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Original Research Article

Evaluating the impact of a self-instructional module on nurses knowledge of enteral tube feeding in selected healthcare settings

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Abstract

Background: Nutrition is fundamental to sustaining life. In situations where individuals are unable to consume food orally-due to illness, gastrointestinal dysfunction, or surgical procedures-nutritional support must be administered via alternative methods. These include enteral nutrition (tube feeding into the digestive system) and parenteral nutrition (intravenous feeding). Among healthcare professionals, particularly nurses, adequate knowledge of enteral feeding is critical to ensuring safe and effective care.

Aim: This study aimed to evaluate the effectiveness of a self-instructional module (SIM) in enhancing the knowledge of staff nurses regarding enteral tube feeding in selected hospitals in Mandya.

Materials and Methods: A pre-experimental one-group pre-test post-test design was utilized. A total of 60 staff nurses from MIMS Hospital, Mandya, were selected through non-probability purposive sampling. Data were gathered using a structured 30-item knowledge questionnaire. Following the pre-test, the SIM was administered, and knowledge levels were reassessed in a post-test. Data were analyzed using descriptive and inferential statistics.

Results: Pre-test results indicated that 70% of participants had moderately adequate knowledge, while 30% had inadequate knowledge; none demonstrated adequate knowledge. After the intervention, 76.66% attained adequate knowledge and 23.33% had moderately adequate knowledge. The mean knowledge score improved significantly from 15.5 (51.66%) to 25.9 (86.33%), reflecting a mean increase of 10.4. A paired t-test confirmed the significance of this improvement ($t = 34.89$, $p < 0.001$). A statistically significant association was observed between the clinical area of practice and pre-test scores ($\chi^2 = 7.8$, $p < 0.001$), while no other demographic variables showed significant associations.

Conclusion: The self-instructional module proved effective in improving nurses' knowledge of enteral tube feeding. The findings underscore the importance of continuous education and structured training programs to ensure safe, consistent, and informed nursing practices in enteral nutrition. The study recommends the implementation of standardized, evidence-based enteral feeding protocols and ongoing professional development initiatives.

Keywords: Enteral tube feeding, Staff nurses, Self-instructional module, Knowledge, Effectiveness.

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1. Introduction

Enteral tube feeding, also known as enteral nutrition or tube feeding, is a method of delivering nutrition directly into the gastrointestinal (GI) tract through a tube. This method is employed when individuals are unable to consume adequate nutrients orally due to medical conditions or impairments. The enteral feeding process involves administering a liquid nutritional formula that is digested and absorbed similarly to regular food, utilizing the digestive system's natural functions. Compared to parenteral nutrition, which bypasses the GI tract, enteral nutrition is generally safer, more cost-effective, and associated with fewer complications.1 It helps

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maintain gut integrity, reduces the risk of infection, and preserves the gastrointestinal mucosal barrier.

Feeding tubes are typically soft, flexible plastic tubes that deliver nutrients and fluids directly into the stomach or small intestine, depending on the placement.[2] In some cases, these tubes are also used to administer medications. Enteral tube feeding serves as an alternative pathway to nourish individuals with disrupted oral intake routes, such as in cases of oropharyngeal dysfunction, neurologic disorders, or anatomical obstructions. Short-term enteral feeding is often managed using nasogastric (NG) tubes, while long-term feeding requires surgically placed tubes like percutaneous endoscopic gastrostomy (PEG) or jejunostomy (PEJ) tubes.[3,5]

2. Need for the Study

Pediatric patients have unique nutritional needs due to their continuous growth and development, requiring specialized care and a tailored approach to nutritional assessment and intervention. Enteral nutrition plays a vital role in paediatric healthcare, serving as a foundational method for nutritional support.[6,7] It is essential to identify appropriate indications, tube placement sites, delivery modes, and timing based on each child's medical condition. In children with cancer, enteral feeding by gastrostomy is often employed to maintain adequate nutrition during treatment.[8]

In children, enteral nutrition is indicated not only in the presence of disease but also in instances of inadequate oral intake due to developmental delays, neurological impairments, or structural abnormalities. Common scenarios necessitating enteral nutrition include impaired swallowing (e.g., due to cerebral palsy or post-stroke complications), decreased consciousness, mechanical ventilation, or GI obstructions. The risk of malnutrition in these patients necessitates prompt and effective nutritional intervention. Complications such as tube dislodgement, aspiration, infection, and nutrient imbalance can be minimized through proper nursing practice.[9,10] Given the complexities of enteral feeding in paediatric settings, it is imperative to equip staff nurses with the necessary knowledge and skills to ensure safe and effective care.

