

Nurses' Competency and Challenges in Enteral feeding in the Intensive Care Unit (ICU) and High Dependency Units (HDU) of a referral hospital, Malawi

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Introduction

Critical illness may cause hyper-metabolism and adequate nutrition is required to limit muscle wasting, respiratory and gastrointestinal dysfunction and alterations in immunity^{1,2}. In critical illness, feeding behaviours change; patients may experience physical obstruction to swallowing or inability to ingest food. This calls for nurses' attention to be focused on the provision of alternatives to oral intake.

One of these alternatives is the provision of enteral (tube) feeding. Enteral feeding includes delivering a complete feed via nasogastric or orogastric tube into the stomach or percutaneous tubes into the jejunum or duodenum³. This feeding is associated with a reduced period of hospital stay, reduced mortality, lower costs and fewer complications as compared to parenteral feeding^{4,5}. Enteral feeding is a common practice at the referral hospital studied. Nasogastric tube feeding using intermittent regimen; where feed is given and stopped at regular intervals, is the standard method used.

Studies have emphasised the role of nurses in nutritional support. Nurses are an important link in nutritional support because they are responsible for administering nutritional formulas⁶. Contrary to this, many studies have reported that although nutrition is a significant concern in hospitals, has low priority and literature on this subject is very scanty^{7,8}. Minimal attention has been paid to how enteral feeding is administered by nurses⁹. There are wide variations in the management of nutritional support which may be related to knowledge gaps, or the use of multiple sources of information,¹⁰ or to a lack of standardization in the care environment¹¹. Maintaining consistencies in feeding the critically ill has been identified as a problem secondary to the inadequate knowledge of the nurses⁵.

Currently in Malawi, there is no scientific data about nurses' tube feeding competency and challenges faced when providing enteral feeding. With such lack of evidence it was hypothesized that there is inadequate level of competency in tube feeding among nurses. Therefore, a survey of the nurses was required to determine their current level of competency and challenges.

A survey was done to assess the nurses' level of knowledge in enteral feeding, to describe their current practice in enteral feeding documentation and to determine challenges experienced in enteral feeding practice. In this study "enteral feeding" was used interchangeably with "tube feeding."

The conceptual model guiding the study was drawn from the American Association of Critical Care Nurses (AACN) Synergy Model for Patient Care. This model defines nursing practice based on the needs of the patient. The model contends that when nurse competencies relate to patient needs, and the characteristics of the nurse and patient synergise, optimal patient outcomes can result¹². Nursing

practice is determined by the needs of patients and their families and reflects an integration of knowledge, skills and experience¹³. The author contends that each patient brings unique needs and characteristics to the clinical situation. Therefore to meet patient needs, nurses must apply certain characteristics and competencies to patient care. These competencies are identified as: clinical judgment, advocacy and moral agency, caring practices, collaboration, systems thinking, responses to diversity, facilitation of learning, and clinical inquiry¹². This model was chosen because of its relevance in recognising nurse competencies as important and that when nurse competencies and patient needs synergise, optimal patient outcome can result¹⁴.

Figure 1 The AACN Synergy Model of Patient Care (Adopted from the AACN)



Design

This was a non experimental descriptive survey using quantitative method of a self administered questionnaire and a retrospective case file review.

Population

The population was all nurses working in the intensive care and three high dependent care units of the referral hospital. All participants had more than three months experience in the unit. All case files of patients who were on tube feeding between January 2009 and July 2010 were targeted for retrospective review.

Sample

All 53 nurses working in the intensive care unit (ICU) and high dependency unit (HDU) were recruited to participate in this study. A convenience sample of 78 case files was selected. All case files from the ICU and HDUs were first checked to identify documentation of nasogastric tube insertion and those found were selected for review.

Inclusion Criteria

All nurses working full time or on locum in the units for at least a total period of three months were included in the study. For patients' files, all case files with documented evidence that a nasogastric or orogastric tube was inserted for feeding, were included.

Exclusion Criteria

All case files with no documented evidence that a nasogastric/orogastric tube was inserted or feeding was being given despite being ordered.

Data Collection

An existing questionnaire by Persenius, Larsson and Hall-Lord¹⁵ was adapted. The questionnaire had many similar concepts that the researcher wanted to measure. Few modifications were made by taking out concepts that were not relevant and adding other relevant concepts. Prior to data collection a pilot test of the questionnaire was conducted on 10 nurses that were doing their upgrading diploma course at Kamuzu College of Nursing. Their level of qualification and work experience were similar to the sample. Revision of the questionnaire was made to facilitate ease of data collection in terms of clarity of questions. The questionnaire consisted of 29 questions with 49 items. An open ended question on 'challenges' allowed the participants to express fully the challenges encountered during tube feeding management. A checklist developed by the researchers based on a literature review and Unit practice was used as an extraction sheet for review of case files. The checklist was pretested by randomly selecting 10 case files for review. It was found that some concepts like documentation of PH gastric aspirates were not standard practice. The checklist was then revised and finalised.

