

7-28-2023

Impact of Nursing Education on Postoperative Ileus Prevention in a Tertiary Care Facility: A Quality Improvement Project

Freddy Pizart

Florida International University, fpiza003@fiu.edu

Charle P. Buscemi

Florida International University, cbuscemi@fiu.edu

Lisset Oliva

Florida International University, loliva2@med.miami.edu

Follow this and additional works at: <https://digitalcommons.fiu.edu/cnhs-studentprojects>

Recommended Citation

Pizart, Freddy; Buscemi, Charle P.; and Oliva, Lisset, "Impact of Nursing Education on Postoperative Ileus Prevention in a Tertiary Care Facility: A Quality Improvement Project" (2023). *Nicole Wertheim College of Nursing Student Projects*. 193.

<https://digitalcommons.fiu.edu/cnhs-studentprojects/193>

This work is brought to you for free and open access by the Nicole Wertheim College of Nursing and Health Sciences at FIU Digital Commons. It has been accepted for inclusion in Nicole Wertheim College of Nursing Student Projects by an authorized administrator of FIU Digital Commons. For more information, please contact dcc@fiu.edu.

**Impact of Nursing Education on Postoperative Ileus Prevention in a Tertiary Care Facility:
A Quality Improvement Project**

A Scholarly Project Presented to the Faculty of the
Nicole Wertheim College of Nursing and Health Sciences

Florida International University

In partial fulfillment of the requirements
For the Degree of Doctor of Nursing Practice


By

Freddy Pizart, MSN, APRN, FNP-BC

Supervised By

Charles Buscemi PhD, APRN, WOCNF

Approval Acknowledged:

DocuSigned by:

27267E0FF76F460...

_____, DNP Program Director

Date: 7/28/2023

Abstract

Postoperative ileus (POI) is a preventable but potentially fatal complication that affects approximately 10% to 30% of patients who undergo major abdominal surgery. Despite the use of Enhanced Recovery After Surgery (ERAS) protocols, tertiary care facilities continue to struggle with this complication affecting not only patient outcomes but also healthcare cost and revenue generation. Although hospitals often offer general education to staff nurses throughout the year, the topics are mainly designed to target national accreditation requirements. This leaves a knowledge gap on specific skills and interventions that could greatly improve health outcomes. To address this issue, a quality improvement project to increase nurse knowledge of POI was implemented in an acute tertiary care facility in the Miami area. A total of 43 registered nurses working in two inpatient step-down units were included in this project. The results were analyzed and a significant increase in mean scores for knowledge and confidence before and after the education intervention were noted. Overall, there was a 34% increase in mean confidence self-assessment score and a 109% increase in knowledge mean scores when compared to baseline. Although a power analysis was not performed, a paired one-tailed *t*-test was executed to determine statistical significance showing a result of $p < 0.0001$. The data shows that nurse education is effective at enhancing knowledge and confidence when identifying, preventing, and treating POI. Based on the evidence and the results of this project, future education should be implemented and the material incorporated into onboarding curriculums for surgical units.

Keywords: Postoperative Ileus, ERAS, education, nursing.

Table of Contents

Introduction.....	3
Purpose and PICO Question	4
Problem Statement.....	5
Problem Identification	6
Background.....	7
Scope of the Problem.....	9
Consequences of the Problem.....	10
Knowledge Gaps.....	11
Proposed Solution.....	12
Summary.....	13
Section Two: Literature Review	14
PICO Question.....	16
Literature Search Process.....	16
Inclusion and Exclusion Criteria.....	18
Literature Appraisal and Literature Matrix.....	18
Characteristics of the Included Studies.....	19
Synthesis of the Literature	25
Research Findings.....	27
Risk Factors Associated with POI	28
Nurse-Driven Interventions	29
Definition of Terms.....	30
Summary.....	31
Section Three: Methodology.....	31
Primary DNP Project Goal.....	32
SMART Objectives.....	34
Theoretical Framework/Conceptual Underpinning	35
Theory Overview	35
Theory/Clinical Fit.....	36
Theory Evaluation.....	37
Setting and Participants.....	39
Procedures.....	39
Participant Recruitment	40
Data Collection	40
Data Analysis	41
Protection of Human Subjects	41
Data Management	42
Section Four: Results	42
Demographic Data	43
Pre-/Post-Intervention Data	44
Section Five: Discussion.....	47
Discussion of the Results.....	47
Implementation Discussion.....	48
Influencing Factors	49
Monitoring	50

Project Maintenance.....	51
Project Limitations.....	52
Areas for Future Research.....	52
Recommendations Based on the Findings.....	53
Interpretation of the Results.....	54
Changes in Patient Care/Healthcare Setting.....	55
Transferability of the Results.....	56
Cost-Effectiveness.....	56
Recommendations Based on Interpretation of Results.....	57
Plans for Dissemination.....	58
Implications for Advanced Nursing Practice.....	59
Nursing Education.....	59
Clinical Practice.....	60
Nursing Administration.....	61
Leadership.....	61
Conclusion.....	62
References.....	65
Appendix A: Literature Matrix.....	72
Appendix B: Email Communications.....	77
Appendix C: Registration Form.....	80
Appendix D: Informed Consent.....	83
Appendix E: Site Approval Letter.....	87

Section One: Introduction

Education has always been paramount when implementing strategies to avoid unintentional patient harm both in primary and tertiary care facilities. Large acute care institutions often depend on professional practice and professional development departments to deliver relevant education material to the staff. Although learning needs assessments are regularly performed throughout the year, the educational material delivered to acute care nurses is mainly dictated by national requirements established by organizations such as The Joint Commission (TJC), Centers for Medicare & Medicaid Services (CMS), Occupational Safety and Health Administration (OSHA), and the Agency for Health Care Administration (AHCA). To achieve zero harm, organizations must implement both training and hands-on competency validation programs that place patients at the center of multidisciplinary care management (American Medical Association, 2022). However, department-specific education on potentially fatal complications, such as those occurring in postsurgical units in the selected tertiary facility has been limited in the past years.

One issue that was identified requiring prompt intervention was the lack of knowledge among acute care nurses when it comes to the development of postoperative ileus in patients who underwent abdominal surgery. This is a topic that was not well understood among the staff and has not been included in core curriculums for post-surgical step-down units in the past. When considering that approximately 10% to 30% of patients who undergo abdominal surgery develop a POI, it is important to ensure that nurses feel comfortable with the topic and have been deemed competent to identify and care for a patient with this complication (Wells et al., 2021). There are several interventions in place today that start with the pre-surgical workup and continue through the postoperative recovery process. However, failure to identify this complication early on or

adhere to nurse-driven interventions to prevent it may result in serious patient harm or prolonged hospital stay. Beyond patient harm, this complication can add significant stress to both the institution's finance department and the healthcare system overall.

It is estimated that the average cost to treat POI and related complications ranges from \$14,983 to \$26,043 (Louis et al., 2021). The development of POIs affects overall revenue and places the institution at risk for legal action or government sanctions. To reduce the incidence of this life-threatening complication, it is important to assess common practices and identify potential knowledge gaps hindering high-quality patient care. Staff for step-down units that care for patients who have undergone abdominal surgery must receive proper education to be able to identify early signs and symptoms of POI as well as interventions to reduce incidence. The educational intervention for this project was tailored to two step-down units with the highest incidence of POIs that render care to patients who have undergone abdominal surgery. The main surgical service lines serving the two units were colorectal, urology, gynecology oncology, general surgery, surgical nutrition, and surgical oncology. Furthermore, relevant education about this complication should be included in the unit or department-specific onboarding curriculum for both newly graduated and experienced nurses.

Purpose and PICO Question

This quality improvement project aimed to enrich acute care nurses' knowledge of postoperative ileus (POI). The goal of enhancing patient safety by implementing an educational plan can reduce extended hospital stays, thus decreasing the overall cost of care for both the client and the institution. Furthermore, this project ensured registered nurses feel more confident when identifying POI and implementing preventive measures. After education was provided to

the staff, the project aimed to integrate the content into the standardized onboarding curriculum for postsurgical care units in the same institution.

Will an educational intervention enhance the knowledge of postoperative ileus (POI) among acute care nurses in an urban tertiary facility when compared to baseline?

P – The target population for this quality improvement project consisted of registered nurses in an acute care facility. Both newly graduated professionals undergoing extended orientation or nurse residency programs and experienced staff from two surgical step-down units were included. All participants were employed in a tertiary facility.

I – An educational intervention was implemented during the course of this project. Educational sessions on postoperative ileus (POI) were offered to the staff over 2 weeks. Pre- and post-assessments were utilized to measure knowledge and confidence levels among the participants.

C – Baseline knowledge of POI among the staff in the selected units. This factor was utilized as a control when implementing the quality improvement project.

O – At the end of the project, it was expected that the participants will demonstrate enhanced knowledge of POI. Furthermore, increased confidence when identifying and treating the complication was also an expected outcome.

Problem Statement

Knowledge deficit on postoperative ileus development among acute care nurses has a major impact on patient safety and prolonged hospital stays. Healthcare professionals must feel comfortable implementing preventive measures and identifying early signs and symptoms of this potentially life-threatening complication. Educational interventions to current staff and the

implantation of the content into the department onboarding curriculum are effective ways to mitigate the effects of this potentially fatal complication.

Problem Identification

Acute care facilities often have programs in place to prevent unintended patient harm such as pressure injuries, falls, central line-associated bloodstream infections (CLABSIs), and others. Education materials and competency validation fairs are often offered throughout the year to practitioners and nurses on these zero-harm initiatives. However, very little information on postoperative ileus (POI) development was delivered to the surgical units before the implantation of this project. Staff members from two step-down units caring for patients who undergo colorectal, gynecological, urology, and other abdominal surgeries lacked appropriate knowledge about postoperative ileus development and prevention. As a result, those two units often had higher incidence rates and the staff reported that little to no information was given about this postoperative complication.

When the recent education plans for the units were assessed, it was identified that skills validations for the year had been scheduled. Such skills included safe medication administration, restraints/seclusion, emergency training (code cart, defibrillator management, etc.), blood administration, abdominal drains, and others. However, no unit-specific education plan had been established for postoperative care interventions including those to prevent POI. This was critical, as a lack of education on such key topics could translate to poor patient education about potential complications (Fawkes & Moore, 2019). Furthermore, the nurses who were onboarded both through regular orientation and nurse residency programs did not receive relevant information on this topic. For the last six nurse residency program (NRP) cohorts, the nurse residents received comprehensive training on deep vein thrombosis (DVT) prophylaxis and surgical site infections

(SSI), but no education was delivered on POI. Poor or insufficient provider education is linked to poor patient outcomes and prolonged hospital stays due to preventable complications or unintended patient harm (Wu & Busch, 2019). It was crucial to stress the need to enhance staff knowledge and confidence caring for the patient population at risk. Current knowledge, onboarding, and yearly education practices did not offer acute care nurses in the institution enough education or competence level to prevent, identify, and treat POI.

Background

Postoperative patients are at risk for many complications that could extend their hospital stay. Unintended patient harm can be devastating to both the patient and the institution as a whole. Overall, studies have indicated that prolonged hospital stays due to harm range from 0.4 to 24.2 days (Tessier et al., 2019). When considering that the overall cost of care has increased, such complications can cost both the client and the institution a substantial amount. This is especially the case if patients undergo abdominal surgery and develop a POI. Although a universal definition is not widely accepted, most experts agree that an ileus occurs when there is decreased or an absence of intestinal motility that leads to intolerance to oral intake and lack of stool production (Khawaja et al., 2022). Healthcare professionals must be able to identify early signs and symptoms to initiate treatment.

