistent. At the same time some nurses reported that they have never used the guidelines at all. This agreed with Fischer *et al*, (2016), who demonstrated that at times the recommended clinical guidelines are not utilized during patient care. There could be factors preventing their implementation but the outcome is delayed recovery of patients. Sluggish use of the guidelines may lead to inappropriate diagnosis and inappropriate care and this sometimes places a large burden to both the patient and the health facility.

5.4. Patient Factors Influencing Management of Enteral Nutrition

In this section, much focus was directed to as to how the nurses were prepared to manage patients of different categories. It also focused on how individual hospitals address this situation and if there are guidelines aligned to these patients.

5.4.1 The Influence of Co-Morbidity in Enteral Nutrition Practice

Presence of guidelines on co-morbid conditions in EN was at (62.5%). Only one facility had guidelines on patients on EN presenting with co morbidities. These

findings show that there is a gap in the actual management of Enteral nutrition in patients with co-morbid conditions.

This finding agrees with McPhail (2016), who says that proper management of co morbidity in patients has some uncertainties that pose challenges to the health care system. This can also affect decision making and planning which interferes with goals of care.

This also means that the practice is rarely reviewed by the hospitals and this may give a reason as to why nurses do not provide excellent care in enteral tube feeding. The challenges of managing patients with co morbidities are real, considering the fact that multidisciplinary recommendations may conflict and targeted priorities fail to make sense especially when there are multiple diseases with multiple drugs, (Bahrman, 2015).

Nurses working in hospitals that provide guidelines on enteral nutrition in patients with co morbid conditions were up to 7.2 times more likely to have been effective in management of EN.

This agrees with other studies that show that, for one to be able to adequately manage a patient with co morbidity, it is safer to isolate the expected outcomes of each of the planned interventions, (Zulman *et al*, 2014). Co-morbidity is becoming common in health care setting and their presence should be approached with caution so as to minimize challenges associated with them, (Moffat & Mercer, 2015).

This also agrees with Fischer *et al*, 2016, who indicates that proper use of guidelines facilitates proper planning and decision making. This will improve the quality of care.

41% of key informants agreed that co morbidity can influence the effectiveness of managing patients on enteral nutrition. This means that co morbidity in enteral nutrition should be emphasized and addressed while doing patient assessment.

5.4.2 How Age Influences Effective Management of EN

Old age affects all body systems in terms of function and response, leading to a slowdown of physiological processes. Aging slows down digestion and peristalsis and this will delay gastric emptying. In addition to presence of two or more condition and administration of multiple drugs, complications can be more frequent with worse outcomes, (Huntsberry-Lett Ashley, 2021).

From the study, it was noted that, less than half of the respondents (40.9%) work in units where patients are classified according to age groups with more than half (61.4%) providing ETF for patients of all age groups. Nurses who work in units where patients are classified according to age groups were up to 10.3 times more likely to have effectively managed enteral nutrition. This finding was in line with Chauhan et al (2021), who found out that generalizations of patients of different ages should be avoided because in old age the patients are more friable and are prone to more complications that lead to delayed recovery, hence necessitating individualized care.

Infants and young children are tender and sometimes have developmental challenges. This means that the approaches to enteral nutrition will be unique and more sensitive. The quality of feeds is different and frequency of feeding is not the same as in adults.

From the study, it can therefore be concluded that during the planning face in Enteral nutrition practice, the age of the patient should be a factor to consider. The quality

and quantity of feeds differ as per age groups. The frequency of feeding and the rate at which feeds are administered is determined by the age of the patient. These factors will therefore have an influence in enteral nutrition practice.

5.5 Health Facility Factors Influencing Effective Management of Enteral Nutrition

5.5.1 Use of Technology

Proper use of technology in Enteral nutrition promotes nurses' competence. This also facilitates the understanding of the scientific rationale behind every intervention, hence improving the quality of care and patient outcomes, (Seron-Albeola, *et al*, 2013).

Use of technology was only minimally emphasised. Applying technology in EN was given more emphasis in private hospitals as opposed to public hospitals. This impacted negatively on nurses' effectiveness in managing EN. It also explains why more effectiveness on EN was more reported in private hospitals.

More than half (52.3%) hospitals provide feeding pumps, smaller portion (23.9%) use X-ray to confirm tube position, and (37.5%) agreed that the hospital provides feeding bags. The general performance of use of technology was at (37.9%). This shows that there is some effort on use of technology in the implementation of EN, but the uptake is minimal and erratic, hence the need for more investigation. However, it was interesting to note that none of the key informants agreed that use of technology can have an influence on the effectiveness in managing Enteral nutrition.

