INCREASING KNOWLEDGE AND CONFIDENCE IN THE CARE OF PATIENTS WITH GASTROSTOMY TUBES

by

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ABSTRACT

COURTNEY SKIPPER. Increasing knowledge and confidence in the care of patients with gastrostomy tubes. (Under the direction of DR. KATHLEEN JORDAN)

Patients requiring admission to the Trauma Intensive Care Unit (TICU) represent some of the most critically ill and complex cases within intensive care. These patients, often suffering from significant trauma to vital areas, may necessitate prolonged enteral feeding, frequently leading to the insertion of gastrostomy tubes. Despite the critical nature of gastrostomy tube management for patients with severe trauma and the need for enteral feeding, there is a gap in knowledge and confidence in this area. This gap necessitates targeted educational programs to improve patient outcomes. This quality improvement project focused on the nursing staff in the Trauma Intensive Care Unit (TICU) at a large academic medical center. The nurses received a comprehensive education module developed according to Lippincott standards, which covered the different types of gastrostomy tube types, nursing interventions, and documentation practices. The module included a didactic component and hands-on practice with gastric tube models. A pre-and post-test knowledge check was conducted to evaluate the learning outcomes. All 43 TICU staff registered nurses at the facility participated. After the educational module's implementation, significant improvements were observed in nursing staff knowledge regarding gastrostomy tubes. The median score for the pre-test was 70%, increasing to 100% on the post-test. Wilcoxon sign-rank test showed a statistically significant difference between pre- and post-test scores, $z = 5.207$, $p < .001$. The results demonstrate the effectiveness of the education module in improving TICU nurses' knowledge of gastric tube care.

DEDICATION

I dedicate this project to those that supported me during this journey. To my husband Aaron and my children, this would not have been possible without you. Thank you for all the sacrifices you made to allow me to pursue my studies. To my sister Meaghan who is a role model and inspiration to me every single day, your continued support of me kept me focused. To my good friend Michelle who was my biggest cheerleader. You never stopped believing in me even when I was having a hard time believing in myself. Lastly, to my colleagues who I met during this program, Christine and Brandalynn, we started off as strangers and ended up as friends. Thank you for walking on this journey with me every step of the way.

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LIST OF ABBREVIATIONS

COVID-19	:	Coronavirus Disease 2019
DNP	:	Doctor of Nursing Practice
EHR	:	Electronic Health Record
PEG	:	Percutaneous Endoscopic Gastrostomy
PEJ	:	Percutaneous Endoscopic Jejunostomy
TBI	:	Traumatic Brain Injury
TICU	:	Trauma Intensive Care Unit

CHAPTER 1: INTRODUCTION

Patients who require admission to the Trauma Intensive Care Unit (TICU) can be some of the sickest and most challenging intensive care patients. The major trauma patients who arrive at Atrium Health Wake Forest Baptist are admitted to the 16-bed TICU, where they receive specialty care. For patients with trauma to the face, neck, or abdomen, or those who may need longer-term feeding for more than thirty days, a gastrostomy tube may be required. Many of these patients already have a nasogastric tube inserted. A nasogastric tube may stay in place for up to thirty days, but the average stay in the TICU is five to twenty days (Biffl et al., 2021). Many nurses in the TICU are unfamiliar with how to care for gastrostomy tubes. With many new graduate nurses and travel nurses in the TICU, this situation led to a request for a quality improvement project to increase knowledge and confidence in the care of gastrostomy tubes by registered nurses.

There are different types of tubes for patients who require an enteral feeding tube based on medical needs. A jejunostomy tube goes directly through the abdomen into the small intestine. Using a camera, percutaneous endoscopic jejunostomy (PEJ) tubes are inserted into the small intestine. Gastrostomy tubes are inserted directly into the stomach. Percutaneous endoscopic gastrostomy (PEG) is the most common procedure in trauma patients and is associated with an up to an 18% overall complication rate (Chaudhry et al., 2017). For those patients with neurological disease or traumatic brain injury, overall complication rates can be as high as 43% (Yuruker et al., 2015). In trauma patients with any single complication, the rate of mortality increases to 13% (Abe et al., 2020), and for each additional complication, the rate of mortality increases dramatically. The types of tubes and insertion techniques in the TICU, PEG versus PEJ, were reviewed. While the PEJ is a smaller tube, it was not associated with fewer

complications or changes in mortality rates than the PEG (Wei et al., 2021). In PEG's push versus pull insertion methods, the overall complication rate was 22% compared to 20% (Kulvatunyou et al., 2018).