Beyond the clinical implications, enteral feeding impacts the psychological and emotional well-being of both patients and their families. Unlike adults, paediatric patients require a holistic approach that considers developmental stages, weight-based dosing, and psychosocial aspects of care. This further underscores the importance of appropriate training and knowledge among healthcare providers.

Therefore, this study aims to evaluate the effectiveness of a self-instructional module (SIM) designed to enhance nurses' knowledge regarding paediatric enteral feeding. By improving nursing competencies, the goal is to optimize patient outcomes and reduce feeding-related complications.

3. Objectives of the Study

1. To assess the pretest knowledge level regarding enteral feeding in children among staff nurses.
2. To evaluate the effectiveness of a self-instructional module on improving knowledge related to enteral feeding in children among staff nurses.
3. To determine the association between the knowledge scores and selected socio-demographic variables of staff nurses.

4. Materials and Methods

An evaluative research approach was adopted using a pre-experimental one-group pretest-posttest design to assess the effectiveness of a Self-Instructional Module (SIM) on staff nurses' knowledge regarding enteral feeding in children. The study was conducted at MIMS Hospital, Mandya, involving a sample of 60 staff nurses selected through non-probability purposive sampling, based on predefined inclusion and exclusion criteria. The data collection tool consisted of two parts: Socio-demographic profile, and a structured knowledge questionnaire on enteral feeding in children, comprising 30 multiple-choice questions. Data were collected using a self-administered method after obtaining formal permission from the concerned hospital authorities and informed consent from the participants. The pre-test was conducted to assess the baseline knowledge, following which the Self-Instructional Module on the significance of enteral feeding was administered on the same day. The post-test was conducted 15 days later using the same structured questionnaire. Collected data were analyzed using both descriptive and inferential statistics to evaluate the effectiveness of the intervention.

5. Results

5.1. Distribution of respondents according to demographic variables age of the respondents

The majority of the staff nurses were in the age group of 22 to 25 years, accounting for 22 respondents (37%). This was followed by 15 respondents (25%) aged 30 to 34 years, and 14 respondents (23%) in the 26 to 29 years age group. A smaller proportion, 9 respondents (15%), were aged 35 years and above. This distribution indicates that a significant portion of the nursing staff are relatively young, suggesting a possibly early-career demographic. Marital Status: In terms of marital status, the majority of the respondents were

married (64%), while 36% were unmarried. This may reflect the typical socio-demographic characteristics of the working nursing population in the study setting. Area of Clinical Practice: With regard to the area of clinical practice, a majority of the respondents (53%) were employed in Paediatric wards, followed by 20% in the General ICU, 17% in the Paediatric ICU, and the remaining 10% in the Emergency Department. The high proportion in paediatric wards could be related to the staffing needs or focus of the healthcare facility. Total Years of Experience: Most of the respondents had 2 to 5 years of clinical experience (42%), while 30% had less than 1 year of experience. Only 8% had more than 5 years of experience in the hospital. This suggests a predominance of early-career nurses in the workforce, which might have implications for training and retention strategies. Educational Status: Regarding educational qualifications, a significant majority (77%) of the nurses had completed undergraduate (UG) nursing education, whereas only 7% had pursued postgraduate (PG) nursing education. This highlights a potential area for professional development and educational advancement among the nursing staff.

