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Nurses' Knowledge, Attitude, and Practice on Enteral Feeding of Critically ill Patients at Kenyatta National Hospital Critical Care Unit

Njuguna Joyce Wangari^{1*}, Lilian Omondi² & Dorcas Maina²

¹ University of Nairobi, P. O. Box 65780-00607, Kamiti, Kenya.

² University of Nairobi, P. O. Box 30197-00100, Nairobi, Kenya.

*Author for correspondence ORCID ID: <https://orcid.org/009-003-8185-244X>; Email: joycewangaringure@gmail.com

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Enteral feeding/nutrition is the most efficient nutritional support strategy used by critical care nurses to feed patients in critical care units (CCUs) who are unable to meet their dietary demands orally. In developing countries, most critically ill patients continue to receive low amounts of their dietary needs in the CCUs. Therefore, it is necessary to carry out investigations on the levels of knowledge, attitudes, and practices of critical care nurses attending to extremely ill patients. This study's objective was to determine the levels of knowledge, attitudes, and practices of critical care nurses on enteral feeding of critically ill patients at Kenyatta National Hospital (KNH) CCUs. The study adopted a cross-sectional quantitative study design. Using a stratified sampling design and proportionate sampling technique, a sample size of 135 critical care nurses was recruited. Data was collected using a standardised questionnaire. Inferential statistics, Pearson Chi-square (χ^2) or Fisher's exact tests were used to analyse the relationship between independent and dependent variables. A p-value of <0.05 was set as the significance criterion. Approximately 65.9% of the study participants noted adequate level of knowledge on enteral nutrition, followed by moderate (23.0%) and inadequate (11.1%) levels of knowledge. Most of the respondents (96.3%) had positive attitudes toward enteral feeding. About 54.7% of the study subjects had competent enteral feeding practices. The gender, age group, terms of service, level of qualification and work experience were not significantly associated with the levels of knowledge, attitudes, and practices on enteral feeding among critical care nurses. This study concluded that the critical care nurses had adequate knowledge, positive attitudes, and competent practices on enteral nutrition. The study recommends that critical care nurses must be provided with regular, continuous medical training on enteral nutrition to maintain a high level of knowledge, positive attitudes, and competent practices on enteral nutrition.

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INTRODUCTION

Enteral feeding/nutrition is the practice of ingesting liquid nutrition through feeding tubes (for instance, nasoduodenal, nasogastric, jejunostomy and gastrojejunostomy) beyond the oesophagus into the stomach (Allen and Hoffman, 2019; Jordan and Moore, 2020). Patients who have a partially functioning gut and cannot take food orally to meet their energy and nutritional needs can only receive nourishment through enteral feeding (Limketkai *et al.*, 2019). Enteral feeding has been documented to reduce gastrointestinal complication rates, increase gastrointestinal wound healing, maintain gastrointestinal function, and shorten hospital stays in critical care units (CCUs) (Komen, 2020). Nevertheless, complicated enteral nutrition methods like gastrostomy and jejunostomy require significant interventions (Compher *et al.*, 2022).

The American Society for Parenteral and Enteral Nutrition (ASPEN), ESPEN (European Society for Parenteral and Enteral Nutrition), and Canadian Critical Care Clinical Practice Guidelines (CCPGs) have shared evidence-based recommendations for nutritional therapy among patients who are extremely ill (De Lazzaro *et al.*, 2022). Several hospitals and healthcare facilities do have policies and standard procedures for enteral feeding practices. According to Lambell *et al.* (2020) and Crossfield *et al.* (2022), these feeding practices may not always adhere to the recommended guidelines. It is estimated that over 35% of extremely sick patients in CCUs are

malnourished, which increases their risk of infection, slows the healing of wounds, lengthens hospital stays, escalates healthcare costs, increases morbidity and mortality, and worsens their suffering (Huang *et al.*, 2019; Zheng *et al.*, 2022).

Critical care nurses play a significant role in the enteral feeding of extremely ill patients (Ramuada *et al.*, 2022). They evaluate calorie needs and initiate, titrate, and provide feed (Kim and Chang, 2019). Besides, they are responsible for the verification of tube placement and tube flushing (Crossfield *et al.*, 2022). It is also crucial that nurses are knowledgeable about complications related to enteral feeding, such as nausea, vomiting, diarrhea, aspiration pneumonia, and catheter obstruction, among others (Bloomer *et al.*, 2018). They follow guidelines and recommendations while administering enteral nutrition. However, malnutrition and underfeeding may occur due to gaps in nursing expertise, a failure to follow dietary recommendations, poor attitudes, and incompetent practices (Komen, 2020). As a result, nurses' knowledge, attitudes, and practices of enteral feeding have a great influence on the clinical outcomes of critically ill patients (Metin and Pars, 2020; Ramuadaa *et al.*, 2023). There are five CCUs in Kenyatta National Hospital (KNH) for patients who are critically ill. However, there was a paucity of literature on the level of knowledge, attitudes, and practices of critical care nurses on enteral feeding, hence the reason for this study.