One of the reasons for increased gastrostomy complication rates is the high rate of nursing turnover. In the TICU, nursing turnover rates are nationally higher than the turnover rate in other types of intensive care units—26.6% annually compared to 16.8% pre-COVID (George & Quatrara, 2018). Although nurses in the TICU are required to have 8 hours of trauma-specific education annually, there are few guidelines on the required content. One TICU in Virginia educated the nursing staff on specific unit needs, complete with a pre- and post-test to measure retention. Following the education, hands-on methods were utilized to reinforce the education provided. Knowledge review of the trauma-specific education showed an increase in test results from 62% on the pre-test to 84% on the post-test (George & Quatrara, 2018).

Additionally, 93% of the nurses felt more confident in assisting each other in the specific tasks that were educated and practiced during hands-on learning sessions, which resulted in an 18% decrease in the overall mortality rate on the unit in the following year (George & Quatrara, 2018). Based on this research and the fact that the TICU had been experiencing a high rate of nursing turnover, the unit leadership concluded that a DNP scholarly project could improve patient outcomes. The focus of the project was narrowed down to educating nurses on the proper care of patients with gastrostomies in the TICU and following up that education with a hands-on learning session for all nurses on the unit.

Problem Statement

Nurse turnover rates for the TICU are higher than those of other types of intensive care units. Since COVID-19, many new graduate and travel nurses have been employed, resulting in

less experience and familiarity with gastrostomy tube management. This has led to some patients experiencing poor outcomes related to their gastrostomy tubes.

Clinical Question

The following clinical question was developed to guide this scholarly project:
In adult trauma patients, (P) will implementing an evidence-based education program for nurses (I) decrease the complication rate of patients with gastrostomy compared to the pre-education complication rates (C) while the patient is in the Trauma ICU?

Purpose

The average hospital length of stay after a surgically inserted gastric tube is nearly 30 days (Law et al., 2019). Education and hands-on learning increase confidence and knowledge in nurses, thereby improving patient outcomes (Centeno, 2023). The purpose of this scholarly project was to increase knowledge and confidence in the care of patients with gastrostomy tubes by educating the nursing staff of the TICU, thereby improving patient outcomes and decreasing complication rates of gastrostomy tubes. This education was followed up with hands-on learning opportunities to reinforce the education provided.

Project Objectives

For this DNP scholarly project, the desired outcome was to increase nursing knowledge and confidence in the care of the various types of gastrostomy tubes and to lower the overall complication rate of gastrostomy tubes in the TICU, which, for the three months prior to this study, was 17.2%.

The program design is a quality improvement project with a predictive correlation component. All nurses in the TICU participated in an education module on gastrostomy tubes created by the DNP student. This education module identified the different types of enteral

feeding tubes and special considerations for each type. Nursing care of the various gastrostomy tubes was taught, as well as how to document care in the electronic health record (EHR). Lastly, the module explained when the provider needs to be notified and when to call the ostomy nurse for assistance. Nurses took a pre- and post-test to assess knowledge retention. After the education module, nurses participated in a hands-on learning event to solidify the education they received. An evaluation of the hands-on learning session was conducted to determine if the registered nurses of the TICU found the sessions helpful. The overall complication rate of gastrostomy tubes in the TICU was monitored before the education and one and two months after the education was complete. The predictive correlation is that as nurses are educated, the overall complication rates of gastrostomy tubes in the TICU will decrease.

The education module was developed with input from nursing and surgical staff to ensure program fidelity and adherence to program design (Bellg et al., 2004). The education was consistent with standards of practice but included special considerations for each type of gastrostomy as requested by the surgeons. The pre-test and post-test assessed knowledge by asking questions about the care of enteral feeding tubes, and they were not just attestations that the nurse completed the education module. The same group did the hands-on learning post-education to ensure that the same information was discussed at each learning session. By ensuring high program fidelity, the outcomes will be more accurate, and the steps will be repeatable (Bellg et al., 2004).