Health facilities need to maximize the use of advanced facilities so that patients can receive optimum care from highly qualified service providers and in return get

positive patient satisfaction, Resources should be aligned with expected outcomes and should be regulated well in relation to timing and quality (Singer & Elia, 2019).

Nursing care should be provided in an environment that supports goal achievement. This means that clinical guidelines should be implemented by use of the right tools and equipment's so that the care giver can be able to achieve his/her targets with minimal difficulties (Meshal *et al*, 2018).

5.5.2 Hospital Policy on Enteral Nutrition

It was noted that enteral Nutrition is not given priority in patients with a functional GIT in all facilities. The recommendation was at (52.3%), and that some hospitals take parenteral nutrition as the first option. This disagrees with other studies that indicate that enteral tube feeding is usually considered as the first option in circumstances where the gastrointestinal tract is intact, (Scot *et al.*, 2014). However, this requires more investigation.

Findings from the study indicated that there was inadequate monitoring and evaluation of enteral tube feeding practices in most of the facilities. Staff development was also initiated at a very low rate, an indication that there is minimal administrative support on the whole process of tube feeding.

These findings were not in line with other studies that indicated that the enteral nutrition practice needs to be reviewed constantly, and be reviewed frequently so as to reduce exposure to complications (BABEN, 2016).

Other studies have shown that the hospital management should facilitate a conducive environment that promotes best service delivery among nurses. The working environment should promote support supervision to improve care standards. When

interventions vary among institutions, it means that patient safety cannot be guaranteed, (Bourgault, *et al*, 2014).

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Overview

This chapter was discussed as under factors influencing effective management of enteral nutrition and the contribution of study findings.

6.2. Conclusion

The research questions were prompted by the fact that enteral nutrition is an essential aspect in the healing process of patients. It is a preferred method of nutrition because it is cheap with fewer complications. When administered correctly and adequately, it promotes the patient's physiological processes and leads to faster recovery. Going by this, then nurses are required to demonstrate effective management of EN in the whole process of nursing care. However, studies have shown that nurses display approaches and practices which are not in line with the standards of care. It has also been noted that some EN practices are based on tradition as opposed to evidence based. This has led to malnutrition and delayed healing.

6.3 Factors Influencing Management of Enteral Nutrition

Nurses' factors influencing EN include nurses' knowledge and, use of practice guidelines. In daily practice, these factors facilitate the provision of quality care that is safe and ethically accepted.

The general performance on nurses' knowledge on Enteral nutrition was good (79.9%), meaning that the information on enteral tube feeding was well understood

and there were no much significant differences. Less than a third (27.3%) had a chance to participate in technical or scientific education conference on enteral nutrition. This also shows that a good percentage of nurses are not active on attaining updates. Institutional initiation of trainings was minimal with low inter hospital coordination.

Use of practice guidelines on EN that are well displayed is associated with positive outcomes with few complications and improves patient satisfaction. This also shows that displaying guidelines on a strategic position could improve reference. Despite the high score, the basic information at the practice level, however indicate that the use of the guidelines is not universal and not promising since some of the participants used the guidelines six months ago and some up to one year ago, an indication that follow up on use of guidelines is not persistent.

Patient factors were also noted to have an influence in effective management of EN. Nurses who understand their patients well are able to provide adequate care with minimal side shows. This could reduce the length of stay and minimize the cost of care to the patient and to the health facility. Patients with co morbid conditions and are on EN were more likely to receive conflicting recommendations from service providers. Having specific guidelines on co morbidities can bring order and understanding while planning for care.

It was also noted that patients were not classified according to age bracket in most of the facilities. This meant that care was given in wholesale as opposed to the expected age sensitive care needed especially in neonates, children and the very aged populations.

The general performance of use of technology was at (37.9%) and the use of technology was never supported by key informants. This shows that there is minimal effort to support technology despite evidences that it fastens and promotes accuracy in patient assessment and monitoring.

Monitoring and evaluation of enteral tube feeding practices in most of the facilities was minimal and erratic. Staff development was also initiated at a very low rate, an indication that there is minimal administrative support on the whole process of tube feeding.