RESEARCH METHODOLOGY

Study Design

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

Study Variables

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

Study Area

The KNH CCUs served as the study area. It is the largest health facility in Nairobi, Kenya, under the Ministry of Health. The KNH is also East and Central Africa's largest teaching and referral public hospital. The hospital has an inpatient capacity of 2,000 beds. There are five CCUs in the hospital: the main CCU and four satellite CCUs, two of which are located in medical wards in levels seven and eight, and cardiothoracic and neurological CCUs in level four. The total bed capacity is 40, including 21 beds in the main CCU and the remainder in the satellite CCUs.

Study Population

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

Eligibility Criteria

Inclusion Criteria

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

Exclusion Criteria

Critical care nursing students were not included in this study.

Sampling Design

Determination of Sample Size

The calculation of sample size used Cochran's (1977) formula with modifications, as described by Kotrlik and Higgins (2001). A total sample size of 135 critical care nurses was obtained.

Sampling Frame

A stratified sampling design was adopted in this study using a proportionate sampling technique. The researcher divided critical care nurses into four homogeneous subpopulations (CCUs satellites) and then applied simple random sampling techniques to each subpopulation.

Data Collection Methods

Data collection utilised a structured questionnaire with closed-ended questions. The critical care nurses were engaged by the principal investigator as well as research assistants. The research assistants guided the study participants through the consent form while outlining the study's goals, confidentiality, and privacy. This was carried out during their shift change after taking a report in the morning. Consenting nurses were issued with the questionnaires, and a follow-up was done to receive the completed questionnaires back.

Pre-test

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

Validity and Reliability Tools

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

Data Scoring system

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

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

The scoring system for nurses' practice on enteral feeding was calculated as follows: each competent practice was assigned a score of "1", and incompetent practice was assigned a score of "0". The scores for the eight questions were summed up and then expressed as percentages. The competent practices had scores of 75% or more of all practices, while the incompetent practices had scores of below 75% of all practices (Abdullah *et al.*, 2014).

Statistical Data Analysis

Raw data from the study participants were entered into Microsoft Excel Spreadsheet, cleaned, organised, and then exported to Statistical

Package for Social Science (SPSS) version 26.0 for statistical analysis. Descriptive statistics were represented using percentages and frequencies. Inferential statistics, Pearson Chi-square, or Fisher's exact tests (when a cell's expected count is lower than five) were used to analyse for an association between independent (nurses' characteristics) and dependent (enteral feeding outcomes) variables. The threshold of significance was set at p less than 0.05.

Study Limitations

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

Ethical Considerations

The KNH/University of Nairobi Ethical Research Committee (Ref: KNH-ERC/RR/987) approved this study. The KNH administration provided permission to conduct the research. Additionally, the enrolment of critical care nurses was approved by the KNH administration. The study was performed with the utmost confidentiality, rights to withdraw from research, anonymity, and privacy. Study participants were allowed to fill in the consent form before they were enrolled in the study.

RESULTS

Socio-Demographic Characteristics of Critical Care Nurses

Among the 135 sampled critical care nurses, female nurses were more than half, with a proportion of 63.7%, while male nurses were 36.3%. The study respondents aged 30-39 and ≥ 40 years old had almost the same proportion of 41.5% and 40.7%, respectively, while those with 20-29 years of age had a proportion of 17.8%. The nurses who were permanently employed were about two-thirds (68.1%), followed by those who were on contract and locum with proportions of 29.6% and 2.2%, respectively. The study participants with diploma qualifications were more than half with a proportion of 52.6%, followed by those who had bachelor's degrees with a proportion of 41.5%, while those with

master's degrees had the least proportion of 5.9%. The working experience of more than three years had a higher proportion of 63.7%, followed by those who had experience of 1-3 years with a

proportion of 21.5%, while those who had experience of less than one year had the least proportion of 14.8% (*Table 1*).

Table 1: Critical care nurses Socio-demographic characteristics

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

Scores of Knowledge on Enteral Feeding among Critical Care Nurses

The respondents were asked to answer nine questions about enteral feeding in the CCUs to assess their enteral feeding knowledge. Among the nine questions on knowledge of enteral nutrition, the question "How often do you perform a nutritional assessment on critically ill patients in

the CCUs?" had the most correct answers at 96.3% (130). In addition, 45.9% (62) of the respondents had the highest incorrect answers for two questions on knowledge of enteral feeding. These questions were "Do you check the gastric residual volume before initiating feed?" and "Do you conduct daily inspections of nostrils?" (*Table 2*).

