Intensive care nurses' knowledge of enteral nutrition: a descriptive questionnaire

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INTENSIVE CARE NURSES’ KNOWLEDGE OF ENTERAL NUTRITION: A DESCRIPTIVE QUESTIONNAIRE

Abstract

Background: Nurses have an important role in the delivery and management of enteral nutrition in critically ill patients, to prevent iatrogenic malnutrition. It is not clear how nurses source enteral nutrition information.

Objective: This study aimed to explore Australian nurses’ enteral nutrition knowledge and sources of information.

Design: Data were collected from members of the Australian College of Critical Care Nurses in May 2014 using an online questionnaire. A combination of descriptive statistics and non-parametric analyses were undertaken to evaluate quantitative data. Content analysis was used to evaluate qualitative data.

Results: 359 responses were included in data analysis. All respondents were Registered Nurses with experience working in an Australian intensive care unit or high dependency unit. Most respondents reported their enteral nutrition knowledge was good (n = 205, 60.1%) or excellent (n = 35, 10.3%), but many lacked knowledge regarding the effect of malnutrition on patient outcomes. Dietitians and hospital protocols were the most valuable sources of enteral nutrition information, but were not consistently utilised.

Conclusion: Significant knowledge deficits in relation to enteral nutrition were identified. Dietitians were the preferred source of nurses’ enteral nutrition information, however their limited availability impacted their efficacy as an information resource. Educational opportunities for nurses need to be improved to enable appropriate nutritional care in critically ill patients.

Keywords- Enteral nutrition, knowledge, critical care, resources, nursing
Implications for practice

- Respondents had significant knowledge deficits in relation to iatrogenic malnutrition
- Dietitians were the preferred source of information regarding enteral nutrition
- Limited access to dietitians after hours impacted delivery of enteral nutrition
- Nurse champions should be used to promote hospital-based education and application of enteral nutrition protocols
INTENSIVE CARE NURSES’ KNOWLEDGE OF ENTERAL NUTRITION: A DESCRIPTIVE QUESTIONNAIRE

Introduction

Enteral nutrition has a vital role in the care of critically ill patients. Enteral nutrition has been demonstrated to maintain the function of the gastrointestinal tract (GIT) (Moreira and McQuiggan, 2009), improve wound healing (Drover et al., 2010), reduce complication rates and reduce length of stay in the intensive care unit (ICU) (Moreira and McQuiggan, 2009). As such, enteral nutrition is considered routine in the care of patients in intensive care (Cahill et al., 2012, Cahill et al., 2011, Dietitians Association of Australia, 2011, Heyland et al., 2003, McClave et al., 2016).

Nurses play a key role in implementing the nutritional plan of care for critically ill patients (Cahill, Murch, 2012), including advocating for early commencement of enteral nutrition, assessment of calorie requirements, and initiating, titrating and administering the feed (Fulbrook et al., 2007, Marshall and West, 2006, Wentzel Persenius et al., 2006).

However, deficits in nursing knowledge (Behara et al., 2008, Cahill, Murch, 2012, Mowe et al., 2008a, Wentzel Persenius et al., 2009), lack of compliance with nutritional guidelines (Behara, Peterson, 2008), and inconsistencies in practice contribute to malnutrition and underfeeding in critically ill patients (Cahill, Murch, 2012, Marshall et al., 2012).

Aim

The aim of this study was to explore Australian ICU nurses’ knowledge of enteral nutrition.

The following two questions were addressed:

1. How do ICU nurses perceive their own knowledge in relation to enteral nutrition?
2. What sources inform ICU nurses enteral nutrition practices?
Method

An online questionnaire consisting of Likert-scale questions, and open and closed-ended questions was used to gather data about enteral nutrition education in ICU nurses. The researchers developed the questionnaire which contained 37 questions. The questions were divided into the following four sections: i) demographics, ii) prioritisation of enteral nutrition, iii) enteral nutrition protocols and resources, and iv) knowledge and sources of enteral nutrition information. The questions related to nurses’ knowledge and sources of information, and enteral nutrition protocols and resources are presented in Table 1. An expert reference group, consisting of ICU nursing (n = 3) and medical (n = 2) staff, and a dietitian reviewed the questionnaire for content validity (Jones et al., 2006). The questionnaire was then pilot tested by ICU nurses who did not form part of the sample.

