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ARTICLE

Assessment of knowledge, attitude and practice of nurses regarding enteral nutrition at a military hospital

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Background and objectives: Enteral nutrition (EN) support plays a vital role in reducing malnutrition in hospitalised patients, and its provision is primarily a nurse's role. Therefore, nurses need to have adequate knowledge and a positive attitude regarding EN. This study aimed to determine the knowledge, attitudes and practices (KAPs) regarding enteral nutrition of nursing personnel at 1 Military Hospital and to determine the need for updated in-service training.
Method: A descriptive, cross-sectional study with an analytical component was used to collect data from military nurses through a validated self-administered questionnaire. A score of 80% and above was rated as adequate knowledge. Descriptive statistics were employed to describe the results and correlations were used to determine relationships between continuous variables.
Results: In total, 207 (86.2% response rate) questionnaires were completed. The median knowledge score was 46.3% (mean 45.8 ± 13.7%, range 6.3–81.2%). Only one participant achieved the target score of ≥ 80%, and 16.3% scored ≥ 60%. No significant differences were found between knowledge and professional rank ($p = 0.14$) and knowledge and years of working experience ($r = -0.01$; $p = 0.85$). A positive attitude towards EN was found and 96.1% of participants expressed the need for additional in-service training.
Conclusion: The nursing personnel have inadequate EN knowledge, irrespective of their professional rank and experience. However, they are perceived to have positive attitudes towards the importance and administration of EN. Therefore, in-service training should be conducted regularly to mitigate the gap in knowledge.

Keywords: attitude, enteral nutrition, knowledge, military hospital, nursing personnel, practice

Introduction

Malnutrition is a debilitating and highly prevalent condition in hospital settings.[1] Globally, malnutrition prevalence in hospitalised patients ranges between 13% and 69%.[1–3] In Australia, 17% of patients were malnourished on admission to hospital. Those that developed malnutrition during hospitalisation stayed on average 26 days longer compared with well-nourished patients.[4] In Africa, at-risk for malnutrition on admission to hospital was diagnosed in 61% of adult patients and increased to 71% on discharge. Of these, only 18.8% were referred for specialised nutrition support during hospitalisation.[5] In South Africa, 21.8% of adult patients admitted to hospital were classified as malnourished.[6]

Factors contributing to worsening nutritional status during hospitalisation include the patient's primary diagnosis (e.g. cancer), loss of appetite, increased nutritional requirements, and immobility resulting in a loss of lean body mass.[7] In addition are nil per os status, and interruptions to feeding due to medical and surgical procedures.[8] The lack of nutritional screening on hospital admission, unavailability of feeding protocols and the limited number of nutritionist/dietitian posts available at healthcare facilities may further contribute to the development and worsening of hospital malnutrition.[2,9] The impact of malnutrition is associated with a longer hospital stay, increased risk for acquired hospital infection, poor prognosis and increased mortality.[4]

The provision of nutrition support has been associated with a 7.2% reduction in mortality and minimised hospital stay up to 30 days.[10] Enteral nutrition (EN) is recommended in haemodynamically stable patients with a functioning gut presenting with compromised swallowing abilities.[10] The role and nature of nursing personnel's responsibilities require them to understand the gastrointestinal tract (GIT) functions and the changes during acute illness.[11] Thus, it is essential for nursing personnel to possess a basic knowledge of the components of nutrition support. Nurses can assist in bringing change to the provision of EN in patients through standardised nutritional practices. As poor nutrition affects mortality and morbidity, it is crucial that nurses feel responsible for providing adequate nutritional support for their patients while in hospital.[12]

Certain identified barriers that affect good clinical practice to EN provision include resistance to change, limited experience of working with critical-care patients, lack of awareness of the availability of protocols, inadequate training and slow administrative processes.[13]

