

# Enteral feeding barriers in the intensive care unit of a tertiary hospital in Ghana

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**Background.** Enteral nutrition (EN) is an important aspect of patient management in the intensive care unit (ICU). However, various barriers have been reported that limit the provision of EN, with implications for patient care and outcomes.

**Objective.** To evaluate the perceived barriers to the provision of EN among ICU healthcare professionals in our resource-limited setting, as a preliminary step toward developing tailored quality improvement interventions in our unit.

**Methods.** A cross-sectional survey of 21 ICU healthcare professionals (17 nurses and 4 doctors) was conducted. The Revised Barriers to Feeding Critically Ill Patients questionnaire was used to evaluate barriers to the provision of EN in our ICU. A Likert scale was used to assess perceived barriers, with each factor rated from 0 to 6; 0 indicating 'not at all' and 6 indicating 'an extreme amount'. Descriptive statistics were used to describe the data as medians, interquartile ranges, counts and proportions. The Wilcoxon-Mann-Whitney test was used to evaluate differences in medians between doctors and nurses, given the skewed distribution of data. Likert-based responses were used to generate a stacked bar chart. Statistical significance was set at  $p < 0.05$ .

**Results.** The main barriers to the provision of EN were related to dietitian support, ICU resources and EN delivery. Dietitian-related barriers included insufficient coverage on weekends, evenings and holidays (median 5), delayed nutritional assessments (median 3) and limited time dedicated to education and training on optimal feeding (median 3). ICU resource constraints included the absence or shortage of feeding pumps and the unavailability of enteral formulas (median 3 for both). Barriers to EN delivery included delayed initiation of motility agents in patients with feeding intolerance (median 3).

**Conclusion.** These findings underscored the importance of developing context-specific quality improvement initiatives to address local barriers to the provision of EN.

**Keywords:** enteral nutrition, intensive care unit, barriers to feeding, Ghana.

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## Contribution of study

This study describes the perceived barriers to the provision of enteral nutrition in an intensive care unit (ICU) in Ghana, adding to the limited data available from African ICUs on this topic. The study provides insights into the systemic, operational, and workforce-related challenges that affect enteral feeding in resource-constrained critical care settings, including limited dietitian coverage, shortage of feeding pumps, and enteral formulas. These challenges highlight the needs and opportunities for strengthening nutrition support through context-specific quality improvement initiatives. As such, this work contributes valuable locally generated evidence to support enhanced care for critically ill patients as well as inform professional development strategies for ICU healthcare professionals in similar low-resource environments.

Enteral nutrition (EN) is an important aspect of patient management in the intensive care unit (ICU); however, various barriers hindering its provision have been widely reported.<sup>[1,2]</sup> This has implications for patient care and outcomes associated with critical illness, as nutritional adequacy and preservation of lean body mass are important prognostic factors in this patient group.<sup>[3]</sup> Several studies have reported barriers to the provision of EN, with variation in their perceived importance according to ICU site and professional group.<sup>[4-10]</sup> Certain barriers are unavoidable, such as haemodynamic instability, intubation or

extubation and surgical contraindications,<sup>[5,8]</sup> whereas others are potentially avoidable, including nursing care, prolonged preoperative fasting, delays in ordering EN, limited access to post-pyloric feeding in patients who require it, lack of standard or specialised formulas and unavailability of feeding pumps.<sup>[11,12]</sup> Other barriers are perpetuated by a lack of protocols, misunderstandings regarding various aspects of feeding and the low priority often assigned to nutrition.<sup>[11,13,14]</sup> Understanding these barriers and providing tailored interventions to address them are essential to improving nutrient delivery in the ICU.

<sup>[4,13]</sup> Given that our resource-limited clinical setting in Ghana differs from those described in many previously published reports, we aimed to investigate specific local barriers to the provision of EN.