Although some acute care nurses understood this concept, the consensus among the unit staff was that this is a common complication that falls on the surgeon and is often unavoidable. However, this misconception among staff had the potential to lead to serious patient harm. To understand how to prevent POI, it was important for nurses to identify patients who are at higher risk to develop this complication. Evidence shows that patients who undergo abdominal surgery, especially those who have colorectal procedures, account for most of the POI cases. Additional

findings indicate prolonged surgery time, age, male gender, preexisting cardiac comorbidities such as congestive heart failure, as well as patients who had laparotomy have much higher risks (Quiroga-Centeno et al., 2020). Although the literature suggests that there is no significant difference between patients who received PCA or epidural as primary methods to control post-surgical pain, there is a higher incidence of POI in patients who receive intravenous opioids in the first 48 hours of surgery (Alhashemi et al., 2018)

Even with the current understanding of both modifiable and nonmodifiable risk factors, there is no universal understanding of the appropriate course of action after patients leave the post-anesthesia care unit and are transferred to surgical care units. Studies have been conducted to identify the best interventions to prevent this complication (Boitano et al., 2018). As a result, there are protocols for enhanced recovery that attempt to mitigate the impacts of POI on both the institution and the patients. Referred to as enhanced recovery after surgery (ERAS), these protocols often guide key aspects of the preoperative assessment, procedure day, intraoperative, and postoperative procedures. Critical postoperative interventions that acute care nurses must understand when following ERAS protocols include the implementation of a clear diet, ambulation within 2 hours, encouraging the patient to chew gum, etc. (Boitano et al., 2018). Furthermore, it is important to understand that the prevention of POI must be a multidisciplinary approach to ensure maximum success rates. Nursing staff plays a critical role by not only following the ERAS protocol but also implementing general interventions known to enhance bowel motility. Recent evidence also suggests that taking a more conservative approach such as instructing the patient to consume coffee and nurse-driven non-pharmacological pain management strategies are also effective (Rodrigues Pessoa et al., 2020). As the last line of

defense, licensed healthcare providers such as registered nurses must understand the significance of this issue for both the patient and the institution.

Scope of the Problem

As previously discussed, POI development affects the patient and the institution as a whole as it prolongs hospital stays and increases the cost of care. Even with the implementation of ERAS protocols in tertiary facilities across the globe, statistics suggest that approximately 10% to 30% of patients who undergo abdominal surgery develop a POI (Wells et al., 2021). This is a significant percentage when the number of abdominal surgeries performed is considered. Between the years 2002 and 2014 alone, approximately 3,951,947 major abdominal surgeries were performed on high-risk members of the population such as those over the age of 50 (Rubin et al., 2021). When trying to understand the scale of the problem, critical aspects such as patient safety, economic impact, and organizational reputation must be considered. The selected units care for more than 300 patients per month and work with several surgeons. In the past few months, there has been an increase in ileus incidence related to colorectal and surgical oncology surgeries. This increase in POI cases has a negative effect on hospital finances, as hospital stays can be extended anywhere from a few days to a few weeks.

The issue also extended to the medical providers and the community, as it required patients to be discharged with additional resources or home assistance. If not identified and treated early and effectively, POI can progress into prolonged postoperative ileus (PPOI) (Peters et al., 2020). This is a serious consideration, as healthcare access and cost continue to increase across the United States. Insurance premiums often increase after hospitalization and some patients can even lose for lifesaving procedures if policies are adjusted. A recent study suggests that Floridians pay higher insurance premiums when compared to the national average. In 2020,

it was estimated that families in Florida paid approximately \$9,284 on premiums and deductibles. This number in term accounts for 16% of the state's median income (Collins et al., 2022). The added cost to care due to unintended patient harm is a heavy financial burden that most families cannot afford. On the other hand, physicians, registered nurses, and other members of the health care team can be directly affected by this problem. In some cases, failure to identify and treat POI can be a strong indication that care was not rendered safely and effectively.

Consequences of the Problem

Overall, the consensus among healthcare professionals is that unintended patient harm must be avoided to reduce both cost and mortality. As a result, several initiatives were being implemented at the system level to ensure that minimum competency requirements are met. However, lack of education on POI continued to be a major factor contributing to diminished provider knowledge and confidence. POIs present with several adverse effects on patient outcomes that can ultimately lead to a poor prognosis. Evidence suggests that the average cost to treat POI and related complications ranges from \$14,983 to \$26,043 (Louis et al., 2021). This is a significant added cost to care that eventually affects overall finances for both the clients and the institution.

Although most cases resolve within days, there are secondary complications that could develop as a result of poor treatment interventions. Some of these include bowel obstruction or necrosis and both hypo and hypervolemia, among others (Khawaja et al., 2022). These complications can not only cause patient death but also further increase the cost. On average, the cost associated with bower obstruction treatment, such as surgical intervention, is \$134,000 (Samuel, 2018). From a financial aspect, institutions lose revenue by adding extra costs to care. Furthermore, extended hospital stays due to POI development have negative effects on overall

staffing needs and nurse-to-patient ratios. Because of the risk of potential secondary complications, these patients require enhanced nursing care. Staff from the selected step-down units often spend more time with POI cases than with uncomplicated surgeries. One of the main reasons for this is the need for more frequent ambulation and a more aggressive fluid resuscitation treatment plan. This adds extra stress to the workforce and ultimately results in increased chances of additional postoperative complications in the unit.

Knowledge Gaps

After additional organizational analysis, knowledge gaps continued to be the primary factor in the selected post-surgical step-down units. Three main areas were identified as the main factors hindering high-quality patient care. The first one was the lack of understanding about POI complications and the interventions need to help prevent or mitigate its impact. Staff in the units often associated decreased flatus production and hypoactive bowel sounds with a “normal post-anesthesia recovery process” after abdominal surgery. Overall, the nurses did not understand the correlation between early ambulation and POI prevention. Because the educational material available to them focused on DVT prophylactic, ambulation was often exclusively linked to the prevention of thrombotic episodes. As a result, the utilization of pharmacological and mechanical interventions such as Lovenox and intermittent pneumatic compression (IPC) devices were considered sufficient for the patient. This led to delayed ambulation and an increased chance of developing POI.

Another knowledge gap was the widespread failure to identify early signs and symptoms of POI. Because the staff was not trained to effectively recognize this complication, complaints associated with nausea, vomiting, anorexia, and abdominal distension were treated and assumed to be normal findings after abdominal surgery. As a result, POI was often identified and

diagnosed by the medical team once the symptoms are severe. This delay marked the difference between a fast and uneventful recovery or a serious complication that could not only delay discharge but also cause serious patient harm.

Lastly, core nurse-driven interventions such as early ambulation, close intake/output monitoring, and patient teaching were not being properly implemented. There was a generalized misunderstanding about the importance of critical data collection. Staff in the selected units did not understand the correlation between accurate intake/output recording and postsurgical complications. Registered nurses often relied on data obtained by nursing assisting personnel such as CNAs and PCTs. In many cases, questions about bowel evacuation or the passing of flatus were non-specific and offered little to no information.

Proposed Solution

The proposed solution was implementing comprehensive staff training and knowledge checks of early identification as well as interventions to prevent POI. The implantation of widespread education is linked to increased adherence to institutional guidelines as well as enhanced provider confidence, knowledge, and skills (Vaismoradi et al., 2020). To address knowledge gaps, face-to-face staff training using both visual and auditory tools were implemented. This approach had been used in the past to address other issues and greatly enhanced understanding among staff members. The educational intervention to address POI was composed of three phases and targeted the current staff in the selected units. The implementation of a self-assessment and a knowledge inventory tool before and after served as a benchmark to measure knowledge and confidence levels before and after the intervention. Both evaluation tools were distributed electronically using platforms such as Qualtrics to ensure accurate and efficient data collection.

Content delivery methods included the utilization of visual presentations and verbal discussions. Staff members from the two selected units attended an interactive training session where evidence-based information on POI prevention, identification, and treatment was provided. During this session, acute care nurses had a chance to identify their knowledge gaps. Furthermore, additional training on enhanced recovery after surgery (ERAS) strategies was delivered during this training. This included current practices as well as evidence-based interventions.

The implementation of continuous education intervention has a positive impact on adherence to evidence-based practice as well as patient safety outcomes (Wu et al., 2018). After the staff was educated, the material was sent to the education department to be implemented in the onboarding curriculum for both experienced and newly graduated staff members hired under the in-house nurse residency program. This ensured maintenance of minimum knowledge and competency level when preventing, identifying, and caring for patients with POI.

Summary

Postoperative ileus (POI) is a common and often fatal complication for patients who undergo abdominal surgery. Failure to implement strategies to prevent and promptly identify this complication can prolong hospital stays and increase financial burden. Although there are widespread opinions among experts, recent studies suggest that the implementation of enhanced recovery after surgery (ERAS) protocols along with early ambulation, coffee consumption, chewing gum, fluid resuscitation, and others can greatly reduce POI incidence rates (Rodrigues Pessoa et al., 2020). After identifying the knowledge deficit among registered nurses leading to an increase in POI cases in a local acute care facility, this quality improvement project aimed to

answer the clinical question: Will an educational intervention enhance the knowledge of postoperative ileus (POI) among acute care nurses in an urban tertiary facility?

An education plan for two selected acute care units specialized in abdominal surgeries ranging from colorectal to gynecology oncology procedures was implemented. Staff knowledge and confidence levels were measured using pre- and post-intervention self-assessment and knowledge inventory tools. Furthermore, the intervention was added to all future staff for those units as part of the core onboarding curriculum.

Section Two: Literature Review

The problem examined herein was inadequate knowledge of postoperative ileus (POI) among acute care nurses in an urban tertiary facility. POI is commonly described as a condition causing post-surgical patients to experience a short-term interruption in their gastrointestinal motility. This condition ordinarily causes the patient to exhibit symptoms such as abdominal discomfort and tenderness, nausea, vomiting and delayed fecal passage. Despite its serious nature, POI is a condition that can be easily managed. Its prevention results in positive outcomes such as enhanced patient comfort, reduced length of stay in the hospital, and lower costs of postoperative recovery. However, for POI to be managed successfully, acute care nurses must be knowledgeable about the condition. A majority of acute care facilities commonly have programs that are intended to prevent accidents and inadvertent injuries such as falls and pressure ulcers among patients. In such facilities, healthcare practitioners such as physicians and nurses are trained on how to prevent and manage such problems when they occur. Despite this, there is a scarcity of information on education regarding postoperative ileus in acute care settings. The implication of this is that acute care nurses have limited knowledge when it comes to caring for

patients who have undergone abdominal surgeries due to urological, colorectal, or gynecological medical problems.

The proposed solution highlighted the need for educational sessions on postoperative ileus (POI) to be offered to the staff over 2 weeks. The utilization of pre- and post-assessments were utilized to measure knowledge and confidence levels among the participants. Vaismoradi et al. (2020) asserted that once critical care nurses are exposed to a program of comprehensive education, their knowledge, skills, and confidence when dealing with POI cases will increase significantly. Moreover, nurses are more likely to abide by the institutional guidelines that have been set to manage POI in the facility after they understand the implications. It was recommended that the nurses were trained in face-to-face sessions where the trainer could utilize both visual and auditory instruments to present evidence-based information on the detection, prevention, and management of POI. Once the nurses were exposed to the presentation, they were allowed sufficient time to engage in verbal discussions and receive instant feedback. The next vital step was to evaluate whether the nurses have learned. This was done by exposing the nurses to a knowledge inventory and self-assessment tool that was utilized to evaluate their level of confidence and knowledge to deal with POI.

The scope of this paper is limited to restating the PICO question guiding the study, the process of literature search, the inclusion and exclusion criteria used to select articles, a literature appraisal and matrix, and the characteristics of included studies. A synthesis of the literature as well as the research topics for this study are also included. After a summative conclusion of the entire paper, there is an alphabetical list of the references cited.

PICO Question

Will an educational intervention enhance the knowledge of postoperative ileus (POI) among acute care nurses in an urban tertiary facility when compared to baseline?

P – The target population for this quality improvement project consisted of registered nurses in an acute care facility. Both newly graduated professionals undergoing extended orientation or nurse residency programs and experienced staff from two surgical step-down units were included. All participants were employed in a tertiary facility.

