

Factors Influencing Management of Enteral Nutrition Among Nurses in Health Facilities of Kisumu County, Kenya

Jeremiah O. Nyoni¹, John O. Okoth², Damaris A. Ochanda³

¹School of Nursing, Midwifery and Paramedical Science, Masinde Muliro University of Science and Technology, Kenya.
e-mail: jimoteki@yahoo.com

²Masinde Muliro University of Science and Technology, Kakamega, Kenya.
e-mail: jokoth@mmust.ac.ke

³Department of Nursing Research, Education and Management, School of Nursing, Midwifery & Paramedical Sciences, Masinde Muliro University of Science and Technology, Kenya.
e-mail: dochanda@mmust.ac.ke

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ABSTRACT

Context: Enteral Nutrition (EN) is a feeding method through the gastrointestinal tract used in patients whose oral intake is not possible. Over 3 million people receive EN globally annually. Nurses play a key role in EN, but despite the progress, studies have demonstrated approaches that are not in line with approved standards.

Aim: To evaluate factors influencing management of enteral nutrition among nurses in health facilities of Kisumu County.

Methods: A cross-sectional, analytical study was conducted in two government hospitals and two private hospitals in Kisumu County, namely, Jaramogi Oginga Odinga Teaching and Referral Hospital, Kisumu County Referral Hospital, Aga Khan Hospital, and Avenue Hospital. A total of 135 participants were selected using systematic random sampling. Twelve key informants were interviewed. Data collection tools included a structured self-administered questionnaire, a nurses' practice observation checklist, and an interview guide.

Results: Most of the participants were females (68.2%) and 31.8% males, with a mean age of 34.2±8.4. The use of well-displayed guidelines influences EN (p-value 0.03). Nurses' level of knowledge influences EN, though with minimal significance. The average total knowledge score was 80.7%. Total nurses' performance shows that 85.2% had a satisfactory performance level.

Conclusion: EN is an essential intervention in the healing process and can be influenced by well-displayed guidelines. The findings indicated that nurses' knowledge can influence the management of enteral nutrition. The study recommends that nurses should focus on adhering to the recommended guidelines on EN that are well displayed, and they should be knowledgeable and well-informed on updates on EN.

Keywords: Factors influencing, management, enteral nutrition, nurses

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1. Introduction

Globally, the number of patients receiving enteral nutrition (EN) is gradually increasing. This increase is attributed to an increase in gastrointestinal disorders and the advancement of equipment (Daurelle, 2023). Over 3 million people receive EN globally annually. Management of EN requires that the service provider demonstrate ability to apply knowledge and skills while adhering to standards (Hadera et al., 2022).

Enteral nutrition can be achieved by the use of a tube. This feeding method helps to provide calories, protein, electrolytes, vitamins, and fluids (Okuley, 2016). It can deliver water and medication (Ojo, 2015). It is a nursing intervention focused on achieving physiological requirements (Alhassan et al., 2019).

Illness increases metabolism and catabolism, which leads to system dysfunctions like failure of the respiratory, gastrointestinal (GI), and immune systems. This will lead to associated negative outcomes like delayed wound healing, muscle wasting, infections, and prolonged length of stay

(Alhassan et al., 2019). To promote recovery and achieve better outcomes, EN is recommended (Adeyinka et al., 2022).

It is sometimes recommended as a first-line option because it is more physiological, protects the gastrointestinal tract, and promotes immunity, leading to better patient outcomes (Alhassan et al., 2019).

Enteral nutrition is done in patients whose gut is at least partially functioning but cannot feed through the oral route. It is given as a short-term intervention. In chronic complications, it can be used as a long-term intervention (Marengo & Dix, 2018). It is associated with fewer complications and is cheaper. It protects the integrity and physiology of the GI tract, promotes peristalsis and blood flow, and minimizes bacterial translocation, hence controlling the risk of systemic infections and improving patients' overall health (Adeyinka et al., 2022).

Nurses independently initiate and manage the whole EN process. The aim is to ensure patients receive adequate nutrition while applying evidence-based practices. The whole process should be optimized for efficiency, practiced

¹Correspondence author: Jeremiah Oteki Nyoni

universally, and well understood. The procedures should benefit the patient (Mula, 2014).