This study followed a previous survey conducted in the same ICU setting,<sup>[15]</sup> which examined prevailing nutrition support practices. The survey findings revealed inconsistencies in EN practices that appeared to be influenced by a lack of standardised operational protocols guiding bedside care.<sup>[15]</sup> Although a written protocol manual for nutrition support was available, many ICU professionals were either unaware of its existence or unfamiliar with its contents, and it offered little practical guidance for providing nutrition support. In addition, healthcare professionals reported limited access to the manual. Notably, most respondents identified the protocol manual as their primary source of nutrition support information, underscoring its perceived importance in our local context. However, there appeared to be a gap between the presence of the protocol and its consistent implementation in daily practice.

In addition to established protocols, registered dietitians are integral members of nutrition support teams, particularly in guiding and optimising nutrition support practices. However, several studies have consistently reported limited dietitian support, especially outside routine working hours, as a significant barrier to the provision of EN.<sup>[6,8,9]</sup> This challenge is also evident in our unit, where dietitian support is limited to weekdays owing to limited staffing capacity. This issue is not unique to our unit but reflects a broader challenge observed across other Ghanaian hospitals and ICUs, and more widely across the African continent, where dietitians are a scarce resource.<sup>[16,17]</sup> This underscores the need to develop and implement standardised, evidence-based protocols that are practical and adapted to local contexts, where dietitian coverage is often unavailable or limited.

In the Ghanaian setting, several critical factors limiting the involvement of dietitians in nutrition support have been reported.<sup>[16]</sup> These include lack of integration in nutrition support teams (where such teams exist), limited training and exposure of dietitians to advanced nutrition support and reduced proficiency in performing key nutrition support tasks such as calculating goal rates and prescribing EN and parenteral nutrition (PN). Additional key barriers include limited awareness of available formulas, absence of standardised algorithms and guidelines for advanced nutrition support, staffing shortages and inadequate access to specialised equipment and supplies. The extent to which these challenges impede effective nutrition support practices in Ghana remains unclear; however, they are likely to contribute significantly to suboptimal nutrition care.

In light of the challenges and insights identified in our previous survey, it was imperative to evaluate the perceived barriers to the provision of EN among ICU healthcare professionals in our setting as the next step toward developing tailored interventions, inspired by the work of Cahill *et al.*<sup>[18]</sup> Potential interventions may include targeted education initiatives for healthcare providers and the development of standardised, practical, nurse-driven EN protocols adapted to the specific, unique needs and resources of our ICU.

## Methods

### Study design and population

This study employed a cross-sectional survey of ICU healthcare professionals (nurses and doctors). All healthcare professionals working in the ICU were invited to participate on a voluntary basis.

### Study site

The study was conducted in a 4-bed, level 1 ICU located in a teaching hospital in Cape Coast, Ghana. The ICU serves a mixed patient population (paediatric, adult, obstetric, medical and surgical) and is the only ICU in Ghana's Central Region. At the time of the survey, staffing included a dietitian and a pharmacist. In addition, 39 nurses worked on a rotational basis, covering two 6-hour daytime shifts (approximately five nurses per shift) and one 12-hour night shift. Clinical care was provided by seven doctors rotating in two 12-hour shifts.

### Sampling technique

All healthcare professionals working in the ICU were invited to participate. The target sample comprised 46 staff members: 39 nurses (10 critical care nurses, 27 registered nurses and 2 health aides) and 7 doctors (1 anaesthesiologist, 1 intensivist and 5 medical officers).

### Data collection and analysis

A validated, paper-based questionnaire (Revised Barriers to Feeding Critically Ill Patients, available here) adopted from Cahill *et al.*<sup>[7]</sup> was distributed to ICU healthcare professionals over a 1-month period. The questionnaire was self-administered and was shown to be comprehensible and easy to complete.<sup>[7]</sup> It was exhaustive in measuring barriers to the delivery of EN and included 20 questions with 4 subthemes: delivery of EN to the patient (7 questions), dietitian support (4 questions), ICU resources (2 questions) and critical care provider attitudes and behaviour (7 questions). Responses to the questions were Likert-based (Table 1).

