



Department of Emergency and critical care medicine,

St. Paul Hospital Millennium Medical College

**Knowledge, Attitude and Practices Among Health Care Providers on
Nutrition in Intensive Care Unit in Selected Tertiary Hospitals In Addis
Ababa, Ethiopia.**

By Shallo Alemu (year II Emergency and critical care medicine resident)

**A Research Proposal Submitted to the Department of Emergency and Critical
Care Medicine for the Partial Fulfillment of the Specialty Certificate in
Emergency and Critical Care Medicine**

Addis Ababa, Ethiopia

November 2023.

St. Paul Hospital Millennium Medical College
Department of Emergency and Critical Care Medicine

**Knowledge, Attitude and Practices Among Health Care Providers on
Nutrition in Intensive Care Unit in Selected Tertiary Hospitals In Addis
Ababa, Ethiopia.**

Investigator: Shallo Alemu (year II ECCM resident)

**Advisors: Dr Ayalew Zewdie, Associate professor of ECCM
Dr Bruktawit Zemedet, Assistant professor of ECCM**

**A thesis Submitted to the Department of Emergency and Critical Care
Medicine for the Partial Fulfillment of the Specialty Certificate in Emergency
and Critical Care Medicine**

Addis Ababa, Ethiopia
November 2023.

Name of investigator	Shallo Alemu, year II ECCM resident
Full title of the research project	Knowledge, attitude and practices among health care providers on nutrition in ICU in selected tertiary hospitals in Addis Ababa, Ethiopia.
Duration of the project	Six months
Study Area	Addis Ababa tertiary hospitals
Total Cost of the project	23,204.00 birrs
Source(s) of Funding	SPHMMC
Address of investigator	Cell Phone: +251912322228 Email: shalloalemu12@gmail.com
Name and address of Advisor(s)	1. Dr Ayalew Zewdie, Associate professor of ECCM Phone: +251960367958 Email: ayalew.zewdie@gmail.com 2. Dr Bruktawit Zemedede, Assistant professor of ECCM Phone: +251910141649 Email: biruktawit.zemedede@sphmmc.edu.et

Assurance of Principal Investigator

I the undersigned agree to accept all responsibilities for the scientific and ethical conduct of the research project. I will provide timely progress report to my advisor and seek the necessary advice and approval from my primary advisors in the course of the research. I will communicate timely to my advisors all stakeholders involved in the study including any source of funding for this research.

Name of the student: _____

Signature: _____

Date: _____

Approval of the Primary Advisor

Name of the primary advisor: _____

Signature: _____

Date: _____

Approval of the Co-Advisor

Name of the primary advisor: _____

Signature: _____

Date: _____

Acknowledgment

First and foremost, glory all be to my holy savior Jesus Christ for his love and forgiveness. I would like to express my sincere gratitude to my advisors Dr Ayalew Zewdie (Associate professor of ECCM) and Dr Bruktawit Zemedie (Assistant professor of ECCM) for their guidance and support throughout development of this thesis proposal. My heartfelt gratitude also goes to SPHMMC ECCM department for giving me this chance to conduct this study! Last but not the least I would like to thank department of respective intensive care units of hospitals in which I'm going to conduct my study. Finally, I would like to acknowledge the contributions of the many scholars whose work has informed and inspired this research

Contents

Assurance of Principal Investigator	3
Acknowledgment	4
Abstract	8
1. Introduction	9
1.1. Background	9
1.2. Statement of the problem	10
1.3. Significance of the study	10
2. Literature review	11
3. Objectives	15
3.1. General objective	15
3.2. Specific objectives	15
4. Methodology	16
4.1. Study setting and period	16
4.2. Study design	16
4.3. Study period	16
4.4. Study population	17
4.5. Inclusion and exclusion criteria	17
4.6. Sample size calculation	17
4.10. Data quality assurance	18
4.11. Data process and analysis	19
4.12. Ethical consideration	19
4.13. Dissemination of results	19
Conclusions	32
References	34
ANNEX 1: Questionnaires.	37
Annex: II Consent Explanation	42

List of figures and tables

<u>Table 1. sociodemographic characteristics of respondents from four ICU in Addis Ababa Ethiopia, 2024</u>	20
<u>Figure 1. knowledge among respondents working in ICU of 4 teaching hospitals in Addis Ababa 2024</u>	21
<u>Table2. Knowledge questions among respondents working in ICU of 4 teaching hospitals in Addis Ababa 2024</u>	22
<u>Figure 2. Attitude among respondents working in ICU of 4 teaching hospitals in Addis Ababa 2024 on feeding in critically ill</u>	23
<u>Table 3. Attitude questions among respondents working in ICU of 4 teaching hospitals in Addis Ababa 2024</u>	24
<u>Figure 3. practice among respondents working in ICU of 4 teaching hospitals in Addis Ababa 2024 on feeding in critically ill</u>	25
<u>Table 3. Practice among respondents working in ICU of 4 teaching hospitals in Addis Ababa 2024</u>	25
<u>Figure 4: sources of information relied on by respondents among respondents working in ICU of 4 teaching hospitals in Addis Ababa 2024 to guide their ICU feeding practices</u>	26
<u>Table 4: Perceived barrier to provide optimal nutritional support in ICU among respondents working in ICU of 4 teaching hospitals in Addis Ababa 2024</u>	27
<u>Table 5: Factors associated with KAP among respondents on feeding in critically in Teaching hospital in Addis Ababa Ethiopia, 2024 (Bivariable analysis)</u>	29

Acronyms and Abbreviations

AaBET - Addis Ababa Burn, Emergency and Trauma Care

ACCPM – Anesthesia critical care and pain medicine

ASPEN - American Society for Parenteral and Enteral Nutrition

ECCM – Emergency and critical care medicine

ICU – intensive care unit

IM – internal medicine

NG – Nasogastric tube

PEG – Percutaneous endoscopic gastrostomy

SPHMMC – Saint Paul’s hospital millennium medical college

Abstract

Background: Proper nutrition support in critically ill patients is essential for maintaining optimal nutritional status, preventing malnutrition, and supporting overall recovery. Adequate and timely enteral feeding in the ICU helps preserve lean body mass, promote immune function, enhance wound healing, and support organ function. It's essential for providers in ICU to be well-informed, have positive attitudes and able to apply state of art practices to feeding critically ill patients for better outcomes. This study is conducted to assess knowledge, attitude and practice of first line health care providers in ICU, nurses and resident physicians.

Methods: this study was designed multicenter cross-sectional survey by using structured self-administered close ended questions. Four ICU settings of teaching hospitals were conveniently selected and all nurses, ECCM, ACCPM and IM resident physicians working in these ICU during study period were included in the study. Simple The sample size was 230 with response rate 100%. The study was conducted from December 01, 2023 to May 30, 2024. Data were entered in to EpiData and SPSS 26. The correlation between independent variables and dependent variables was estimated using bivariate and multivariate logistic regression at a 95% confidence level.

Results: The level of good knowledge and practice among respondents were 58% and 68.8% respectively. Respondents who worked in ICU for 1 – 5 years are 3.2 times likely to have better knowledge better knowledge ($p = 0.002$ AOR 5.112, 95% CI 2.156 – 12.116) than those who worked in ICU for less than one year. Likewise, those respondents who worked in ICU for above 5 years have 7.89 odds of having better knowledge when compared with those less than one year (AOR 7.890, 95% CI 1.695 – 36.722). ECCM residents are 13.354 times better in having adequate knowledge when compared to nurses (AOR 13.354, 95% CI 4.222 – 42.235). Likewise, IM residents are found to have 2.93 times adequate knowledge when compared to nurses (AOR 2.936 95% CI 1.091 – 7.900). Females are 10.68 times likely to have good practice when compared to males (AOR 3.323 95% CI 1.613 - 6.844). Besides, ECCM residents are 61.871 times better practice when compared with nurses on feeding in critically ill (AOR 61.871, 95% CI, 15.338 - 249.577). Likewise, IM residents are 7.188 times better in their practice when compared to nurses (AOR 7.188, 95% CI 2.235 - 23.118) and ACCP residents are 5.556 times likely to have better practice when compared with nurses (AOR 5.556, 95% CI 1.736 - 17.783). Most of respondents 159(66%) still routinely check for gastric residual regardless of whether the patient is tolerating feeding or not.

Conclusion:

This study underscores the critical need for comprehensive education and consistent practices among ICU health care providers regarding enteral feeding. With over half of the respondents demonstrating adequate knowledge and higher percentage exhibiting good practice, it is evident targeted training can significantly, enhance health care. Despite these advancements, routine practices like gastric residual checking indicates the need for adherence to ongoing updates

Introduction

1.1. Background

The intensive care unit (ICU) is a specialized medical facility within a hospital that provides critical care to patients with life-threatening conditions or severe illnesses. The ICU is staffed by a highly skilled and multidisciplinary team of healthcare professionals, including doctors, nurses, respiratory therapists, and other specialists. It is equipped with advanced monitoring equipment, life support systems, and specialized technology to closely monitor and support the vital functions of critically ill patients.

Diseases accounting for admission to ICU varies greatly among ICUs in different setups. In Ethiopian context patients with cardiovascular diseases accounted for the majority of admissions (26%), followed by those with neurological disorders (19.8%) and infectious diseases (20%). With 16% of admissions for each, diabetic ketoacidosis and heart failure were the most common specific causes to the unit, followed by stroke (15.2%)(1,2)

Nutrition plays a crucial role in the care and recovery of ICU patients by supporting healing and recovery, preserving lean body mass, enhancing immune function, improving respiratory function and decreasing length of stay there of.