2. Significance of the study

Monitoring of EN practice is vital to reduce complications, reduce electrolyte and metabolic abnormalities and ensure adequate nutrition is delivered (British Association for Parenteral and Enteral Nutrition, 2016). However, studies have indicated that guidelines on EN are not adhered to in Sub-Saharan Africa, especially in low-income countries like Kenya (Ali et al., 2019; Manyala et al., 2022). Lack of resources and nursing workforce leads to inadequacy in EN practices (Omondi et al., 2018).

The study's findings will give insight into nurses' factors influencing the management of EN. Understanding the whole process will help minimize mortality and morbidity and promote faster patient recovery. The institutions will benefit from the study findings in making appropriate decisions. The administrators will be guided on what should be emphasized, which will help improve the quality of nursing care.

The study will also shed some light on the curriculum developers in nursing schools. The content and process of tube feeding education should be aligned with current studies and technology. The study will help the researcher uncover critical areas in practice and education processes that are in line with academic advancements and technology. It also forms the basis for other related studies.

3. Aim of the study

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

3.1 Research question

What are the nurses' related factors that influence the effective management of enteral nutrition?

4. Subjects & Methods

4.1. Research Design

The study employed a cross-sectional, analytical research design. Cross-sectional studies are one-time observational studies (Wang & Cheng, 2020). After collecting descriptive data, the researcher finds the relationship between variables and how they influence one another (Sebunje, 2015).

4.2. Study setting

The study was conducted in Kisumu County, which is located in western Kenya. Kisumu County is among the 45 Counties of Kenya where studies on EN have not been done. Four hospitals were sampled to participate in the study. They are referral hospitals that provide EN: Jaramogi Oginga Odinga Teaching and Referral Hospital, Kisumu County Referral Hospital, Avenue, and Aga Khan Hospital.

4.3. Study subjects

A purposive sample included all the nurses caring for patients on EN in Kisumu County's health facilities according to the following inclusion and exclusion criteria.

Inclusion criteria

- The study participants were qualified nurses.
- Have provided EN for at least six months.

Exclusion criteria

- Those who may not be available to perform EN at the clinical area during data collection.

Sample size determination

Out of the population, 135 nurses were sampled. The sample size was calculated using the Taro Yamane Scientific formula (Uniproject Materials, 2016)

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

Twelve key informants were sampled using purposeful sampling. These were nurses who performed managerial duties related to EN. They were not among the 135 nurses.

Sampling procedures

The study employed probability and non-probability sampling techniques. Random sampling was used to select hospitals. Purposive sampling was used to identify the wards. Systematic sampling was applied to identify participants. Key informants were selected using convenient sampling.

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% distributed as follows:

Facility 1: Aga Khan Hospital (29)

Facility 2: Jaramogi Oginga Odinga Teaching and Referral Hospital (32)

Facility 3: Kisumu County Referral Hospital (13)

Facility 4: Avenue Hospital (14)

Facilities 1 and 4 are private, while facilities 2 and 3 are government.

4.4. Tool of data Collection

The questionnaire and interview guide were developed by the researcher, while the observation checklist was adopted from the *Nursing Council of Kenya (2021)* practice manual, 10th edition, with the purpose of standardizing the data collection process. They were written in English and administered only once to the study participants to capture knowledge of the use of guidelines and clinical practice of EN.

4.4.1. Structured Self-Administered Questionnaire

It contained systematically organized questions. It was designed by the researcher to assess the nurses-related factors influencing the management of enteral nutrition (Knowledge and reported clinical practice). It had 24 multiple choice questions, including personal information (8 items) such as gender, age, and training level; knowledge level regarding EN management (6 items) such as seeking consent before feeding, frequency of checking tube position, and frequency of checking gastric residual volume; nurses' factors (4 items) such as adhering to guidelines of EN, last time using guidelines, and using the guidelines that were well displayed, self-reported clinical practice (6 items) such as following the recommended route of feeding patients who cannot swallow, inappropriate technique for administering enteral tube formula, and irrelevant point to consider during initial assessment of patient for ETF.

Scoring system

Each item was given one mark, and the total was summed to give a total for each participant against the 100 percent target.

4.4.2. Nurses Practice Observation Check List

This checklist was adopted from the Nursing Council of Kenya practice manual. It aimed to assess nurses' clinical performance. The components included the steps followed during EN in line with the clinical practice manual. It had six items, such as seeking consent, checking for tube position, checking for gastric residual volume, what is done when formula is not flowing, what is done after feeding, and checking for complications.