Nurses should be empowered to embrace the best medical treatment to bring positive outcomes to the lives of their patients.[14] A change in practice by nursing personnel improved the commencement of EN within 24 hours of admission and positively affected the goal of achieving the target feeding rate, the calories delivered and overall nutritional prescription by day six.[15,16]

Enteral nutrition is of vital importance in managing patients presenting with oral feeding difficulties. It maintains gut

motility, immunity and metabolic responses.[17,18] However, limited studies have explored the knowledge, attitudes and practices (KAP) of nursing personnel regarding EN, especially in the military environment. The study aimed to determine the KAP regarding the provision of EN and to identify the need to improve in-service training and upgrade the nutrition module offered at the South African Medical Health Service (SAMHS) nursing college.

Materials and methods

Study design and setting

This descriptive, cross-sectional design with an analytical component was conducted in 2016 at 1 Military (tertiary) Hospital, Thaba Tshwane, Pretoria, South Africa.

Sample size and population

For a population of 500, the calculated sample size was 240, based on a precision of C*p* = 10%, 90% power and a confidence level of 95%. Simple random sampling was applied to select the participants. They comprised all nursing personnel employed at 1 Military Hospital on a permanent or contract basis and willing to participate. As all nursing personnel work on a rotation basis between clinics and ward levels, we included all nurses working day and night duty in the following wards: paediatric, internal medicine, surgical, psychiatric, renal unit, orthopaedic, obstetrics and gynaecology, intensive care unit wards, and outpatient clinics.

Methods

The questionnaire comprised two sections: Section A involved the participants' demographic information, and section B applied the KAP questions to collect data. For this study, an 80% and above score was rated as adequate knowledge. These results were set in line with other studies that conducted KAP, as a score of 80% is desired to establish whether there is an excellency in administering EN by nursing personnel.[19]

The literature review guided the questionnaire and was assessed for content validity by a panel of experts in EN. Face validity was evaluated by the participants who took part in the pilot study at 1 Military Hospital. An adjustment from the pilot study feedback was made accordingly.

The researcher obtained informed consent from the participants who freely volunteered to participate in the study, and the maintenance of confidentiality was always a priority. The appointment-based method provided a safe tool to ensure that participants answered the questionnaire individually.

Ethical approval

Ethical approval was granted by the Health Research Ethics Committee of the Faculty of Medicine and Health Sciences, Stellenbosch University, and 1 Military Hospital Research Ethics Council. Ethic references #S15/10/247 and #REC-111208-019.

Statistical analyses

Data analyses were performed using Microsoft Excel (Microsoft Corp, Redmond, WA, USA) on a predesigned spreadsheet. Descriptive statistics were used to analyse the participants' demographic profiles, using frequencies and percentages presented using tables and graphs. Relationships between two continuous variables (knowledge and years of experience) were analysed with regression analysis and the strength of the relationship was measured with the Pearson or Spearman correlation based on data normality. A *p*-value less than 5% indicated significance in hypothesis testing. The Statistical Package for the Social Sciences Version 23.0 (SPSS Inc, Chicago, IL, USA) was used to analyse the data.

Results

A total sample size of 207 was achieved. This moved the accuracy to 11%, maintaining 90% power and a confidence level of 95%. Some questions had missing responses, and such were excluded from the study. Thus, an 86.25% response rate was achieved for this study.

Table 1 indicates the demographic information of participants included in the study. Most of the participants were female (78.3%) and aged between 20 and 29 years. Almost half of these participants held a college degree or diploma qualification, of which nearly two-thirds obtained their tertiary qualification at the military college. About 43% worked as professional nurses, and 3.8% were nursing assistants. Less than 8% had a level of experience in nursing of less than one year (7.8%).

Enteral nutrition knowledge

The level of knowledge obtained among participants is represented in Figure 1. Participants scored a median knowledge level of 46.3% (mean 45.8% ±13.7, range 6.3–81.2%), lower than the set target of 80%. Only one participant achieved the target score of ≥ 80% and 16.3% obtained above 60%.