CHAPTER 2: LITERATURE REVIEW

Methodology of Literature Review

In performing a comprehensive literature review for the years 2017-2022, the databases of Cochrane, PubMed, and CINAHL were searched using the keywords "gastrostomy," "complications," and "trauma." Initially, sixty-six studies were found. After the initial search, "intensive care unit" or "ICU" were added as keywords and thirty-four studies met these criteria. After reviewing the abstracts, pediatric studies were excluded, except for one, resulting in thirteen final research articles. The pediatric study (Berman et al., 2017) was a mixed-methods study comparing complication rates for PEG insertion at tertiary hospitals versus smaller community hospitals. Interviews with the healthcare team were conducted to explore why certain programs had greater success. Caregiver satisfaction was also measured using a standardized tool. This study was included as it was one of the few investigating caregivers' and the healthcare team's perceptions of the competence and capabilities of the providers and nurses. Facilities where caregivers rated the staff as more competent, and staff who felt more competent in providing care for PEG tubes,

Gastrostomy Use, Outcomes, and Trends in Critical Care

The retrospective analysis by Law et al. (2019) examined a significant dataset of patients with surgically placed gastric tubes in U.S. critical care settings over 20 years. A key finding was the doubling of gastrostomy tube use in critical care from 1994-2014. Additionally, patients with gastrostomies saw a statistically significant decrease in hospital mortality and a slight decrease in length of stay (to an average of 29 days). However, despite improved in-hospital survival, an alarming 50% of these patients discharged to long-term care facilities passed away within one

year. The study's conclusion suggests this persistently high 1-year mortality is likely due to underlying organ failure.

Gastrostomy Insertion Methods and Complications

Multiple studies examined the different methods of gastrostomy insertion and their potential impact on complication rates. Two meta-analysis studies focused on the surgically inserted gastric tube to determine if the insertion methods (PEG vs. other techniques) impact complications and mortality rates in high-risk populations (Kohli et al., 2022; Strijbos et al., 2018). Both studies concluded that PEG was the preferred type of surgically inserted gastric tube as it had a lower mortality and complication rate. Eight studies were retrospective analyses (Braasch et al., 2022; Cha et al., 2020; Chaudhry et al., 2017; Chaudhry et al., 2018; Kulvatunyou et al., 2018; Law et al., 2019; Varone et al., 2022; Wei et al., 2021). These studies focused on the insertion method, which type of provider inserted the gastric tube, and the optimal time to place the gastric tube. No statistically significant difference was found in the complication rates whether a surgeon versus a gastroenterologist inserts the gastrostomy tube. Even though a PEJ is a smaller tube, the PEG is more common and has fewer complications. This is thought to be from provider insertion confidence as the PEG is more commonly used.

Gastrostomy in Specific Patient Populations

The studies also indicate that certain patient populations are more susceptible to complications related to gastrostomy tubes. Traumatic brain injured (TBI) patients are some of the most unstable trauma patients. The two retrospective studies by Chaudhry et al. (2017; 2018) reviewed PEG placement in that population. The first study (2017) determined that PEG placement with comorbidities in the TBI patient population dramatically increased PEG complication rates and mortality rates. The second study (2018) also reviewed PEG placement in

the TBI population. This study determined that early PEG placement in this population increases mortality rates as these patients are often too unstable to tolerate that procedure. The authors recommended placing PEG in the seven-to-fourteen-day window post-injury.

In a different study, Cha et al. (2020) reviewed TBI patients with abdominal trauma requiring exploratory abdominal surgery. In this study, the authors found that the TBI patients who needed urgent abdominal surgery benefitted from the early placement of gastric tubes and had better outcomes and shorter lengths of stay than those who did not have a gastric tube placed during the initial exploratory abdominal surgery. However, according to the study, the difference was not statistically significant.

The retrospective study by Braasch et al. (2022) reviewed the mortality rate of elderly trauma patients with surgically placed gastric tubes. Overall, according to the report, the mortality rate of elderly patients experiencing trauma is 10% compared with the overall trauma mortality rate of 6%. Those patients with surgically placed gastric tubes had a statistically significant increased mortality rate. Elderly trauma patients needing PEG had more severe injuries than those not requiring PEG placement. One interesting finding in this study is that there is a negative correlation between dementia, trauma, and mortality rate. This condition was attributed to elderly patients with dementia having less severe trauma.