I – An educational intervention was implemented during the course of this project. Educational sessions on postoperative ileus (POI) were offered to the staff over 2 weeks. Pre- and post-assessments were utilized to measure knowledge and confidence levels among the participants.

C – Baseline knowledge of POI among the staff in the selected units. This factor was utilized as a control when implementing the quality improvement project.

O – At the end of the project, it was expected that the participants would demonstrate enhanced knowledge of POI. Furthermore, increased confidence when identifying and treating the complication was also an expected outcome.

Literature Search Process

Four databases were chosen to source the journal articles used to inform this literature: Cochrane Library, MEDLINE, PsycINFO, and the Cumulative Index to Nursing and Allied Health Literature (CINAHL). The medicine and healthcare databases were specifically chosen because they offer a collection of meta-analyses and systematic reviews on various topics in medicine and healthcare. A database like Cochrane Library, for example, is comprised of supplements and editorial pieces on various medical and healthcare-related issues.

Several limiters were placed on them during the literature search process. The first limiter that was placed was about the timeframe within which the journal articles were published. To ensure that the information included in the literature review is only the most recent, the search was limited to journal articles published from the year 2017 to date. This is depicted in the literature matrix attached as Appendix A. Another important limiter that was placed on the search is document type; the focus of this search was journaled articles on postoperative ileus. Databases such as MEDLINE and Cochrane Library also allowed the use of medical subject headings (MeSH) to narrow the search to only journal articles focusing on postoperative ileus (POI). CINAHL, on the other hand, allowed me to conduct a focused search aimed at finding articles that were both peer-reviewed and focused on evidence-based practice.

In addition to the limiters, several words and phrases were used as search terms to find relevant information. The keywords/phrases used were “postoperative ileus,” “educational intervention,” and “educational intervention on postoperative ileus.” The search using these search terms yielded approximately 40 pieces of writing; however, 13 of the articles were excluded because they were published more than 5 to 7 years ago. Another eight were excluded because they were not journals; the remaining 10 were excluded because they were duplicates. A total of 26 full-text articles and abstracts were screened during the literature search.

It is notable that the search conducted in the Cochrane Library, for example, was particularly effective because this database has a tab that allows one to conduct a search using a PICO question. Consequently, the question “Will an educational intervention enhance the knowledge of postoperative ileus (POI) among acute care nurses in an urban tertiary facility?” was keyed and some very useful articles were found. Another nine articles and four abstracts were screened.

Inclusion and Exclusion Criteria

Several inclusion and exclusion criteria were considered when identifying articles for use in this research. Any article that was published before 2015, for example, was excluded from the study. If the article was not peer-reviewed, it was also excluded. The preference for peer-reviewed journal articles was underpinned by the fact that such articles are ordinarily written by experts in a particular field and reviewed by many other experts in the same field before being published. A peer-reviewed article is thus perceived as having a high degree of quality and validity compared to one that has not been reviewed. To be included in this study, the journal articles had to have the term "postoperative ileus" in their abstracts; the articles also had to focus on educational intervention for healthcare professionals. Three main exclusion criteria were used in this study. First, any publication written in a language other than English was excluded from the current research. Additionally, journal articles that were not available in the full text were also excluded. Lastly, articles that did not include a primary study were also excluded.

Literature Appraisal and Literature Matrix

The use of (Dang et al., 2022) evidence hierarchy was invaluable in this research because it offered an opportunity to categorize the studies included herein based on their validity, feasibility for use in patient care, and quality of research design. As indicated in Appendix A, each of the journal articles that were included in this research was critically analyzed based on its purpose, study design, sampling, data collection technique results, strengths/weaknesses, and level of evidence. According to Dearholt and Dang's (2017) evidence hierarchy, articles that are assigned Level I of evidence status are only those which utilize a randomized control trial, experimental study, or systematic review study design. Appendix A reveals that the articles included in this research are of Level I, II, and III evidence status. During the review of the

selected articles, data was given a quality rating. From the nine articles selected, five offered high-quality or grade-A results. These articles incorporate comprehensive literature reviews and consistent results while presenting references to scientific evidence. The remaining four offered good or grade B results as the data presented offered fairly consistent results with adequate reference to scientific evidence.

Characteristics of the Included Studies

As previously discussed, nine articles were selected for inclusion in this research. The purpose of the article by Frees et al. (2017) was to demonstrate the benefits of enhanced recovery after surgery protocols (ERAS) over standard protocols (SP) when preventing gastrointestinal complications after abdominal surgery. This study was conducted using 27 postoperative patients who underwent radical cystectomy (RC) and urinary diversion in the hospital setting. Since the authors utilize a randomized control trial study design, this article is categorized under Level I evidence. Data in this research was collected using face-to-face interviews by trained staff and patient-initiated quality of life, subject diary, experience, and satisfaction questionnaires were utilized. The results from this study indicated that the implementation of ERAS significantly affects the length of stay for postoperative patients undergoing RC. Overall, patients had a 6.1-day reduction in hospital stay and achieved a faster bowel recovery process by shortening the first bowel movement and flatus production time. The strengths of this study include strong and relevant inclusion criteria as well as the implementation of both objective and subjective data. Furthermore, data was collected consistently using face-to-face interviews and patient reporting systems. The limitations associated with this study include a small sample size as well as an uneven distribution of patients in both groups due to consent withdrawal by three patients.

The second article was by Garfinkle et al. (2019), who used a systematic review and meta-analysis as their study design, hence placing the research under Level I evidence. The goal of these researchers was to determine the incidence of postoperative ileus after loop ileostomy closure. Data was collected via literature search using a standardized data extraction form. The selected articles were evaluated using quality analysis tools. After applying relevant exclusion and inclusion criteria, the researchers' final sample was a total of 67 articles. The results of this study revealed that, although more evidence and review were needed, it was determined that the 30-day cumulative incidence of POI was 8%. Potential factors associated with POI include hand-sewn small bowel anastomosis and longer surgery length. A major strength of this study is the strong selection criteria and a higher level of evidence. A significant limitation is the heterogeneity between the selected articles and the fact that a retrospective approach was observed in most of the selected studies.

The third article that was selected for this research was by Hsu and Szu (2022). To achieve their aim of measuring and contrasting the effects of chewing gum on POI incidence and prevention, these authors used a randomized control study design, hence qualifying the research as Level I evidence. The sample included in this study was comprised of 30 colorectal patients in the inpatient setting who underwent colon resection surgery. To collect relevant data, Xylitol chewing gum was given to the patients (one piece every 15 minutes, three times daily) on day one postoperative. The authors followed the participant's overall functional status from enrollment to discharge using the Karnofsky Scale. The primary endpoints were stool production and flatus passage. The researcher personally auscultated bowel sounds, and flatus was self-reported by the patients. The study revealed that patients who were given gum had significantly fewer complications. Evidence also suggests that chewing gum may be associated with faster

stool production and the passing of flatus after colorectal surgery. A major strength of this article is its consistency with measuring strategies; a notable weakness, however, is that the research did not gather quantitative data on post-surgical physical activity and ambulatory status of the patients. Chewing gum may be associated with faster stool production and the passing of flatus after colorectal surgery. A major strength of this article is its consistency with measuring strategies; a notable weakness, however, is that the research did not gather quantitative data on post-surgical physical activity and ambulatory status of the patients.

The fourth article selected for inclusion in this research was that by Koch et al. (2021). This article is Level III because the researchers utilized a retrospective research design. The aim of this study was to investigate the risk factors of POI, particularly the effect of perioperative intravenous fluid after a colectomy. The sample included in this study was comprised of 464 patients aged 18 years or older who had had an elective colorectal resection at a tertiary-care academic medical center. The data used in this study was collected from the institutional database; only data recorded in the period January 2015 to March 2018 was included. The results from this research indicate that being male, receiving a high quantity of intravenous fluid after an operation, having postoperative infections, and undergoing colostomy construction and ileostomy/ileorectal anastomosis significantly increase a postoperative patient's risk of developing POI significantly (Koch et al., 2021). The most significant limitations associated with this study are its retrospective design and using a sample population from a single institution. A notable strength is that it offers valuable information to healthcare professionals and patients regarding the risk of POI during elective resection.

The fifth article included in this project was by Peters et al. (2020). The purpose of this study was to examine the incidence and prevalence of inflammatory processes in patients who

experienced colorectal surgery. These researchers also intended to investigate the effect of POI on both short-term and long-term quality of life. Since the researchers utilized a randomized control trial research design, it qualifies as Level I evidence. The sample included in this research was comprised of 265 patients; these patients, who had to be 18 years or older and had undergone elective segmental colorectal resection with primary anastomosis, were randomly assigned to either the intervention or control group (Peters et al., 2020). The results of this study reveal that patients who have undergone colorectal surgery and developed POI have a higher level of inflammatory biomarkers, reduced quality of life, longer hospital stays, and higher healthcare costs. A major strength of this article is that the researchers collected data prospectively as part of a randomized control trial. Moreover, the fact that analyses were conducted on the whole sample as well as a select group that developed POI, means that the results of the study represent the general population that experiences colorectal surgery. A significant limitation, however, is that the researchers focused on levels of systemic cytokines instead of cytokines in the bowel wall, which is a more accurate indication of POI. The use of self-reported questionnaires also increased the risk of recall bias (Peters et al., 2020).

The sixth article selected was by Quiroga-Centeno et al. (2020); the researchers used a systematic review and meta-analysis of both randomized controlled trials and retrospective cohort studies, hence qualifying this study as Level II of evidence. The purpose of this study was to assess the available literature to determine the risk of prolonged postoperative ileus (PPOI) among patients who have undergone elective colorectal surgery. The sample included in this study was comprised of 42 studies derived from the PubMed, EMBASE, and SciELO databases. The 42 studies described 29,736 patients who experienced colorectal surgery in the period 1996–2017 (Quiroga-Centeno et al., 2020). Data in this study was collected using a data extraction

form. The results of this research, based on the GRADE Approach, revealed that the use of laparotomy increases a patient's risk of PPOI significantly during a colorectal operation. The major strength of this article is that it offers valuable information on the early identification of patients who are at high risk for PPOI. Notable limitations included the use of lack of a uniform definition of PPOI across the studies.

The seventh article included herein was by Sugawara et al. (2017). The purpose of this study was to invent a model that would allow the stratification of the probability of prolonged postoperative ileus (PPOI) in patients going through abdominal surgery. The invention of the model was based on the evaluation of factors that are predictive of PPOI. The research design used by these researchers was a randomized controlled trial, hence qualifying the research as level I evidence. The sample included in the study was comprised of 841 patients who had experienced major abdominal surgery in the period 2012–2013. Data was collected from databases that offered information on the patient's characteristics, operative features, and postoperative outcomes. The results of this study revealed that smoking history, colorectal surgery, and an open surgical approach are all independent predictive factors for prolonged postoperative ileus. It was discovered that patients who had undergone open colorectal surgery and had a history of smoking were 19.6% more likely to develop PPOI than those without such histories. The greatest strength of this article is that it highlights a useful probability classification model for predicting PPOI incidence in patients who undergo general surgery (Sugawara et al., 2017). Limitations associated with this article include the relatively small and retrospective nature of patients in the PPOI group, which may have weakened the analyses, and a lack of robust validation of the established monogram.

The article by Tang et al. (2022) was the eighth to be selected for inclusion in this research. This study was conducted to determine the effects that probiotics or synbiotics have on the timely postoperative recovery of gastrointestinal function among patients diagnosed with gastrointestinal cancer (Tang et al., 2022). Since the study design used was a systematic review and meta-analysis of randomized controlled trials, this study offers Level II evidence. The sample in this study was comprised of 21 studies that were selected from four databases, namely: Cochrane Library, EMBASE, PubMed, and Web of Science. Data was collected by extracting information such as the authors, sample size, primary illnesses, type of surgery, study design, et cetera, from each of the 21 studies. The results of this study indicate that the recovery of gastrointestinal function after related cancer surgery may be improved by administering the patient perioperative probiotics and synbiotics. The major strengths of this article include the fact that only RTCs were included in the meta-analysis and that the researchers reduced bias by conducting a rigorous literature review. Notable limitations, however, are that some of the studies included had very small sample sizes and that some outcome measures were also based on a small number of articles (Tang et al., 2022).