Scoring system

Nurses' management of EN was evaluated by adding up all the scores on the six items that were observed. The procedure step was scored '1' if it was performed or '0' if it was not performed. The overall score was converted into a percent score. The total performance score was categorized as satisfactory $\geq 80\%$ and unsatisfactory $> 80\%$.

4.4.3. Interview Schedule

This involved a face-to-face interview with key informants who play administrative roles. The researcher designed it to assess the opinion of key informants on nurses' use of guidelines. It contained only two items: Comment on nurses' use of guidelines on EN and what can you say about the influence of nursing education on EN.

4.5. Procedures

Ethical consideration: The study was approved by Masinde Muliro University of Science and Technology, IREC, and NACOSTI (reference number 162620). Permission was sought from the hospitals. Participants were allowed to voluntarily participate in the study without coercion. Privacy was maintained. They were informed about the aim of the study, the processes, their responsibility, risks, and benefits. Confidentiality was maintained. Anonymity was observed. No information was shared during the study. The 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. The researcher did not allow deceptive practices to be employed. Information was communicated as it is without any alteration.

The questionnaires were administered at the workplace and given 25 minutes to fill out. Beneficence—do no harm—was adhered to. Intentional harm was avoided, and potential harm was minimized. The welfare of participants was promoted. Possible benefits were maximized. Participants were made to understand that the study's benefits could apply to all nurses and not only to the study participants.

Two academic supervisors and three clinical supervisors designed and reviewed the questionnaire. The items on data collection tools were clear and easy to understand, enabling the researcher to draw relevant conclusions. After the validation of data collection tools, their practicability was established by subjecting them to a pilot study in which twelve participants were involved. This pilot study was used

to help measure the consistency of the instruments. On the eve of data collection, the research instruments were pre-tested on twelve respondents, three from each hospital. They were analyzed and found reliable (Questionnaire 0.85, observation checklist 0.80, and interview guide 0.78).

Data collection started in August 2019 and ended in June 2020. It took a long time because it happened during the COVID-19 pandemic. At that time, the infection control measures were as follows: Correspondences were done online, there was minimal contact with staff, and screening for COVID-19 was done each time a hospital visit was made. There must be written approval for every visit.

Two research assistants were identified from each institution. The research assistants were required to have good communication skills in both English and Kiswahili. The questionnaire was administered during official hours. The principal researcher interviewed key informants personally.

Research assistants completed the observation checklist a week after completing the questionnaires to reduce the Hawthorne effect. The researcher facilitated supervision and monitoring throughout the data collection period.

In data collection, identification numbers were given, thus avoiding personal identity. Questionnaires, observation checklists, and interviewed data were checked, labeled as per facility, and stored. Instruments were transferred to the custody of the researcher where access was minimized. Data cleaning was done to improve the quality of data.

4.6. Data analysis

Data was coded and entered in the Statistical Package of Social Science (SPSS) version 27. Descriptive statistics were used to obtain frequency, mean, percentage, and standard deviation. Other statistical tests used included P value, Odds Ratio, Bivariate Logistic Regression, and one sample t-test.

5. Results

Table 1 reveals that most participants were females (68.2%) and 31.8% males. An equal proportion were aged between the ages of 20–29 and 30–39 years (36.4%) with an overall mean age of 34.2 ± 8.4 ranging from 20 to 59 years. 67.1% had attained a diploma from a medical training institute, with less than a third (31.8%) having baccalaureate degrees. Workstations were represented as follows: Medical 44(50%), Surgical 25(28.4%), and ICU 19(21.6%). Duration in the department shows that 60.2% spend between 0 to 2 years, 18(20.4%) spend between 3 to 5 years, and 17(19.3%) spend over five years.

The table also shows that 98.9% of studied nurses had undergone tube-feeding training in their nursing schools. Those who had a chance to attend any scientific training on EN 47(53.4%) and those who have never had a chance for training 41(46.6%). Source of knowledge, nursing school 62(70.4%), in service training 14(15.9%), Journals 3(3.4%), guidelines and protocols 9(10.2%).

Table 2 reveals that 69(78.4%) knew that they had to seek consent, 79(89.8%) to check tube position before every feeding, and 70(79.6%) to check for gastric residual volume every 4 hours. Also, 66(75%) knew that they had to flush with room temperature water if the feed was blocked,

85(96.6%) to keep their head of the bed elevated at 30° for about 30 minutes, and 83(94.3%) knew they had to check for complications before and after feeding.