Nutrition support in ICU refers to enteral or parenteral provision of calories, protein, electrolytes, vitamins, minerals, trace elements, and fluids. American Society of Parenteral Nutrition (ASPEN) recommends using the enteral route of feeding whenever possible, as it is associated with fewer complications compared to parenteral nutrition. Early initiation of enteral nutrition is recommended within 24-48 hours after admission to the ICU, unless contraindicated. Trophic or low-volume enteral feeding may be considered initially, gradually advancing to meet energy and protein goals(3)

The knowledge and attitude of health professionals play a crucial role in the provision of nutrition in the Intensive Care Unit (ICU). The understanding and expertise of healthcare providers regarding nutrition-related principles and practices significantly impact the delivery of optimal nutrition support to critically ill patients. Furthermore, their attitudes towards nutrition, including their beliefs, values, and perceptions, can influence their decision-making and implementation of nutrition interventions(4,5).

Health professionals with comprehensive knowledge of nutrition in the ICU possess an understanding of the nutritional requirements of critically ill patients, the impact of malnutrition on outcomes, and the appropriate methods for assessing nutritional status. They are familiar with the various routes of nutrition delivery, such as enteral feeding or parenteral nutrition, and understand the indications and contraindications for each method. This knowledge enables them to make informed decisions regarding the type, timing, and dosage of nutrition support, tailored to the individual patient's condition(5–8).

Enteral feeding formulas in ICU vary from setting to setting but are required to be iso-osmolar to plasma with calorie density of 1 kcal/mL, made up of protein content of about 40 g/1000 mL, mixture of simple and complex carbohydrates, fats and essential vitamins, minerals, and

micronutrients. These formulas can be standard, high protein, fiber containing or disease specific(3).

Enteral feeding is administered via NG tube, gastrostomy tube, feeding jejunostomy tube, Percutaneous Endoscopic Gastrostomy (PEG) or Percutaneous Endoscopic Jejunostomy (PEJ)(3).

1.2. Statement of the problem

The knowledge, attitudes and practices of health care providers on nutrition in the Intensive Care Unit (ICU) significantly influence the provision of nutritional support and affect outcomes of ICU care (5,9,10). However, there is a gap in understanding the current level of knowledge and adherence to best practices among healthcare professionals in the ICU setting in Ethiopia. Despite the high ICU mortality rate in Ethiopia 39.70% (95% CI: 33.66, 45.74)(11) and inadequate nutrition as one of top contributors to death (AHR:3.56, 95% CI (2.20–5.78) (2), studies are lacking in Ethiopia to identify gaps in ICU nutrition provision to critically ill and develop interventions to address the problem.

Hospital based retrospective follow up study of 388 patients admitted to surgical intensive care unit in 2019 – 2022 G.C in Ethiopia showed absence of enteral nutrition as one of cause of death among 38.1% patients died in ICU (AHR:3.56, 95% CI (2.20–5.78)(2).

1.3. Significance of the study

The finding of this study is a grand input to be used by facilities that have been delineated with knowledge and practice of health care providers working in ICU about enteral feeding.

It highlights importance of up-to-date practices and the need for regular training.

By doing so, it supports the development of hospital ICU feeding protocol. In addition, it opens avenues for further research, such as exploring reasons behind gender disparities in practices. It lays foundation for evaluating the long- term impact of improved training programs on patient outcomes.

Finding of this study adds valuable data to the existing body of knowledge on feeding practices in the ICU. Comparative analysis of these findings with previous studies will enable understanding of regional and contextual differences in enteral feeding practices in critically ill. By identifying areas where knowledge and practice can be improved, it provides a basis for designing more effective educational interventions for ICU staff.

2. Literature review

Knowledge among healthcare professionals regarding ICU feeding encompasses an understanding of the nutritional requirements of critically ill patients, the indications and contraindications for enteral and parenteral nutrition, and the management of complications associated with feeding. This includes knowledge of different feeding formulas, methods of administration, and monitoring techniques. Additionally, knowledge of the impact of nutrition on patient outcomes, such as the prevention of malnutrition and its associated complications, is crucial(5,9,12,13).

Adequate nutritional support is essential to meet the increased metabolic demands, promote wound healing, and improve patient outcomes. Feeding critically ill patients is a crucial aspect of their care, as adequate nutrition plays a significant role in their overall recovery and outcomes. Critically ill patients often experience a state of hypermetabolism and increased nutrient requirements due to the stress response and tissue repair processes(14).

Inadequate knowledge is one of barrier against provision of optimal nutrition in ICU.(5)Inadequate knowledge attitude was reported by 67.7% from 196 nurses participated in cross-sectional study in Ethiopia (15); 54% of 174 ICU nurses in public hospitals in Yemen sampled to descriptive cross-sectional study(8).

Studies show different factors that affected knowledge of providers on ICU feeding. While it's logical to think that the better level of education is the better knowledge will be, study done in Ethiopia showed that holders of a bachelor's degree were less likely to be knowledgeable than diploma holders (AOR= 0.24, 95% CI: (0.61, 0.93)). This logic is supported by other study from Yemen which showed significant correlation between the participants' overall level of knowledge of EN care and their educational background ($P=0.011$) and sources of knowledge about EN ($P=0.050$)(8,15)

A multi-center cross-sectional study performed at governmental and nongovernmental hospitals in Palestine included 405 physicians and nurses indicated that Pearson score between knowledge, attitude and practice scores of the respondents was $r = 0.134$, ($p < 0.001$). The results shows that those with more knowledge were more likely to have a positive impact on nutrition care(5).

Evidences showed that early enteral feeding within 24 – 48 hours is associated with less gut permeability, diminished activation, and release of inflammatory cytokines (ie, tumor necrosis factor [TNF] and reduced systemic endotoxemia). (16) Retrospective cohort study of 110 trauma patients admitted to ICU in which 68 aged 50 ± 16.7 years patients were initiated on early enteral feeding and another 42 patients aged 49 ± 13.5 years received delayed enteral nutrition; delayed feeding was associated with prolonged hospital stay (81.4 ± 44.7 days vs. 76.84 ± 41.4 days, $p=0.01$), wound site infections (26.2% vs 10.3% , $p=0.03$)(17). Practically, though, there exists different practices among health care providers all over the world. Most of nurses (83.2% of 140 nurses from Iran interviewed initiate feeding within 24 – 48 hours of ICU admission(9), while the time to initiate feeding by physicians varied between level of training as, attending doctors, fellows, and residents reporting waiting an average of 2.43, 1.79, and 2.63 days, ($P = .613$)(10).

On the other hand, poor practice of enteral nutrition was reported by 53.8% of 196 nurses recruited to cross sectional study on public hospitals in Ethiopia with the practice being significantly associated with nurses' age (AOR = 0.023, 95% CI: (0.001,0.52)), nurses receiving enteral nutrition training (AOR = 1.951, 95% CI: (0.06, 0.60)), and nurses from ICUs having a guideline and protocol on enteral feeding practice (AOR = 3.401, 95 % CI: (1.186, 9.789)(12) Other study, however, found no statistically significant association between years of experience and practice (5).

Delayed initiation of feeding in critically is also attributed to patient's clinical conditions. Multicenter survey of critical care nursing practitioners in Canada found the five most significant barriers to adequate enteral nutrition from nursing perspective as follows; other aspects of patient care taking precedence over nutrition, lack of feeding pumps, lack of enteral formula on the unit, difficulties obtaining small bowel access in patients who do not tolerate enteral nutrition, and lack of or insufficient dietitian coverage on weekends and holidays(18)(19).

Accordingly, perceived barriers for health care providers in ICU to provide adequate nutrition to patients vary from setting to setting. While "Delay in physician ordering EN initiation" (3.33 ± 1.32) and "Waiting for dietitians to assess patients" (3.22 ± 1.20) were the two most significant perceived barriers among 244 medical professionals who work in pediatric and adult intensive care units in Saudi Arabia hospitals recruited cross-sectional study on 24 potential barriers on ICU feeding in the year 2022; other study done in multicenter hospitals in Jordan which

included 131 nurses showed most common barrier to adequate ICU nutrition was found to be lack of enough nursing staff to deliver adequate nutrition” ($M=4.80$, $SD=1.81$, 60%), followed by “Fear of adverse events due to aggressively feeding patients” ($M= 4.59$, $SD=1.50$, 56%)(20,21).