The last article selected for inclusion herein was a Level I by Watanabe et al. (2021). In this article, the researchers used a systematic review and meta-analysis research design to investigate the effect that coffee consumption after gynecological, cesarean section, and abdominal surgeries such as colorectal surgery has on the development of POI. The sample included in this research was comprised of 27 studies derived from a search of five electronic databases, namely: PubMed, Cochrane Library, EMBASE, ICTRP, and the National Library of Medicine. The data in this article was collected by two independent reviewers who screened the studies, extracted the data, and used the Risk of Bias 2 instrument to evaluate the risk of bias

(Watanabe et al., 2021). The reviewers also evaluated the quality of evidence in each study. The results of this study revealed that the postoperative consumption of coffee reduces a patient's time to first defecation and POI after colorectal, abdominal, and gynecological surgeries (Watanabe et al., 2021). A major strength of this article was that only RCTs were included in the meta-analysis, hence enhancing the quality of evidence. A notable weakness, however, was that the researchers did not examine the dose-response association between the consumption of coffee and the studied outcomes. The researchers also failed to report the features of coffee consumers. Lastly, this study had a limitation because its results may not be generalized to all populations.

Synthesis of the Literature

The choice of a research design is one of the most important responsibilities of any effective researcher. This is because a research design influenced the research methodology and techniques that a researcher will use to carry out the research. The research design selected by a researcher is ordinarily determined by various factors such as practicality, ethics, and the purpose of the research. As indicated in Appendix A, the nine articles used various research designs such as randomized control trials, systematic reviews and meta-analyses, and retrospective cohort studies. Peters et al. (2020), Hsu and Szu (2022), and Frees et al. (2017) used a randomized control trial study design. In randomized control trials, research participants are ordinarily arbitrarily assigned to either the research group that receives a particular intervention, or the control group that does not receive any intervention. Frees et al. (2017) applied their RCT by using a controlled pilot study and recruiting and randomizing participants using the ERAS Protocol. Consequently, all three articles offer Level I evidence; the implication is that the information derived from these three articles is of very high quality.

Watanabe et al. (2021), Tang et al. (2022), Garfinkle et al. (2019), Sugawara et al. (2017), and Quiroga-Centeno et al. (2020) used a systematic review and meta-analysis. Systematic reviews commonly merge the findings collected from several original studies which were sought out systematically and analyzed using predetermined criteria of inclusion. More often than not, systematic reviews include meta-analyses; a meta-analysis is the merging of research findings from various independent studies to for up with a single overall result. While meta-analysis may be carried out on any results that are selected by a researcher, once they are merged with a systematic review, they are considered to be Level II evidence. Watanabe et al. (2021) applied their RCT design by performing a random-effect meta-analysis of the sample studies. The systematic review and meta-analysis by Garfinkle et al. (2019) offered high-quality Level I data; those by Tang et al. (2022) and Sugawara et al. (2017) offered Level II evidence. The reason for this discrepancy is that while, for example, Tang et al. (2022) only offered a review of randomized control trials, Garfinkle et al. (2019) offered a review of both randomized control trials and quasi-experimental studies.

On their part, Koch et al. (2021) utilized a retrospective cohort study research design; the quality of evidence offered by this study, therefore, is classified under Level III. This was the only article in those reviewed as part of this research that utilized a retrospective cohort research design. Cohort studies generally involve two groups of respondents who have varying exposure to specific agents, like smoking, a particular type of surgery, or a vaccine. The two groups of respondents are then followed up and studied for a specified duration of time, to determine the discrepancies between them regarding specified outcomes. The predominant use of randomized control trials and systematic reviews with meta-analyses of both randomized controlled trials and quasi-experimental studies means that the current research utilizes very high-quality data

because it is informed by levels I, II, and III evidence. However, there were significant discrepancies in the manner in which the researchers applied their research design.

Research Findings

Notably, the findings by researchers in each study were heavily influenced by the purpose or goal of the study. The predominant goal for the authors of the articles included was to attempt to understand and identify risk factors associated with POI development and to identify some interventions that may be used to prevent the condition. These studies had similar findings related to the risk factors associated with postoperative ileus. A practical example of this is that both Sugawara et al. (2017) and Koch et al. (2021) agreed that being of the male gender significantly increases a patient's risk of developing prolonged postoperative ileus. Moreover, according to Sugawara et al. (2017), patients who have undergone open colorectal surgery and have a history of smoking were 19.6% more likely to develop postoperative ileus than those without such histories. Koch et al. (2020) also discovered that receiving a high quantity of intravenous fluid after the operation, having postoperative infections, and undergoing colostomy construction and ileostomy/ileorectal anastomosis increase a postoperative patient's risk of developing POI significantly. Quiroga-Centeno et al. (2020) research, which was based on the GRADE approach, revealed that the use of laparotomy increases a patient's risk of PPOI significantly during a colorectal operation. Garfinkle et al. (2019) asserted that some potential factors associated with POI include hand-sewn small bowel anastomosis and longer surgery length. Although more evidence and review are needed to substantiate this, these researchers discovered that the 30-day cumulative incidence of POI was 8%. Lastly, according to Peters et al. (2020), patients who have undergone colorectal surgery and developed POI have a higher

level of inflammatory biomarkers, reduced quality of life, longer hospital stays, and higher healthcare costs.

The research findings from the other articles included in this research inclined towards identifying interventions that may be used to enhance interventions on postoperative ileus. According to Frees et al. (2017), the implementation of ERAS significantly affects the length of stay for postoperative patients undergoing RC. Overall, patients had a 6.1-day reduction in hospital stay and achieved a faster bowel recovery process by shortening the first bowel movement and flatus production time. On the other hand, Hsu and Szu (2022) and Watanabe et al. (2021) agreed that the consumption of chewing gum and coffee after a colorectal operation is effective in both preventing the development of postoperative ileus and reducing its impacts if it occurs. Hsu and Szu (2022) discovered that patients who were given gum had significantly fewer complications. Evidence also suggests that chewing gum may be associated with faster stool production and passing of flatus after colorectal surgery. On their part, Watanabe et al. (2021) found out that the postoperative consumption of coffee reduces a patient's time to first defecation and POI after colorectal, abdominal, and gynecological surgeries. On their part, Tang et al. (2022) discovered that the recovery of gastrointestinal function after related cancer surgery may be improved by administering the patient perioperative probiotics and synbiotics.

Risk Factors Associated with POI

It is important to highlight the primary risk factors associated with postoperative ileus. The review of the literature offered a better understanding of such risk factors, thus enhancing the content of the educational intervention. As previously discussed, male patients of more advanced age who undergo colorectal surgery, especially procedures involving ileostomy or anastomosis, and receive higher volumes of intravenous fluids are at much higher risk of

developing postoperative ileus (Koch et al., 2020). This finding was consistent with the identified cases in the selected units and highlighted potential populations that need to be closely monitored by both the medical providers and the registered nurses. Koch et al. (2020) also found that the presence of infection also has a strong correlation with PIO incidence. This valuable piece of information was vital, as infection prevention is a topic that is deeply rooted in nursing care principles and can be prevented in many cases. Subsequently, Sugawara et al. (2017) suggest that a history of smoking is associated with reduced arterial blood flow and tissue perfusion in the digestive tract thus it can be utilized as a predictor for POI. This was a valuable finding as smoking information is available to nursing staff in the selected units. Furthermore, smoking history was being re-evaluated each time the patient gets admitted to the facility. Another relevant finding suggested that patients with previous cardiovascular conditions present a much higher risk of developing this potentially life-threatening complication (Quiroga-Centeno et al., 2020).

Nurse-Driven Interventions

Some of the most cost-effective interventions to enhance patient safety are often driven by registered nurses. This is particularly the case when implementing changes to reduce POI incidence in acute tertiary care facilities. Relevant examples of this are early ambulation, coffee consumption, and encouraging the patient to chew gum when contraindications are not a concern. As previously discussed, Hsu and Szu (2022) suggested that chewing gum significantly reduces the amount of time for the first passing of flatus or defecation among colorectal patients with a history of colon cancer. This was a critical finding, as colorectal is one of the main surgical service lines for the selected units. Furthermore, chewing gum is an efficient way to reduce POI incidence without the need for advanced protocols or added costs. Subsequently,

patients who are not NPO and can have liquids should be encouraged to consume coffee. Watanabe et al. (2021) assert that similar to gum, coffee consumption significantly reduced the amount of time for defecation of flatus production after surgery for patients undergoing colorectal and gynecological abdominal surgery. Because there were no risks associated with this intervention, the nursing staff plays a vital role during implementation. Once more, colorectal and gynecology oncology are two major service lines in the selected units.

Definition of Terms

Important terms to know for this project offer a better understanding of the clinical problem and proposed solution.

Table 1

Important Terms and Definitions

Important Terms	Definitions
Flatus/Flatulence	The medical encyclopedia from MedlinePlus defines flatulence as gas or air in the intestinal track that is moved through the rectum.
Postoperative Ileus	Obstipation and intolerance of oral intake that results from non-Mechanical disruption of normal bowel motility following abdominal surgery (Kalff et al., 2021).
Bowel Necrosis	A serious and often fatal complication from several disease processes characterized by reduced bowel perfusion leading to cellular death (Campbell & Silberman, 2022).
Peristalsis	The medical encyclopedia from MedlinePlus defines peristalsis as a series of wave-like movements that aid with the movement of food and secretions through the digestive tract.

Summary

Postoperative ileus (POI) is a common and often fatal complication for patients who undergo abdominal surgery. The findings derived from the literature review conducted reveal that while postoperative ileus is a common issue among patients who undergo gynecological and gastrointestinal surgeries such as colorectal surgery, it is a condition that can be easily prevented or/and controlled. Once healthcare professionals tasked with caring for postoperative patients are equipped with relevant knowledge and skills, they can easily manage the condition of POI. On the other hand, failure to implement strategies to prevent and promptly identify this complication can prolong hospital stays and increase the financial burden. Since education has always been crucial during the implementation of strategies aimed at preventing unintentional harm to patients in healthcare facilities that offer either primary or tertiary care to patients, it was recommended that nurses in the acute care settings were trained on the effective prevention and management of POI.

Section Three: Methodology

Quality improvement methodologies play a critical role in change implantation and evidence-based practice. Although some of the most widely utilized methodologies such as Lean and Six Sigma were introduced by other business industries, healthcare has adopted these principles with incredible results. Correct identification and implementation of these principles facilitate the process of critically assessing change or new ideas and require an iterative and longitudinal approach (Migita et al., 2018).

This section will discuss important organizational assessment aspects while laying the foundation utilized to implement the quality improvement project. Critical goals, SMART objectives, and stakeholders are discussed and established based on the previously identified

clinical problem of POI development. Collaborative strategies are needed to successfully achieve leadership and departmental support. Additionally, a detailed analysis of the caring science and mindful practice nursing theory by Dr. Jean Watson, which is already in place at the selected institution, is conducted in this section.

Primary DNP Project Goal

This project aimed to enhance provider knowledge and confidence in postoperative ileus (POI) identification, management, and prevention. Lack of understanding about this common complication leads to prolonged hospital stays and an overall increase in healthcare costs. Education interventions targeting key concept areas are linked to enhanced adherence to established practice guidelines and provider skills, thus, increasing patient safety (Vaismoradi et al., 2020). The implementation of enhanced learning activities in the selected units aimed to help acute care nurses identify knowledge gaps while fortifying their current understanding of postoperative ileus development.