6.4 Contribution of Study Findings

The study acted as an eye opener to give an insight on factors influencing effective management of enteral nutrition. Nurses' factors, patient factors and health facility factors were looked into and this shed some light to service providers, policy makers and to students to focus on finer details that can promote faster healing of patients receiving enteral nutrition.

6.5 Recommendations

To the service providers (nurses)

1. To effectively manage enteral nutrition, nurses should target on widening their knowledge base, by attending trainings and conferences on EN. They should always adhere to the internationally approved guidelines on enteral nutrition.

To the policy makers

1. The enteral nutrition practice should be reviewed constantly and comprehensively and updates should be shared promptly. Clinical practice guidelines should be updated to include current recommendations

To the health facilities

1. Modern technology in enteral nutrition should be promoted like use of feeding pumps, feeding bags, and use of X-ray.
2. Health facilities should formulate guidelines on co morbidities in patients receiving enteral nutrition.

6.6 Further research

1. More studies are needed to find out how doctors' and nutritionists' miscalculations and misdiagnosis influences effective management of enteral nutrition.
2. More studies are recommended on factors influencing effective use of guidelines at the work place.

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APPENDICES

APPENDIX I: CONSENT FORM

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

CONSENT FOR YOU TO PARTICIPATE IN THE STUDY

RESEARCHER: JEREMIAH O. NYONI

INTRODUCTION

The study is aimed at evaluating factors influencing practice of enteral nutrition among nurses in Kisumu County

PARTICIPANT STATUS

Treatment and care for patients on enteral tube nutrition will be undertaken the usual way, except that the participants will be exposed to some questions and then they will be expected to respond according to their understanding.

STUDY GOALS

The study will enable the researcher to know whether the nurses have the necessary skills required and if there are any nurse related factors that can be eliminated so as to provide the necessary nutritional requirement for the patients. The study will also focus on patient factors and institutional factors that influence tube feeding.

TYPE OF DATA

The participants will be required to clearly state what they understand about enteral nutrition. State the challenges they face. Direct observation will be done. Key informants will be interviewed.

PROCEDURES

The participants will be given a written form to fill in writing, and if unable to read, an interpreter will be there to assist him or her to understand the study questions and any clarification made.

An observation check list will also be used to determine how the tube feeding procedure is carried out at the departments.

NATURE OF THE COMMITMENT

Each participant will be expected to take approximately 20 minutes at each point of contact, and it is expected that each participant will be interviewed only once, unless circumstances dictate that we meet more than once. A questionnaire will be filled and observation check list filled accordingly.

SPONSORSHIP

The study will be entirely sponsored by the student conducting the study. This is because the study is for academic purposes.

PARTICIPANT SELECTION

All eligible participants will get equal chance to participate. They should have worked in the department for not less than 6 months. They should have a valid practice license from the nursing council of Kenya.

The participant should be above 18 years of age and not above 60 years. This is because the person is expected to be an adult who can make independent decisions.

POTENTIAL RISKS

There are no foreseeable physical risks. However, some participants may be affected psychologically for fear that they might be identified as not being incompetent. Some may fear that they might lose their job but this will not be the case because data collected will only be used for academic purposes.

POTENTIAL BENEFITS

The study will enable us to identify gaps in enteral nutrition and necessary corrections will be made. Efficient nutrition will be provided and length of stay of patients will be reduced

There are no alternatives to the study since no medical-surgical interventions will be involved during the study.

COMPENSATION

All the patients will be receiving due care, therefore no compensation will be done.

CONFIDENTIALITY PLEDGE

All personal information that is obtained or you give during the study; will be kept confidential unless the law requires us to release it. Any photographs taken will be destroyed upon completion of the study. Each participant will be given a unique study number that will be used in place of your name for all study related work. Your name will only be captured on the consent form. All documents will be kept in locked cabinets in a controlled room with limited access. The following people will be allowed to access your information:

- People involved in doing the research at study site
- Representatives from regulatory authorities responsible for approving research studies.
- Representatives of health agencies that keep track of certain conditions important to public health.

VOLUNTARY CONSENT

Participation in the study is strictly on voluntary basis, and failure to participate in the study will not result in any penalty or loss of any benefits.

RIGHT TO WITHDRAW AND WITHHOLD INFORMATION

Participants who have consented to participate have the choice to withdraw from the study and can refuse to give any information without any penalty. The participant can withdraw if terminally ill or when there are changes in mental status.

CONTACT INFORMATION

If you have questions about participation in the study or in case of injuries, please call Jeremiah Nyoni at mobile number 0715889545 or MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY.