The **Table 1** distribution of respondents' knowledge levels before and after an educational intervention. Prior to the intervention, nearly one-third of participants exhibited low or insufficient knowledge, while the majority demonstrated a moderate understanding, indicating some familiarity but limited competence. Notably, no respondents displayed a high level of knowledge at the pre-test stage. Following the intervention, a significant improvement in knowledge levels was observed. No participants remained in the lowest category, suggesting that the program effectively addressed basic knowledge gaps. While a smaller proportion of respondents remained at a moderate level, the majority—77%—achieved a high level of knowledge in the post test. This shift from 0% to 77% in the high knowledge category underscores the effectiveness of the intervention in enhancing understanding and competence on the topic.

This study evaluated the impact of a Self-Instructional Module (SIM) on the knowledge of staff nurses regarding enteral feeding in children by comparing their pre-test and post-test scores. Pre-test Mean Score: 15.5. The average score before the intervention indicates that staff nurses possessed a moderate baseline knowledge of enteral feeding in children. Post-test Mean Score: 25.9. Following exposure to the SIM, the mean score increased significantly, demonstrating a marked improvement in knowledge. Mean Difference (Enhancement): 10.4. This average increase in scores reflects a substantial enhancement in understanding. A gain of 10.4 points clearly indicates that the SIM was highly effective. Standard Deviation of Enhancement: 3.73 While individual improvements varied somewhat, the standard deviation suggests that the SIM had a consistently positive effect across participants. Paired t-test Value: 34.89. This very high t-value shows a strong statistical difference between pre- and post-test scores, indicating that the improvement is highly unlikely to be due to chance. Statistical Significance: $p < 0.05$. The results are statistically significant, confirming the effectiveness of the SIM as an educational intervention. The Self-Instructional Module (SIM) proved to be highly effective in improving the knowledge of staff nurses regarding enteral feeding in children. The statistically significant increase in scores post-intervention, coupled with a high t-value, supports the use of SIMs as valuable educational tools in nursing practice. These findings highlight the potential of structured, self-paced learning modules to enhance professional competency in clinical settings.

Table 1: Distribution of respondents according to their pretest and posttest knowledge scores. (N=60)

S. No	Level of Knowledge	Pretest		Posttest	
		Frequency	Percentage	Frequency	Percentage
1	Inadequate knowledge	18	30%	-	-
2	Moderately adequate knowledge	42	70%	14	23%
3	Adequate knowledge	-	-	46	77%

Table 2: Effectiveness of self-instructional module on knowledge regarding enteral feeding in children among staff nurses by comparing pretest and posttest knowledge scores. (N-60)

Level of Knowledge	Pretest	Posttest		Enhancement		Paired 't'test
	Mean	SD	Mean	SD	Mean	SD	
Overall knowledge scores Regarding Enteral Feeding in Children Among Staff Nurses	15.5	1.45	25.9	1.62	10.4	3.73	34.89 SS P,0.05 df=59

5.2. Association of demographic variables with pre-test knowledge

A Chi-square (χ^2) test was conducted to examine the association between categorical demographic variables and nurses' pre-test knowledge scores. The analysis revealed a statistically significant association between the nurses' area of clinical practice and their pre-test knowledge ($\chi^2 = 7.8$, $p < 0.001$), indicating that the clinical setting-such as pediatric wards, intensive care units, or general wards-significantly influences baseline knowledge about enteral feeding in children. In contrast, no significant associations were found for other demographic variables including age, years of experience, education level, marital status, and economic status. These findings suggest that clinical practice area plays a more critical role in shaping initial knowledge, and that targeted training interventions may be most effective when tailored to specific clinical settings with identified knowledge gaps.

6. Discussion

The present study aimed to evaluate the effectiveness of a self-instructional module (SIM) in enhancing nurses' knowledge regarding enteral tube feeding (ETF). The findings demonstrated a statistically significant improvement in knowledge scores post-intervention, suggesting that SIMs are an effective educational tool for improving clinical competence among nursing staff in this domain. The pre-test and post-test analysis revealed a marked increase in the mean knowledge scores of nurses after exposure to the self-instructional module.

These results are in line with the findings of Thomas et al.[11] who reported that a structured teaching program significantly improved nurses' knowledge of nasogastric feeding practices. Similarly, Dayalal Patidar et al.[12] concluded that self-instructional modules were highly effective in enhancing nurses' understanding of patient management, particularly in relation to chest tube drainage. Both studies highlight the broader utility of SIMs in diverse nursing practices, reaffirming their adaptability and effectiveness as educational strategies.