Participants completed and submitted responses anonymously. Data were encoded electronically using ODK Collect v2023.1.2 (Get ODK Inc., USA) for Android, entered into a spreadsheet and exported using the statistical programming language R (R Foundation for Statistical Computing, Austria) for analysis. Normality of data distribution was assessed using the Shapiro-Wilk test. Descriptive statistics were used to describe the data as medians, interquartile ranges (IQR), counts and proportions. The Wilcoxon-Mann-Whitney test was used to evaluate differences in medians between doctors and nurses, given the skewed distribution of data. Likert-based responses were re-coded into three categories: 'Little' (0 - 2), 'Moderate' (3) and 'A lot' (4 - 6). These re-coded variables were then used to generate a stacked bar chart using Datawrapper (Datawrapper, Berlin). This approach grouped conceptually similar responses to facilitate clearer interpretation and presentation of the results. Significant barriers, identified from the stacked bar chart, were ranked according to the frequency of 'A lot' ratings. For overall analysis, however, barriers were ranked according to their median scores. Statistical significance difference was set at  $p < 0.05$ .

### Ethical considerations

The study was approved by the Ethical and Review Committee of the Cape Coast Teaching Hospital in Ghana (ref. no. CCTHERC/EC/2022/102). Survey responses were submitted anonymously, and confidentiality was maintained. Participants were informed that participation was voluntary. Completion and submission of the survey were regarded as implied consent to participate.

## Results

Table 2 shows the characteristics of the participants.

### Barriers to feeding

This survey identified several key barriers to the administration of EN in the ICU. The top six barriers were related to dietitian support, delivery of EN to the patient and ICU resources. These included insufficient

**Table 1. Likert scale used in the survey<sup>[7]</sup>**

Response	Interpretation
0	Not at all
1	Very little
2	A little
3	A moderate amount
4	A lot
5	A great deal
6	An extreme amount

**Table 2. Characteristics of participants**

Characteristic	n(%) n=21
Age	
34 years or less	18 (86%)
35 - 49 years	3 (14%)
Primary clinical speciality	
Nurse	17 (81%)
Physician	4 (19%)
Physician category	
Surgeon	1 (25%)
Other clinical specialities	3 (75%)
General practitioner	1 (33%)
Medical officer	2 (67%)
ICU experience	
0 - 5 years	19 (90%)
6 - 10 years	1 (4.8%)
11 - 15 years	1 (4.8%)

ICU = intensive care unit.

dietitian coverage, especially during evenings, weekends and holidays; delays in initiating motility agents; prolonged waiting times for dietitian assessment; limited time allocated to education and training on optimal feeding; unavailability of enteral formulas; and lack of feeding pumps in the unit (Table 3; Fig. 1). Barriers associated with critical care provider attitudes and behaviour had the lowest median scores.

When Likert scores were collapsed into three levels – ‘Little’ (0 - 2), ‘Moderate’ (3), and ‘A lot’ (4 - 6) – to group conceptually similar responses and facilitate clearer interpretation and presentation in a stacked bar chart (Fig. 1), the most frequently reported barriers to the provision of EN again centred on dietitian support, delivery of EN and resource limitations. The barriers most commonly rated as ‘A lot’ included inadequate dietitian coverage (60%), waiting for a dietitian assessment (43%), limited time for education and training on optimal feeding (43%), unavailability of enteral formulas (43%), lack of feeding pumps (43%) and delays in initiating motility agents (38%).

By contrast, barriers such as fear of adverse events, feeds being withheld owing to diarrhoea, failure to progress feeds and feeding delays related to procedures were predominantly rated as ‘Little’, suggesting that they were perceived as less significant barriers to the administration of EN.

Sub-analysis by profession (Table 4) indicated differences in perceived barriers between nurses and doctors. Nurses were more likely than doctors to perceive the following as significant barriers: waiting for physicians to confirm tube placement; frequent displacement of feeding tubes; delays in initiating motility agents; delays or difficulties in obtaining small bowel access; and the general belief that provision of adequate nutrition does not impact patient outcomes.