In another study, Marcotte et al. (2018) conducted a Level IV therapeutic study in trauma patients. The authors found that the complication rate for surgically placed gastric tubes can be as high as 22%, while the mortality rate remains around 10%. This study used a validated tool to review the need for surgically placed gastric tubes to reduce unnecessary procedures and decrease mortality rates. During the study period, the percentage of unnecessarily placed gastric tubes decreased from 25% to 8%.

Gastronomy Education for Nursing

One study by George and Quatrara (2018) showed that a trauma-specific education objective was best taught using a module and reinforced with stimulation-type learning. The learning peaked at two months post-module and simulation lab. It was recommended to have quarterly sessions for review to maintain a high level of knowledge. The study concluded that higher confidence in nursing skills and education improved patient outcomes. Further study is needed to determine if the nursing retention rate was impacted. The article applied to this scholarly project in that the study methods will be replicated in this scholarly project.

Conceptual/Theoretical Framework

This scholarly project is a quality improvement project with predictive correlation: The gastrostomy tubes' overall complication rate will decrease as the unit's educational level and nurse confidence level increase. The model used for this study is the Iowa Model for Evidence-Based Practice. This is a seven-step model for the implementation of evidence-based practice. This model was chosen because it allows the unit to own and take responsibility for the change. Once the data collection phase ends, it will be up to the TICU to maintain the quarterly hands-on learning sessions. The steps identified in the Iowa Model allow the unit to have buy-in and input once the evaluation has been completed. This will be important if they continue to educate the staff moving forward.

CHAPTER 3: METHODS

Setting

The setting for this scholarly project was the Trauma Intensive Care Unit (TICU) at Atrium Health Wake Forest Baptist, an academic medical center in Winston-Salem, North Carolina. This 885-bed tertiary-care hospital houses a Level 1 adult and pediatric Trauma Center that treats around 3,400 patients annually. Adult trauma patients requiring intensive care admission are admitted to the 16-bed TICU.

Population

Due to increased nursing turnover and the high percentage of travel nurses in the TICU, the population focused on this scholarly project was the TICU nursing staff. All staff registered nurses were included. The TICU Nurse Manager, Assistant Nurse Manager, and Clinical Educator were excluded from the scholarly project. If any staff nurse left the TICU before the project's completion, their data were excluded from the final results.

Intervention

A list of registered nurses working in the TICU was obtained from the nurse manager. An education module was developed using Lippincott standards and approved by the medical director, clinical expert, nurse manager, and clinical educator. This module covered the differences between gastrostomy tube types, special considerations, nursing interventions, and the Post-Surgical Gastric Tube order set. It also included instructions on electronic health record (EHR) charting and when to notify the provider. A quiz was created based on the module's content. This quiz was approved by the clinical expert, nurse manager, clinical educator, and the TICU medical director. This quiz was administered before and after the didactic session of the module.

Following the didactic session of the module, in-person in-services were conducted in the TICU with samples of the four gastric tube types available for hands-on practice. The goal was to reach 80% of the nurses with these in-services. Staff nurses who participated in the in-service received an evaluation using a 5-point Likert scale form (See Appendix B).

Data Collection Plan

Data collection is the hallmark of any Doctor of Nursing Practice (DNP) scholarly project. It goes beyond simply gathering numbers; it is about uncovering insights and trends hidden within the data (Polit & Beck, 2017). Data for this DNP project was collected in several ways.

The first data group was the Reporting Workbench Report. This report, developed in collaboration with the Trauma Program Coordinators, determined the percentage of complications for surgically placed gastric tubes in TICU. The report included data for any trauma patient, but it was filtered to include only those patients currently in the TICU. This report was run monthly. It was run before the intervention and continued monthly for data comparison at one, two-, and three-months post-intervention.

The second data group was a 10-question test (See Appendix A) developed in Articulate. Based on the education module developed per Lippincott standards, the test covered the content presented in the didactic session regarding the four gastric tube types. This test was administered to TICU nursing staff before and after they completed the gastric tube education module. The unit educator extracted test scores, de-identified, emailed, and saved the data on a work computer.

The DNP project focused on data from TICU nurses, including any Registered Nurse (RN) working there full-time, part-time, or as needed. Inclusion criteria extended to travel nurses

contracted to the TICU. Nurses floating to the TICU, including those from the Float Pool, were excluded from the QI project.