Table 3 presents Bivariate analysis results on the relationship between nurses' knowledge and EN nurses' performance. None of the independent variables considered under nurses' clinical practice and competence in enteral tube feeding (ETF) resulted in significant association. Nevertheless, nurses who normally flush the tube with room temperature water if feeding formula is not flowing into the tube were 2.1 times as likely to be competent than those who normally push with a large syringe to unblock the tube or those who stop feeding and raise the issue during the ward round, the results not being statistically significant (OR: 2.1; 95% CI: 0.6–7.4; p = 0.23).

Table 4 demonstrates the frequency and percentage distribution of nurses' self-reported clinical practice, majority 75(85.2%) correctly cited EN as the recommended feeding route. 81(92%) rightly said that financial background is an irrelevant point to consider during the initial patient assessment for EN. 48(54.6%) were aware that complications of EN are classified as mechanical, gastrointestinal, and metabolic and that adverse is not considered a complication of EN. 87(98.9%) were correct in stating the reasons for elevating the head of the bed while feeding through EN to avoid aspiration. 55(62.5%) participants indicated checking for bubbles in the tube using water and a cup.

Table 5 presents the results of a Bivariate analysis of the relationship between self-reported clinical practice and EN nurses' performance. Nurses who would not consider the patient's financial background during the initial assessment of the patient for ETF were up to 2.5 times more likely to have managed EN as per the recommendations as opposed to those who did not (OR: 2.5; 95% CI: 0.4–14.8; p = 0.28). Knowledge of the recommended route of ETF, classification of ETF complication, and recommended method of confirming tube placement did not yield any statistically significant association. Both knowledge and self-reported clinical practice knowledge scores were added, and an average was calculated. The average score was at 80.7%

Table 6 demonstrates the clinical application of the guidelines as reported by the studied nurses. It shows that 79(89.8%) of the study participants reported adhering to EN guidelines while performing the procedure. 48(54.6%) had used such a guideline/protocol on EN one month prior to the study. 51(58%) used guidelines that were well displayed. 24(27.3%) had had a chance to participate in technical or scientific education on EN.

Table 7 shows the relationship between nurses' use of EN guidelines at the workplace and EN nurses' performance. Results indicate that nurses who used a guideline more than one month ago were up to 0.7 times more likely to have managed EN as per the recommendations in contrast to those who had used the guidelines 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). There were significant findings on nurses who used guidelines that were well displayed (p-value 0.03).

The whole process was quantified in Figure 1. The percentage distribution of total nurses' clinical performance

on managing EN indicates that 85.2% of the nurses managed EN as per recommendations.

Enteral nutrition practice, as reported by key informants. 25% of the key informants said that the use of guidelines could influence the quality of EN practice. 40% of the participants agreed that the nurses' knowledge can influence EN practice. 25% of the participants commented that well-displayed EN guidelines can influence EN practice.

Table (1): Frequency and percentage distribution of respondents' demographic characteristics (n=88).

Variables	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±SD (Range) in years	34.2±8.4	(20.0–59.0)
Highest level of training		
Medical Training College Certificate	1	1.1
Medical training college Diploma	59	67.1
Baccalaureate Degree	28	31.8
Workstation		
Medical	44	50.0
Surgical	25	28.4
ICU	19	21.6
Length of time worked in the 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
The main source of knowledge on EN practice		
Nursing School	62	70.4
In-service training	14	15.9
Journals	3	3.4
Unit guidelines and protocols	9	10.2

Table (2): Frequency and percentage distribution of nurses' knowledge on management of EN (n=88).

Variable	N	%
Seeking consent before feeding a patient on EN		
Yes	69	78.4
No	19	21.6
Frequency of checking tube position		
After insertion only	9	10.2
Before every feeding	79	89.8
Frequency of 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
Nursing care if feeding formula is not flowing into the tube		
Flush tube with room temperature water	66	75.0
Push with a large syringe to unblock the tube	14	15.9
Stop feeding and raise the issue during ward round	8	9.1
Nursing care after feeding		
Let patients do abdominal exercises to improve digestion	3	3.4
Keep the head of the bed elevated at 30° for about 30 minutes	85	96.6
time for detecting complications related to EN		
During ward rounds	3	3.4
During the time for report	2	2.3
Before and after feeding	83	94.3

Table (3): Bivariate analysis of the relationship between nurses' knowledge and EN nurses' performance (n=88).