Whilst knowledge among health professionals is limited due to inadequate training (12,22), specifically designed education program based on deductive lectures in quasi-experimental design, nurses' understanding of enteral nutritional assistance improved significantly after lectures (mean change 14.2%, $p.001$). They improved in the importance of nutrition (14.2%, $p.001$), nutritional assessment (11.7%, $p.001$), nutrition care planning and implementation (4.1%, $p.003$), complications prevention (8.5%, $p.001$), and nutrition evaluation (15.4%, $p.001$). Notably, although not dramatically, awareness of dietary goals increased(23)

Attitude regarding enteral feeding in ICU entails recognizing the significance of early initiation of feeding, promoting interdisciplinary collaboration to develop individualized feeding plans, and advocating for adequate resources and support for nutritional assessment and monitoring(24)

A multi-center cross-sectional study performed at governmental and nongovernmental hospitals in Palestine included 405 physicians and nurses showed that with an interquartile range of 16.00–20.00, the median attitudes score regarding malnutrition and nutrition care is 18.00. Only a small percentage of respondents knew when to refer (13.1%) and when the patient was at risk or malnourished (11.9%), while a quarter of respondents felt they knew how to refer to a dietitian (23.2%). 51.1% of participants agreed that they need more training to better support the patients' nutritional needs, while 9.6% of participants strongly indicated that they knew some strategies to support patients' food intake at mealtime(5)

There are four methods of enteral nutrition administration; continuous, cyclic, intermittent, and bolus feedings. Though the available literature lacks significant evidences to suggest best feeding method Descriptive multicenter study done on 253 ICU nurses in Jordan showed that the most common method, practiced by enrolled nurses, of administering food was by gastric feeding using a Naso-gastric tube (NGT) (mean: 3.76), followed by percutaneous endoscopic gastrostomy (PEG) (mean: 2.48) (25,26).

Measurement of gastric residuals routinely before each feeds correlates poorly with aspiration risk, rather decreases in calorie delivery to critically ill who needs optimal nutritional delivery (27) But, studies found that it's practiced among nurses in Ethiopia, 39.1% of 196 nurses surveyed in cross-sectional study on public hospitals in Ethiopia(12).

Collectively, the knowledge, attitude, and practice of healthcare providers regarding ICU feeding have a direct impact on patient care and outcomes. When providers are well-informed, hold positive attitudes, and consistently apply evidence-based practices, they can effectively prevent and address malnutrition, reduce complications, enhance immune function, promote wound healing, and improve overall patient recovery. Therefore, ongoing education, training, and quality improvement initiatives are essential to ensure that healthcare providers maintain up-to-date knowledge, foster positive attitudes, and consistently implement best practices in ICU feeding(3–5).

3. Objectives

3.1. General objective

To assess the knowledge, attitudes and practices of health care providers on nutrition in ICU in selected tertiary hospitals in Addis Ababa

3.2. Specific objectives

- To determine the knowledge of health care providers on nutrition in ICU in selected tertiary hospitals in Addis Ababa during period from December 01, 2023 to May 30, 2024.
- To find out attitudes of health care providers on nutrition in ICU in selected tertiary hospitals in Addis Ababa during period from December 01, 2023 to May 30, 2024.
- To identify practices of health care providers on nutrition in ICU in selected tertiary hospitals in Addis Ababa during period from December 01, 2023 to May 30, 2024.

4. Methodology

4.1. Study setting and period

The study was conducted at four conveniently selected ICU settings of tertiary hospitals in Addis Ababa, capital city of Ethiopia.

The city is divided into 11 sub-cities and has 49 hospitals. Thirteen are public hospitals. Thirteen of the city's hospitals are public. Furthermore, the city has 51 health centers and 700 different level private clinics(28)

There are 15 ICU in public hospitals in Addis Ababa each with 3-15 beds totaling 103 beds; all having mechanical ventilator capacity; 93% have ultrasound and 53% have intensivist staff(29)

AaBET Hospital located in Addis Ababa, Ethiopia is an emergency and trauma center that provides emergency medical services and critical care to patients. The hospital has a dedicated critical care unit that provides specialized care to critically ill patients. The ICU entails 14 beds and is run by Emergency and critical care medicine (ECCM) department.

SPHMMC is one of the rapidly growing tertiary care centers in Addis Ababa, Ethiopia. Almost all specialty programs are given and one of them is Emergency and Critical care medicine specialty programs. This ICU also has 15 beds with ventilators and functional closed suctioning system, medical air and is run by separate intensive care unit.

Ethiopia's largest general public hospital, Black Lion Hospital (Tikur Anbesa in Amharic), is one of the nation's university hospitals. The Ministry of Health (MoH) donated Black Lion Hospital, the biggest referral hospital in the nation, to Addis Abeba University (AAU) in 1998 so that the faculty could use it as their primary teaching hospital. With the most senior specialists on staff, the faculty at this health training institution is the biggest and oldest in the nation. There are 60 resident physicians and 56 nurses working at Black Lion ICU. The ICU here has 12 beds and is run by department of anesthesia and critical care.

Alert Comprehensive Specialized hospital emergency and critical care is established as department since 2020 G.C and is staffed by 64 nurses, 20 general practitioners, and 8 senior physicians with dedicated 12 ICU beds and is run by the department.

4.2. Study design

This study was multicenter cross-sectional survey by using structured self-administered close ended questions.

4.3. Study period

The study was conducted from December 01, 2023 to May 30, 2024 with the prepared questionnaires.

4.4. Source population

All health care providers working in ICU setting of selected tertiary hospitals in Addis Ababa Ethiopia.

4.4. Study population

All health care provider who fulfilled the inclusion criteria from the selected ICUs in tertiary hospitals in Addis Ababa.

4.5. Inclusion and exclusion criteria

Inclusion criteria

- All Nurses, and physicians working in ICUs of selected tertiary hospitals during the study period.

Exclusion criteria

- Professionals unwilling to participate
- Professionals who have less than 6 months experience in the ICUs
- Practicing residents who came from other institutions for detachment
- Dietitian
- Respiratory therapist
- Senior physicians
- General practitioners

4.6. Sample size calculation

The sample size for the study will be determined using single population proportion formula below

$$n = \frac{(Z \alpha/2)^2 \cdot pq}{d^2}$$

✓ n =required sample size

✓ $p=0.50$

✓ $d=0.05$

✓ $Z\alpha/2=1.96$ with $CI=95\%$

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

Non response rate = 10% $\rightarrow 384 + 38.4 = 422$ Based on this assumption 422 participants are required.

Total number of staffs in selected ICU settings are 600, and calculated sample size is greater than five percent of this, using the correction formula to estimate final sample size (nf.) from a finite target;

Population (N): Thus $nf = \frac{n}{1+n/N} = 422/1+422/500 = 244$. Final sample size is 244.

4.7. Sampling technique

The study was conducted by using simple random sampling of study participants after probability proportionate to size allocation formula is done and sample size to be obtained from each hospital is known, such that $n_i = (N_s / N) * n$ where:

n_s is the sample size allocated to stratum i .

N_s is the population size of stratum i .

N is the total population size.

n is the desired total sample size.

4.8. Variables

Independent variables

- Experience in ICU in years
- Sex
- Profession
- Experience
- Type of residency
- Level of residency
- Prior training on enteral feeding

Dependent variables

- Knowledge
- Attitude
- Practice

4.9. Data collection methods & techniques

Structured close ended questionnaires were distributed to the study participants. The questionnaire was developed by deductive approach from previous literatures(8,9,18,30). It has four parts; the first part entails sociodemographic status of respondents. Part two of the questionnaire has 8 questions and test basic knowledge of participants. The questions in this part are basic and considered professional roles and responsibilities and test what is common to most health professionals. Part three of the of the questionnaire has 10 questions based on Likert scale and tests attitude of participants on nutrition in ICU and last one, part four, entails 12 questions on practice among providers on ICU nutrition.

4.10. Data quality assurance

A pretest was done on 5% of the study sample patients. Before the data collection period, one-day training was given for data collectors. Onsite supervision was given to solve any doubt with data collection tools and techniques. The collected informations were checked for consistency & completeness by the principal investigator on a daily basis. Data cleaning was checked by the codebook for any missing values and data errors

4.11. Data process and analysis

Data was cleaned, entered into EpiData version 4.6, and exported to SPSS Version 26 for analysis. Frequency and percentage were used to describe the descriptive natures of the patients. Descriptive statistics, cross-tabulation and chi-square test, and regression analysis of knowledge, attitude and practices on nutrition in ICU of studied participants was done and adjusted odds ratio (AOR) with 95% confidence intervals (CIs) was reported to measure the strength of association. Variables having a p-value <0.05 were be considered statistically significant. Goodness of fit of the final model was checked using Hosmer and Lemeshow test considering good fit at P-value > 0.05 .

4.12. Ethical consideration

Ethical clearance was obtained from the research directorate of SPHMMC, institutional review board (SPHMMC-IRB) before the start of the study and also from SPHMMC ethical review committee. During data collection, the names of study participants were not be included and confidentiality was reassured through code numbers.

4.13. Dissemination of results

The result of this study is submitted to the SPHMMC Department of Emergency and Critical Care as partial fulfillment of the certificate in the postgraduate course and will be presented to the university community as part of the research thesis defense and disseminated to the SPHMMC, and scientific community at a large

4.14. Operational definition

Knowledge – arranged informations and understandings stored in memory about nutrition in ill ICU patients. Each answer for knowledge questions will be given a “1” score for correct answers and “0” for incorrect answers. It’ll be scored out of 8 marks and will be changed to percentage. Adequacy of knowledge will be based on previous studies (8,9,12)

Adequate Knowledge – those who scored $\geq 65\%$.

Inadequate knowledge - those who scored below 65%.

Attitude - it is a positive or a negative view the way professionals think about enteral feeding in critically ill.

Positive attitude – those who respond with I, II or III of Likert scale on questionnaire. Attitude part of this survey has 10 questions weighed out of 50. Of the total 50 marks those who scored 25 or above are said to have positive attitude.

Negative attitude – others who scored below 25 are said to have negative attitude.

Practice: the act of ordering or giving enteral feeding; following adequacy, complications and managing complications of enteral feeding.