Table 2: Scores of knowledge on enteral feeding among critical care nurses

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

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

Most of the critical care nurses had an adequate level of knowledge (65.9%), followed by moderate (23.0%) and inadequate (11.1%) levels

of knowledge. There was insignificant association between gender, age group, terms of service, level of qualification and work experience with the levels of knowledge on enteral feeding among critical care nurses attending critically ill patients in Kenyatta National Hospital CCUs ($p > 0.05$; Table 3).

Table 3: Relationship between level of knowledge on enteral feeding and socio-demographic characteristics among critical care nurses

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

n = sample size; df = degree of freedom

Scores of Attitudes Towards Enteral Feeding among Critical Care Nurses

In assessing the attitudes toward enteral feeding, the study participants were asked eight questions. Although questions 4, 5, 7, and 8 were reverse-

coded, the questions which had the highest number of respondents for strongly agree, agree, disagree, and strongly agree were 3 (84.4%), 1 (44.4%), 4 (59.3%) and 8 (45.9%) respectively (Table 4).

Table 4: Scores of attitudes towards enteral feeding among critical care nurses

Questions	Strongly agree	Agree	Disagree	Strongly disagree
Do you believe enteral feeding is the first feeding option in critically ill patients?	56 (41.5%)	60 (44.4%)	14 (10.4%)	5 (3.7%)
Do you believe it is crucial for critical care nurses to understand how to administer enteral feeding?	113 (83.7%)	20 (14.8%)	1 (0.7%)	1 (0.7%)
Do you feel responsible for the adequate provision of nutrition through enteral feeding to your critically ill patients?	114 (84.4%)	20 (14.8%)	1 (0.7%)	0 (0.0%)

Do you believe enteral feeding increases workload?	9 (6.7%)	19 (14.1%)	80 (59.3%)	27 (20.0%)
Do you believe it is difficult to administer enteral feeding?	8 (5.9%)	4 (3.0%)	67 (49.6%)	56 (41.5%)
Do you believe enteral feeding reduces hospital stay?	41 (30.4%)	60 (44.4%)	21 (15.6%)	13 (9.6%)
Do you believe enteral feeding causes unnecessary discomfort to your critically ill patients?	10 (7.4%)	21 (15.6%)	77 (57.0%)	27 (20.0%)
Do you believe tube feeding in critically ill patients is expensive and offers no benefits?	3 (2.2%)	2 (2.2%)	67 (49.6%)	62 (45.9%)

Relationship between Attitudes Towards and Socio-demographic Characteristics Enteral Feeding of Critical Care Nurses

Most of the respondents had positive attitudes towards enteral feeding at 96.3%. The gender, age

group, terms of service, level of qualification and work experience noted no significant relationship with attitudes towards enteral feeding among critical care nurses attending critically ill patients in KNH CCUs ($p > 0.05$; Table 5).

Table 5: Relationship between attitudes towards enteral feeding and socio-demographic characteristics among critical care nurses

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

df = degree of freedom; n = sample size

Scores of Practices on Enteral Feeding among Critical Care Nurses

In the determination of practices on enteral feeding, this study used eight questions. The question "Do you give hospital kitchen feeds like soups and milk to patients on tube feeding?" had the highest competent practices of 100% (135),

followed by the question "Do you verify tube placement at least once in a day before commencing tube feeding in the unit?" with 99.3% competent practices. The question with the highest incompetent enteral feeding practices at 43.7% (37) was, "Do you perform nutritional assessment on patients in the unit at least once a week?" (Table 6).

Table 6: Scores of practices on enteral feeding among critical care nurses

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

Relationship between practices on Enteral Feeding and Socio-demographic Characteristics among Critical Care Nurses

Approximately 55.6% of the study participants had competent enteral feeding practices, whereas 44.4% had incompetent enteral feeding practices.

The gender, age group, terms of service, level of qualification and work experience were not significantly associated with practices of enteral feeding among critical care nurses attending critically ill patients in KNH CCUs ($p > 0.05$; Table 7).

Table 7: Relationship between practices on Enteral Feeding and Socio-demographic characteristics among critical care nurses

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

df = degree of freedom; n = sample size

DISCUSSION

Patients who are extremely ill are hypermetabolic and have greater energy needs due to their disease status (Darawad *et al.*, 2018). Enteral nutrition remains the most effective nutritional support approach for severely ill patients in the CCUs (Allen and Hoffman, 2019). Enteral nutrition enhances intestinal immune function, reduces the risk of infection, promotes wound healing, lowers healthcare expenses, shortens the time of stay in the CCUs and lowers morbidity and mortality (Quiroz-Olguín *et al.*, 2021; Zheng *et al.*, 2022). Critical care nurses usually implement nursing interventions that contain all necessary components of nursing care, among them the administration of enteral nutrition in critically ill patients (Jordan and Moore, 2020). The critical care nurses' knowledge, attitudes, and practices on enteral nutrition, therefore, influence the outcomes of enteral feeding (Komen, 2020).