Independent variables	No.	ETF Performance		OR	95% CI	P value
		≥80% Score	<80% Score			
Seek consent before feeding.						
Yes	19	84.2	15.8	0.9	0.2-3.7	0.88
No	69	85.5	15.5			
Frequency in which I check for tube position						
After insertion only	9	88.9	11.1	1.4	0.2-12.5	1.00
Before every feeding	79	84.8	15.2			
Frequency in checking for gastric residual volume						
Every 4 hours	70	85.7	14.3	1.2	0.3-4.9	0.72
Every shift / Daily / Never checks	18	83.3	16.7			
Nursing care if feeding formula is not flowing into the tube						
Flush tube with room temperature water	66	87.9	12.1	2.1		
Push with a large syringe to unblock the tube / Stop feeding and raise the issue during ward round	22	77.3	22.7		0.6-7.4	0.23
Nursing care after feeding						
Let the patient exercise	3	66.7	33.3	0.3		
Keep the head of the bed elevated at 30 degrees for about 30 minutes	85	85.9	14.1		0.03-3.91	0.36
Time for detecting complications related to EN						
Before and after feeding	83	85.5	14.5	1.5	0.1-14.4	0.73
During ward rounds/during report-giving	5	80.0	20.0			

6. Discussion

Nutrition is one of the most important aspects of medical care for critically ill patients. A high prevalence of morbidity and mortality is associated with malnutrition, affecting up to 40% of hospitalized patients. Enteral nutrition (EN) is a delivery system that supplies all the essential nutrients - including water and minerals - into the gastrointestinal tract (by mouth or tube) and then into the stomach, duodenum, or jejunum (Hadera et al., 2022). The study aimed to evaluate factors influencing management of enteral nutrition among nurses in health facilities of Kisumu County.

This study reveals that the average total nurses' knowledge was good, above eighty percent, meaning that the information on EN was well understood. Most of the study participants scored eighty percent and above in clinical performance. Forty percent of the key informants agreed that knowledge level can influence the clinical practice of EN. These findings indicate that knowledge level can influence EN practice. However, the association between knowledge and clinical assessment did not yield significant findings. The findings agree with Wangari et al. (2024), who noted that around two-thirds of the nurses studied had adequate knowledge of EN.

Table (4): Frequency and percentage distribution of nurses' self-reported clinical practice (n=88).

Variable	N	%
Recommended route of feeding a patient who cannot swallow		
Parenteral nutrition	12	13.6
Enteral tube feeding	75	85.2
Normal oral intake	1	1.1
Inappropriate technique for administering enteral tube formula		
Continuous feeding pump	6	6.8
Intermittent gravity drip	4	4.6
Through a large vein	76	86.4
Large bore syringe	2	2.3
Irrelevant point to consider during the initial assessment of the patient for ETF		
Suitability of tube insertion and equipment to be used	6	6.8
Equipment to be used in the procedure	1	1.1
Financial background	81	92.0
Not considered a complication of ETF		
Adverse	48	54.6
Mechanical	23	26.1
Gastrointestinal	8	9.1
Metabolic	9	10.2
Reason for elevating the head of the bed while feeding through ETF		
To avoid aspiration	87	98.9
To increase pressure on the tube	1	1.1
Recommended method of confirming tube placement		
Checking for bubbles in the tube water and cup	55	62.5
X-ray	32	36.4
Check pH	1	1.1

Table (5): Bivariate Analysis of the relationship between self-reported clinical practice and EN nurses' performance (n=88).

Independent variables	No.	ETF Performance		OR	95% CI	P value
		≥ 80% Score	< 80% Score			
Recommended route of tube feeding						
ETF	75	84.0	16.0	0.4	0.1–3.7	0.68
Parenteral / Normal oral intake	13	92.3	7.7			
Inappropriate technique for administering EN formula						
Continuous feeding pump/intermittent gravity drip/using a large bore Syringe	76	82.5	17.1	-	-	-
Through a large vein	12	100	0.00			
What should not be considered during the initial assessment of the 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			
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 with 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			
Reason for elevating the head of the bed						
To avoid aspiration	87	85.1	14.9	-	-	-
To increase pressure in the tube	1	100.0	0.0			
Average total knowledge		80.7%				

Table (6): Nurses’ related factors regarding using EN guidelines at the workplace (n=88).