There was no significant difference between EN knowledge learned at the military nursing college and the following variables: gender, nursing ranking category, and institutional college where training was received. Furthermore, there was no correlation between the level of knowledge and years of experience ($r = -0.01$; $p = 0.85$).

Figure 2 indicates the percentage of correct responses to the knowledge questionnaire. The benefits of EN, such as reducing the risk of malnutrition and being a symbol of care, were stated correctly in approximately 50% of the participants' responses. One-third were able to identify EN complications such as hyperglycaemia, aspiration, tube dislodgement and diarrhoea. Moreover, only 41.8% correctly indicated that EN should be initiated within 24–48 hours post-admission in haemodynamically stable patients.

Attitudes to enteral nutrition

Table 2 indicates the participants' attitudes towards EN. More than half (50.8%) of the participants perceived EN as a tool to reduce the length of hospital stay, and 32.1% mentioned that it is cost-effective. However, 7.14% regard EN to be unnecessary and time-consuming due to the tremendous amount of recording that is required in patient feeding charts.

Although almost all (99.5%) agreed that nursing personnel ought to understand the administration of EN for the well-being of their patients, close to one-quarter (27%) did not consider EN as the first option in critically ill patients as they felt that it causes discomfort. More than two-thirds of participants (67.1%) believed that it is easier to nurse patients who are on EN as it can be administered at the same feeding rate throughout the duration required by the patient. However, 4.5% believed that EN is an expensive treatment that does not impact or benefit the critically ill patient.

Table 1: Demographic distribution of participants

Category	Variable	Frequency (*n*)	Percentage (%)
Gender	Male	45	21.74
	Female	162	78.26
	Total	207	100
Age	< 20 years	1	0.48
	20–29 years	80	38.65
	30–39 years	60	28.99
	40–49 years	37	17.87
	50–59 years	29	14.01
	> 60 years	0	0.00
	Total	207	100
Qualification	Less than Grade 12	0	0.00
	Grade 12 (Standard 10)	3	1.45
	Nursing certificate	85	41.06
	College degree/diploma	95	45.89
	University degree	24	11.60
	Master's degree	0	0.00
	Total	207	100
Institution where qualification was obtained*	SAMHS Nursing College	158	74.18
	Civilian nursing college	24	11.27
	University	26	12.21
	Other	5	2.35
	Total	213	100
Staff category	Enrolled nursing assistant	8	3.86
	Enrolled nurse	71	34.30
	Professional nurse	89	43.00
	Professional nurse with specialty**	38	18.36
	Other	1	0.48
	Total	207	100
Working experience as a professional nurse	< 1 year	16	7.77
	1–5 years	66	32.04
	6–10 years	43	20.87
	11–15 years	24	11.65
	16–20 years	17	8.25
	21–25 years	27	13.11
	> 25 years	13	6.31
	Total	206	100

SAMHS = South African Medical Health Service.
*More than one option could be identified.
**Speciality of nurses included: Orthopaedic, Paediatrics, Primary Healthcare, Midwifery, Critical Care, Neonatology, Psychiatric and Mental Health, Cardiology.

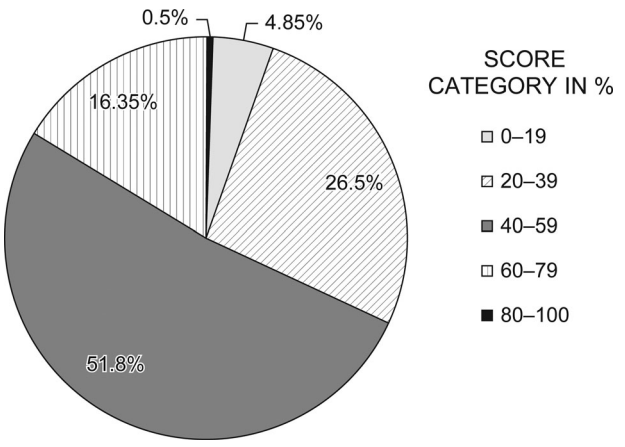

Figure 1: Level of knowledge score (%) among participants.