All data was collected electronically. The reports in Epic were reviewed weekly. The test results were tracked in HealthStream daily until 100% of the unit had completed the education module. An electronic roster from HealthStream documented in-service attendance. While 100% of RNs were required to complete the education module and testing, the goal was for 80% to complete the in-person in-services. The education modules and in-services were completed over two weeks in late September 2023 after Atrium Health Wake Forest Baptist's IRB department approved this DNP project.

A paired t-test was run on the pre- and post-education test scores to determine if there was a statistical difference. Before the test, data was checked for outliers and normality of distribution. If assumptions were not met, the Wilcoxon signed-rank test would have been used since it's appropriate for non-parametric data (Field, 2017) and can determine whether there is a median difference between the pre- and post-module scores. Additionally, a One-Way ANOVA was run on the complication rate of surgically placed gastric tubes to determine if there was a statistical difference in the data over time.

Confidentiality of Data

Maintaining data confidentiality is vital to the research process and a top hospital priority (Polit & Beck, 2017). All data was collected on a password-protected, hospital-issued laptop. Furthermore, dual-factor authentication was required for remote access. Extra care was taken to avoid using paper data to prevent loss or misplacement. Nurses were assigned numbers for data collection and analysis, ensuring anonymity. The Epic report was sent to the Trauma Program Coordinator, who provided complication rates by month, year, and percentage, without any

patient identifiers. Lastly, the IRB application for this scholarly project was submitted to Atrium Health Wake Forest Baptist and the University of North Carolina Charlotte and was approved after several revisions (See Appendix C).

Outcome Measures

Short-term and long-term goals were established to measure outcomes and assess the project's success (Kleinpell, 2022). The short-term goal was to increase nursing knowledge retention, as demonstrated by higher scores on the post-test compared to the pre-test. The long-term goal was to decrease the overall complication rate for patients with gastrostomy tubes compared to the pre-education rate. This measure was tracked through electronic health records (EHR) reports. The report's accuracy has been validated (Hwang et al., 2021) and is currently the source of overall complication rate data for gastrostomy tubes.

CHAPTER 4: RESULTS

Sample Size and Demographics

The education module was completed by all 43 staff registered nurses in the TICU. After the education module was completed, a hands-on in-service education was provided in the TICU. The in-service was repeated daily over two weeks until all the nurses had attended. The average length of time the in-service lasted was 20 minutes. Sixty-one staff participated in the in-services, but the evaluation form was only given to the 43 registered nurses who worked directly in the TICU. Of these 43 registered nurses, six were travel nurses and 37 were staff nurses. While the Nurse Manager, Assistant Nurse Manager, and Unit Educator attended the in-services and participated in the education module, they were excluded from the sample size.

Results of Educational Module

Forty-three Trauma Intensive Care Unit (TICU) nurses participated in the educational module and completed the pre- and post-test. Pre-test scores ranged from 20% to 100%, with an average of 70.47% (SD = 19.27). Post-test scores ranged from 80% to 100%, with an average of 95.58% (SD = 7.00).

The pre- and post-test scores were compared using inferential statistics to evaluate whether there was a statistically significant improvement in the TICU nurses' knowledge regarding gastric tubes. Prior to analysis, the data were tested for outliers and the normality of distribution. Visual inspection of boxplots showed one mild outlier in the pre-test data (Figure 1). Further evaluation using histograms (Figure 2) and the Shapiro-Wilk test showed that the post-test data were not normally distributed, $p \leq .05$. Therefore, the Wilcoxon signed-rank test was used for data analysis.