## Discussion

This study identified several key barriers to the provision of EN in our unit. Significant barriers included low dietitian coverage outside routine working hours, lack of feeding pumps, unavailability of EN formulas and delays in initiating motility agents. Healthcare provider attitudes and behaviour were less commonly reported as barriers, suggesting that systemic obstacles may play a greater role than individual barriers. This observation is consistent with previous literature reports.<sup>[7]</sup>

The predominant barrier identified was insufficient dietitian coverage, especially on weekends, evenings and holidays – a challenge similarly reported in studies from Saudi Arabia,<sup>[8]</sup> Egypt<sup>[6]</sup> and Jordan.<sup>[9]</sup> In contrast, this barrier was not reported in Canadian ICUs.<sup>[7]</sup> Limited dietitian availability was further compounded by delays in patient assessment, especially outside routine working hours. In our setting, these challenges reflect staffing constraints that preclude coverage on weekends, evenings and holidays. This shortage of dietitians in critical care settings in Africa and Ghana has been widely reported.<sup>[17]</sup>

An additional feature of our resource-limited setting is that the majority of doctors and nurses are early-career professionals (0 - 5 years of ICU experience; Table 2). This is commonly encountered in resource-constrained settings across Africa, where training and recruitment of specialist care providers remain limited. Consequently, ICUs may rely more heavily on less experienced staff to manage complex patients, with potential implications for quality of care. In our context, the combination of limited dietitian coverage and high proportion of early-career professionals may exacerbate challenges in delivering optimal nutrition care.

One Canadian paediatric ICU<sup>[19]</sup> also reported waiting for a dietitian as a barrier to feeding. A long-term strategy to resolve this barrier could be to increase dietitian staffing levels, enabling sustainable dietitian support on weekends, evenings and holidays. However, this falls outside the immediate locus of control of the ICU team and requires broader policy-level interventions. Previous studies have reported improved adherence to feeding protocols and EN delivery when dedicated dietitians were available in the ICU<sup>[5,10,20]</sup> underscoring their critical role within the multidisciplinary team. In the interim, and given our current context, implementation of nurse-driven feeding protocols may empower nurses to initiate and advance feeding in the absence of dietitians, especially on weekends, holidays and evenings. This is especially relevant in our setting, where nursing staff may have limited ICU experience, which may affect their confidence and decision-making in initiating and advancing enteral feeding. For example, in one German ICU, responsibility for starting and escalating EN was assigned to ICU nursing staff rather than physicians.<sup>[21]</sup> This approach was effective in promoting the delivery of EN and empowered nurses to advance or withhold nutrition appropriately when clinically indicated.<sup>[14,21,22]</sup> Implementation of a nurse-led EN protocol resulted in timely initiation of EN, minimised cessation of EN attributed to intolerance, improved achievement of nutrition goals in the majority of patients and contributed to reduced mechanical ventilator days and mortality rates.<sup>[22]</sup>

However, in a Jordanian study, the majority of nurses did not consider themselves directly responsible for overall patient nutrition beyond merely administering EN.<sup>[23]</sup> They were more focused on preventing EN complications and evaluating EN than on establishing nutrition goals.<sup>[23]</sup> Similarly, in our context, both nurses and doctors reported an inability to estimate the nutritional requirements of patients,<sup>[15]</sup> an important step in providing adequate nutrition. These findings emphasise the importance of dietitians, whose knowledge and skills are central to estimating the nutrient requirements of each patient. Nevertheless, in