Insert Table 1 around here please

Ethical Considerations

Ethical approval was obtained from Monash University Human Research Ethics Committee (CF14/532 – 2014000187). Completion of the online questionnaire implied consent.

Sample

Participants were recruited via email from the Australian College of Critical Care Nurses (ACCCN), a professional organisation for critical care nurses, with approximately 2396 members (ACCCN, 2014). Only those members who had agreed to be contacted for research purposes were included in the invitation to participate. Participants were included in the study if they were a Registered Nurse, registered with the Australian Health Practitioner Regulation Agency (AHPRA), and currently or previously employed in an adult ICU.
Data Collection

The data were collected over four weeks from May 2014 using the online survey tool Survey Monkey (www.survey.monkey.com). Data were then downloaded into SPSS Version 20 for analysis. Incomplete questionnaires, where less than half of the questionnaire was completed, were excluded from the analysis.

Data Analysis

Demographic data such as age, gender, years nursing and employment status, were analysed using descriptive statistics. To aid data analysis, qualifications were categorised as either ‘postgraduate’ or ‘undergraduate’, and job classifications were categorized as ‘Registered Nurse’, ‘specialist’ or ‘non-clinical’. ‘Specialist nurses’ included nurse specialists, nurse consultants, Nurse Practitioners and support or liaison nurses. ‘Non-clinical nurses’ included nurse managers, researchers and academics. The demographic data were presented in aggregate form using frequencies, percentages and medians and interquartile range (IQR). Closed-ended questions contained categorical variables which were coded and then analysed using non-parametric statistics (Pallant, 2013, Punch, 2003). The frequency of the responses was recorded for both closed-ended and Likert-scale questions. The Kruskal Wallis Test and the Mann Whitney U Test were used to compare the outcomes of continuous variables with categorical variables as appropriate (Pallant, 2013). A p value with an alpha coefficient 0.05 was considered significant. The effect size was then calculated to determine the magnitude of the difference between groups (Sullivan and Feinn, 2012), with 0.1 being a small effect, and 0.5 being a large effect (Pallant, 2013).

Content analysis was used to analyse qualitative data and derive themes (Elo and Kyngas, 2008). This process was initially undertaken separately by two researchers, then their findings compared. Any differences were discussed until consensus was reached. Credibility of the qualitative data was established through the use of representative
quotations from the open questions. Respondent anonymity was assured. Questionnaires were submitted anonymously and all data presented in aggregate form only.

**Results**

1726 nurses were invited to participate in the study. The response rate was 22.5% \((n = 388)\), however once incomplete questionnaires were excluded from the analysis, 359 responses were included in the analysis. The majority of respondents were female, and most were aged 36-55. There were respondents from each Australian state and territory (Table 2).

*Insert Table 2 around here please*

Respondents worked a median of 36 hours per week (IQR 30-40 hours). The median number of years working in nursing was 20 years (IQR 12-30 years) and the median time working in ICU was 14 years (IQR 7-21 years). Most respondents had completed a postgraduate qualification in critical care nursing, and held clinical roles in combined ICU / high dependency settings (Table 3).

*Insert Table 3 around here please*

**Self-rated knowledge**

Most respondents considered that their enteral nutrition knowledge was good \((n = 205, 60.1\%)\) or excellent \((n = 35, 10.3\%)\). There was no statistically significant difference in respondents self-rated knowledge of enteral nutrition when compared by level of qualification \((p = 0.32)\) or job classification \((p = 0.19)\) (Table 4).
Knowledge deficits

Respondents reported knowledge deficits in relation to gut physiology, and feed formulation and administration rates. Feed formulation, including a lack of understanding of different feed formulas, types of formulations required for different clinical presentations, and calculation of regimes and calories were commonly reported. Respondents acknowledged that the dietitian was primarily responsible for determining the feeding regime and choosing the appropriate formulation, however they believed that they needed a better understanding of what they were administering to their patient.