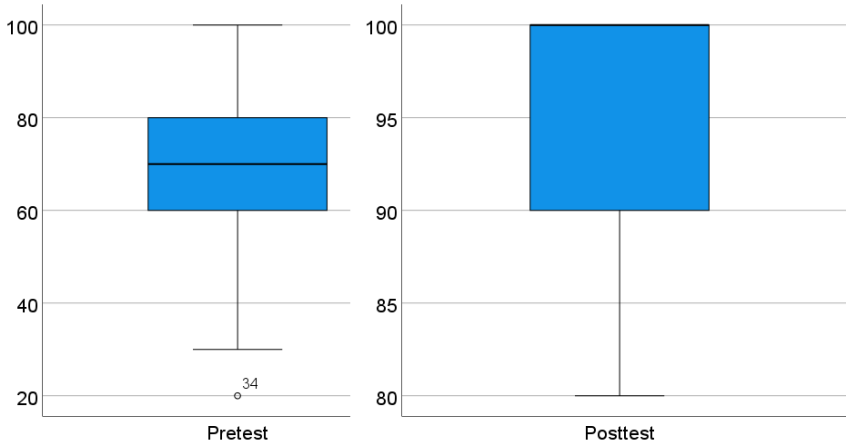

Figure 1

Boxplots of Pre-Test and Post-Test Scores

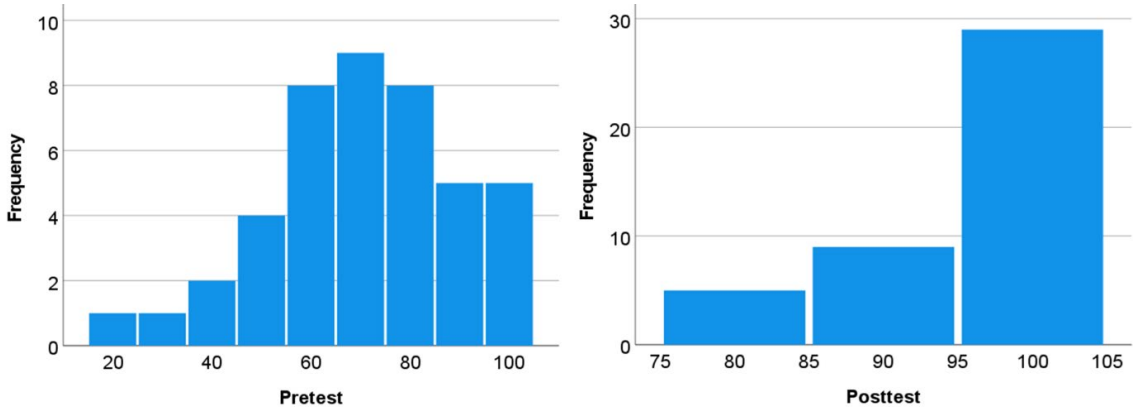

Figure 2

Boxplots of Pre-Test and Post-Test Scores

The Wilcoxon sign-rank test was run to evaluate whether there was a statistically significant difference in the TICU nurses' knowledge regarding gastric tubes before and after the training. The median pre-test score was 70%, and the median post-test score was 100%. Results of the Wilcoxon sign-rank test showed a statistically significant difference between pre- and post-test scores ($z = 5.207$, $p < .001$). The results indicated improved TICU nurses' knowledge regarding gastric tubes after participating in the education module.

Results of In-Service Evaluation

After the hands-on learning in-service that was offered in the TICU, staff nurses were given an anonymous evaluation form. The form used a standard 5-point Likert scale, with "5" indicating "Strongly Agree" and "1" indicating "Strongly Disagree." Seven questions assessed the registered nurses' perceptions of the in-service. With 43 individuals responding, the median score across all questions was 4.89, indicating that staff nurses found the in-service beneficial.

Comparison of Gastrostomy Complication Rates

Unfortunately, there were no gastrostomy tube insertions in the TICU during the data collection period. Therefore, there no data was available to compare the pre-intervention complication rates with the post-intervention complication rates.

Discussion of Results

Pre- and post-test results demonstrated a statistically significant increase in registered nurses' knowledge and confidence in caring for gastrostomy tubes. While the minimum required score on the post-test was 80%, all participating nurses achieved this benchmark. Notably, pre-test scores ranged from 20% to 100%, highlighting a knowledge gap that varied from mild to severe. The lack of data on post-intervention gastrostomy complication rates prevented comparison with the pre-intervention rate. As a result, the clinical question regarding a potential decrease in the gastrostomy complication rate in the three months post-intervention could not be fully answered.

Regarding the in-service evaluation form, TICU registered nurses received a median score of 4.89 out of 5. The lowest score was 4, and the highest was 5. Scores of four and above

on the Likert scale correlate to varying levels of agreement. All nurses who evaluated the in-service found it helpful and beneficial to their learning and professional practice.

CHAPTER 5: DISCUSSION

Significance

With the average hospital length of stay after gastrostomy insertion being nearly 30 days (Biffl et al., 2021), a significant portion of nursing care is often unaccounted for in literature examining gastrostomy insertion complications. The unavailability of data during the 3-month study period prevented a comparison of pre- and post-intervention gastrostomy complication rates. Seasonal factors may have played a role, as October through December tend to be the slowest trauma months, with the period around Christmas experiencing the fewest traumas (Pape-Kohler et al., 2014). However, the education module and in-service demonstrated a statistically significant improvement in TICU registered nurses' knowledge regarding gastrostomy care.