**Table 3. Barriers to EN feeding**

Characteristic	Median (IQR); Likert score	Interpretation	Subtheme
Not enough dietitian coverage	5 (3, 6)	A lot	Dietitian support
No response	1		
Delays in initiating motility agents	3 (1, 4)	Moderate	Delivery of EN to the patient
Waiting for dietitian to assess the patient	3 (2, 5)	Moderate	Dietitian support
Not enough time dedicated to education and training on optimal feeding	3 (2,5)	Moderate	Dietitian support
Enteral formula not available on the unit	3 (1, 4)	Moderate	ICU resources
Absence or shortage of feeding pumps	3 (1, 5)	Moderate	ICU resources
Waiting for physician to confirm tube placement	2 (0, 2)	Little	Delivery of EN to the patient
Delay in physicians ordering the initiation of EN	2 (1, 3)	Little	Delivery of EN to the patient
Frequent displacement of feeding tube	2 (2, 4);	Little	Delivery of EN to the patient
No response	1		
Delays and difficulties in obtaining small bowel access	2 (1, 3)	Little	Delivery of EN to the patient
Other aspects of care take priority over nutrition	2 (0, 3)	Little	Delivery of EN to the patient
Nutrition therapy not routinely discussed	2 (1, 3)	Little	Delivery of EN to the patient
Dietitian not routinely present on weekday patient rounds	2 (1, 4)	Little	Dietitian support
Non-ICU physicians requesting patient not to be fed	2 (1, 3)	Little	Critical care provider attitudes and behaviour
Feeds withheld owing to diarrhoea	2 (1, 3);	Little	Critical care provider attitudes and behaviour
No response	1		
Fear of adverse events	2 (1, 3)	Little	Critical care provider attitudes and behaviour
Feeds withheld too far in advance of procedures	2 (1, 3)	Little	Critical care provider attitudes and behaviour
No response	2		
Lack of familiarity with current guidelines	2 (1, 4)	Little	Critical care provider attitudes and behaviour
Nurses failing to progress feeds	1 (1, 2)	Little	Critical care provider attitudes and behaviour
General belief that provision of adequate nutrition does not impact patient outcomes	1 (0, 2)	Little	Critical care provider attitudes and behaviour

IQR = interquartile range; EN = enteral nutrition; ICU = intensive care unit.

resource-limited settings such as ours, it is imperative to leverage the role of nurses in the timely initiation and administration of EN.<sup>[22]</sup> While nurse-driven protocols may improve consistency of nutrition care, dietitian oversight of nutrient delivery and the overall nutrition care process remains essential when available.

Unavailability of EN formulas and feeding pumps has been widely reported in other settings, consistent with our findings (Fig. 1).<sup>[4,10,13,17]</sup> The limited availability of feeding pumps and continuous feeding bags in our setting limits EN delivery to predominantly bolus feeding.<sup>[15]</sup> Although bolus feeding is feasible in many cases, a recent systematic review suggests that continuous or intermittent EN delivery may be associated with fewer complications and improved safety.<sup>[24]</sup> In addition, the limited availability and high cost of ready-to-use formulas have resulted in an increased reliance on prepared blenderised tube feeds (BTF) or fortified family meals in our setting, similar to practices reported in other Ghanaian hospitals and elsewhere in Africa.<sup>[16,17,25]</sup> This explains the reported barrier of ‘Enteral formula not available in the unit’. Historically, BTFs were utilised in hospitals before the introduction of commercial formulas, and there has been a resurgence in their use, especially for stable patients requiring home EN.<sup>[26,27]</sup> However, BTFs pose challenges to safety,<sup>[26,28,29]</sup> nutritional adequacy<sup>[25,30]</sup> and standardisation,<sup>[16,25,29,30]</sup> especially in resource-limited settings with a nearly doubled risk of infection and malnutrition compared with developed countries.<sup>[17]</sup> BTF preparation is also labour-intensive,<sup>[29]</sup> limiting their feasibility in resource-constrained settings. Resource limitations in our setting

present significant challenges for the safe use of BTFs, particularly for critically ill patients. Providing safe, sterile feeds to the most vulnerable patients in the hospital represents an important quality improvement imperative, especially in our resource-limited setting. Similar to other public-sector hospitals in Ghana, our facility does not procure EN formulas or commercial oral nutrition supplements (ONS); instead, families and caregivers are responsible for purchasing these products. ONS are primarily designed to supplement oral intake and may be insufficient as the sole source of nutrition in critically ill patients. In the short term, we are developing local recipes using powdered products (complete or nutrient-specific), which may be a standardised, safe alternative to blended whole foods or fortified family meals. In the absence of feeding pumps, gravity sets for continuous delivery may be the next step for quality improvement.