Enteral nutrition practices

Table 3 indicates the practices nurses implement to reduce the risk of aspiration in tube-fed patients. The majority reported using a Semi-Fowlers' (35.36%) and litmus test (26.22%) to minimise aspiration risk in patients. However, 7.93% of participants indicated that the patient should be fed at a slower rate.

Figure 3 indicates how the participants would address the management of a patient presenting with diarrhoea on EN. More than one option could be indicated. Nearly two-thirds of the participants (65.7%) reported that they would administer fluids and electrolyte therapy to prevent dehydration and 57% would assess and treat the cause of diarrhoea. More than two-thirds (68.1%) indicated that the most effective way of addressing a diarrhoea episode is to communicate with the dietitian to change the feed. Adjusting of feeding rate and

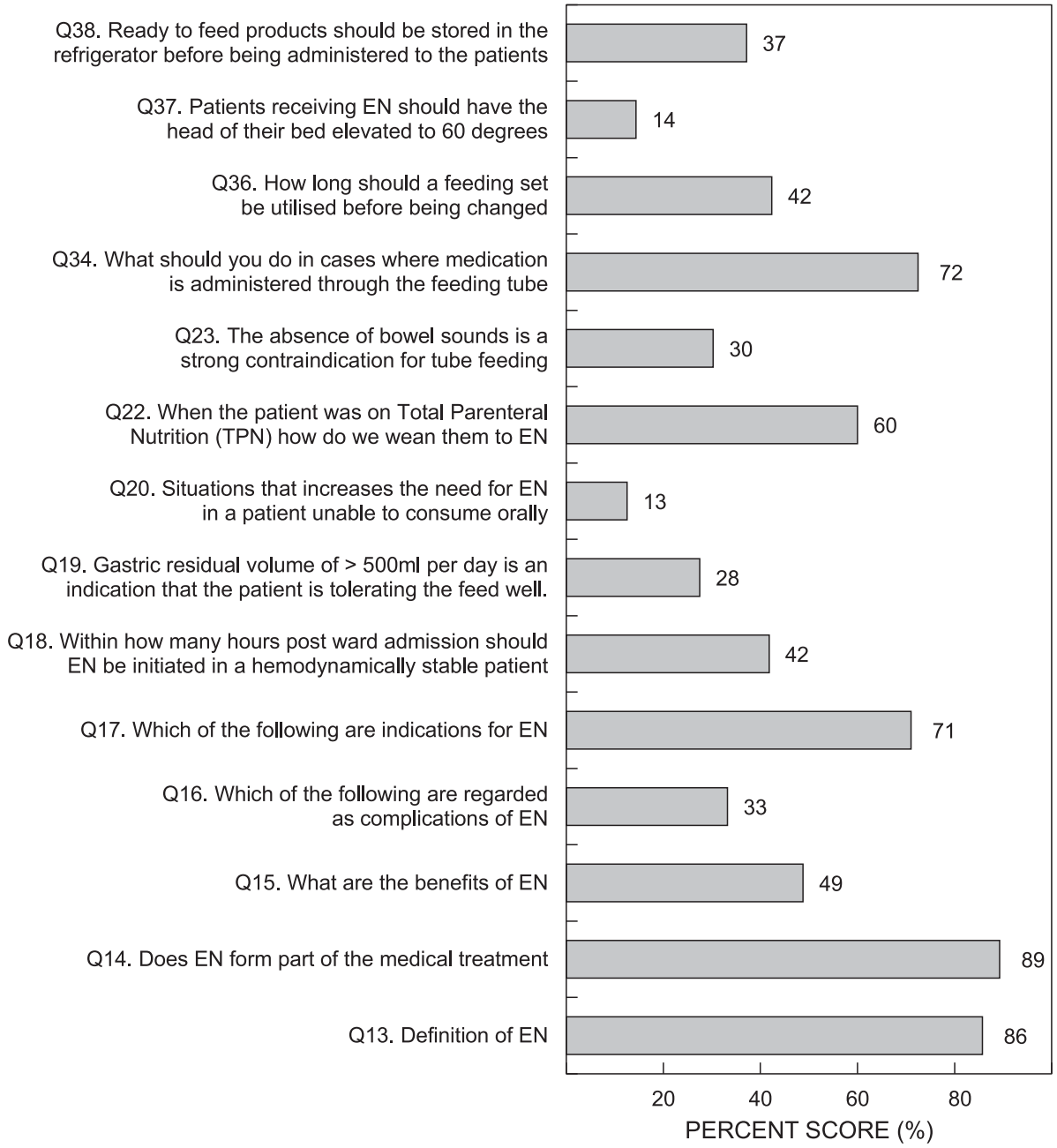

Figure 2: Bar graph presenting the percentage of correct answers obtained. (EN = enteral nutrition; TPN = total parental nutrition).

immediate cessation of feed was an option for 16.4% and 25.1% respectively.

Participants were evaluated on the various ways to unblock a blocked feeding tube. More than half (60.9%) would flush the feeding line with lukewarm water, sterile water, Coca-Cola or bicarbonate of soda solutions. At least 20.3% would consider changing the feeding tube. Other methods of unblocking a feeding tube included: removing the feeding line from the patient (3.9%), placing the machine onto the prime pump setting (1.6%), contacting the dietitian (3.1%), and discontinuing feeding (3.9%). Participants who could not remember how to unblock a feeding tube comprised 6.2%.

Regarding feeding protocols and policies, a third (30%) of the participants indicated the availability of a feeding protocol in the workplace; however, nearly half (43.4%) did not know if such protocols existed. The availability of a protocol does not mean that it is being used regularly, as 80% indicated that they referred to the protocols only once or twice per month.