Good practice –practice of enteral feeding as the international societies like ASPEN standard. and above.

Bad practice = practice of enteral feeding below standard.

5. Results and discussions

5.1.Sociodemographic characteristics

This study was conducted on 240 respondents who work in intensive care unit in four teaching hospitals in Addis Ababa. The mean age of respondents is 30.8 (± 3.57). Of total 240 respondents male comprise 64.6% with male to female ratio of 1.8:1. 180 (75%) were resident physicians and the remaining were nurses in profession. Only 10 (4.2%) of respondents had prior training on feeding in ICU.

Most of respondents, 160(66.7%) worked in ICU for 1 - 5 years.

Table 1. sociodemographic characteristics of respondents from four ICU in Addis Ababa Ethiopia, 2024

Variables (n=240)	Category		Frequency	Percent
	21-30 years		165	68.7
	31- 40 years		75	31.3
Sex	Male		155	64.6
	Female		85	35.4
Experience in ICU	Less than 1 year		40	16.7
	1 – 5 years		160	66.7
	Above 5 years		40	16.7
Prior training in ICU	Yes		10	4.2
	No		230	95.8
Profession	Physicians	ECCM residents	60	25
		ACCPM residents	60	25
		IM residents	60	25
	Nurses		60	25

ECCM --- emergency and critical care medicine, ACCPM --- Anesthesia, critical care and pain medicine, IM --- internal medicine

Knowledge

In assessing their level of knowledge respondents were asked 8 questions. The mean score and mean value were used to classify their knowledge about feeding in critically ill. The mean of knowledge score is 58.8%, SD 17). Those respondents who scored mean and above the mean are ranked as good and those below the mean are classified as poor knowledge.

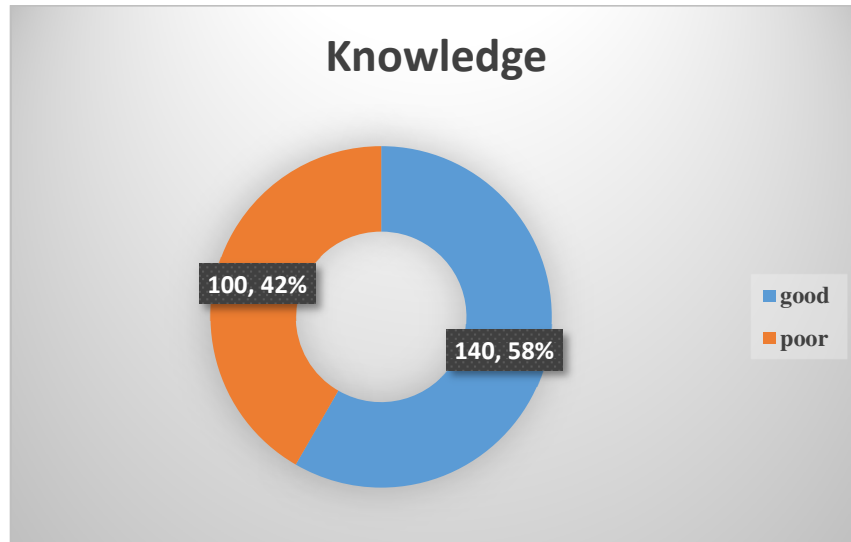


Figure 1. knowledge among respondents working in ICU of 4 teaching hospitals in Addis Ababa 2024

Table2. Knowledge questions among respondents working in ICU of 4 teaching hospitals in Addis Ababa 2024

Question	Answered correctly	Not correctly answered
Optimal time to initiate feeding in critically ill?	130 (54.2%)	110 (45.8%)
Composition of nutrients to begin with feeding in otherwise well-nourished patient admitted to ICU	115 (47.9%)	125 (52.1%)
Not advantages of enteral feeding?	180 (75%)	60 (25%)
Not contraindications to enteral feeding in critically ill	155 (64.6)	85(35.4%)
Appropriate dosing weight to be used for calculation of kilocalories requirement in critically ill	135(56.3%)	105 (43.7%)
How are feeding volumes started so that target energy requirement measured from Resting Energy Expenditure or estimated based global assessment will be met	160 (66.7%)	80 (33.3%)
How are you going to monitor feeding intolerance in critically ill according to latest evidence-based guidelines	110 (45.8%)	130 (54.2%)
Method found to be effective in prevention of aspiration during enteral feeding in critically ill	130 (54.2%)	110 (45.8%)

Attitude

There were 10 attitude related questions put on Likert's scale to assess about attitude of respondents on feeding in critically ill Cronbach's alpha for the survey $\alpha=0.78$.

The level of respondent's perception was ranked in to two levels score above or equal to the mean value. Attitude score equal or above 3.0 were taken as having positive perception score and those who below the average score of 3.0 are considered as having negative perception

Out of 240 respondents, about 230 (91.4%) of respondents scored 3.0 and above had positive perception towards feeding in critically ill, whereas 10(4.1%) have scored below and had negative perception.

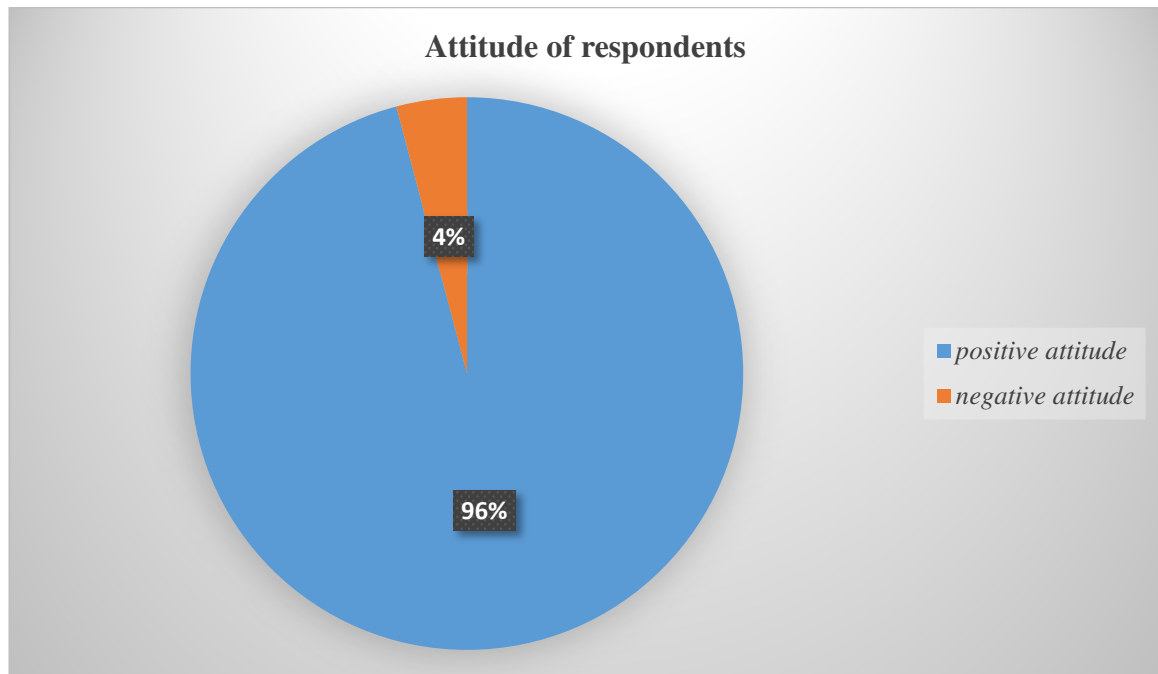


Figure 2. Attitude among respondents working in ICU of 4 teaching hospitals in Addis Ababa 2024 on feeding in critically ill

Table 3. Attitude questions among respondents working in ICU of 4 teaching hospitals in Addis Ababa 2024

Scores	5	4	3	2	1
How important do you believe adequate nutrition is for critically ill patients in the ICU?	75(31.1%)	120(49.8%)	40(16.6%)	5(2.1%)	0
In your opinion, is early initiation of enteral nutrition in the ICU important?	63(26.2%)	141(58.5%)	30(12.4%)	5(2.1%)	0
How confident are you in your ability to identify and manage complications related to enteral or parenteral nutrition in the ICU?	60(24.9%)	145(60%)	25(10.4%)	5(2.1%)	5(2.1)
Do you recommend training to improve ICU feeding practices?	155(64%)	60(25%)	25(10.4%)	0	0
How likely are you to adopt or advocate for changes in ICU feeding practices based on new evidence or guidelines?	15(6.3%)	135(56.3%)	90(37.5%)	0	0
How likely are you to use specialized nutritional assessment tools (e.g., subjective global assessment, Nutritional Risk Screening) in ICU patients to guide feeding decisions?	60(25%)	140(58.3%)	40(16.7%)	0	0
How comfortable are you with adjusting enteral feeding rates and formulas based on a patient's changing clinical status?	20(8.3%)	150(62.5%)	60*25%)	0	0
How familiar are you with the potential complications associated with ICU feeding?	30(12.5%)	145(60.4%)	65(27.1%)	0	0
How frequently do you collaborate with other healthcare professionals (e.g., physicians, nurses, dietitians) to develop feeding plans for ICU patients?	35(14.6%)	165(68.8%)	30(12.5%)	5(2.1%)	5(2.1%)
How do you feel about importance of provider's ability to assess the nutritional status of ICU patients?	2(0.8%)	8(3.3%)	1(0.4%)	229(95%)	1(0.4%)