The present study's outcomes also resonate with the work of Khaja,[13] who demonstrated that SIMs were highly effective in improving pediatric nurses' knowledge regarding the prevention of ventilator-associated pneumonia. Likewise, Mohammed et al.[14] found that an educational program on nasogastric tube placement significantly improved pediatric nurses' knowledge and practices, mirroring the positive impact observed in our findings. These studies collectively emphasize that SIMs and structured educational programs promote evidence-based nursing practice by enabling learners to revisit content, study at their own pace, and reinforce key clinical concepts.

At the international level, conference proceedings such as ESPEN[15] have also underscored the importance of continuous professional education in nutrition therapy, highlighting the global recognition of structured training modules in advancing nursing competence. In addition, targeted interventions by clinical pharmacists, as reported by Hossaini Alhashemi et al.,[16] significantly improved nurses' knowledge, attitudes, and practices in medication administration through enteral feeding tubes. This further validates the effectiveness of specialized training and interdisciplinary approaches in enhancing safe and evidence-based patient care.

Taken together, the findings of the present study and prior research suggest that SIMs represent a powerful educational strategy in nursing education. They not only bridge knowledge gaps but also foster critical clinical competencies required for safe and effective patient care in enteral feeding practices.

Recommendations: Based on the study findings, the following recommendations are proposed:

1. Integration of self-instructional modules in nursing education: Nursing faculties should adopt self-instructional modules as an effective teaching strategy to enhance knowledge and skill acquisition. These modules can promote independent learning and improve clinical competency.
2. Development of topic-specific modules: Similar self-instructional modules should be developed on various nursing topics to support continuous learning and standardized training across different areas of practice.
3. Training for staff nurses: Staff nurses should receive training on the development, implementation, and evaluation of self-instructional modules. This will empower them to utilize such tools effectively in both educational and clinical settings.
4. Further research: Additional research is recommended to assess nurses' practices related to Enteral Tube Feeding (ETF) and their adherence to established protocols. Such studies will help identify gaps and inform targeted interventions to improve patient care quality.

7. Implications

Healthcare institutions should provide in-service education and training on Enteral Tube Feeding standards, policies, and

best practices to newly employed nurses. Similarly, nursing faculty and colleges need to incorporate updated, evidence-based recommendations into their curricula and offer comprehensive nutritional courses. To maintain and enhance competency, regular refresher in-service programs are strongly recommended, alongside increasing access to informational resources such as textbooks, scientific journal articles, and internationally recognized evidence-based guidelines. Additionally, documentation systems should be reviewed and revised to better support nurses in their practice.

8. Limitations

The sample size was limited due to administrative constraints, which may affect the generalizability of the findings. Additionally, the study focused exclusively on staff nurses working in selected hospitals within Mandya, restricting the transferability of the results to other geographic regions or healthcare settings. Furthermore, knowledge assessment relied solely on a self-administered questionnaire, which may not comprehensively reflect the nurses' practical skills or their ability to apply knowledge in real-world clinical situations.

9. Conclusion

The study revealed that staff nurses had inadequate knowledge and exhibited some unsafe practices regarding enteral tube feeding insertion. The developed self-instructional module was effective in significantly improving the knowledge and practice of nurses working in the paediatric unit. Additionally, most participants expressed satisfaction with the module. These findings highlight an urgent need to develop or adopt evidence-based enteral nutrition guidelines and protocols within hospitals. Establishing a multidisciplinary nutritional support team with clearly defined roles, along with regular in-service training and instructional programs, is essential to ensure safe and effective enteral feeding practices.

10. Ethical Clearance

Formal written permission was obtained from the private hospital and the ethical committee. Written informed consent was taken from all participating staff nurses. The anonymity and confidentiality of the staff nurses were strictly maintained throughout the study.

11. Source of Funding

This study was self-funded.

12. Conflict of Interest

The authors declare that there is no conflict of interest regarding this study.

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