Ethical consideration

The study was approved by the University of KwaZulu-Natal Health Sciences Research Ethics Committee and the Malawi College of Medicine Research Ethics Committee. Consent was obtained from the hospital management and individual participants (nurses) before data collection.

Data Analysis

Data were analysed using SPSS version 15 for Windows. Data from open-ended question was quantified and analysed quantitatively. Descriptive statistics were used to analyse data. The Chi-Square test was used to determine the relationship between age and knowledge and the Mann-Whitney U test was applied to make associations between level of nursing training and knowledge.

Results

Demographic Characteristics of participants

The survey was carried out between June and July 2010. Out of the 53 nurses, 51 agreed to participate. There were 4 (7.8%) males and 47 (92.2%) females and the mean age was 37.5 years. A total of 29 (56.9%) had a certificate in nursing, 16 (31.3%) had a diploma in nursing, and 6 (11.8%) had a degree certificate. Almost all (50, 98%) participants indicated that enteral nutrition was part of their nursing training in college and that they had had a practical demonstration of the procedure. The findings further revealed that 96.1 % participants had never had in-service training in enteral feeding. Examination of sources of knowledge revealed that nursing school training 37(72.5%) was the common source of knowledge about tube feeding.

Table 1 Demographics of participants (n=51)

	n	%	
Gender	Male	4	7.8
	Female	47	92.2
Age (years)	22-28	14	27.5
	29-34	12	23.5
	35-45	15	29.4
	46-61	10	19.6
Level of training	Certificate	29	56.9
	Diploma	16	31.4
	Degree	6	11.8
Did your training include the following?	Yes	No	
Demonstration of tube feeding	50(98)	1(2)	
Nutritional assessment	46(90.2)	5(9.8)	
Type of feed to give through the tube	47(92.2)	4(7.8)	
Specifying the amount to give	41(80.4)	10(19.6)	
Complications to observe for	46(90.2)	5(9.8)	
Experience in the ICU or HDU			
3 months to 1 year	14	29.4	
More than 1 year	37	70.6	

Participants' competency in enteral feeding

Participants reported that nutritional assessment (29, 56.9%), insertion of the nasogastric tube (45, 88.2%), and tube feeding (42, 82.4%) was within the scope of their practice. Orogastric tube feeding was not reported by any nurse. Participants reported adequate knowledge in these areas: insertion of a nasogastric tube 51(100%), checking for proper tube placement 47(92.2%) and giving bolus feeds 35(68.8%). Inadequate knowledge was reported in the following areas: assessment of nutritional status (22, 43.1%), aspirating gastric residual volume (22, 43.1%). The findings showed that 31 (60.8%) participants position their patients in a semifowler/ sitting during tube feeding. To confirm proper tube placement; 47 (92.2%) reported using the water bubbling method.

On measures to prevent tube feeding complications; 41 (80.4%) participants reported that they always confirmed tube placement, and 38 (74.5%) always flushed the tube after feeding. Checking gastric residual volume was reported as never done by 23 (45.1%) participants and always done by 16 (31.4%). Daily inspection of nostrils in a patient with a nasogastric tube was reported as never done by 10 (19.6%), sometimes done by 18 (35.3%). On documentation of nutritional care, 12 (23.5%) reported that they almost always document and 24 (47.1%) always document the care given. Discussion of nutritional management with clinicians was reported as almost always done by 7 (13.7%) and always done by 20 (39.2%).

The results showed that the common type of tube feed given to patients is hospital kitchen food reported by 31 (62.7%) participants. Regarding nurses' awareness of guidelines for tube feeding existing in the unit; 39 (76.5%) participants stated that there are no guidelines in the units.

Challenges in the Practice Environment

The results indicated that 35 (68.6%) participants identified feed and tube shortage as a common challenge, followed by patients'/guardians' refusal of tube feeding (18, 35.3%).