The selected practice site was a nonprofit, tertiary care facility with over 300 inpatient beds and 30 satellites serving the ever-growing south Florida community. A total of nine units, including critical care, render care to postoperative patients and are staffed with approximately 200 to 250 registered nurses. Of those nine, two operate under surgical services such as gynecology oncology, nutrition, urology, colorectal, general surgery, and surgical oncology. Combined, the two selected units cared for an average of 20 to 30 post-surgical patients per week. The majority of these cases were related to malignancy and involved abdominal surgery such as pancreaticoduodenectomy (Whipple), liver resection, total hysterectomy, etc.

With the volume of patients undergoing surgical processes in the selected units, the incidence of POI had increased over the past year. Failure to produce stool or pass flatus was one

of the main reasons for delayed discharges in these two units affecting an average of three to four patients per week. This was especially the case for patients who had major abdominal surgery involving intestinal manipulation such as colostomy/ileostomy reversal, colon resection, non-robotic total hysterectomy, and Whipple. Without any intervention, the institution was at risk of jeopardizing both revenue and patient safety.

Although the organization had systems in place such as enhanced recovery after surgery (ERAS) protocols to reduce the incidence of POIs, nurse-driven interventions were not discussed during onboarding programs and yearly competency validation. This had a profound negative impact on confidence levels and overall professional knowledge needed to identify, treat, and prevent this complication. The literature suggested that ongoing knowledge reinforcement and proper education can close these knowledge gaps. As a result, nurses caring for these patient populations should receive education on implementing early ambulation, coffee consumption, chewing gum, fluid resuscitation, and other interventions to reduce POI incidence rates (Rodrigues Pessoa et al., 2020). These cost-effective solutions could streamline unit workflow while cutting additional costs.

Key supporters of the project included advanced practice registered nurses (APRNs) from two surgical services (urology and surgical oncology) as well as the professional development department (PDD). Ongoing guidance and support from the APRNs played a vital role when planning the intervention and assessing its success. Furthermore, as subject matter experts (SMEs), these professionals were essential when validating the information and analyzing the raw data collected before and after the educational intervention. Subsequently, the PDD was a critical part of the implementation plan as they oversee nursing education and competency validation strategies.

Additional stakeholders included unit managers, directors, unit educators, attending physicians, and the nurse residency manager for the institution. These stakeholders were critical, as they facilitated the platform needed to implement change after the initial educational intervention. This was especially the case for the unit educator and the residency manager as these two professionals played a major role when implementing future education into onboarding curriculums for both experienced and newly licensed nurses.

The sample for this project included 43 registered nurses working in two surgical step-down units. This number comprised both novice and expert nurses from the day and night shifts. As professionals directly caring for the affected patient population, it was important to apply the educational intervention to this group. Of the two units, one specialized in surgical oncology, and the other in surgical nutrition/urology. Both of these units often cared for patients who had colorectal and general surgery procedures such as ileostomy/colostomy creation/reversion, enterocutaneous fistula repairs, etc.

SMART Objectives

Setting clear goals and objectives was vital to successfully implementing the educational intervention and future change in the selected institution. These objectives paved the road to success when enhancing provider knowledge and confidence levels related to POIs identification and prevention. While resources and support from all stakeholders were leveraged and maintained at all times, it was also critical to adhere to the following SMART objectives:

- Develop a teaching strategy and materials to deliver the educational intervention by February 2023.
- Obtain IRB approval for project implementation by April 2023.

- Recruit 25 to 30 qualified participants before the implementation of the quality improvement project.
- Develop and implement an educational model to improve provider knowledge of POIs detention and prevention within 4 months of project initiation.
- Improve ongoing provider knowledge and patient outcomes by implementing new curriculum processes by the end of the quality improvement project.

Theoretical Framework/Conceptual Underpinning

While evidence-based practice guides professionals by providing accurate and confirmed information, theoretical frameworks serve as solid foundations when planning and implementing changes (Younas & Quennell, 2019). It is important to fully understand the evidence being presented as well as the process to be followed during all steps of education development. This is particularly the case when issues related to patient safety, such as the development of POIs, must be addressed in tertiary care settings. To successfully implement this project, the nursing theory of caring science and mindful practice by Dr. Jean Watson was utilized.

Theory Overview

The science of caring by Jean Watson is a theory with a high focus on the manner in which nursing professionals express or deliver care to patients and themselves. In this theory, Watson considered the significance of the metaparadigm concepts of nursing and defined all four of them clearly. Wei and Watson (2018) assert that according to the theory of human caring, a person in nursing refers to a valued human being who needs to be respected, understood, cared for, nurtured, and given all the assistance that they need to be fully functional. Nursing, on the other hand, is described as a science that is mediated by scientific, professional, ethical, and personal associations that revolve around individuals and their experiences of health and disease.

Sitzman and Watson (2014) emphasize that in her theory of caring, Watson defines the metaparadigm of health as the absence of illness or an advanced level of bodily, mental, and social functionality experienced on a daily basis. Any activities whose focus is to promote the absence of disease are also classified as “healthy.”

In her definition of environment, Watson asserts that nursing (care) occurs in all societies and that it is transmitted by caregivers as they cope with their environment (Sitzman & Watson, 2014). Several assumptions underpin caring science. According to Pajnkihar et al. (2017), the most significant concepts include the perception of care as the backbone of nursing practice and it is only practiced and depicted interpersonally. The same article states that care is comprised of 10 needs of caring, which Watson names the “carative factors.” Watson argues that any time a nurse assumes the role of caring, they must address all 10 caring factors.

Theory/Clinical Fit

The goal of this project was to improve patient outcomes by enhancing the knowledge of the providers when detecting and preventing POIs. It was important to highlight the relationship with Watson’s theory, as one of her main goals is to enhance caring behaviors in the nursing profession. This idea can also enhance patient satisfaction, thus, completing the circle of care. Furthermore, Dr. Watson’s theory calls for an initial focus on addressing the needs of the providers before shifting attention to the patients (Pajnkihar et al., 2017).

When considering key aspects from the SWOT analysis, it was evident that this theory will directly satisfy provider needs from beginning to end. This was especially the case when planning educational interventions for these professionals. According to Watson’s theory, the development and maintenance of caring attributes have a strong link to provider-centered education. To improve satisfaction and overall well-being, providers need to understand and

address their own needs while demonstrating caring behaviors (Pajnkihar et al., 2017). This was paramount as some of the identified weaknesses are related to caregiver fatigue. By implanting this theory, the information delivered had a profound effect on the staff by addressing their unique learning needs. Such an approach had a higher chance for success, which eventually translated to increased patient safety.

Furthermore, this nursing theory was already part of the frameworks utilized by the institution. With caregiver needs as a priority, meetings and meditation sessions were regularly conducted in the institution following the *caritas* process. This was a major advantage, as it aligned the framework utilized in the project with that of the institution.

Theory Evaluation

As indicated by Peterson and Bredow (2013), a middle-range theory of nursing such as Watson's theory of caring may be evaluated using internal and external analysis to determine its viability. Some of the elements that are evaluated in the analysis include the theories of clarity, consistency, adequacy, logical development, and significance.

Watson's caring science does not fully meet the requirements of clarity and consistency. Although the theorist uses language clearly and in an artful manner, her *caritas* and carative factors concepts are quite complex (Pajnkihar et al., 2017). In addition, the theory is conspicuously inconsistent and confusing. An obvious inconsistency, for instance, is that the theory is referred to using various names, such as caring science, transpersonal caring, and the theory of human caring (Sitzman & Watson, 2014).

Regarding significance, Watson's caring science is indeed important. Once this theory has been clearly understood, it can successfully guide nursing professionals on how to provide the best care for patients and their families. Moreover, the focus that is currently placed on the

need for health care to be safe and of high quality emphasizes the need for nurses to put more attention to the process of caring (Wei & Watson, 2018). Consequently, while Watson's theory is indeed quite broad and intricate, it is very applicable to the various contexts of nursing (Peterson & Bredow, 2013). Many nursing schools have incorporated the principles of this theory into their practice, and the research based on it continues to improve health outcomes for many patients across the world.

Adequacy is another important aspect that must be considered when evaluating a theory. Watson's caring science may be described as adequate, not only for nursing education but also for actual practice and research (Peterson & Bredow, 2013). The adequacy of this theory is underpinned by its scope, context, and content, particularly the emphasis placed on the four meta-paradigms of nursing. Watson's caring science is logically developed. Initially, the focus of the theory was on the relationship and interactions that occur between a nurse and their patient; Watson's intention was to highlight its significance as a new and unique discipline. However, since the theory was logically developed, other researchers and experts have been able to modify it and evolve more modern views of concepts such as *caritas* and carative factors (Wei & Watson, 2018). Regarding the level of theory development, Watson's caring science covers nursing practice as a whole. However, there is a particular focus on the caring association between a nurse and patient and the manner in which clinical *caritas* procedures may be used to create an effective caring association.

Watson's caring science is satisfactorily testable. The testability of the theory is confirmed by the fact that various valid and reliable scientific instruments may be used to evaluate the concepts of the theory (Sitzman & Watson, 2014). Since the techniques of care in

nursing practice may be qualitative, quantitative, or even naturalistic, they can easily be tested to determine their impact.

Setting and Participants

The project took place in a tertiary care facility with over 900 registered nurses. There institution has a total of 15 inpatient units and approximately 10 ambulatory services provided all across the community. Two units were selected to conduct this project as these were the units with the highest rates of POIs. The first unit was classified as an oncology step-down (OSD) and serves patients from the gynecology, surgical (liver/pancreas), colorectal, and gastrointestinal oncology service lines. Subsequently, the second unit was a urology/surgical step-down (USSD) serving patients under the care of the surgical nutrition, colorectal, general surgery, and bariatric service line.

The staff rendering care in the selected units ranged from novices to experts in the field. Both units participated in the home-grown residency program and hired an average of two to four nurse residents per cohort. There were three cohorts per year with an average of 15 to 20 newly graduated registered nurses trained for the selected units each year. Although the USSD unit had a large number of experienced staff, the OSD unit was staffed by newer nurses or agency providers. The predominant cultures were Hispanic and Hindi with some small groups from the Caribbean islands. The total number of participants included both experienced and newly graduated nurses with at least 6 months of experience from all cultures and backgrounds.

Procedures

This quality improvement project used a quasi-experimental research design. Often utilized in healthcare, this research design does not involve the use of randomized controlled trials. However, there are several types of quasi-experimental studies that include, non-

equivalent control pretest-posttest design, non-equivalent control posttest only design, one group pretest-post-test design, and time-interrupted series (Bloomfield & Fisher, 2019). The project used an initial assessment or pretest followed by an educational intervention and a final assessment or posttest. Because the study did not include a control group, it followed a one group pretest-posttest design.

Participant Recruitment

Participants from the two selected units were recruited via email as seen in Appendix B. This phase was completed in collaboration with the two unit educators and the leadership team. Information sessions were available to the staff to describe the main purpose of the project as well as participation instructions. A total of two reminders were sent via email 2 and 3 weeks prior to project implementation as seen in Appendix B. Participants were able to reply to the email for more information or go directly to the project enrollment form seen in Appendix C using the provided link. Furthermore, emails had a QR code that can be scanned using a mobile device to access the form. To ensure form integrity, double registration was closely monitored, and the IP address recorded.

Data Collection

Data collection methods included the use of electronic platforms such as Qualtrics to ensure easy access and data integrity. The first step for participants was to register to participate utilizing an electronic form. During this process, critical demographic data including age, ethnicity, years of experience as a nurse, highest nursing degree, etc. was collected.

Once registered, the participants received instructions to attend the education intervention in the unit. Staff nurses were not required to come during their personal days. Before the education intervention, nurses were asked to scan a QR code to complete the pre-intervention

assessment. This was administered using Qualtrics and did not require the nurses to enter personal information. Once the initial assessment was completed, participants completed the educational session delivered via PowerPoint presentation. Lastly, a final assessment or posttest was administered at the end of the intervention to benchmark the program's effectiveness on the provider's baseline knowledge.