Operational challenges such as delays in initiating motility agents appeared to be another significant barrier to EN delivery, particularly among nurses ( $p=0.045$ ). This tends to limit the advancement of EN to goal rate, especially in patients with high gastric residual volumes (GRV). In a previous survey conducted at our facility,<sup>[15]</sup> GRV thresholds used to guide practice were found to be unstandardised, despite the presence of a written protocol in the ICU specifying a volume of 250 ml as the standard threshold. Doctors were more aware of this threshold value than nurses, with some nurses reporting that no standard volume was used to guide practice. This may contribute to interruptions and feeding at lower residual volumes, including a reliance on arbitrary markers such as 50% of the previous feed volume as an indicator

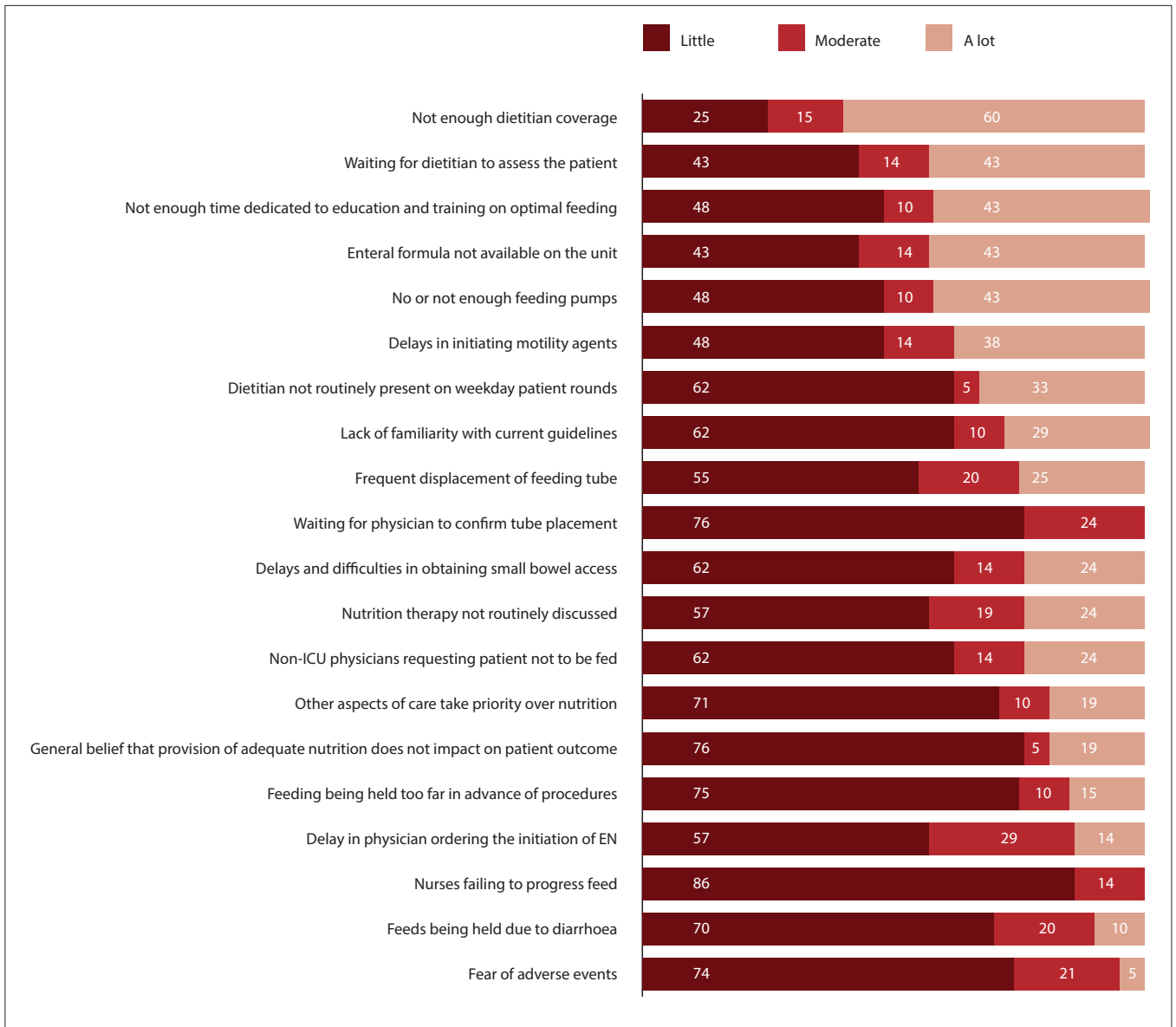


Fig. 1. Perceived barriers to the provision of enteral nutrition.

The Likert plot shows the proportion of respondents rating each barrier as 'Little', 'Moderate' or 'A lot'. Not enough dietitian coverage, absence or shortage of feeding pumps, enteral formulas not available in the unit, insufficient time dedicated to education and training on optimal feeding, and waiting for a dietitian to assess the patient were frequently reported as significant barriers.

of feeding intolerance. Such practices are problematic and have the potential to impact the adequacy of nutrient delivery.

Frequent displacement of feeding tubes, necessitating reinsertion, was also perceived as a significant barrier to feeding, more so by nurses than doctors. Similarly, confirmation of feeding tube placement was identified as a significant barrier by nurses. Although nurses in our unit are expected to insert feeding tubes and confirm placement, they