This study demonstrated that about two-thirds of the critical care nurses noted an adequate level of knowledge of enteral nutrition (EN). According to the findings, the nurses were equipped with adequate knowledge of EN. This could be attributed to the fact that critical care nurses received sufficient fundamental knowledge throughout their basic nursing education and in-service refresher training sessions or as a result of maintenance of concise and up-to-date guidelines that critical care nurses could quickly access and adhere to while at work (Ahmed *et al.*, 2018; Mohamed *et al.*, 2021). Nurses' knowledge regarding enteral feeding is crucial in reducing critically ill patients' morbidity and mortality, as well as minimising complications associated with enteral feeding (De Lazzaro *et al.*, 2019; Ramuada *et al.*, 2022). Similar studies have also reported adequate knowledge of enteral nutrition among critical care nurses attending extremely sick patients in CCUs. For instance, studies conducted by AIOtaibi and Abdelavi (2022) and Mahmoodpoor *et al.* (2021) noted that critical care nurses had adequate knowledge of enteral nutrition.

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

On the other hand, other similar studies did not reveal an association between critical care nurses' knowledge of enteral feeding with gender, age group, level of qualification, terms of service and working experience of nurses attending critically ill patients in the CCUs. For instance, a study by Mohamed *et al.* (2021) documented a significant association between the level of qualification and working experience with the level of knowledge of enteral nutrition among nurses attending critically ill patients in the CCUs of Ain-Shams University Hospitals, Cairo, Egypt. Besides, a study by Hadera *et al.* (2022) also noted that the level of qualification was significantly associated with knowledge of critical care nurses in the CCUs of Public Hospitals in Addis Ababa, Ethiopia.

The present study also assessed the attitudes of critical care nurses towards enteral nutrition in KNH's CCUs. Overall, the critical care nurses had a positive attitude towards enteral nutrition, with a proportion of 96.3%. Most of the respondents felt that it was their responsibility to provide adequate nutrition through enteral nutrition to severely ill patients. In addition, they believed it was important to understand how to administer enteral feeding. The presence of less positive attitudes toward EN among critical care nurses may have effects on the quality of care (El-sol and

Mohammed, 2018). The findings of this study concurred with previous studies by Mahmoodpoor *et al.* (2021) and Ramuada *et al.* (2022) that reported a positive attitude regarding enteral feeding among critical care nurses. Nevertheless, a study by Mohamed *et al.* (2021) found that critical care nurses had a negative attitude towards enteral nutrition in the CCUs of Ain-Shams University Hospitals, Cairo, Egypt.

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

This study also reported that about 54.7% of the critical care nurses had competent enteral feeding practices. Competent practices regarding enteral nutrition can assist in minimising associated complications such as aspiration pneumonia, diarrhea, and catheter obstruction, among others (Ramuada *et al.*, 2022). Incompetent nursing practices may result in hypocaloric feeding or complications related to enteral feeding (Tatsumi, 2019; Jordan and Moore, 2020). The findings of this study corroborated with those of earlier studies, which assessed practices of enteral feeding. According to a study by Margrate *et al.* (2018), the critical care nurses attending critically ill patients had competent practices of enteral nutrition. However, the findings contradicted those of Hedera *et al.* (2022), who reported that critical care nurses had incompetent practices of enteral feeding in adult CCUs of Public Hospitals in Addis Ababa, Ethiopia.

There was an insignificant relationship between the critical care nurses' gender, age group, terms of service, level of qualification, and work experience with the practices of enteral nutrition

at KNH CCUs. The study findings were inconsistent with those of Mohamed *et al.* (2021), who documented that critical care nurses' age, level of qualification and work experience were significantly associated with practices of enteral nutrition at paediatric CCUs in Ain-Shams University Hospitals, Cairo, Egypt. Also, Mahmoodpoor *et al.* (2022) revealed that nurses' practices had a significant association with age and work experience in the CCUs of two hospitals at Tabriz University, Iran.

CONCLUSIONS

The study concluded that the critical care nurses attending critically ill patients had an adequate level of knowledge, positive attitude, and competent practices of enteral feeding at KNH CCUs. In addition, the critical care nurses' gender, age group, terms of service, level of qualification and work experience were not significantly associated with the levels of knowledge, attitudes, and practices of enteral feeding.

Recommendations

The current study recommends that critical care nurses in KNH CCUs should be encouraged to continue building and enhancing their knowledge of enteral nutrition via educational programs and participation in educational seminars, as well as on how to safely administer enteral feeding. This will ensure continuity of nursing care, given that the respondents had adequate knowledge, positive attitudes, and competent practices.

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Conflict of Interest

The authors have no conflict of interest.

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