Data Analysis

Inferential statistical methods help with the formulation of effective conclusions by drawing important data using statistical tests such as student's *t*-test (Mishra et al., 2019). This project used a *t*-test to determine outcomes for the educational intervention. These parametric test tools often help compare the means of two groups or two points of data (George & Mallery, 2019). The *t*-test alone can help determine if the proposed intervention was beneficial to the participants. In this case, it helped determine if there was a significant difference between the baseline knowledge and follow-up data. Furthermore, the results helped determine if the nursing-focused education intervention led to significant changes in knowledge about POIs. The data was also presented using graphs and tables.

Protection of Human Subjects

All participants were provided with a well-defined informed consent as seen in Appendix D outlining the goals and purpose of the project. This consent was also used to establish permission from the participants to collect data related to the project. To protect the participant's privacy, the team did not collect personal identifiers such as name, employee ID, etc. during the pre and post-intervention assessment; all data collected during the initial and the final assessment remained anonymous and individual results were not discussed with leadership or other third-party organizations. Because the purpose of this project was to enhance knowledge among

providers via an educational intervention, there was significant risk associated with participation. Furthermore, the project did not include any patients or other participants from vulnerable populations.

Data Management

All collected raw data remained anonymous at all times and will be stored in secure servers maintained and encrypted by Qualtrics. Information downloaded from those servers will be saved in password-protected computers with hard drive encryption enabled. No data will be stored or downloaded to shared computers such as workstations or personal mobile devices. Electronic data will be deleted from the servers and any other previously mentioned devices using secure document elimination processes 1 week after project implantation and data analysis. Printed information about the project or participants must be shredded within 24 hours.

Section Four: Results

The results of this project undoubtedly had significant implications in nursing practice. This was especially the case when emphasizing the importance of support management for patients who have experienced postoperative ileus. This section will analyze the impact of nursing education on enhancing the knowledge needed to prevent postoperative ileus among hospitalized patients who undergo abdominal surgery. Important demographic data such as years of experience, ethnicity, level of education, etc. offer a better understanding of the overall characteristics of the participants. This data was critical, as it helps identify both generational and cultural strategies needed to plan the implantation method. Additionally, an analysis of the pre- and post-intervention data was performed to determine project effectiveness using descriptive statistics. This information offered a better understanding of the difference between the base knowledge and the gained knowledge after the intervention.

Demographic Data

Using SPSS v. 25, the demographic data was analyzed through descriptive statistics. More specifically, the frequency distribution of the demographic data collected during project enrollment was tabulated. Unit A was a surgical nutrition and urology unit that cares for patients who undergo enterocutaneous fistula repairs and other major abdominal procedures. Subsequently, unit B cared for surgical oncology patients that undergo more critical procedures. As a result, a larger number of staff nurses was seen there. As seen in Table 2, of the total participants ($n = 43$), 69.7% were Hispanic or Latinos ($n = 30$) with the majority of the participants being female ($n = 32$). Furthermore, it was identified that 85.7% of participants ($n = 36$) were bachelorette-prepared nurses.

Table 2

Demographic Data for Sample (N = 43)

Characteristic	Result
Average Age	31-40
Gender	
Male	16 (37.3%)
Female	32 (74.4%)
Race and Ethnicity	
White	30 (69.7%)
African American	8 (18.6%)
Latino/Hispanic	30 (69.7%)
Asian	5 (11.6%)
Highest Education	
ASN	4 (9.3%)
BSN	36 (85.7%)
MSN	8 (18.6%)

There was also a similar number of experienced nurses in both units with unit B having the largest amount of newly graduated nurses with less than three years of experience. Unit B had seen the biggest impact on staffing since the COVID-19 pandemic. As a result, demographic

data showed an overall lower number of years of relevant experience. There was no significant difference in the number of times the healthcare professionals cared for patients who underwent major abdominal surgery. However, unit B had a slightly different process as it was a more advanced step-down unit. Only more experienced RNs or those who received additional precepting time were allowed to care for critical patients such as those who had a liver resection or a Whipple procedure.

Pre-/Post-Intervention Data

Data from the pre- and post-intervention assessment was collected and analyzed using statistical tools provided by Qualtrics. Normal distribution was determined using a Kolmogorov-Smirnov Test with pre-intervention scores revealing $p = 0.115$ and post-intervention $p = 0.07712$ indicating that the data was normally distributed. Although a power analysis was not conducted, a paired one-tailed t -test was performed to determine if there was a significant difference in scores and self-assessment questions after the intervention. The first set of questions asked the participants to self-assess their knowledge and confidence levels regarding postoperative ileus prevention, identification, and management. As seen in Table 3, pre-intervention data revealed that knowledge self-assessment score was ($M = 6.02$, $SD = 2.16$), self-confidence ($M = 7.19$, $SD = 2.27$), and knowledge scores ($M = 3.93$, $SD = 1.59$).

A total of two participants rated their overall knowledge of POI at a level 10 during the initial assessment. Subsequently, 14 of them felt confident identifying factors that place the patient at risk for developing POI and only 10 felt confident identifying early signs and symptoms of POI. When asked about their ability to care for a patient who has undergone major abdominal surgery and has a high risk of developing POI or has been diagnosed with the complication, only 11 of the participants reported feeling confident. Furthermore, 29 of them felt

they had a good understanding of important nursing interventions that can be implemented to prevent POI among post-surgical patients.

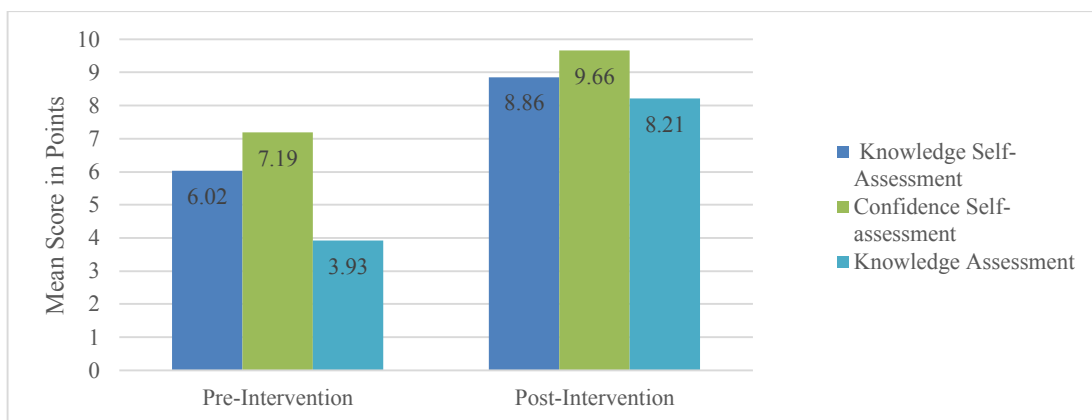
Part two of the assessment was used to re-evaluate the effects of the intervention as it challenged the participant's knowledge of POI definition, statistics, financial impact, risk factors, diagnostic studies, treatment, and nursing interventions after the presentation. As seen in Table 3, post-intervention data revealed that knowledge self-assessment score was ($M = 8.86$, $SD = 1.29$), self-confidence ($M = 9.66$, $SD = 0.64$), and knowledge scores ($M = 8.21$, $SD = 1.55$).

Table 3

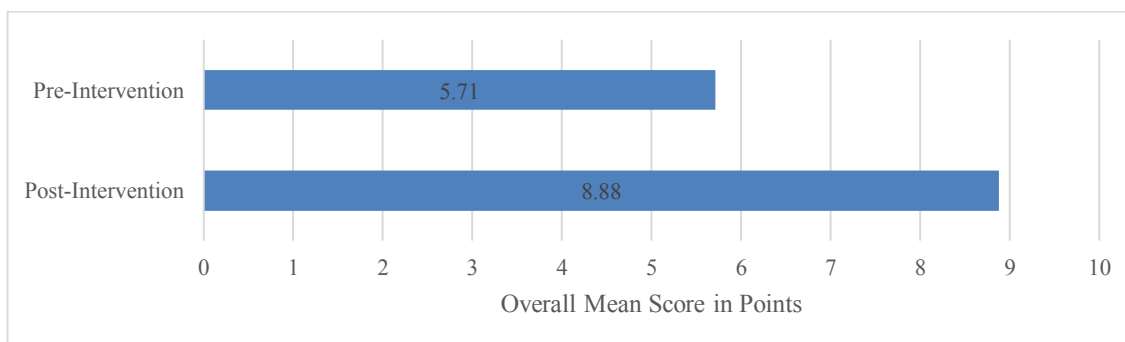
Pre and Post-Intervention Scores

Characteristic	Result
Pre-intervention	
Knowledge self-assessment	$M = 6.02$ $SD = 2.16$
Confidence self-assessment	$M = 7.19$ $SD = 2.7$
Knowledge Assessment	$M = 3.93$ $SD = 1.59$
Post-Intervention	
Knowledge self-assessment	$M = 8.86$ $SD = 1.29$
Confidence self-assessment	$M = 9.66$ $SD = 0.64$
Knowledge Assessment	$M = 8.21$ $SD = 1.55$

Overall, providers from both units reported higher confidence levels when completing the post-intervention self-evaluation. As seen in the comparison graph from Figure 1, mean knowledge self-assessment scores increased by 47% from 6.02 to 8.86. Confidence among nurses showed a 34% increase from a mean of 7.19 to 9.66 after the education intervention. Subsequently, mean scores for the assessed knowledge of POI showed a significant improvement of 109% from 3.93 to 8.21.

Figure 1*Pre- and Post-Intervention Scores Comparison*

Combined, there was a significant increase in overall scores from the pre- to the post-intervention assessment. The overall score was assigned a maximum value of 10 points calculated using combined scores from the self-assessment, confidence, and knowledge inventory data points. As seen in Figure 2, the overall pre-intervention scores were ($M = 5.71$, $SD = 1.37$) and post-intervention ($M = 8.88$, $SD = 2.45$). This indicates an overall mean score increased of 55.5% from 5.71 to 8.88. Lastly, a paired one-tailed t -test was performed using the overall scores from all participants to determine statistical significance. This offered consistent results with the two-tailed P value less than 0.0001.

Figure 2*Overall Pre- and Post-Intervention Scores Comparison*

Section Five: Discussion

Data from the pre- and post-intervention assessment suggest that there was a significant difference in knowledge scores after the implementation of an education intervention on postoperative ileus. The staffing and time allocation challenges associated with this project aligned with those being faced by many healthcare institutions nationwide. Several site visits were needed to answer all questions and engage with the staff. Critical stakeholders such as leaders and educators also played a vital role by highlighting the significance of the issue and reinforcing the need for education. Close project monitoring was a critical aspect of the implementation plan. This was specially the case during data collection and monitoring. Although the results are significant, there were some project limitations such as the small sample size and the inconsistent attention of the participants. The results generated open the topic to future research where experience and generational consideration should be considered.

Discussion of the Results

The results of this project indicate a significant improvement from the baseline knowledge of POIs after an educational intervention in two tertiary care units. This aligns with the original goals of enhancing provider knowledge and highlights the importance of provider education in the clinical setting. The education intervention using evidence from the literature offered a streamlined and interactive way to deliver information at the bedside while minimizing interruptions to patient care processes. Uninterrupted education utilizing the buddy system offered both the staff and the institution an opportunity to explore a new avenue for future training strategies. This was a critical point as it offered stakeholders a more effective way to deliver information while maintaining productivity and efficiency.

The data from this project also offers valuable information about the staff's overall base knowledge and learning styles. This is especially the case when discussing prevention strategies and ways to incorporate them into the already existing protocols. Such a finding aligns with the available literature and further supports the need for supplemental training. It is important to bring attention to standardized education tailored to a specific patient care population.

Stakeholders have to think past the annual education required by accreditation bodies and implement unit or department-specific training programs that address the previously identified knowledge gaps.