Would be helpful to have dietitian provide in-service with select critical care scenarios to gain understanding for how she approaches a patient case and chooses dietary formula based on patient’s past history, multi-organ failure, type of surgery done, allergies, etc. (Respondent 44).

Gut physiology and malnutrition were also reported as areas of knowledge deficit for respondents. Respondents described a lack of understanding of the impacts that feeding, or lack thereof, had on the patients’ morbidity and mortality.

Would like further education re re-feeding syndrome (Respondent 270).


[Better understanding of] pathophysiology of the gut during critical disease process (Respondent 315).

Sources of information related to enteral nutrition

Respondents identified that most of their enteral nutrition knowledge was sourced from the unit dietitian and hospital policies and protocols. Most respondents reported having
access to a dietitian \( (n = 332, 94.9\%) \), and that there was a protocol \( (n = 324, 92.6\%) \) to guide the provision of enteral nutrition in their unit. Despite the availability of these resources, only 23\% of respondents \( (n = 74) \) reported the protocol was followed ‘all of the time’, and only 12\% of respondents \( (n = 39) \) had access to a dietitian after hours.

Postgraduate studies, journal articles and hospital in-service were the other common sources of information related to enteral nutrition. Little information was reportedly obtained from undergraduate nursing training. Other sources of knowledge included the medical staff, research coordinators or pharmacist, self-directed learning or reflection of own experiences, and conferences or seminars (Table 5).

*Insert Table 5 around here please*

Several respondents reported having received little education focused on enteral nutrition as part of their professional nursing training, and many respondents stated that there were limited, if any, opportunities for enteral nutrition education in the clinical setting.

*My knowledge [of enteral nutrition] was gained mostly by self-education ...*

*When I came to this ICU, the feeding policy was non-existent and feeding practices were poor* (Respondent 97).

*Postgraduate education provides limited education regarding nutritional therapy and the value of same in critically ill patients* (Respondent 133).

Many respondents \( (n = 272) \) identified that they would like to receive further education related to enteral nutrition. Within the ICU, respondents indicated a preference for informal education, delivered at the bedside by colleagues or from dietitians who were regarded as the ‘expert’ in nutrition. Respondents also indicated a need for increased access to unit policies and guidelines regarding enteral nutrition.
Some respondents indicated a preference for education from sources outside of the ICU, such as access to clinical journals, attendance at conferences or webinars, or from formal education such as an undergraduate or postgraduate course. Less formal sources such as the Internet and email were also suggested.

**Discussion**

There are four important findings in this study: i) respondents rated their own enteral nutrition knowledge as good or excellent, but identified significant knowledge deficits, ii) respondents had received little formal education related to enteral nutrition, iii) respondents did not routinely follow enteral nutrition protocols, and iv) respondents preferred sources of enteral nutrition information were hospital-based in-services and dietitians.

Most respondents rated their enteral nutrition knowledge as either good or excellent. Despite this positive knowledge rating, and in juxtaposition to the high percentage of the sample with a critical care postgraduate qualification, a significant knowledge deficit was reported. Respondents reported poor understanding of morbidity and mortality associated with malnutrition, and a lack of knowledge relating to basic physiology of the GIT system. Some respondents also reported a knowledge deficit in relation to potential complications of feeding such as re-feeding syndrome. Similar knowledge deficits have been identified previously (Cahill, Murch, 2012, Marshall, Cahill, 2012), and are a major barrier for implementing good enteral nutrition related care (Behara, Peterson, 2008, Darawad et al., 2015, Mowe, Bosaeus, 2008a).

Good nutrition care requires nurses to administer, monitor and titrate enteral nutrition based on the patient’s response (Darawad, Hammad, 2015). Consistent with findings by Mowe et al. (2008a), respondents from this study acknowledged their role in assessing feed tolerance and delivering enteral nutrition. Yet respondents reported knowledge deficits in
relation to calculating caloric requirements, differences in feeding formulas and formula selection for differing clinical presentations, all of which may prevent nurses adequately assessing and managing their patients (Darawad, Hammad, 2015).