Implications and Recommendations

While the clinical question could not be fully answered, the study highlighted a significant knowledge gap regarding gastrostomy tube care in the Trauma Intensive Care Unit. The positive feedback on the in-service confirms the findings of George and Quatrara (2018) which highlights the effectiveness of targeted electronic education combined with in-person instruction for improving patient outcomes. The two-week in-service period drew sixty-one attendees, including forty-three TICU registered nurses from the study pool. Additional attendees were certified nursing assistants, float pool nurses, and residents. These diverse disciplines brought unique perspectives to the in-service, enhancing the learning experience (Hamoenss, 2020). While multi-disciplinary education presents challenges, academic medical centers are

ideal settings for its implementation. Based on voluntary attendance, this type of education would be well-received at this facility. Future quality improvement projects should consider inclusivity across disciplines to maximize impact on patient outcomes.

Sustainability

The education module was designed to be adaptable beyond the TICU. Two versions exist: one with pre- and post-tests for assessment, and a second with the post-test only for wider use across the hospital. The in-service kit and script have been provided to the Clinical Education department for future use. The scholarly project's methodology was well-documented, ensuring easy replication of the education or project.

Strengths and Limitations

This quality improvement project addressed a specific educational need in the TICU with the aim of improving patient outcomes. Although the clinical question could not be fully answered due to a lack of gastrostomy tube insertions during the collection period, the education module successfully closed an identified knowledge gap. Support from TICU medical and nursing leadership, positive feedback from the in-services, and strong program fidelity ensured consistency and replicability of the project.

This project was limited to registered nurses in the TICU, excluding trauma floors and the neuro intensive care unit. While the sample size was adequate, the collection period coincided with seasonally slow trauma months, resulting in no gastrostomy tube insertions in the TICU. Moreover, while there were three TBI patients with gastrostomy tubes in the neuro ICU during the period, they were treated outside the trauma service and hence excluded from the study. These limitations prevented the collection of post-intervention complication data, leaving the clinical question unanswered.

Conclusion

The COVID-19 pandemic's lingering impact on the nursing profession continues to be felt. High turnover rates and increased reliance on travel nurses can lead to nurses caring for patients in areas where they have limited experience. This is particularly concerning in specialized units, potentially contributing to poorer patient outcomes (Vander Weerdt, 2023). Quality improvement projects can pinpoint areas where units require improvement. Targeted education addressing unit-specific competencies or knowledge gaps, especially when combined with hands-on learning opportunities or in-services, can effectively lead to better patient outcomes.

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APPENDIX A: LEARNING CHECK

Atrium Health Wake Forest Baptist

Feeding Tube Post-Learning Assessment

1. True or False: An abdominal binder is contraindicated in patients with feeding tubes and should never be utilized.

2. When caring for a patient with a PEG tube, how often should the tube be turned in a clockwise direction?
   a. Every 2 hours
   b. Every 8 hours
   c. Every 16 hours
   d. Every 24 hours

3. What is the proper fit for a PEG tube's bumper and the patient's skin?
   a. 1-2 cm distance between the bumper and the patient's skin
   b. The bumper should touch the patient's skin
   c. 3-4 cm distance between the bumper and patient's skin
   d. The distance should equal 10% of the total length of the tube

4. How often should feeding tube site checks be performed?
   a. Every hour
   b. Every 6 hours
   c. Every 12 hours
   d. Every 24 hours

5. True or False: Crushed medications should not be administered through a J-tube secondary to risk of clogging.

6. True or False: When caring for a patient with a G-J tube, water from the balloon should be removed and replaced with distilled water once every shift.