Table 2 Participants' responses about their knowledge in enteral nutrition procedures

	Yes n(%)	No n(%)		
Are you competent enough in the following?				
Assessing patient's nutritional status	29(56.9)	22(43.1)		
Inserting a nasogastric tube	51(100)	0(0)		
Checking for proper tube placement	47(92.2)	4(7.8)		
Giving continuous tube feeding	35(68.6)	16(31.4)		
Giving bolus/intermittent tube feeding	37(72.5)	14(27.5)		
Choosing the appropriate formula to feed	26(51)	25(49)		
Aspirating gastric residual volume	29(56.9)	22(43.1)		
Do you do the following to prevent complications and communicate care?				
	Never ¹ n(%)	Sometimes ² n(%)	Almost always ³ n(%)	Always ⁴ n(%)
Confirm tube placement ¹	1(2.0)	7(13.7)	2(3.9)	41(80.4)
Flush tube before /after feed administration	2(3.9)	6(11.8)	5(9.8)	38(74.5)
Check residual volume	23(45.1)	10(19.6)	3(3.9)	16(31.4)
Inspect nostrils/mouth	10(19.6)	18(35.3)	9(17.6)	14(27.5)
Document care	3(5.9)	12(23.5)	12(23.5)	24(47.1)
Discuss nutritional Management	7(13.7)	17(33.3)	7(13.7)	20(39.2)

Table 3. Reported Challenges experienced by nurses during tube feeding management

Item	n(%)
Feed/tube shortage	35 (68.6%)
Staff shortage	3 (5.9%)
Patients/guardians refusing/ignorance of guardians	18 (35.3%)
Inadequate knowledge of nurses	5 (9.8%)
Difficult monitoring	3 (5.9%)
Patients removing/coughing up tube/vomiting	3 (5.9%)
Cold feed	1(2.0%)
Lack of guidelines	1(2.0%)

Case file Review

A total of 78 case files were eligible for review of tube feeding documentation. The results showed that many of the components in tube feeding interventions were not documented. Nutritional assessment was not documented in 55 (70.5%) case files, and confirmation of tube placement was never (0%) documented. A total of 43 (55.1%) case files had documentation of the feeding regimen, and 41(52.6 %) case files had documentation of the fluid balance.

Table 4. Case note review of enteral nutrition documentation by nurses

Nursing intervention	Yes n(%)	No n(%)
Nutritional assessment	23 (29.5)	55 (70.5)
Doctor/Dietician consulted	2 (2.6)	76 (97.4)
Obtaining patient consent	5 (6.4)	73 (93.6)
Confirmation of tube placement	0 (0)	78 (100)
Feeding regimen	43 (55.1)	35 (44.9)
Bowel records	15 (19.2)	63 (80.8)
Fluid balance record	41(52.6)	37(47.4)
Measures to prevent complications	12 (15.4)	66 (84.6)

Discussion

Source of knowledge

It was found that nurses' main source of knowledge about enteral feeding was nursing school training. This indicates that use of evidence based information is weak in the settings under study . The basic principles are that all practical decisions should be based on research studies and that these research studies are selected and interpreted according to some specific norms characteristic of evidence-based practice. The source of this evidence may not be obtained through pre service training only but also from unit guidelines, journals and in-service education which were not mentioned by the majority.

Nutritional assessment

Nurses lacked adequate knowledge on assessment of patients' nutritional status. Similar findings were reported by Persenius, Hall-Lord, Baath, and Larsson¹⁷. The authors found that nurses acknowledged that not all patients are nutritionally assessed, and nurses lacked skill in performing nutritional assessment.

Aspirating gastric residual volume

Nurses did not aspirate patient's gastric residual volume. These results are consistent with findings from a review of literature by Bowman¹⁸ which showed that there is little standardization in practice related to gastric residual volume. Similary Persenius, Hall-Lord, Baath, and Larsson¹⁷ in a study done in Sweden reported that gastric residual volumes were seldom documented by nurses yet Jarden¹⁹ reported that there are several existing reviews and clinical practice guidelines which recommend measuring of gastric residual volumes before giving the next tube feed. This shows that there is a gap in this practice by the nurses studied. The study did not check whether protocols were available but relied on the report by the participants.

Bedside Confirmation of Proper Tube Placement

Clinical practice for verification of placement of large bore feeding tube is variable²⁰. Likewise in this study, although the majority of nurses reported that they confirm tube placement

they use water bubbling method which is outdated. A review of study findings showed that no research was identified on the water bubbling method but that many nurses use auscultatory method^{20,5}. Though different, both methods are not based on current evidence. Current guidelines recommend use of more than one method to assure correct placement and these include: pH aspirate and auscultation as the best bedside techniques²¹. However x-ray remains the gold standard for confirming placement²², though Turgy and Khurrshid²³ contend that repeated radiographic confirmation is not practical, and poses a radiation hazard.

Patient's Head Positioning during Tube Feeding

Another important finding of the study is the observation that nurses placed patients in semi fowler/sitting position during tube feeding. This finding is in line with the current guidelines which state that unless contraindicated, the head of the bed should be elevated at 30 degrees (which is semifowler) during intermittent feeds to minimise aspiration^{4,5}.