CONSENT STATEMENT

I confirm that I have read the written information in this document or have had the information read to me for this study.

- I have had the opportunity to ask questions about this study and I am satisfied with the answers and explanations have been provided.
- I am aware that I grant access to data to authorized persons described in the information sheet above
- I have been given enough time and opportunity to consider participating in the study

Sign (participant) -----

Date -----

Confirmed by -----

Sign-----

Date -----

APPENDIX II: QUESTIONNAIRE

SECTION A: SOCIO-DEMOGRAPHIC DETAILS

1. Gender

- 1) ____ Male
- 2) ____ Female

2. Age in Years ____

3. Highest level of training

- 1) ____ Certificate
- 2) ____ Diploma
- 3) ____ Degree
- 4) ____ Post graduate

4. Which is your work station?

- 1) ____ Medical
- 2) ____ Surgical
- 3) ____ ICU

5. How long have you practiced in this unit?

- 1) ____ 0 to 2 years
- 2) ____ 3 to 5 years
- 3) ____ above 5 years

6. Was enteral tube feeding part of training in your nursing school?

1) ____ yes

2) ____ no

7. Have you undergone any training on enteral tube feeding?

1) ____ Yes

2) ____ No

8. What is your main source of knowledge regarding enteral nutrition practice?

1) ____ nursing school training

2) ____ in-service training

3) ____ reading from journals/books

4) ____ unit guidelines and protocols

SECTION B: ASSESSMENT OF KNOWLEDGE LEVEL

1. Which is the recommended route of feeding for a patient with a functional gastrointestinal tract who cannot swallow?

1) _____ parenteral nutrition.

2) _____ enteral tube feeding

3) _____ normal oral intake.

2. The following are appropriate techniques for administering enteral tube formula EXCEPT?

- 1) _____ continuous feeding pump
- 2) _____ intermittent gravity drip
- 3) _____ through a large vein
- 4) _____ large bore syringe

3. During initial assessment of patient for ETF, the following points are relevant EXCEPT?

- 1) _____ suitability of the tube insertion and presence of gag reflex
- 2) _____ equipment to be used in the procedure
- 3) _____ financial background of the patient

4. Complications of ETF can be classified as follows EXCEPT?

- 1) _____ adverse
- 2) _____ mechanical
- 3) _____ gastrointestinal
- 4) _____ Metabolic.

5. Why should you elevate the head of the bed while feeding a patient through a tube?

- 1) ___ for easy reach of patient's mouth
- 2) ___ to avoid aspiration
- 3) ___ to increase pressure in the tubes

6. Which is the recommended method of confirming tube placement?

- 1) ___ checking for bubbles in the tube by water and cup
- 2) ___ X- ray of the chest
- 3) ___ check for pH of gastric content