7. What is the best practice to avoid weakening a feeding tube?
   a. Wrap the tubing with tape
   b. Adjust the clamp on the tube to a new position daily
   c. Never allow the patient to mobilize if they have a feeding tube
   d. All of the above

8. How often should a feeding tube be flushed if the patient is on continuous feeds?
   a. Every hour

b. Every 3 hours
c. Once a day
d. Twice a day

9. What should you do if your patient's G-tube clamp is directly touching their skin?
   a. Place dry gauze securely between the clamp and the skin
   b. Assure the patient this is not a problem
   c. Tape the clamp to the skin to secure in place
   d. Cover the entire tube exit site with an occlusive dressing

10. Which option describes appropriate care of a feeding tube exit site?
   a. Scrub vigorously with chlorhexidine every 48 hours
   b. Wash with water only and let air dry every 24 hours
   c. Wash with antibacterial soap and dry thoroughly every 24 hours
   d. Wash with Dakins solution every 24 hours

APPENDIX B: IN-SERVICE EVALUATION FORM

Atrium Health – Nursing Professional Development

Evaluation Tool

Activity Title: Enteral Feeding Tubes In-Service

Date: ___ Location: Atrium Health Wake Forest Baptist

Please rate the effectiveness of this continuing nursing education activity

Response Codes: 5-strongly agree, 4-agree, 3-undecided, 2-disagree, 1-strongly disagree

As a result of this educational activity, my knowledge of the following topics increased:	Strongly agree **5**	Agree **4**	Undecided **3**	Disagree **2**	Strongly disagree **1**
1. What is a gastrostomy					
2. Types of gastrostomy tubes and special considerations for each type					
2. When to call the provider or ostomy nurse					
4. How to perform site care for gastrostomy tubes					
5. Medication administration for each type of gastrostomy					
6. Flush protocols for gastrostomy tubes for feeds, medication administration and NPO					
7. Post-insertion gastrostomy order set and documentation in WakeOne					

Please evaluate the presenter / faculty for this program					
The learning outcomes, content, teaching methods, and materials were effective and valuable	Strongly agree **5**	Agree **4**	Undecided **3**	Disagree **2**	Strongly disagree **1**
Courtney Skipper, MSN, RN					

APPENDIX C: IRB LETTER

WAKE FOREST UNIVERSITY
HEALTH SCIENCES

Office of Research
INSTITUTIONAL REVIEW BOARD

MEMORANDUM

To: Briana Miller
Nursing Administration

From: Brian Moore, Chair
Institutional Review Board

Date: 12/15/2023

Subject: Not Human Subjects Research: IRB00102891
Increasing Knowledge and Confidence in the Care of Patients with Gastrostomy Tubes

The Wake Forest University School of Medicine Institutional Review Board has reviewed your protocol and determined that it does not meet the federal definition of research involving human subject research as outlined in the federal regulations 45 CFR 46. 45 CFR 46.102(f) defines human subjects as "a living individual about whom an investigator (whether professional or student) conducting research obtains (1) data through intervention or interaction with the individual, or (2) identifiable private information."

The information you are receiving is not individually identifiable. In recent guidance published by the Office of Human Research Protections (OHRP) on the Guidance on Research Involving Coded Private Information or Biological Specimens, OHRP emphasizes the importance on what is being obtained by the investigator and states "if investigators are not obtaining either data through intervention or interaction with living individuals, or identifiable private information, then the research activity does not involve human subjects."

Note that only the Wake Forest University School of Medicine IRB can make the determination for its investigators that a research study does not meet the federal definition of human subject research. Investigators do not have the authority to make an independent determination that a study does not meet the federal requirements for human subject research. Each project requires a separate review and determination by the Board. The Board must be informed of any changes to this project, so that the Board can determine whether it continues to not meet the federal requirements for human subject research. If you have any questions or concerns about this information, please feel free to contact our office at 716-4542.

The Wake Forest School of Medicine IRB is duly constituted, has written procedures for initial and continuing review of clinical trials; prepares written minutes of convened meetings, and retains records pertaining to the review and approval process; all in compliance with requirements of FDA regulations 21 CFR Parts 50 and 56, HHS regulations 45 CFR 46, and International

Medical Center Boulevard, Winston-Salem, NC 27157-1023 (336) 716-4542 / fax (336) 716-4480

Conference on Harmonisation (ICH) E6, Good Clinical Practice (GCP), as applicable. WFSM IRB is registered with OHRP/FDA; our IRB registration numbers are IRB00000212, IRB00002432, IRB00002433, IRB00002434, IRB00008492, IRB00008493, IRB00008494, and IRB00008495.
WFSM IRB has been continually fully accredited by the Association for the Accreditation of Human Research Protection Programs (AAHRPP) since 2011.