Table 2: Participants' attitudes toward EN

Attitude	Percentage (%)
Reduces hospital stay	50.79
Is cost-effective	32.14
Is time-consuming due to increased recording	7.14
Is complicated to administer	5.56
Is unnecessary	0.40
Increases workload	3.97
	100

*More than one option could be selected.

Table 3: Practices implemented to reduce the risk of aspiration in tube-fed patients

Practice	Participants (*n*)	Percentage (%)
Elevate the bed above 30° or to 45°/Semi-Fowler's position	58	35.36
Feed patient slowly	13	7.93
Stop the feeds	8	4.88
Place the patient in an upright position	34	20.73
Perform litmus test	43	26.22
According to dietitian instructions	5	3.05
I do not know	3	1.83
Total	164	100

*More than one option could be selected.

Nutrition training of nursing personnel

The percentages of participants who received formal training on EN through a lecture/presentation and full-day workshops were 57% and 7.4%, respectively. About 52.2% received training from the military nursing college and 12.6% from the dietitian via in-service training.

Some 25% of the participants indicated that in-service training was their primary source of nutrition knowledge, followed by the nursing college (20.5%). The Intranet, the internal Department of Defence (DoD) communication system (16%) and scientific journal articles (2.3%) were the least indicated sources. Nearly all (96.1%) expressed the need to receive EN updates, preferably in the form of formal in-service training by the dietitian.

Discussion

Nutritional care is one of the core responsibilities of nursing personnel.[11] Therefore, a basic knowledge of administering EN is expected of nursing personnel. This study was one of the first in the DoD to assess the KAP of EN among nursing personnel at a military hospital. The study findings revealed that, in general, nurses possessed inadequate knowledge of EN, as shown by the knowledge score level of 46.3%.