An increase in knowledge and confidence among the nurses could significantly impact overall patient outcomes. Results from the provider's self-assessment also suggest that the project had a positive impact on this area. This information further supports the need for stakeholder involvement when planning and implementing educational interventions. By empowering the nurses and providing adequate information institutions could potentially see a decrease in POI incidence. Simple teaching strategies that support the everchanging unit needs and a major focus on nurse-driven interventions are key.

Implementation Discussion

Although the majority of the staff was extremely supportive and appreciative of the intervention, there were issues with engagement and interruptions during project implantation. The staff in the selected units cared for three to five patients on any given day. Participants carried a mobile device provided by the institution that is used to enhance communication among all members of the multidisciplinary care team. This had a major impact on content delivery and engagement as the participants would often get distracted by a call or text requiring their immediate attention. A positive way to mitigate this was the utilization of the already existing

“buddy system” that assigns a second RN to function as a resource when the primary nurse was not available. This was considered when scheduling the participants to attend the educational intervention. Other strategies that proved useful was delivering content during allocated staff huddle time. Furthermore, times that were likely to be fast passed such as medication administration schedules, physician rounding, and laboratory collection were avoided.

Another challenge with implementation was recruiting and maintaining engagement among the participants. The selected units were heavily affected by the challenges associated with the COVID-19 pandemic. Staff turnover rates lead to the implantation of incentive pay that greatly enhances compensation. As a result, participants were working an average of four to five shifts per week instead of the regular three. This added additional stress and contributed to the overall staff attitude towards the project implantation. An effective way to mitigate this was performing frequent site visits and constantly working with key stakeholders such as leaders and educators. By highlighting the significance and importance of the identified clinical problem, the participants were able to understand the need for education.

Influencing Factors

A major factor contributing to the success of the program was the unconditional support from key stakeholders and subject matter experts. The selected institution has a robust educational structure and a culture that supports learning and staff-driven interventions. This offered a solid foundation that greatly improved the outcomes of the quality improvement project. Structural empowerment and the implementation of a nursing theory also played a significant role. The selected units embody a culture of safe communication where staff nurses are key members of policymaking and change implementation. As a result, participation in the

unit-based practice counsels offered the perfect avenue to deliver critical information about the project.

Additionally, cultural considerations were useful when promoting, recruiting, and implementing this quality improvement project. Different learning styles and generational considerations were utilized to ensure a cohesive and safe learning environment. This was especially the case for groups that consisted of previous nurse residents. Such individuals played a key role by promoting and helping engage other staff members. Such support is likely related to the requirements established by the institution's Nurse Residency Program (NRP). This factor also played a significant role in the technology implementation. Because of the generational difference and the recent shift to electronic form validation, these individuals served as peer resources and change agents for the rest of the staff.

Monitoring

Project monitoring was achieved by implementing both remote and on-site visits. Remote platforms such as Qualtrics were utilized to register participants as well as to collect pre- and post-intervention data. During the registration phase, electronic forms were closely monitored daily to prevent double registration or inappropriate form dissemination. Because the enrollment link was sent via email, the employee was expected to register during work hours. Information such as IP address was monitored daily. This process was continued until registration was closed and included the platform utilized to collect consent. Adobe Acrobat Sign was closely monitored two times per day. This was done to ensure the accuracy and legitimacy of the consent requests. All forms were screened and signed by the researcher within 24 hours of successful registration and consent signature. Site visits were also implemented to maintain staff engagement and reach those who had more questions or had not reviewed their email communications.

During the implementation phase, there was a more active presence in the clinical setting. Daily site visits were implemented and reinforced by electronic data monitoring. The pre- and post-intervention assessment remained open only during the time of implementation and daily reports were utilized to determine the integrity and accuracy of the data collected. These reports were generated online using tools provided by Qualtrics and compared the number of attendees to the number of responses received. The participants who used mobile devices were encouraged to connect to the institution-provided Wi-Fi network. IP address and date were closely monitored both during the site visit and while remote.

Project Maintenance

To successfully implement long-lasting change, it is crucial to maintain engagement from the leadership and education team. These key stakeholders were critical as they continued to reinforce the goals of the project and the need for change. A strong rapport facilitated the maintenance project during the time of implementation. However, there are concerns about future maintenance for both newly hired and current staff members. A solution to mitigate this was a constant collaboration with the decentralized education department. Educators from this department oversee the onboarding and competency validation process for the entire institution. Close collaboration with these key individuals can ensure the implementation of the education intervention for all employees being onboarded.

Another solution for maintenance after the project was completed was utilizing the current structure in place for nursing engagement and professional development. The institution has a clinical ladder system that works in a points system. The nurses can get these points by participating in activities such as competency validation and in-services. Such structure offers a perfect opportunity for knowledge re-enforcement by selecting individuals from the two units.

Such individuals have to be identified by the manager and the unit educator as peer resources.

Charge nurses are often the choice as they serve not only as peer resources but also as agents of change and role models.

Project Limitations

Although the selected units offered a fair representation of the effects of the educational intervention, it is a rather small sample size and a power analysis was not performed. As a result, the data does not necessarily represent the institution at a larger scale or offers significant statistical significance. This project offered a snapshot of the knowledge and confidence improvement but does not necessarily evaluate the critical thinking or problem-solving abilities of the participants when the acquired knowledge is to be applied in real-life scenarios.

Furthermore, there was no follow-up after the project implementation to collect or analyze data related to patient outcomes.

As previously mentioned, another limitation was the occasional interruptions during the educational intervention. It is impossible to ensure that all the participants received the same information. This could have a negative impact on information retention and ultimately the post-intervention knowledge assessment score.

Areas for Future Research

The ever-changing world of healthcare always requires future research and evaluation. The selected institution has experienced a major staff turnover change in the past 3 years. As a result, the overall experience across the hospital has significantly dropped. Many of the nurses in the selected units graduated during or immediately before the COVID-19 pandemic changed the way education is delivered. In fact, the institution had to implement major changes to the home-grown nurse residency program to mitigate the lack of clinical rotations for the upcoming newly

graduated nurses. This had a profound effect on education effectiveness and knowledge delivery strategies. Future research should aim to answer questions related to lived experiences and the impact of training on post-pandemic nurses. This could potentially shape the way information is delivered to better match new emerging learning styles and modalities.

Furthermore, this quality improvement project brings new attention to the effectiveness of the ERAS protocols in place to prevent POI development. Additional research including pre- and post-surgical interventions is needed to build a correlation between the protocols and nursing-driven interventions. Although effective to some extent, ERAS protocols can be expensive and time-consuming for both the institution and the providers. A better understanding of its relationship to patient outcomes, when paired with nursing-driven interventions, will offer a better picture and potentially save the institution additional resources and time.

Recommendations Based on the Findings

Data collected and analyzed during this project offered a better understanding of the potential strategies to prevent POI. The implantation of an educational intervention had a significantly positive effect on provider knowledge and confidence levels when caring for patients at risk of developing or being diagnosed with POI. Planning such educational intervention required close analysis of factors such as culture and generation. This was a critical step that should be utilized to maximize results and staff support toward the intervention. Support from key stakeholders such as nursing leadership and unit educators was crucial when implementing and maintaining the project. Frequent site visits and the implementation of electronic platforms were needed to streamline data collection processes and further maximize time utilization. Platforms such as Qualtrics were used to generate reports and maintain document integrity. Time saved here can then be utilized to build rapport with the staff and key

stakeholders. This is an important step as it can also promote collaboration and engagement throughout the course of the project.

To mitigate the staffing shortage stress and distractions associated with regular patient care, uninterrupted education strategies should be taken into consideration (Routray & Mohanty, 2022). A buddy system can be utilized to allow the participants to leave the unit and go to a separate area of the institution. This will minimize the number of distractions such as patient call lights and other peer communication requests. Furthermore, close consideration should be employed when delivering information to the participants. These considerations should include the number of years of experience as a nurse and other cultural/generational traits. This is especially the case after the impacts of the COVID-19 pandemic on the way that nursing education is delivered. Such factors should also be further studied to ensure maximum results. To further enhance outcomes, additional research is needed to link the effectiveness of established ERAS protocols and nursing interventions at the unit level. This can greatly reduce POI incidence and potentially cut additional costs.

Interpretation of the Results

The implementation of a teaching intervention on POI prevention and management can potentially change the way nurses render care to postoperative patients in tertiary care facilities. Changes to the education infrastructure are needed to enhance the implementation of standardized education, which is specific and tailored to the individual clinical setting. Both the changes and the results of this project can be transferred to different patient care areas. This will not only enhance provider knowledge but also reduce the overall cost of care and promote patient safety. Additionally, the educational intervention utilized in this project offers a cost-

effective solution, as it is delivered during regular work hours with no additional monetary compensation for the participants.

Dissemination of the intervention and results of the project in the appropriate journal can potentially impact education strategies to prevent patient harm all over the nation. This is a crucial step to highlight changes to advanced/clinical practice, nursing education, administration, and leadership. Such changes can transform the way education is delivered as well as enhance productivity and staffing needs.

Changes in Patient Care/Healthcare Setting

Patient care settings should promote a culture where continuing education and evidence-based practice are crucial components of daily operations. Departments caring for postsurgical patients must have systems in place to ensure that staff nurses feel confident identifying, preventing, and caring for a patient with POI. The implementation of mandatory education and comprehensive workflows to care for this patient population should include clear definitions and expectations from both the providers and the nursing staff. This can be achieved by developing patient care workflows or nurse-driven protocols.

The implementation of the buddy system can be further utilized to provide staff with additional training time that is free of distractions or interruptions. Patient care settings should be able to provide these spaces while minimizing the impact on unit dynamics. During project implementation, this was achieved by booking conference rooms or staff lounges for specific times. Furthermore, support from the unit educator was vital. If there is no unit educator, the implantation of superusers can be explored as it offers additional support and promotes staff engagement.

Transferability of the Results

The results of this project cannot be easily transferred to other clinical settings with or without the previously discussed recommendations. This is mainly because of the small sample size and the site limitations. However, the information obtained can be utilized to formulate similar strategies with additional support from the literature. The potential benefits of patient safety can extend to both inpatient and ambulatory care settings. This strategy can be utilized to target providers and staff members performing follow-up appointments. Even with a much slower risk after discharge, POI can develop at later stages and should be promptly identified. In the inpatient units, the results can be replicated not only with POI but also with other gastrointestinal complications arising from abdominal surgery. To do so, potential limitations such as staff availability and multidisciplinary support should be taken into consideration.

Structural empowerment and organizational culture should be addressed and modified accordingly. The results are dependent on factors such as stakeholder support, willingness to participate, staff engagement, and culture of change. Units must have an adequate support system and foster a culture that is welcoming to change and evidence-based practice. All these come together to facilitate both the implementation and maintenance of the project. Ultimately, the results achieved could have a positive impact on both the organization and society as a whole. By increasing provider competency and offering additional tools to prevent unwanted patient harm, the overall cost of care for both the institution and the patient can be greatly reduced.

Cost-Effectiveness

Although there is no consistent literature suggesting superior cost-effective methods, the application of the educational intervention in this project took advantage of the already existing infrastructure and information delivery systems. There was no additional cost associated with the

project as the staff members were registered to attend sessions during regular work hours. However, it is important to note that compensation should be a critical factor to consider. This is especially the case when delivering information to units that are mainly staffed by contract or temporary staff. Employees who are working over their regular hours to meet unit needs should also be considered as they often have different pay rates. To mitigate this, close attention was given to scheduling and staffing needs for the institution. When implementing during off time, other staffing policies and/or procedures should be assessed as well. The implementation of this quality improvement project required approximately 30 minutes. However, some institutions require payment for 2 full hours if the employee must attend an off-schedule training. This can be addressed by allocating time and resources for employees to participate during less active hours.