SECTION C: PATIENT FACTORS INFLUENCING MANAGEMENT OF ENTERAL NUTRITION

1. In your daily practice, have you ever had a chance to provide tube feeding to a patient with comorbid conditions?

- 1) ___ Yes
- 2) ___ No

2. Does the hospital provide guidelines that guide the provision of tube feeding in patients with comorbid conditions?

- 1) ___ Yes
- 2) ___ No

3. In your unit, are patients classified according to age groups?

1) ☐ Yes

2) ☐ No

4. Which is the age limit for the patients you nurse on tube feeding?

1) ☐ Neonates

2) ☐ children below 12 years

3) ☐ adults

4) ☐ all age groups

5. While designing a nursing care plan on a patient receiving tube feeding, which of the following do you consider most?

1) ☐ financial status

2) ☐ severity of illness

3) ☐ education level

6. In your practice, do you think gender can have an impact on planning and patient outcome?

1) ☐ Yes

2) ☐ No

**SECTION D: NURSE RELATED FACTORS INFLUENCING
MANAGEMENT OF ENTERAL NUTRITION**

1. Do you adhere to guidelines of enteral tube feeding while performing the procedure?

1) ____ yes

2) ____ no

2. When was the last time you used a guideline/protocols on EN?

1) ____ one month ago

2) ____ six months ago

3) ____ more than one year ago

4) ____ never used guidelines/protocols

3. Have you had a chance to participate in any technical or scientific education on enteral tube feeding?

1) ____ Yes

2) ____ No

**SECTION E: HEALTH FACILITY FACTORS INFLUENCING
MANAGEMENT OF ENTERAL NUTRITION**

1. Which is the recommended method of feeding a sick patient who cannot take food orally?
 - 1) ____ Parenteral nutrition
 - 2) ____ enteral tube feeding
 - 3) ____ oral intake
2. In your hospital, do you use X-Ray to confirm feeding tube position?
 - 1) ____ Yes
 - 2) ____ No
3. Does the hospital provide feeding bags for patients on tube feeding?
 - 1) ____ Yes
 - 2) ____ No
4. Does the hospital provide feeding pumps that can be used in enteral tube feeding?
 - 1) ____ Yes
 - 2) ____ No
5. Does the hospital provide guidelines on tube feeding?
 - 1) ____ Yes
 - 2) ____ No
6. Are the guidelines well displayed for easy reading?
 - 1) ____ yes
 - 2) ____ No
7. Does the hospital have a regular program to check on nurses' implementation of guidelines on ETF?
 - 1) ____ Yes
 - 2) ____ No

SECTION F: QUESTIONNAIRE ON CLINICAL PRACTICE

1. Do you usually seek for consent before feeding a patient on ETF?
 - 1) ____ Yes
 - 2) ____ No
2. At what frequency do you check for tube position?
 - 1) ____ after insertion only
 - 2) ____ before every feeding
 - 3) ____ after feeding
3. How frequent do you check for Gastric Residual Volume?
 - 1) ____ every 4 hours
 - 2) ____ every shift
 - 3) ____ daily
 - 4) ____ never checks
4. What do you normally do if feeding formula is not flowing into the tube?
 - 1) ____ flush tube with room temperature water.
 - 2) ____ push with large syringe to unblock tube
 - 3) ____ stop feeding and raise the issue during ward round
5. After feeding, which of the following do you practice?
 - 1) ____ let patient do abdominal exercises to improve digestion.
 - 2) ____ allow patient to lie flat and relax.
 - 3) ____ keep head of bed elevated at 30° for about 30 minutes.
6. How often do you check for complications related to ETF?
 - 1) ____ During ward rounds
 - 2) ____ During time for report
 - 3) ____ Before and after feeding.

APPENDIX III: PERFORMANCE OBSERVATION CHECKLIST ON TUBE FEEDING FOR CRITICALLY ILL

Observe how each of the following activity is practiced

		Done	Not Done
1.	Assemble all equipments before procedure		
2.	Assign roles to assistant		
3.	Wash and dry hands		
4.	Seek for consent		
5.	Aspirating all stomach contents and measure before feeding		
6.	Confirming tube placement before delivery of feed?		
7.	Positioning patient with head at least 30 degrees		
8.	Flushing tube before and after feeding		
9.	Documentation.		

APPENDIX IV: INTERVIEW GUIDE

1. In your view, what is the role of the administration in providing quality EN?
2. How do you ensure that resources are managed adequately in relation to EN?
3. In your view, what can you say about availability and use of guidelines on EN within the hospital?
4. What can you say about the state of nursing education in your hospital in relation to EN?
5. What are the factors that influence the provision of Enteral nutrition in your hospital?

APPENDIX V: PROPOSAL APPROVAL



MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY (MMUST)

Tel: 056-30870
Fax: 056-30153
E-mail: directordps@mmust.ac.ke
Website: www.mmust.ac.ke

P.O Box 190
Kakamega – 50100
Kenya

Directorate of Postgraduate Studies

Ref: MMU/COR: 509099

19th June, 2019

Jeremiah Oteki Nyoni,
HNR/G/02/2015,
P.O. Box 190-50100,
KAKAMEGA.

Dear Mr. Nyoni,

RE: APPROVAL OF PROPOSAL

I am pleased to inform you that the Directorate of Postgraduate Studies has considered and approved your Masters Proposal entitled: *"Clinical Management of Critically Ill Patients on Enteral Tube Feeding in Health Facilities in Kisumu County"* and appointed the following as supervisors:

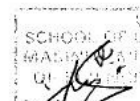
1. Prof. Lt.(Rtd)John M. Okoth - SONMAPS, MMUST
2. Dr. Damaris Ochanda - SONMAPS, MMUST

You are required to submit through your supervisor(s) progress reports every three months to the Director of Postgraduate Studies. Such reports should be copied to the following: Chairman, School of Nursing & Midwifery Graduate Studies Committee and Chairman, Department of Clinical Nursing and Health Informatics and Graduate Studies Committee. Kindly adhere to research ethics consideration in conducting research.