This study had a sample size of 207, of which 78.26% were female. In general, the nursing profession is female dominant, thus in contrast with the Malawian study in which 56.5% were male participants.[20] In total, 40% of the nursing personnel had less than five years of working experience. Military nursing graduates serve at least four years at a hospital facility, after which they are released to work in an area of their choice (government or private).[21] Similarly, Mula study participants' average years of working experience comprised 4.74 years.[20]

International clinical guidelines recommend early initiation of EN within 24–48 hours post-admission in haemodynamically stable patients unable to consume adequately through the oral route.[22] This practice was understood by only 42% of the participants in this study, which is, therefore, a matter of great concern. The benefits of early EN include a reduction in the risk of infection and length of hospital stay, as well as overall hospital treatment costs.[18,19,23,24] EN maintains the GIT integrity and functioning and minimises bacterial translocation.[18,25] Delayed administration of EN may therefore have a negative outcome in the hospitalised patient.

Enteral nutrition is considered safe and cost-effective. However, it can lead to hyperglycaemia, aspiration, diarrhoea and tube dislodgement if not properly administered and monitored.[7] In the findings of a Jordanian study, diarrhoea followed by abdominal pain, vomiting, tube dislodgement and weight loss were the most common EN complications.[26] It is of note that 66.8% of participants were unable to identify the potential EN complications in the current study. Poor assessment and management of EN complications can be detrimental to the patient's health outcome.

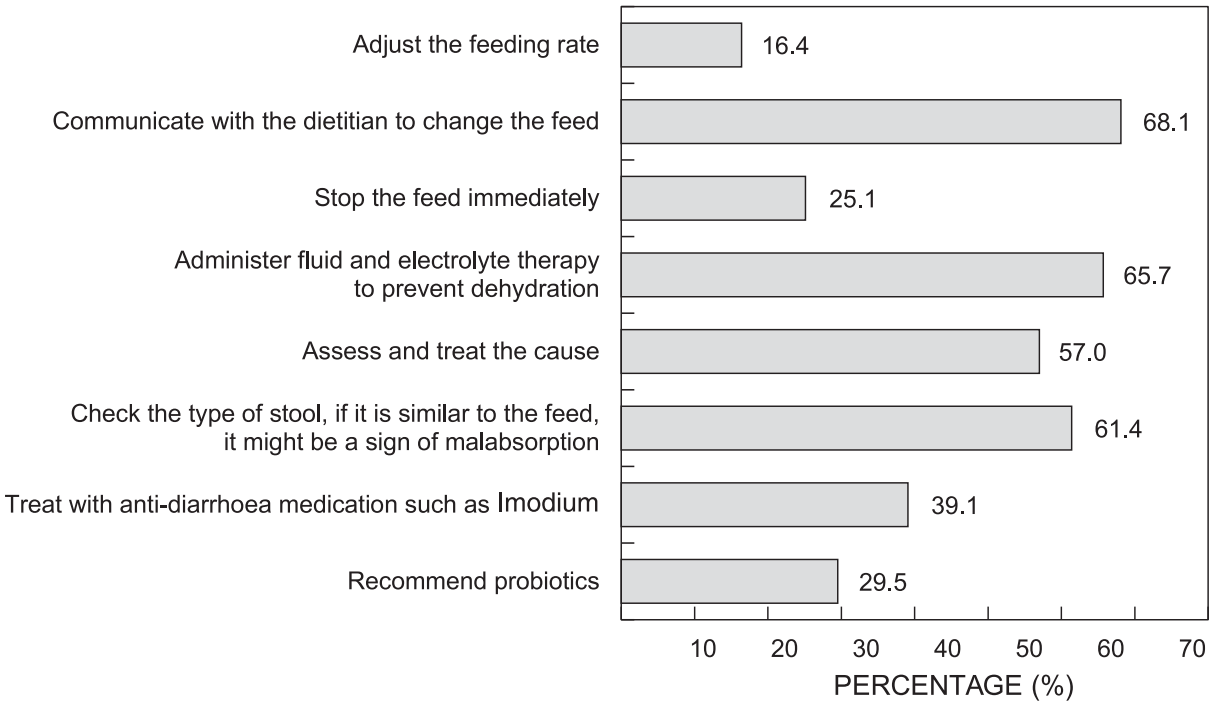

Figure 3: Management of a patient presenting with diarrhoea on enteral nutrition.