The common feed used is the hospital kitchen feed. Similar findings were discovered in the Kenyatta hospital where Kobe⁷ found that the majority of nurses (66%) reported that they give a hospital kitchen feed. Contrary to this; in South Africa, Ellmer²⁴ found that in the ten Burn Units studied; only commercial products were used. Despite the difference in practice, both types of feed are acceptable as literature supports that properly selected local food can be formulated into enteral feed^{25,26}. What is required is to make sure that the feed used meets the nutritional needs of individual clients.

Documentation of Care

The majority of nurses reported that they document their feeding practices and this is commendable. However, this was not evident when the case files were reviewed. Many of the tube feeding aspects of care were not documented. These findings are consistent with a study conducted in Sweden by Persenius, Hall-Lord, Baath and Larsson¹⁷ who found that important nutritional parameters were not documented by state registered nurses. The low percentage of documentation is disheartening as the responsibility of documentation lies with the nurse who provides the care. The researcher's personal experience of documentation by nurses being poor is consistent with the findings of the study. It is possible that the problem could lie with the documentation tool being used, a shortage of time or it could also be that the nurses neglected the documentation. This may not be conclusive as the study did not assess the reasons for poor documentation. Further study in this area may be necessary.

In-Service Training and use of guidelines

Delivering excellent nutritional care requires that on-going education and training be offered. This study revealed that almost all nurses involved in tube feeding practice have never received in-service training on tube feeding. This is in direct conflict with the guidelines which mention that all health care professionals involved in this care should be oriented in this practice for standardization,⁵ as an absence of guidelines may affect practice.

Discussion of Nutritional management

There is no nutrition team in the hospital. Findings of this study show further that discussion about nutritional issues with clinicians is somehow poorly done where almost half of the nurses, reported poor practice. This correlated

with case note review which showed no documentation of consultation in almost all case files. This is inconsistent with recommended practice. Numerous authors²⁷ state that experienced and properly organised groups working to agreed protocols; have fewer nutritional complications.

The Relationship between Age and Knowledge, Level of training and knowledge

In this study the Chi-Square test revealed that there is no association between age and knowledge. The Pearson, $\chi^2=3.207$, $df=3$, $p=.361$ was not significant. The increase in age was not associated with the increase in knowledge. Similarly the Mann-Whitney U test revealed no significant difference in knowledge levels between the certificate nurses and registered nurses. The probability value (p) was .91. This is above .05 so the result was not significant. This implies that nurses at all levels of training have no difference in enteral feeding competency.

Reported Challenges

Many factors such as staffing shortages and unavailability of feeds have been reported to contribute to unintentional underfeeding¹. This study has similar results as the majority of nurses, reported feed and tube shortage as a major challenge. It was also noted that patient/family members' refusals of tube feeding was the second most common represented challenge faced by the nurses. This might be secondary to the family's lack of adequate information. Lewis et al investigated patients' relatives' perceptions about information they received to make decisions about tube feeding of their sick relatives, and who they would have preferred to help in their decision²⁸. The study results indicated that relatives preferred greater physician participation and reported that their informational needs were not adequately met. This suggests that relatives' acceptance of tube feeding may be improved with greater physician involvement and information giving. Casarett²⁹ concur, stating that all clinicians need to improve their engagement with patients and families in relation to artificial nutrition. This study did not examine the level of physician involvement, quantity and quality of information given to families. A study examining these two components is therefore recommended.

Strengths and Limitation of the Study

To the researchers' knowledge, this study is unique in that no other documented research has explored tube feeding practices in Malawi. Absence of this literature therefore was reason enough to do the study locally.

This was a local study, as the participants were from one hospital only, therefore the findings may not be generalised to other settings. Furthermore nurses that responded to the questionnaire might not be the ones that were involved in the documentation practice. Bedside observation of tube feeding practice would be the most objective method, but this was not feasible for the researcher due to time and money constraints.

The case note review did not account for the actual documented feed given (type and amount) as this was also beyond the scope of the study. Therefore further research in this area is needed, as there are reports of discrepancy between prescribed and delivered feed⁴. Incomplete documentation and missing data in case notes can result in non response bias which can affect the results.

Conclusion

Overall the results revealed opportunity for improving tube feeding practices at the referral hospital studied. The results showed that participants had received general pre-service training in tube feeding. There is a variation in their knowledge ranging from the majority having adequate knowledge in many aspects, to a similar majority lacking knowledge in some aspects. Report of poor practice has also been shown by the majority, especially in checking gastric residual volume, daily inspection of nostrils and in documentation. The results have also revealed tube and feed shortage, patient/ guardian refusal of tube feeding challenges which may affect nurses' practice. The findings therefore underscore the importance of nurses' competency and addressing the challenges for optimal provision of tube feeding. Addressing these areas would improve practice.

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