Variable	No.	%
Adheres to the guidelines of EN while performing the procedure		
Yes	79	89.8
No	9	10.2
The last time I used guideline/protocol on ETF		
One month ago	48	54.6
Six months ago	23	26.1
> 1 year ago	12	13.6
Never used before	5	5.7
I used guidelines that were well-displayed		
Yes	51	58.0
No	37	42.0
Had a chance to participate in technical or scientific education on ETF		
Yes	24	27.3
No	64	72.7

Table (7): Bivariate analysis of the relationship between nurses' use of EN guidelines at the workplace and EN nurses’ performance (n=88).

Independent variables	No.	ETF Performance		OR	95% CI	P value
		≥ 80% Score	< 80% Score			
Adheres to the guidelines of ETF 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 ETF.						
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			
I used guidelines that were well-displayed						
Yes	51	92.2	7.8	3.8	1.1-13.4	0.03
No	37	75.7	24.3			
Participated in technical or scientific education on ETF						
Yes	24	87.5	12.5	1.3	0.3–5.2	1.00
No	64	84.4	15.6			

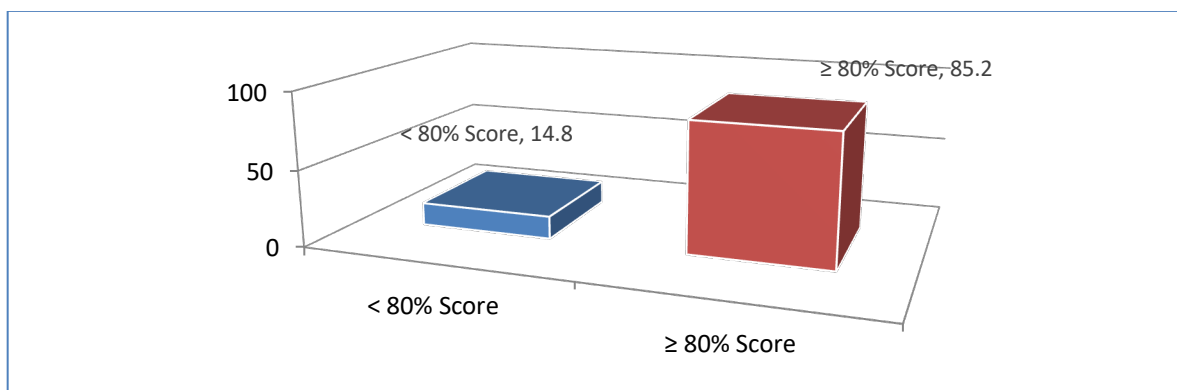


Figure (1): Percentage distribution of total nurses’ clinical performance on management of EN

They also agree with *Mahmoodpour et al. (2021)*, who indicated that around three-fourths of the participants had high knowledge of nutritional care.

These findings were not in line with the findings of *Atiyah et al. (2023)*, who found that nearly two-thirds of the participants were poorly informed about nasogastric tube feeding. It also disagreed with *Al-Qualah and Alrubaiee (2020)*, who found that only ten percent of the nurses had adequate knowledge of EN management.

This finding shows that knowledge level may not directly influence clinical performance in EN. The effect that existed was negligible. Most of the participants had learned EN in a training school, which could also mean that nursing schools provide adequate knowledge. This finding necessitates more studies to evaluate factors that can influence EN. Experimental and qualitative studies with a larger sample size are best recommended.

Nurses who used guidelines that were well displayed significantly influenced EN practice in the clinical area. This

finding was in line with the universal recommendations. This finding 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 *Abdel Halim (2021)*, who noted that implementing guidelines impacted EN practice. This finding 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 in the clinical area, which enables quick reference and assurance, meaning there will be minimal guesswork. The practice is not based on tradition but on scientific evidence. It enables participants to use international updates, hence providing adequate nutrition. Good management of EN leads to faster healing, reducing the accumulation of patients in hospitals and reducing the cost of care.

The present study results indicate that most of the participants managed EN according to the recommended guidelines compared to a few nurses who did not. This practice means most participants could incorporate knowledge and skills in managing EN.

The finding was similar to *Mehrnoosh et al. (2018)*, which indicated that more than two-thirds of the nurses performed moderately in nasogastric tube feeding. It also agreed with *Wangari et al. (2024)*, who indicated that more than half of the subjects were competent in EN practice.