It is the policy and regulations of the University that you observe a deadline of two years from the date of registration to complete your master's thesis. Do not hesitate to consult this office in case of any problem encountered in the course of your work.

We wish you the best in your research and hope the study will make original contribution to knowledge.

Yours Sincerely,


SCHOOL OF GRADUATE STUDIES
MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY
KAKAMEGA

Prof. John Obiri
DIRECTOR, DIRECTORATE OF POSTGRADUATE STUDIES

APPENDIX VI: APPROVAL BY IREC



MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY
Tel: 056-31375 P. O. Box 190-50100
Fax: 056-30153 Kakamega, Kenya
E-mail: ierc@mmust.ac.ke
Website: www.mmust.ac.ke

Institutional Ethics Review Committee (IERC)

Ref: MMU/COR: 403012 vol2 (26)

Date: 1st July, 2019

Jeremiah Oteki Nyoni
Masinde Muliro University of Science and Technology
P.O. Box 190-50100
KAKAMEGA

Dear Mr. Oteki

RE: Clinical management of critically ill patients on enteral tube feeding in health facilities in Kisumu County- MMUST/IERC/45/19

Thank you for submitting your proposal entitled as above for initial review. This is to inform you, that the committee conducted the initial review and approved (with minor revisions) the above Referenced application for one year.

This approval is valid from **1st July, 2019 through to 1st July, 2020**. Please note that authorization to conduct this study will automatically expire on **1st July, 2020**. If you plan to continue with data collection or analysis beyond this date please submit an application for continuing approval to the MMUST IERC by **1st, June, 2020**.

Approval for continuation of the study will be subject to submission and review of an annual report that must reach the MMUST IERC secretariat by **1st June, 2020**. You are required to submit any amendments to this protocol and any other information pertinent to human participation in this study to MMUST IERC prior to implementation.

Please note that any unanticipated problems or adverse effects/events resulting from the conduct of this study must be reported to **MMUST IERC**. Also note that you are required to seek for research permit from **NACOSTI** prior to the initiation of the study.

Yours faithfully,

Dr. Gordon Nguka (PhD)

Chairman, Institutional Ethics Review Committee

- Copy to:
- The Secretary, National Bio-Ethics Committee
 - Vice Chancellor
 - DVC (PR&I)
 - DVC (A & F)

APPENDIX VII: APPROVAL FROM NACOSTI

 REPUBLIC OF KENYA	 NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
Ref No: 162620	Date of Issue: 19/September/2019
RESEARCH LICENSE	
	
This is to Certify that Mr. JEREMIAH NYONI of Masinde Muliro University of Science and Technology, has been licensed to conduct research in Kisumu on the topic: CLINICAL MANAGEMENT OF CRITICALLY ILL PATIENTS ON ENTERAL TUBE FEEDING IN HEALTH FACILITIES IN KISUMU COUNTY for the period ending : 19/September/2020.	
License No: NACOSTI/P/19/1269	
162620 Applicant Identification Number	 Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION
	Verification QR Code 
NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.	

APPENDIX VIII: APPROVAL BY KISUMU COUNTY

COUNTY GOVERNMENT OF KISUMU

Telegrams: "PRO.(MED)"
Tel: 254-057-2020105
Fax: 254-057-2023176
E-mail: kisumucdh@gmail.com



County Director of Health,
Kisumu.
P.O. Box 721-40100,
KISUMU.

DEPARTMENT OF HEALTH

REF: GN.133.VOL.III/691

Date: 23/07/2019

Jeremiah Oteki Nyoni

RE: APPROVAL TO CONDUCT RESEARCH ON CLINICAL MANAGEMENT OF CRITICALLY III PATIENTS ON ENTERAL TUBE FEEDING IN HEALTH FACILITIES IN KISUMU COUNTY – MMUST/IERC/45/19

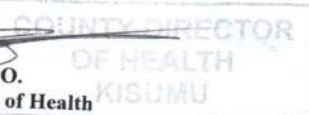
We are in receipt of the request for research approval.

This office has reviewed your application and grants you permission to conduct your study for a period of one year within health facilities in Kisumu County and share your findings with this office.

It is noted that ethical approval has been obtained from Masinde Muliro University.

By a copy of this letter, kindly accord him your necessary cooperation.


Dr. Onyango D. O.
County Director of Health
Kisumu County



From the County Director of Health office