Practice score among respondents

Mean score and mean value was used to rank practices among respondents based on 6 practice questions. Data reliability test was seen with Cronbach alpha of 0.85. Those who scored above 65.2 are ranked as good practice and those scored below are scored as bad practices. 162 (68.8%) respondents have good practice

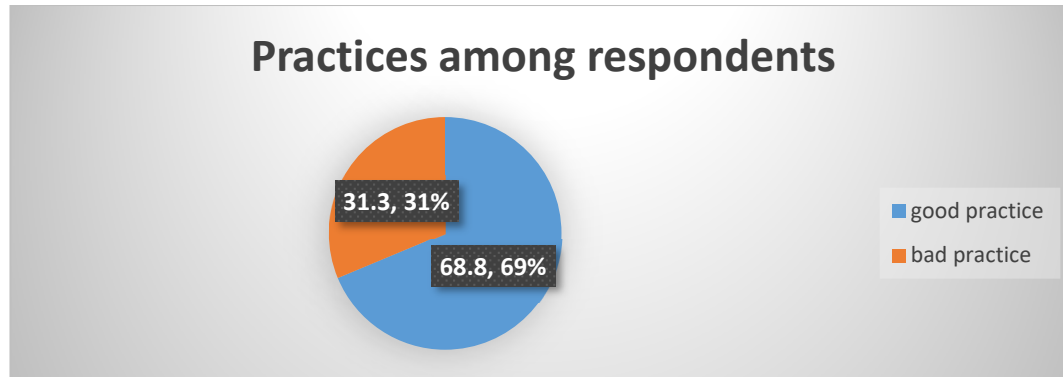


Figure 3. practice among respondents working in ICU of 4 teaching hospitals in Addis Ababa 2024 on feeding in critically ill

Table 3. Practice among respondents working in ICU of 4 teaching hospitals in Addis Ababa 2024

Questions	Good practice	Bad practices
Assessing nutritional status of critically ill patients admitted to the ICU?	Daily, 89.6%	10.4%
How soon after ICU admission do you initiate enteral nutrition	With in 24 hrs, (54.2%)	45.8%
Do you involve a multidisciplinary team in developing and reviewing feeding plans for ICU patients?	Always (87.4%)	12.6%
How often do you monitor feeding tolerance in critically ill?	At least daily (81.3%)	18.7%)
How often do you measure gastric residual volumes (GRVs) to assess feeding tolerance?	Only when there are signs of feeding intolerance (27.1%)	66% of respondents routinely check for gastric residual before feeding the patient

How are you going to order enteral feeding for patients with different profiles?	Based on estimated calorie need (52.1%)	41.7 % of respondents order same feeding regimen for all patients.
--	---	--

Most of respondents used research articles and journals as source of information for their practice on ICU feeding.

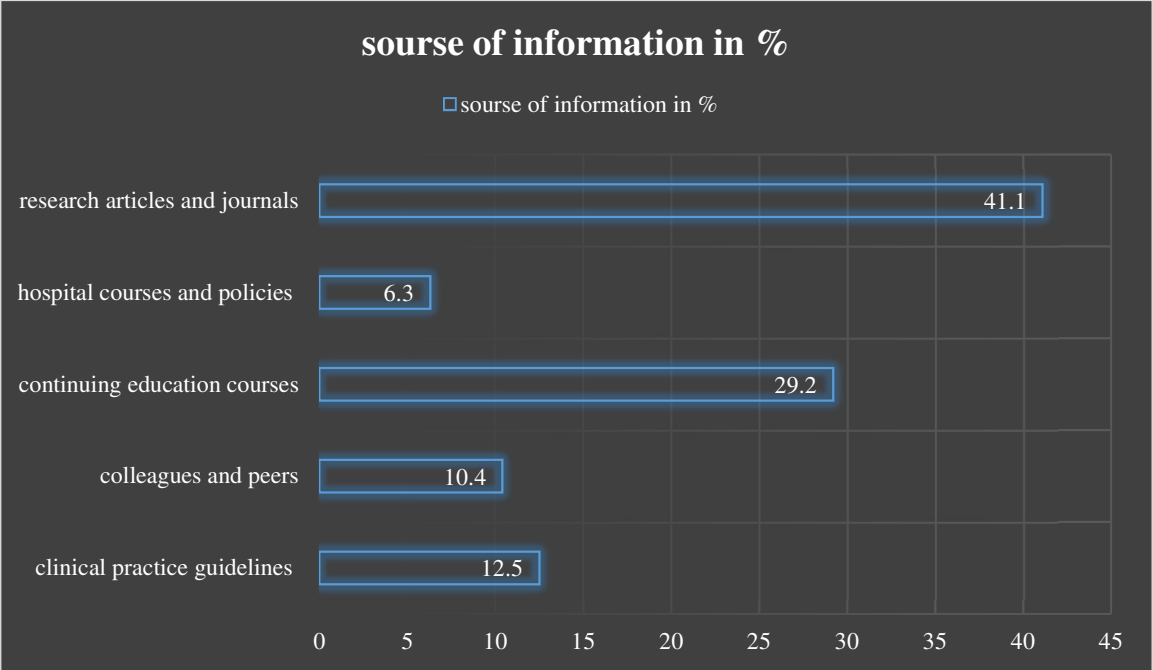


Figure 4: sources of information relied on by respondents among respondents working in ICU of 4 teaching hospitals in Addis Ababa 2024 to guide their ICU feeding practices

Perceived barriers	Frequency	Percentages
Concerns about complications	20	8.3
Difficulty in assessing nutritional need	55	22.9
Lack of awareness of nutritional guidelines	85	35.4
Limited availability of dedicated enteral feeding	80	33.3

Table 4: Perceived barrier to provide optimal nutritional support in ICU among respondents working in ICU of 4 teaching hospitals in Addis Ababa 2024

Bivariate and multivariable analysis of factors affecting level of knowledge, attitude and practice of the respondents

Associated factors with knowledge

After all the independent variables that could affect knowledge of respondents were tested in the regression model. As the number of respondents who were trained on ICU nutrition is critically low, 10) correlation was not done for this variable.

To evaluate association between duration of time respondents worked in the ICU and their level of knowledge on feeding in critically ill Chi-square test of independence was done. The observed frequencies revealed that among those who worked in the ICU for 1- 5 years 105 has good knowledge while 55 do not. Conversely among those who worked in the ICU for less than a year 25 of them had poor knowledge and only 15 of them had good knowledge.

The analysis resulted in a Chi-Square statistic (χ^2) of 11.78, with 1 degree of freedom. The associated p-value was 0.003, below the alpha level of 0.05, suggesting a statistically significant association between duration of time respondents worked in the ICU and their level of knowledge on feeding in critically ill. Effect size was calculated with Cramer's V, 0.22 and this effect size is statistically significant.

Multiple logistic regression model was used to compute an adjusted odds ratio to quantify the strength of association with the dependent variable. Those respondents who worked in the ICU for 1 – 5 years were found to have better knowledge ($p = 0.002$ AOR 5.112, 95% CI 2.156 – 12.116) than those who worked in ICU for less than one year. Likewise, those respondents who worked in ICU for above 5 years have 7.89 odds of having better knowledge when compared with those above 5 years (AOR 7.890, 95% CI 1.695 – 36.722).

ECCM residents are 13.354 times better in having adequate knowledge when compared to nurses (AOR 13.354, 95% CI 4.222 – 42.235). Likewise, IM residents are found to have 2.93 times

adequate knowledge when compared to nurses (AOR 2.936 95% CI 1.091 – 7.900).

Associated factors with attitude

Univariate logistic analysis was done to assess association between attitude and independent variable with the finding of P value of less than 0.25 only with age of respondents. Binary logistic regression analysis showed that respondents aged between 20 to 30 are 2.3 times likely to have positive attitude when compared to those above age of 30 (AOR 2.28, 95% CI 0.68 – 8.4)

Associated factors with practice

To evaluate association between sex of respondents and their practice on feeding in critically ill Chi-square test of independence was done.

The analysis resulted in a Chi-Square statistic (χ^2) of 3.78, with 1 degree of freedom. The associated p-value was 0.04, below the alpha level of 0.05, suggesting a statistically significant association between the two variables. Binary logistic regression analysis showed that females are 10.68 times likely to have good practice when compared to males (AOR 3.323 95% CI 1.613 - 6.844)

Multiple logistic regression model analysis showed that ECCM residents are 61.871 times better practice when compared with nurses on feeding in critically ill (AOR 61.871, 95% CI, 15.338 - 249.577). Likewise, IM residents are 7.188 times better in their practice when compared to nurses (AOR 7.188, 95% CI 2.235 - 23.118) and ACCP residents are 5.556 times likely to have better practice when compared with nurses (AOR 5.556, 95% CI 1.736 - 17.783).

Otherwise, there found no strong association between years of experience and prior training in ICU nutrition among respondents with their level of practice.

Most of respondents 159(66%) still routinely check for gastric residual regardless of whether the patient is tolerating feeding or not.