may not feel responsible for or empowered to perform this task, possibly fearing potential repercussions if complications arose. This finding indicates a need for targeted education and training to empower nurses to perform this essential task safely without delaying nutrient provision, alongside the establishment of hospital-level policies that protect and support nurses undertaking these responsibilities. Redistribution of procedural responsibilities in resource-limited settings may be particularly relevant, as doctors are not always immediately available. Frequent displacement of feeding tubes have also been cited as a significant barrier to providing EN in other studies.<sup>[10,13]</sup> Providing interventions aimed at improving

tube securement and empowering nurses to be able to place and confirm tube placement without the intervention of a doctor may help minimise the identified operational barriers in our setting.

### Strengths and limitations

This study is limited by its small sample size and single ICU setting, which may have contributed to non-significant findings. Nevertheless, the findings provide valuable insights into the barriers encountered in a resource-limited ICU in Ghana, contributing to the limited data available on this topic and informing potential areas of quality improvement in our setting. Inclusion of the perceptions of both nurses and doctors allows identification of critical areas requiring intervention, which may be useful for targeted quality improvement initiatives. Future studies should evaluate the effectiveness of small-scale, incremental quality improvement initiatives designed to address specific barriers in resource-limited settings. Such pilot initiatives could serve as test cases and potentially foster regional or national centres of excellence.