Most respondents indicated that their enteral nutrition knowledge was sourced from within the hospital, and that postgraduate studies were inadequate in informing enteral nutrition decisions. Educational opportunities relating to nutrition were scarce, with limited education provided by hospitals. This is concerning because significant knowledge and educational deficits hinder optimal delivery of nutrition (Mowe et al., 2008b). Additionally, education must be ongoing to maintain currency and retention of knowledge. Previous longitudinal research has confirmed the need for regular enteral nutrition education, with knowledge deficits reported over a three-month follow-up period post education (Spear et al., 2013).

Adherence to protocols has been shown to improve enteral nutrition delivery (Marshall, Cahill, 2012) and improve clinical outcomes in critically ill patients (Bourgault et al., 2007). This study found that most respondents had access to an enteral nutrition protocol to guide delivery, but it was not regularly followed. This is a common issue highlighted in the literature (Cahill, Murch, 2012, Marshall and West, 2006, Mowe, Bosaeus, 2008a, Persenius et al., 2009), and several studies have recommended increasing education as a strategy to improve adherence to protocols (Bourgault, Ipe, 2007, Cahill et al., 2014, Darawad, Hammad, 2015, Marshall, Cahill, 2012).

Finally, as reported in other studies, dietitians were seen as one of the greatest sources of information regarding enteral nutrition (Kalaldeh et al., 2014, Persenius et al., 2006). Many respondents felt that regular in-service education provided by a dietitian or an ‘expert’ in nutrition would be ideal to inform enteral nutrition knowledge. However, their availability (limited to office hours) impacted the use of the dietitian as a source of information (Cahill, Murch, 2012). In-service education and liaising with colleagues has
previously been documented as a preferred source of enteral nutrition information (Darawad, Hammad, 2015, Marshall et al., 2011). This may be because information gained from a colleague is obtained quickly and can be easily applied to clinical practice (Marshall, West, 2011). Training some nurses in an advanced capacity, to act as a clinical champion, may improve access to an enteral nutrition expert (Bourgault, Ipe, 2007).

Access to educational resources can be challenging for nurses, due to both time restrictions and costs (Hegney et al., 2010). E-learning is an alternative solution to the provision of education, which is simple to access, and cost effective (Yu et al., 2007). Education provided ‘in-house’ such as in-service education is also easily accessible to the majority of nurses and may influence patient care immediately as it will be specific to unit practices and may assist in the management and decision making of their current patient.

**Study limitations**

A strength of this study was the inclusion of nurses from across Australia, with a diverse range of clinical education and experience. One limitation of this study was that respondents, were all members of one professional organisation (ACCCN), and therefore had a demonstrated interest in intensive care nursing. A higher percentage of respondents held a postgraduate qualification than the wider ICU population. In addition, respondents had previously agreed to be contacted for research purposes. These factors restrict the generalisability of the study results beyond that of the sample population.

Another limitation of this study was that nurses were asked to self-report their own level of enteral nutrition knowledge. Respondents may over or under report their level of knowledge in self-report studies, which can affect the results.

Finally, the study’s response rate (23%) may suggest a relative lack of interest in the area of study (McFall and Milke, 2007). There is a possibility of non-response bias as those that responded may have had a greater interest in nutrition in the critically ill.
Conclusion

This study has further highlighted the challenges associated with enteral nutrition in the ICU. Despite respondents indicating their enteral nutrition knowledge was ‘good’ or ‘excellent’, knowledge deficits were prevalent, in particular in relation to GIT physiology, and the implications of malnutrition on morbidity and mortality. In addition, hospital protocols regarding enteral nutrition were not routinely followed. Instead, dietitians were the preferred source of nurses’ enteral nutrition information, however their limited availability impacted their efficacy as an information resource. Hospital based educational opportunities, such as in-services, were another preferred source of information for nurses, but were not widely available.
References

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