Table 5: Factors associated with KAP among respondents on feeding in critically in Teaching hospital in Addis Ababa Ethiopia, 2024 (Bivariable analysis)

	Knowledge		COR (95%CI)	AOR (95% CI)
Profession	Adequate	Inadequate		
ACCPM	25	35	0.952 (0.474 to 1.914)	1.585(0.591 – 4.249)
ECCM	50	10	6.667(2.914 to 15.253)	13.354(4.222 – 42.235)
IM	35	25	1.867(0.929 to 3.752)	2.936(1.091 – 7.900)
NURSES	20	40	1	1
Sex				
Male	95	60	1	1
Female	45	40	0.829(0.490 – 1.403)	0.816(0.436 – 1.530)
Age in years				
20 – 30	95	70	1.429(0.837 – 2.437)	1.339(0.610 – 2.940)
31 – 40	35	40	1	1
Experience in ICU in years				
1 – 5 years	100	60	2.917(1.428 – 5.959)	5.112(2.156 – 12.116)
Above 5 years	20	20	1.333(0.559 – 3.180)	7.890(1.695 – 36.722)
Less than 1 year	15	25	1	1

	Practice		COR (95%CI)	AOR (95% CI)
Profession	Good	Bad		
ACCPM	35	25	1.400(0.699 – 2.805)	5.556(1.736 - 17.783)
ECCM	55	5	11.00(3.933 – 30.763)	61.871(15.338 - 249.577)
IM	40	20	2.00 (0.981 – 4.078)	7.188(2.235 - 23.118)
NURSES	30	30	1	1
Sex				
Male	100	55	1	1
Female	65	20	2.112 (1.170 – 3.813)	3.323 (1.613 - 6.844)
Age in years				
20 – 30	110	55	0.833(0.472 – 1.470)	0.34(0.143 - 0.826)
31 – 40	55	20	1	1
Experience in ICU in years				
1 – 5 years	110	50	1.200(0.58 – 2.459)	1.413(0.577 - 3.458)
Above 5 years	30	10	1.200(0.492 – 2.925)	.857(0.877 - 25.178)
Less than 1 year	25	15	1	1

Discussions

According to this study about half of respondents 140 (58.2) had enough understanding of feeding in critically ill. This is not incongruent with study done in Ethiopia on nurses' perception about feeding in ICU which showed that almost 2/3 had no adequate understanding. This finding also, invariably, differs from study done in Jordan on knowledge among nurse Which reported that 54% of respondents were known to have inadequate understanding of enteral feeding in ICU(12,22,31). This seems to be because of study population. This study assessed knowledge not only among nurses, but also among resident physicians working in the ICU during the time of data collection.

Our study showed that those respondents who worked in ICU for above one year were shown to be more knowledgeable than those who worked for less than 1 year.

ECCM residents were found to have adequate understanding with AOR 13.354, 95% CI 4.222 – 42.235 when compared to nurses.

Our study demonstrated that respondents who had worked in the ICU for more than one year possessed significantly greater knowledge compared to those with less than one year of ICU experience. This seems to be because longer work duration means more opportunities for informal learning through daily practice and mentorship from senior colleagues. This finding is consistent with multicenter study from Palestine showed that ICU workers with longer experience had higher KAP scores compared to those with less experience(32)

Moreover, ECCM residents exhibited a robust understanding, with an Adjusted Odds Ratio (AOR) of 13.354 (95% CI: 4.222 – 42.235) when compared to nurses. It seems that ECCM residents are most often motivated by career path in critical care driving their interest and efforts in this direction.

Our study revealed that only 10 respondents (4.1%) had prior dedicated training on feeding in critically ill patients. This indicates a critical need for educational programs designed to improve knowledge among healthcare providers. This finding aligns with a quasi-experimental study conducted in Australia, where nurses' understanding of enteral nutritional assistance improved significantly after participating in a specifically designed education program based on deductive lectures (mean change 14.2%, p.001) ((23). Implementing similar educational programs in our setting could bridge the knowledge gap and enhance the quality of care provided to critically ill patients. The improvement in knowledge through structured training underscores the importance of continuous professional development in ensuring healthcare providers are equipped with the latest evidence-based practices.

Our study found that more than half of the respondents (52.4%) initiate feeding within 24 hours of ICU admission, given no contraindications. Additionally, 155 respondents (64.5%) correctly identified that the absence of bowel sounds is not a contraindication for initiating feeding. However, this finding is lower when compared to a study conducted at Iran University of Medical Sciences, The hnan, where 82.3% of the nurses were able to initiate feeding within the first 24 hours of admission (9).

The lower percentage in our study might be attributed to several factors, including differences in training, institutional protocols, and the varied study populations. The higher percentage in the Tehran study may reflect more rigorous training programs or stricter adherence to updated guidelines in their ICU settings. This discrepancy underscores the importance of continuous education and the implementation of standardized protocols to ensure early and appropriate nutritional support.

There was no significant association between respondents age and their knowledge about ICU feeding. This result is consistent with study done in Yemeni hospital 174 nurses where investigators found no association between level of knowledge and respondents age(8)

Most of respondents 165 (68.3%) were found to have good practice while 31.3% had poor practice in their approach to feeding in critically ill. This finding was superior to most of studies Addis Ababa (46.4%) and (Egypt (58%) mainly because of difference in the tool used to assess the practice(9,12,33). Differences in these findings can also be due to specific assessment tools and methodologies employed, which may have provided a more accurate reflection of actual practices.

Moreover, the findings indicate that targeted interventions and continuous professional development programs can effectively enhance the practice levels of healthcare providers. The disparity between our results and those of other studies underscores the need for standardized assessment tools to ensure comparability and consistency in evaluating healthcare practices.

Gender disparities in ICU feeding practice quality noted in this study was that females were 10.68 times likely to have good practice when compared to males (AOR 10.787 95% CI 2.235 - 23.118). The finding is consistent with study by Jordan and Moore (2019) which also found disparity between gender and suggested that tailored interventions might be necessary to address these disparities and improve overall care quality(34).

Eventhough most of respondents 159(66%) still routinely check for gastric residual regardless of whether the patient is tolerating feeding or not, the latest ASPEN guidelines recommend gastric residual measurement only when the patient develops signs of feeding intolerance(3,35) This is because most respondents on this study are not in keeping with latest evidence-based practice.

Most of respondents, 54.2% illustrated that backrest elevation during feeding is most effective method for prevention of aspiration during feeding. This is scientifically proven as it was stated in ASPEN guideline(3,36).

Our study showed that barriers to providers which hindered them from giving optimal enteral feeding to critically ill is lack of awareness of nutritional guidelines (35.5%), followed by limited availability of dedicated enteral feeding (33.2%). These findings are similar to previous literatures(19,37).

Our study found a significant positive correlation between respondents' knowledge and their practice in feeding in critically ill, as indicated by a Pearson correlation coefficient of 0.384. This relationship is statistically significant, with a p-value of .000, suggesting that higher knowledge levels are associated with improved practices. This finding is congruent with multicenter study from Palestine which also showed positive correlation between knowledge, and practices regarding nutrition care(32)

Conclusions

A substantial proportion of healthcare providers demonstrated adequate knowledge about enteral feeding, but notable gaps still exist, particularly among those with less experience. The study emphasizes critical need for targeted educational programs as only 4.1% of respondents had prior training on ICU nutrition. Implementation of structured training programs could significantly improve understanding and adherence to nutritional protocols.

This study highlights the critical role of experience and specialized training in enhancing knowledge and practice among respondents. Values of prolonged exposure and mentorship in ICU has been underscored as respondents with more than one year of ICU experience demonstrated significantly greater knowledge. ECCM residents, in particular, showed robust understanding and better practices compared to nurses reflecting impact of specialized training and career motivation in critical care.

Though more than half of respondents initiate feeding within 24 hours of ICU admission, lower percentages compared to other studies suggest that continuous education and the implementation of standardized protocols are essential.

The study identified key barriers such as a lack of awareness of nutritional guidelines and limited availability of dedicated enteral feeding resources. These barriers align with findings from previous literature and indicate areas where improvements can be made.

While most respondents adhere to some best practices, such as recognizing the importance of backrest elevation during feeding in prevention of aspiration during feeding, there are areas where practice deviates from latest ASPEN guidelines, such as routine gastric residual checks and withholding feeding without the patient having signs of feeding intolerance.

Addressing these discrepancies through continuous professional development and adherence to updated guidelines is crucial.

Overall, this study highlights the need for ongoing education, standardized assessment tools, and adherence to evidence based guidelines to ensure optimal nutritional support for critically ill patients.

Recommendations

To Hospitals on which the study was conducted – I would suggest to open training center and to arrange periodic training sessions to frontline providers in ICU-on nutrition in critically ill and develop hospital protocol based on latest evidence-based guidelines.

To respondents – I would like to suggest respondents to capitalize their knowledge and amend their practice in accordance with the available evidences on feeding in critically ill. I am so confident in your potential to improve those gaps.