Table 4. Barriers to feeding by profession

Subtheme	Characteristic	Nurses; median (IQR) (n=17)	Physicians; median (IQR) (n=4)	p-value
Delivery of EN to the patient	Delay in physicians ordering the initiation of EN	2 (1, 3)	2 (1, 3)	0.5
	Waiting for physician to confirm tube placement	2 (1, 4)	0 (0, 1)	0.021
	Frequent displacement of feeding tube	3 (2, 5)	1 (1, 2)	0.023
	No response	1	0	-
	Delays in initiating motility agents	3 (2, 4)	1 (0, 1)	0.009
	Delays and difficulties in obtaining small bowel access	2 (1, 4)	1 (1, 1)	0.045
	Other aspects of care take priority over nutrition	2 (0, 3)	2 (1, 4)	0.9
	Nutrition therapy not routinely discussed	3 (2, 4)	1 (1, 2)	0.061
Dietitian support	Waiting for dietitian to assess the patient	3 (2, 5)	4 (3, 6)	0.4
	Dietitian not routinely present on weekday patient rounds	2 (1, 4)	3 (1, 6)	0.7
	Not enough dietitian coverage	5 (3, 6)	5 (2, 6)	>0.9
	No response	1	0	-
	Not enough time dedicated to education and training on optimal feeding	3 (2, 5)	3 (2, 5)	0.7
ICU resources	Enteral formula not available on the unit	3 (1, 4)	4 (2, 6)	0.6
	Absence or shortage of feeding pumps	2 (1, 4)	5 (3, 6)	0.3
Critical care provider attitudes and behaviour	Non-ICU physicians requesting patient not be fed	2 (1, 3)	3 (2, 4)	0.6
	Nurses failing to progress feeds	1 (1, 2)	1 (1, 2)	0.5
	Feeds withheld owing to diarrhoea	2 (1, 3)	1 (1, 2)	0.4
	No response	1	0	-
	Fear of adverse events	2 (1, 3)	2 (1, 2)	0.7
	No response	2	0	-
	Feeds withheld too far in advance of procedures	2 (1, 3)	2 (1, 2)	0.3
	No response	1	0	-
	Lack of familiarity with current guidelines	2 (1, 4)	3 (2, 4)	0.7
	General belief that provision of adequate nutrition does not impact patient outcomes	1 (0, 3)	0 (0, 0)	0.040

EN = enteral nutrition; ICU = intensive care unit; IQR = interquartile range.

## Future directions

Multimodal interventions<sup>[18]</sup> have been shown to reduce ICU feeding barriers and improve overall nutrition adequacy. Our study provides actionable insights into quality improvement priorities relevant to our resource-limited setting. A priority is to empower nurses in our unit to assume greater responsibility for the initiation and advancement of EN, supported through targeted training and implementation of nurse-driven EN protocols. Nurses working in the unit should be authorised and supported to insert, confirm placement of and reinsert feeding tubes as required, reducing dependence on doctors for these procedures.

Improving the quality of enteral feeding is another important priority. Transitioning from BTFs or cooked meals to standardised EN formulas prepared from modular products or commercial ingredients would allow for more predictable nutritional composition and enhanced safety. Increasing the availability of commercial enteral formulas represents a meaningful step toward improving nutrition care.

To sustain engagement in these quality improvement initiatives, healthcare professionals could be incentivised through recognition initiatives, such as 'quality improvement hero' badges. These proposed interventions will be co-ordinated through the African Clinical Nutrition Consortium. Consortium members in Ghana are planning interlinked postgraduate research projects aimed at addressing these barriers both within our ICU and across other ICUs in the country.

## Conclusion

This survey-based analysis highlights the significant barriers to providing EN in a limited-resource ICU setting, including limited availability of dietitians, lack of enteral formulas and feeding pumps, and operational issues, such as delayed initiation of motility agents. Addressing these specific issues through targeted training and improved resource allocation can help optimise nutrition support and improve patient outcomes. In our setting, ICU staff are often early-career professionals, and retention is challenged by high turnover related to internal rotation policies and migration. These challenges necessitate simple, sustainable solutions to improve care and enhance professional engagement. Transitioning to standardised modular feeds, empowering nursing staff, implementing nurse-driven EN protocols and improving institutional procurement systems are key steps toward safer and more effective delivery of EN. Overall, this study underscores the importance of context-specific quality improvement initiatives to advance critical care nutrition in Ghana and similar low-resource settings.

**Declaration.** We declare that this article is our original work and we take full responsibility for its content and authenticity.

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**Author contributions.** All authors contributed to the conceptualisation and design of the study. EKA contributed to the primary draft of the manuscript, data curation and data analysis. MAA contributed to data curation. LTH contributed to the primary draft. All authors contributed to revisions and the final draft for publication. All authors read and approved the final article.

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**Data availability statement.** The data supporting the findings of this study are openly available in Zenodo at <https://doi.org/10.5281/zenodo.15381631>.

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