However, the findings were not in line with the findings of *Hadera et al. (2022)*, who noted that more than half of the respondents performed poorly in the clinical practice of enteral nutrition. The findings were also contrary to *Alhassan et al. (2019)*, who noted that most participants needed to adhere to the guidelines. The finding did not agree with a study by *Moustafa et al. (2018)*, who indicated that more than half of the study participants had unsatisfactory performance in EN.

Generally, there was a good score, but it is interesting to note that none of the activities was performed at 100%. This brings us to another question: What happens to the patients who were given EN with guidelines not followed to a hundred percent? This finding opens another area for investigation.

7. Conclusion

EN is an essential aspect of the healing process that can be influenced by the presence and use of guidelines. It is a preferred method because it is cheap and has fewer complications. When administered correctly, it promotes the patient's physiological processes and leads to faster recovery.

The findings indicated that nurses' knowledge can influence the management of enteral nutrition. This association was noted despite no significant association between knowledge and EN clinical practice.

The presence and use of clinical guidelines on EN impacted clinical competence. Where guidelines were well displayed, clinical performance was higher.

The study indicated that most of the participants manage EN according to the recommended practice guidelines. Also, most of the participants scored well on EN knowledge.

8. Recommendations

- To the service providers (nurses): Nurses should focus on adhering to the recommended guidelines on EN that are well displayed. Nurses should be knowledgeable and well-informed on updates on EN.
- To policymakers: Ensure that guidelines on EN are formulated according to the latest updates and displayed well.
- Further research: Factors affecting implementation of clinical practice guidelines at the workplace. Clinical outcomes on patients who are managed without using guidelines.

9. References

- Abdel Halim, F. (2021)*. Effect of educational nursing guidelines regarding enteral feeding on nurses' knowledge and practice at critical care units. *IOSR Journal of Nursing and Health Science (IOSR-JNHS)*, 7(3), 69-75. <https://doi.org/10.9790/1959-0705026975>
- Adeyinka, A., Rouster, A. S., & Valentine, M. (2022)*. Enteric Feedings. In StatPearls. StatPearls Publishing.
- Alhassan, R. K., Tsikata, R., Tizaawaw, R. N., Tannor, P. A., Quaw, P. P., Awortwi, C. A. A., Ayanor, M. A., Afaya, A., Salia, S. M., Milipaak, J., & Mwini-Nyaledzigbor, P. P. (2019)*. Adherence to standard nursing protocols on nasogastric tube feeding in a secondary referral hospital in Ghana: Comparing self-ratings by professional and auxiliary nurses. *BMC Health Service Research*, 19(1). <https://doi.org/10.1186/s12913-019-3931-6>
- Al-Qualah, T. A. H., & Alrubaiee, G. G. (2020)*. Intensive care nurses' knowledge of enteral nutrition at Public Hospitals in Sana'a, Yemen: A Cross-Sectional Survey. *F1000 Research*, 9, 759. <https://doi.org/10.12688/f1000research.25041.1>
- Ali, S., Sharma, K., & Daroowalla, F. (2019)*. Feeding at the end of life in Sub-Saharan Africa, when less is more. *PAMJ-Clinical Medicine*, 1(1), <https://doi.org/10.11604/pamj-cm.2019.1.16.20525>
- Atiyah, M. A., Tinyag, A. M., & Dawood, S. B., Jassim, S. K., & Khudhair, A. S. (2023)*. Nurses' knowledge and attitudes about enteral feeding complication by nasogastric tube in the intensive care unit. *Rawal Medical Journal*, 48(3), 689-691. <https://doi.org/10.5455/rmj.20230412124848>
- Attia, F. M., Mahmoud, M. H., & Mahmoud Abo El-Fadl, N. M. (2021)*. Effect of implementing nursing guidelines on nurses' performance regarding complications of nasogastric tube among critically ill patients. *Journal of Nursing Science Benha University*, 2(2), 586-600. <https://doi.org/10.21608/jnsbu.2021.194609>
- British Association for Parenteral and Enteral Nutrition, (2016)*, Enteral feed monitoring. Available at: <https://www.bapen.org.uk/education/nutrition-support/enteral-nutrition/enteral-feed-monitoring/>