References

1. Gidey K, Hailu A, Bayray A. PATTERN AND OUTCOME OF MEDICAL INTENSIVE CARE UNIT ADMISSIONS TO AYDER COMPREHENSIVE SPECIALIZED HOSPITAL IN TIGRAY, ETHIOPIA [Internet]. Vol. 56, Ethiop Med J. 2018. Available from: <https://www.researchgate.net/publication/371563763>
2. Zewudie MM, Melesse DY, Filatie TD, Zeleke ME. Variables associated to intensive care unit (ICU)-mortality among patients admitted to surgical intensive care unit in Ethiopia: a retrospective observational study. BMC Anesthesiol. 2023 Dec 1;23(1).
3. Compher C, Bingham AL, McCall M, Patel J, Rice TW, Braunschweig C, et al. Guidelines for the provision of nutrition support therapy in the adult critically ill patient: The American Society for Parenteral and Enteral Nutrition. Journal of Parenteral and Enteral Nutrition. 2022 Jan 1;46(1):12–41.
4. Osooli F, Abbas S, Farsaei S, Adibi P. Identifying critically ill patients at risk of malnutrition and underfeeding: A prospective study at an academic hospital. Adv Pharm Bull. 2019;9(2):314–20.
5. Shakhshir M, Alkaiyat A. Healthcare providers' knowledge, attitude, and practice on quality of nutrition care in hospitals from a developing country: a multicenter experience. J Health Popul Nutr. 2023 Dec 1;42(1).
6. Osooli F, Abbas S, Farsaei S, Adibi P. Identifying critically ill patients at risk of malnutrition and underfeeding: A prospective study at an academic hospital. Adv Pharm Bull. 2019;9(2):314–20.
7. Zaky D, Zaki DSD, Zakaria DM, Abd El-Galil HM. Malnutrition in ICU. International Journal of Internal Medicine [Internet]. 2018;7(4):54–9. Available from: <http://journal.sapub.org/ijim>
8. Ali Hussein Al-Qalah T, Alrubaiee GG. Intensive care nurses' knowledge of enteral nutrition at public hospitals in Sana'a, Yemen: a cross-sectional survey. F1000Res. 2020 Jul 22;9:759.
9. Jamshidi S, Hejazi N, Mazloom Z. ICU Nurses' Knowledge about Enteral Feeding in Critically Ill Patients in Nemazee Hospital in Shiraz, Iran. International Journal of Nutrition Sciences. 2020 Mar 1;5(1):19–23.
10. Behara AS, Peterson SJ, Yimin Chen, Butsch J, Lateef O, Komanduri S. Nutrition support in the critically ill: A physician survey. Journal of Parenteral and Enteral Nutrition. 2008 Mar;32(2):113–9.
11. Endeshaw AS, Tarekegn F, Bayu HT, Ayalew SB, Gete BC. The magnitude of mortality and its determinants in Ethiopian adult intensive care units: A systematic review and meta-analysis. Vol. 84, Annals of Medicine and Surgery. Elsevier Ltd; 2022.
12. Hadera T, Worku T, Tuli W. Nurses' Knowledge, Practice, and Associated Factors with Enteral Nutrition in Adult Intensive Care Units of Public Hospitals. Ethiop J Health Sci. 2022 Mar 1;32(2):423–32.

13. Cahill NE, Narasimhan S, Dhaliwal R, Heyland DK. Attitudes and beliefs related to the canadian critical care nutrition practice guidelines: An international survey of critical care physicians and dietitians. *Journal of Parenteral and Enteral Nutrition*. 2010 Nov;34(6):685–96.
14. Singer P. Preserving the quality of life: Nutrition in the icu. Vol. 23, *Critical Care*. BioMed Central Ltd.; 2019.
15. Hadera T, Worku T, Tuli W. Nurses' Knowledge, Practice, and Associated Factors with Enteral Nutrition in Adult Intensive Care Units of Public Hospitals. *Ethiop J Health Sci*. 2022 Mar 1;32(2):423–32.
16. Heyland DK, Dhaliwal R, Drover JW, Gramlich L, Dodek P. Canadian clinical practice guidelines for nutrition support in mechanically ventilated, critically ill adult patients. Vol. 27, *Journal of Parenteral and Enteral Nutrition*. American Society for Parenteral and Enteral Nutrition; 2003. p. 355–73.
17. Li PF, Wang YL, Fang YL, Nan L, Zhou J, Zhang D. Effect of early enteral nutrition on outcomes of trauma patients requiring intensive care. *Chinese Journal of Traumatology - English Edition*. 2020 Jun 1;23(3):163–7.
18. Darawad MW, Alfasfos N, Zaki I, Alnajjar M, Hammad S, Samarkandi OA. ICU Nurses' Perceived Barriers to Effective Enteral Nutrition Practices: A Multicenter Survey Study. *Open Nurs J*. 2018 May 28;12(1):67–75.
19. Chapple LA, Chapman M, Shalit N, Udy A, Deane A, Williams L. Barriers to Nutrition Intervention for Patients With a Traumatic Brain Injury: Views and Attitudes of Medical and Nursing Practitioners in the Acute Care Setting. *Journal of Parenteral and Enteral Nutrition*. 2018 Feb 1;42(2):318–26.
20. Zaher S. Barriers to Delivery of Enteral Nutrition in Intensive Care Settings in Saudi Arabia: A Comparative Study of the Perceptions of Health Care Providers Working in Adult and Paediatric ICUs. *Risk Manag Healthc Policy*. 2022;15:2357–70.
21. Darawad MW, Alfasfos N, Zaki I, Alnajjar M, Hammad S, Samarkandi OA. ICU Nurses' Perceived Barriers to Effective Enteral Nutrition Practices: A Multicenter Survey Study. *Open Nurs J*. 2018 May 28;12(1):67–75.
22. Al Kalaldehy M, Watson R, Hayter M. Jordanian nurses' knowledge and responsibility for enteral nutrition in the critically ill. *Nurs Crit Care*. 2015 Sep 1;20(5):229–41.
23. Kim H, Chang SJ. Implementing an educational program to improve critical care nurses' enteral nutritional support. *Australian Critical Care*. 2019 May 1;32(3):218–22.
24. Alhashemi SH, Ghorbani R, Vazin A. Improving knowledge, attitudes, and practice of nurses in medication administration through enteral feeding tubes by clinical pharmacists: A case-control study. *Adv Med Educ Pract*. 2019;10:493–500.
25. Ichimaru S. Methods of Enteral Nutrition Administration in Critically Ill Patients: Continuous, Cyclic, Intermittent, and Bolus Feeding. Vol. 33, *Nutrition in Clinical Practice*. John Wiley and Sons Inc.; 2018. p. 790–5.

26. Thong D, Halim Z, Chia J, Chua F, Wong A. Systematic review and meta-analysis of the effectiveness of continuous vs intermittent enteral nutrition in critically ill adults. Vol. 46, *Journal of Parenteral and Enteral Nutrition*. John Wiley and Sons Inc; 2022. p. 1243–57.
27. Reignier J, Mercier E, Le Gouge A, Boulain T, Desachy A, Bellec F, et al. Effect of Not Monitoring Residual Gastric Volume on Risk of Ventilator-Associated Pneumonia in Adults Receiving Mechanical Ventilation and Early Enteral Feeding A Randomized Controlled Trial [Internet]. Available from: <http://www.r-project>
28. Addis Ababa City Structure Plan DRAFT FINAL SUMMARY REPORT. 2017.
29. Laytin AD, Sultan M, Debebe F, Walelign Y, Fisseha G, Gebreyesus A. Critical care capacity in Addis Ababa, Ethiopia: A citywide survey of public hospitals. *J Crit Care*. 2021 Jun 1;63:1–7.
30. Jiao J, Chen Y, Yang L, Li W, Zhou Z, Li L, et al. Nursing Practice Based on Evidence-Based Concepts to Prevent Enteral Nutrition Complications for Critically Ill Neurosurgical Patients. *Front Surg*. 2022 Mar 18;9.
31. Jordan EA, Moore SC. Enteral nutrition in critically ill adults: Literature review of protocols. Vol. 25, *Nursing in Critical Care*. Blackwell Publishing Ltd; 2020. p. 24–30.
32. Shakhshir M, Alkaiyat A. Healthcare providers’ knowledge, attitude, and practice on quality of nutrition care in hospitals from a developing country: a multicenter experience. *J Health Popul Nutr*. 2023 Dec 1;42(1).
33. Abdel Hameed Shahin M, Shahin MA, Yousef Mohamed W, Sayed M. Nurses’ Knowledge and Practices regarding Enteral Nutrition at the Critical Care Department of Al-Manial University Hospital in Egypt: Impact of a Designed Instructional. *Journal of American Science* [Internet]. 2012;8(11). Available from: <http://www.jofamericanscience.org><http://www.jofamericanscience.org>editor@americanscience.org397<http://www.jofamericanscience.org>.61
34. Jordan EA, Moore SC. Enteral nutrition in critically ill adults: Literature review of protocols. Vol. 25, *Nursing in Critical Care*. Blackwell Publishing Ltd; 2020. p. 24–30.
35. Choban P, Dickerson R, Malone A, Worthington P, Compher C. A.S.P.E.N. clinical guidelines: Nutrition support of hospitalized adult patients with obesity. *Journal of Parenteral and Enteral Nutrition*. 2013 Nov;37(6):714–44.
36. Lewis K, Alqahtani Z, McIntyre L, Almenawer S, Alshamsi F, Rhodes A, et al. The efficacy and safety of prokinetic agents in critically ill patients receiving enteral nutrition: A systematic review and meta-analysis of randomized trials. *Crit Care*. 2016 Aug 15;20(1).
37. Huang J, Yang L, Zhuang Y, Qi H, Chen X, Lv K. Current status and influencing factors of barriers to enteral feeding of critically ill patients: A multicenter study. *J Clin Nurs*. 2019 Feb 1;28(3–4):677–85.

ANNEX 1: Questionnaires.

1- Socio Demographic Character of Participants.