In the current study, 74.4% of participants had a clear understanding of the administration of drugs through a feeding tube. Guidelines indicate that when the tube is used for both feeding and drug administration it should be flushed with 15–30 ml of water before and after medication. The feed should be temporarily put on hold and resumed immediately after medication.[7,27–29]

Furthermore, international guidelines state that patients on EN should have their beds elevated between 30° and 45° to reduce the risk of aspiration.[22] This study found that the three most common methods used to reduce the risk of aspiration are Semi-Fowler's positioning and/or head of bed elevation (35.4%), use of the litmus paper test (26.2%) and placing the patient in an upright position (20.7%). In contrast, Hammad *et al*.[17] found that almost two-thirds of nurses place patients in a Semi-Fowler's position when the patients are on EN.

Overall, nursing personnel had a positive attitude towards EN, and they considered themselves able to administer EN. More than half of the participants believed that EN reduces hospital stay and can be cost-effective. However, a small percentage felt that it increases workload, is complicated and unnecessary, and prolongs hospital stay because the patients cannot eat orally. The findings are similar to those reported by Martins *et al*., where 89% of nursing personnel felt the importance of addressing nutrition while caring for their patients.[30]

This study found that flushing with the use of solutions such as sterile or lukewarm water, or Coca-Cola, is the most common (60.9%) practice to resolve a clogged tube. This was consistent with the findings of Hammad *et al*.[17] Other methods mentioned in the current study include changing the feeding line, disconnecting the feed, removing the tube from the patient, setting the feeding pump on prime and feeding on gravity flow.

The presence of a protocol/policy in the workplace eliminates the misconception, assumption and misinterpretation of patient information.[31] Literature provides evidence-based guidelines and protocols to guide healthcare workers and clinicians in the appropriate ways of administering EN to prevent discrepancies and minimise complications. In this study, only 30% of participants reported having a feeding protocol available in their unit. This presents a gap that needs attention. Darawad *et al*.[32] and Morphet *et al*.[33] reported the availability of protocols in facilities as being 41% and 92.6% respectively. However, the availability of a protocol does not imply frequent usage and necessitates regular enforcement.

Training nurses regarding EN can assist in minimising the associated complications such as aspiration, diarrhoea and blocking of tubes.[23] Bedier *et al*. investigated the effects of an educational programme on nursing practice regarding patient care, the results showed an immediate enhancement in knowledge and daily practice.[23] Moreover it is appreciated that 96% of participants expressed the need for regular nutrition training.

The aspects of medical intervention strategies, including EN, are constantly changing. Therefore, healthcare personnel must keep abreast of the current recommendations and implement these in their practices.[34] This study identified a knowledge gap that affects how nurses manage patients on EN. In addition, the need to update the nutrition training manual to breach the knowledge gap at the military nursing college was identified.

Due to the staff rotation system at the hospital, all staff working at the ward level and clinics were invited to participate. However, those stationed at the clinics for a prolonged period could have been disadvantaged regarding the knowledge and practical EN aspects as this is executed at the ward level. Nevertheless, the study indicated the need for continuous in-service training.

Conclusion

This study determined the KAPs of nutrition amongst nurses at 1 Military Hospital. Although we found inadequate knowledge regarding a variety of EN aspects, the participants displayed a positive attitude regarding EN and expressed a need for regular updates. Frequent in-service training, face-to-face lectures and presentation by a dietitian is necessary for nursing personnel to keep up to date with evolving EN guidelines and nutrition-related knowledge and practices regularly.

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