- Daurelle, B. (2023).** Enteral nutrition: Recent advances in enteral nutrition and how our technology benefits. Hoist Medical. Available at: <https://hoist-medical.com/en/avancees-nutrition-enterale/>
- Hadera, T., Worku, T., & Tuli, W. (2022).** Nurses' knowledge, practice, and associated factors with enteral nutrition in adult intensive care units of public hospitals. *Ethiopian Journal of Health Sciences*, 32(2), 423–432. <https://doi.org/10.4314/ejhs.v32i2.23>
- Hyeon-Hwa, L., Mi Ah, H., Jong, P., So Yeon, R., Youn Kyoung, J., & Seong Woo, C. (2023).** Enteral nutrition practice and associated factors among intensive care unit nurses in South Korea. *Topics in Clinical Nutrition* 38(1), 36-46, <https://doi.org/10.1097/TIN.0000000000000295>
- Mahmoodpour, A., Sanaie, S., Momen, F., Pourmoghaddam, M. A., & Saghaleini, S. (2021).** Knowledge, attitude and practices of intensive care unit nurses towards nutritional care in critically ill patients. *Journal of Research in Clinical Medicine*, 9(1), 35-39. <https://doi.org/10.34172/jrcm.2021.035>
- Manyala, C., Oluchina, S., & Mbithi, B. (2022).** Assessment of socio-demographic factors influence on nurses' adherence to protocols on nasogastric tube feeding in a county Teaching and Referral Hospital, Kenya. *East African Medical Journal*, 99(2).
- Marengo, K., & Dix, M. (2018).** Enteral feeding: How it works and when its used. Healthline. Available at: <https://www.healthline.com/health/enteral-feeding>
- McLeod, S., & Guy-Evans, O., (2023).** Qualitative vs quantitative research methods and data analysis. Simply psychology. Available at: <https://www.simplypsychology.org/qualitative-quantitative.html>
- Mehrnoosh N., Alipour H., & Karimollahi M. (2018).** Performance of critical care nurses in nasogastric tube nutrition in Ardabil Hospitals. *Healthcare Journal*. <https://doi.org/10.29252/JHC.20.3.186>
- Moustafa, H. L. A., Mohamed, H. A., & Mohmoud, A. M. (2018).** Nurses' performance regarding tube feeding among critically ill patients. *Journal of Nursing and Health Science (IOSR-JNHS)*, 7(1), 30–36. <https://doi.org/10.9790/1959-0701033036>
- Mula, C. (2014).** Nurses' competency and challenges in enteral tube feeding in intensive care unit (ICU) and high dependency unit (HDU) of referral hospital, Malawi. *Malawi Medical Journal: The Journal of Medical Association of Malawi*, 26(3), 55–59.
- Nursing Council of Kenya (2021).** Manual of Clinical Procedures. 10th edition. Available at: https://library.daystar.ac.ke/cgi-bin/koha/opac-detail.pl?biblionumber=41951&shelfbrowse_itemnumber=82510
- Ojo, O. (2015).** The challenges of home enteral tube feeding: A global perspective. *Nutrients*, 7(4), 2524–2538. <https://doi.org/10.3390/nu7042524>
- Okuley, A. (2016).** Enteral nutrition: Definition and guidelines. Science Courses. Study.com. Available at: <https://study.com/academy/lesson/enteral-nutrition-definition-guidelines.html>
- Omondi, G. B., Serem, G., Abuya, N., Gathara, D., Stanton, N. A., Agedo, D., English, M., & Murphy, G. A. V. (2018).** Neonatal nasogastric tube feeding in a low-resource African setting - using ergonomics methods to explore quality and safety issues in task sharing. *BMC Nursing*, 17, 46. <https://doi.org/10.1186/s12912-018-0314-y>
- Sebunje, W. (2015).** Research techniques. Available at: <https://www.linkedin.com/pulse/research-techniques-william-sebunje/>
- Uniproject Materials, (2016).** How to calculate a reliable sample size using Taro Yamane method. Available at: <https://uniprojectmaterials.com/view-blog/how-to-calculate-a-reliable-sample-size-using-taro-yamane-method>
- Wang, X., & Cheng, Z. (2020).** Cross-sectional studies: Strengths, weaknesses, and recommendations. *Chest*, 158(1S), S65–S71. <https://doi.org/10.1016/j.chest.2020.03.012>
- Wangari, N. J., Omondi, L., & Maina, D. (2024).** Nurses' knowledge, attitude, and practice on enteral feeding of critically ill patients at Kenyatta National Hospital Critical Care Unit. *East African Journal of Health and Science*, 7(1), 22-23. <https://doi.org/10.37284/eajhs.7.1.1697>