1-Age	_____ years
2-sex	I. Male II. Female
4- Profession.	I. Emergency and Critical care medicine resident II. Internal medicine resident. III. Anesthesia, critical care and pain medicine resident. IV. Nurse
5 If you are a resident, level of residency	I. Year 1 II. Year 2 III. Year 3
6- Work experience in ICU (In years)	I. Less than one year II. 1-5 years III. More than 5 years.
7- have you ever trained on ICU nutrition	I. Yes II. No

2. Questions to assess knowledge of participants on enteral feeding in critically ill

1- What is optimal time to initiate feeding in critically ill? (given no contraindications)	I. 24 – 48 hours II. 72 hours III. 96 hours
2- Which one holds true about composition of nutrients to begin with feeding in otherwise well-nourished patient admitted to ICU with ARDS and no chronic medical condition or other organ failure? (only one answer)	I. Carbohydrate 50%, protein 30%, fats 20% with added essential minerals II. Carbohydrate 55%, protein 15%, fats 30% with added essential minerals III. Carbohydrate 30%, protein 30%, fats 40% with added essential minerals?

3- What are advantages of enteral feeding? (more than one answer is possible)	I. Provision of nutrient support II. Maintenance of gut integrity, III. Modulation of the immune response, IV. Reduce the risk of infectious complications.
4- Which one is not contraindications to enteral feeding in critically ill?	I. Patient being on high dose vasopressors II. Upper GI bleeding III. Bowel obstruction IV. Intractable vomiting V. Absence of bowel sound in post op patients
5- What is appropriate dosing weight to be used for calculation of kilocalories requirement in critically ill?	I. Ideal body weight in all II. Actual body weight in all III. Actual body weight in those BMI <29.9 kg/m² and 110% of the Ideal body weight for those with BMI ≥30 kg/m²
6- How are feeding volumes started so that target energy requirement measured from Resting Energy Expenditure or estimated based global assessment will be met?	I. Start 100% from the start II. Start low and incrementally increase dosing as tolerated to achieve maintenance dose in few days III. Either of the above is possible.
7- How are you going to monitor feeding intolerance in critically ill according to latest evidence-based guidelines?	I. Checking gastric residual volume before every feeding II. Checking bowel sound before every feeding III. Monitoring for abdominal distension, vomiting or regurgitation
8- What are methods is found to be effective in prevention of aspiration during enteral feeding in critically ill? (only one answer)	I. Backrest elevation II. Postpyloric feeding III. Motility agents like erythromycin/metoclopramide

3. Questions to assess attitude of participants on enteral feeding in critically ill?

Circle on a number to which you believe for each row of attitudes.

1. How important do you believe adequate nutrition is for critically ill patients in the ICU?
 - I. Extremely important
 - II. Very important
 - III. Moderately important
 - IV. Slightly important
 - V. Not important
2. In your opinion, is early initiation of enteral nutrition in the ICU important?
 - I. Extremely important
 - II. Very important
 - III. Moderately important
 - IV. Slightly important
 - V. Not important
3. How do you feel about importance of provider's ability to assess the nutritional status of ICU patients?
 - I. Extremely important
 - II. Very important
 - III. Moderately important
 - IV. Slightly important
 - V. Not important
4. How confident are you in your ability to identify and manage complications related to enteral or parenteral nutrition in the ICU?
 - I. Very confident
 - II. Confident
 - III. Moderately confident
 - IV. Slightly confident
 - V. Not confident
5. How likely are you to use specialized nutritional assessment tools (e.g., subjective global assessment, Nutritional Risk Screening) in ICU patients to guide feeding decisions?
 - I. Very likely
 - II. Likely
 - III. Somewhat likely
 - IV. Somewhat unlikely
 - V. Very unlikely
6. How frequently do you collaborate with other healthcare professionals (e.g., physicians, nurses, dietitians) to develop feeding plans for ICU patients?
 - I. Always
 - II. Often
 - III. Sometimes
 - IV. Rarely
 - V. Never
7. How familiar are you with the potential complications associated with ICU feeding?
 - I. Very familiar
 - II. Familiar
 - III. Somewhat familiar
 - IV. Not very familiar
 - V. Not familiar at all

8. How comfortable are you with adjusting enteral feeding rates and formulas based on a patient's changing clinical status?
 - I. Very comfortable
 - II. Comfortable
 - III. Moderately comfortable
 - IV. Slightly comfortable
 - V. Not comfortable
9. Do you recommend training to improve ICU feeding practices?
 - I. Extremely important
 - II. Very important
 - III. Moderately important
 - IV. Slightly important
 - V. Not important
10. How likely are you to adopt or advocate for changes in ICU feeding practices based on new evidence or guidelines?
 - I. Very likely
 - II. Likely
 - III. Somewhat likely
 - IV. Somewhat unlikely
 - V. Very unlikely

4. Questions on practice of participants on enteral feeding in critically ill

1. How often do you assess the nutritional status of critically ill patients admitted to the ICU?
 - I. At admission only
 - II. Daily
 - III. Every other day
 - IV. Weekly
 - V. As needed or when there are significant changes in the patient's condition
2. How soon after ICU admission do you initiate enteral nutrition, if feasible and safe?
 - I. Within 24 hours
 - II. Within 48 hours
 - III. Within 72 hours
 - IV. After 72 hours
3. How do you address feeding intolerance in ICU patients? (Select all that apply)
 - I. Adjusting feeding rates and volumes
 - II. Changing the type of enteral formula
 - III. Administering prokinetic agents
 - IV. Withholding enteral feeding temporarily
 - V. Other (please specify)
4. Do you involve a multidisciplinary team (e.g., physicians, nurses, dietitians) in developing and reviewing feeding plans for ICU patients?
 - I. Always
 - II. Often
 - III. Sometimes
 - IV. Rarely
 - V. Never
5. Which method do you practice when administering enteral feeding in critically ill? (more than one applies)
 - I. Continuous infusion with pump machine

- II. Intermittent feeding
 - III. Cyclic feedings
 - IV. Bolus feedings
6. What methods for administering enteral feeding do you know in your practice? (more than one can apply)
- I. Nasogastric Tube (NGT)
 - II. Percutaneous Endoscopic Gastrostomy
 - III. Jejunostomy Tube (J-tube)
 - IV. Orogastric Tube
 - V. Gastrostomy-Jejunostomy Tube (GJ-tube)
7. How often do you document enteral nutrition-related interventions and assessments in the medical records of ICU patients?
- I. Always
 - II. Often
 - III. Sometimes
 - IV. Rarely
 - V. Never
8. How often do you measure gastric residual volumes (GRVs) to assess feeding tolerance?
- I. Routinely after each feeding
 - II. Daily
 - III. Every other day
 - IV. Only when there are signs of feeding intolerance
 - V. Never
9. Do you monitor feeding tolerance and adequacy regularly in ICU patients receiving enteral nutrition?
- I. Yes, at least once a day
 - II. Yes, every other day
 - III. Yes, once a week
 - IV. No, only when there are signs of feeding intolerance or complications
 - V. No, not routinely monitored
10. How are you going to order enteral feeding for patients with different profiles?
- I. Similar for all patients
 - II. Based on estimated calorie need
 - III. Based on what is available
11. What sources of information do you rely on to guide your ICU feeding practices? (Select all that apply)
- I. Clinical practice guidelines
 - II. Research articles and journals
 - III. Continuing education courses
 - IV. Colleagues and peers
 - V. Hospital protocols and policies
 - VI. Other (please specify)
12. What barriers or challenges do you perceive in providing optimal nutrition support in the ICU?
- I. Lack of awareness of nutritional guidelines and best practices
 - II. Limited availability of dedicated enteral feeding protocols
 - III. Difficulty in assessing nutritional needs accurately
 - IV. Concerns about complications such as aspiration or refeeding syndrome
 - V. Other (please specify)

Annex: II Consent Explanation

My name is Shallo Alemu, a 3rd year post graduate resident physician in Emergency Medicine and Critical Care at St. Paul Hospital millennium medical College and AaBET hospital. As part of my post graduate academic course work, I am required to do clinical research for the completion.

I'm conducting a survey on the knowledge, attitude and practice on enteral feeding in critically ill among health professionals working in ICU setting in teaching hospitals in Addis Ababa, Ethiopia.

The aim of the research is to study knowledge, attitude and practice on enteral feeding in critically ill, and identify our strengths & weaknesses. This will help improve the quality care given to patients our patients in ICU.

To do this I shall obtain data in the form of a questionnaire administered to volunteer participants from Resident physicians, nurses and dietitians. The results obtained will enable us come up with recommendations. Therefore, I shall need your consent as the participant in order to be included in the study.

This is the volunteer exercise and no victimization will occur on the basis of refusal to participate in the study. One can withdraw from the study at any point in time. Any information obtained in the course of the study is beneficial to the management of the patient. All information will be treated with utmost confidentiality.

Annex: III. Informed Consent Form

I have understood the explanation by the investigator and hereby give informed consent to participate in the study:

1. I accept to participate in the study
2. I accept to be interviewed concerning knowledge, attitudes and practices on the knowledge, attitude and practice on enteral feeding in critically ill among health professionals working in ICU setting in teaching hospitals in Addis Ababa
3. I understand that the information I give will be treated with utmost confidence.
4. I understand that my participation in the study is voluntary and I can withdraw my consent at any point of study and that such withdrawal will not affect my work in any way.

Participants name: _____ **Signature** _____

Investigator's name _____ Signature _____