Furthermore, the cost of materials and supporting staff should be considered. The implementation of superusers in clinical settings that do not have a unit educator ensures additional support and project maintenance. However, this can have a negative impact on staff and add additional cost to the implementation plan. Electronic delivery systems can help mitigate this by offering the opportunity to participate while removing the additional costs associated with on-site personnel.

Recommendations Based on Interpretation of Results

Immediate and continued education is needed to enhance nurses' knowledge and confidence in identifying and caring for patients with POI. This can be achieved via face-to-face uninterrupted training in the unit. Support from the subject matter experts (SMEs) and the stakeholders is crucial to standardize information delivery and enhance flexibility. In the case of patient care settings that provide services to patients who underwent abdominal surgery,

education regarding POI should be included in the yearly educational plan and competency validation. The integration with the unit-based competency modules will not only ensure the information is delivered but also provide a sense of importance and urgency.

Furthermore, educational modules on POI prevention and treatment should utilize the current practices and employee onboarding policies. Education on specialties that deviate from standard institution-required education is determined by SMEs and stakeholders. As a result, POU training should be included in the onboarding process for all employees coming into surgical areas. This will provide additional support and knowledge, which can help reduce negative patient outcomes. Once onboarded, these nurses should receive continued education with up-to-date information supported by evidence. This is especially the case for novice nurses entering extended orientation programs such as nurse residencies. To further enhance compliance and collaboration, nurse-driven interventions can be integrated into the ERAS protocol or clearly stated in a standard of practice or SOP document. By providing nurses in the unit the tools and support needed to implement the newly acquired knowledge leaders and relevant stakeholders can maximize outcomes. The role of the unit manager and educator must be maintained as primary resources to the staff. This will ensure both project maintenance and ongoing engagement from all parties involved.

Plans for Dissemination

The results of this quality improvement project will be shared both internally and externally. Platforms such as grand rounds will offer an opportunity for leaders in the institution to see the results and strategies utilized. Broader audiences will be reached via electronic publication in the *Journal for Nurses in Professional Development* (JNPD). This well-respected journal guides countless professional development practitioners and nurse educators by

providing strategies to reduce patient harm and increase quality measure outcomes. The majority of the articles found in the JNPD analyze the success of educational interventions and teaching strategies in the clinical practice setting. This will offer a broader stage and a potential solution to other institutions.

Furthermore, the Association for Nursing Professional Development (ANPD) also hosts annual conferences, such as Aspire, where similar projects are presented. This will offer an opportunity to engage with other experts and further discuss the results and implementation strategies. The same platform will also open dialogues about project challenges and barriers to implementation experienced by other institutions.

Implications for Advanced Nursing Practice

As role models and leaders, advanced practice registered nurses (APRNs) must be able to identify needs at all stages of care. This project highlighted the need for nursing staff to receive additional education and support when caring for patients who have had abdominal surgery. This not only increases patient safety and satisfaction but also streamlines the workflows to identify early signs and symptoms of POI, as well as interventions to reduce incidence. According to Wu and Busch (2019), poor or insufficient provider education is linked to poor patient outcomes and prolonged hospital stays due to preventable complications or unintended patient harm. The results from this project sensitize the administration of healthcare facilities to the importance of educating relevant staff about postoperative ileus. Furthermore, it is critical to analyze the implications to overall nursing education, clinical practice, administration, and leadership.

Nursing Education

As indicated by Hammad et al. (2023), the curriculum development process in the medical field, especially those for colorectal and surgical oncology, is based on competency-

based objectives that are founded upon the core objectives of the Accreditation Council for Graduate Medical Education (ACGME). When looking at the onboarding process for colorectal and surgical oncology, there are several competency-based principles that must guide the process. According to the American Society of Clinical Oncology (ASCO, 2020) , some of these include the scope of practice and the role of the advanced practice provider (APP). The incorporation of these competency-based approaches plays a critical part as APPs guide and serve as leaders. The results from this quality improvement project highlight the need to modify the onboarding process to ensure that the staff is provided with the knowledge needed to care for patients as well as introduced to key subject matter experts. However, there is also room for improvement in overall nursing education in the institution and nationwide. This project opened the door for more interprofessional collaboration among providers by promoting communication and autonomy. Nurses should be oriented to the relevant patient care processes and protocols in the units related to the issue. Furthermore, these professionals should be made aware of departmental meetings, grand rounds, educational seminars, etc.

Clinical Practice

Ensuring the safety of patients is a vital consideration in colorectal for all healthcare institutions. Robust and effective leadership was a major factor in ensuring the safety of patients in these two units. Several protocol enhancements have occurred in the field of colorectal cancer surgery in the past few decades. In fact, according to Shen et al. (2017), practices such as the preoperative risk evaluation of sarcopenia, nutrition, and frailty have played an instrumental role in enhancing postoperative outcomes for patients. In addition to this, the emergent strategies of patient optimization, particularly the adapted surgical intervention, have also enhanced postoperative outcomes. The findings from this quality improvement project can greatly enhance

current practices and protocols by adding a cost-effective layer of nursing care. This could potentially transform unit workflow and decrease the overall cost of care for both the patient and the institution.

Nursing Administration

The process of assigning and maintaining beds available to treat patients in a healthcare facility is usually an intricate and challenging undertaking, particularly in the colorectal and surgical oncology units. (Ravaghi et al., 2020) asserted that while there are no particular rules or guidelines to determine the needed number of beds in a healthcare facility, colorectal and surgical oncology are perceived as sensitive units that should not be crowded. It is worth noting that the bed capacity in any unit, including those caring for postsurgical patients, is dependent on various factors. However, the prevention of POI can have a tremendous impact on discharge turnover rates. Faster discharge of patients from the hospital, in turn, will significantly reduce the financial burden for both the patient and the hospital. By reducing the incidence of POIs, the nursing administration have seen enhancements in both census and bed availability.

Furthermore, the results of this project opened the door for further evaluation of the existing policies and procedures addressing employee onboarding processes. SMEs and stakeholders harnessed the power of the systems already in place to further expand the training requirements for employees hired into surgical areas where POIs are likely to develop. This not only addressed current gaps but also set the foundation for future change.

Leadership

Although staff satisfaction is a rather comprehensive and multi-dynamic process, inpatient or tertiary care settings always appear to be more affected by poor leadership. The rates of psychiatric morbidity, burnout, and work dissatisfaction tend to be much higher in colorectal

and surgical oncology units (Sharma et al., 2018). This has a negative impact on staff satisfaction and the quality of care that is being rendered. The results from this quality improvement project transformed interactions between staff members and leadership thus improving satisfaction and outcomes. Furthermore, the reduction of POIs can be a significant factor when analyzing unit benchmarks. This was crucial when looking at the overall picture of productivity and effectiveness of the individual department. As primary stakeholders, leaders can directly influence the course of these benchmarks and further enhance safety at a larger scale.

Conclusion

The development of POIs affects a large number of patients and has a direct impact on overall revenue. This often fatal complication places the institution at risk for legal action or government sanctions. Although institutions often have clear guidelines and requirements for competency validation or content refresher, there is no specific system in place to educate nurses on POI identification, prevention, and treatment. This leads to major knowledge gaps that negatively impact patient care and quality outcomes. A quality improvement project was implemented to evaluate the effectiveness of an educational intervention on the confidence and knowledge identifying or preventing POIs among acute care nurses in a tertiary care institution. The primary goal was to enhance the nurses' understanding of the potentially fatal complication, thus increasing patient outcomes. A review of the available literature revealed that although not fully understood, POI is more prevalent among patients who undergo abdominal surgery with previous modifiable and/or nonmodifiable risk factors such as heart disease, smoking, etc. Additional findings suggested that nurse-driven interventions such as early ambulation, coffee consumption, and chewing gum can significantly reduce POI incidence.

Two step-down units in a large urban tertiary care facility were selected, and a total of 43 ($N = 43$) participants, primarily Hispanics, were recruited to attend a 30-minute educational intervention. The participants were screened, and eligibility was determined based on experience and employment conditions. Those who were contract or temporal staff and those who had recently graduated from the nurse residency program were excluded. Recruitment and data collection were completed and managed using electronic platforms such as Qualtrics and Adobe Acrobat Sign. The participants were then invited to attend an education intervention where a pre- and post-assessment was administered. The assessment consisted of two parts using both self-assessment questions to rate the nurses' confidence levels and knowledge questions.

Data from the pre- and post-intervention assessment revealed a significant increase in confidence levels when the nurses were asked to rate their abilities to identify and care for a patient with POI. A paired one-tailed t -test was then utilized to establish statistical significance where $p < 0.0001$ indicated an extremely significant improvement. However, limitations such as sample size, lack of power analysis, and interruptions during the educational session must be considered. As a result, further research is suggested to analyze the impact of the COVID-19 pandemic on nursing education and the effects of nurse-driven interventions when combined with ERAS protocols. Ultimately, the project can be implemented in other care settings and can have a positive effect on nurse satisfaction, census reduction, staffing needs, unit benchmarks, and profit margins.

Overall, the finding of this quality improvement project shed some light on the importance of provider education about POI development and prevention. There are several ways to mitigate the impact of this potentially lethal complication. Factors such as financial impact and cost-effectiveness of the systems in place to prevent POI must be considered.

Education interventions highlighting critical information about this complication are a very effective at enhancing provider knowledge and should be implemented for all staff members who work in areas caring for postoperative patients.

References

- Alhashemi, M., Fiore, J. F., Safa, N., Al Mahroos, M., Mata, J., Pecorelli, N., Baldini, G., Dendukuri, N., Stein, B. L., Liberman, A. S., Charlebois, P., Carli, F., & Feldman, L. S. (2018). Incidence and predictors of prolonged postoperative ileus after colorectal surgery in the context of an enhanced recovery pathway. *Surgical Endoscopy*, *33*(7), 2313–2322. <https://doi.org/10.1007/s00464-018-6514-4>
- American Medical Association. (2022, May 13). *Specifications manual for Joint Commission National Quality Measures*. Table Of Contents TJC (v2022B1). <https://manual.jointcommission.org/releases/TJC2022B1/>
- Bloomfield, J., & Fisher, M. (2019). Quantitative research design. *Journal of the Australasian Rehabilitation Nurses' Association*, *22*(2), 27–30. <https://doi.org/10.33235/jarna.22.2.27-30>
- Boitano, T. K. L., Smith, H. J., Rushton, T., Johnston, M. C., Straughn, J. M., & Leath, C. A. (2018). Impact of enhanced recovery after surgery (ERAS) protocol on the gastrointestinal tract in gynecologic oncology patients undergoing laparotomy. *Gynecologic Oncology*, *149*(3), 624. <https://doi.org/10.1016/j.ygyno.2018.03.020>
- Campbell, E. A., & Silberman, M. (2022, July 17). *Bowel necrosis*. *StatPearls*. <https://www.ncbi.nlm.nih.gov/books/NBK534298/>
- Collins, S. R., Baumgartner, J. C., & Radley, D. C. (2022, January 12). State trends in employer premiums and deductibles, 2010–2020. *Commonwealth Fund*. <https://www.commonwealthfund.org/publications/fund-reports/2022/jan/state-trends-employer-premiums-deductibles-2010-2020>

- Dang, D., Dearholt, S. L., Bissett, K., Ascenzi, J., & Whalen, M. (2022). *Johns Hopkins evidence-based practice for nurses and healthcare professionals model and Guidelines*. Sigma Theta Tau International.
- Fawkes, K., & Moore, J. (2019). Newly registered nurses' experiences of delivering patient education in an acute care setting: An exploratory study. *Journal of Research in Nursing, 24*(8), 556–567. <https://doi.org/10.1177/1744987119869770>
- Frees, S. K., Aning, J., Black, P., Struss, W., Bell, R., Chavez-Munoz, C., Gleave, M., & So, A. I. (2017). A prospective randomized pilot study evaluating an ERAS protocol versus a standard protocol for patients treated with radical cystectomy and urinary diversion for bladder cancer. *World Journal of Urology, 36*(2), 215–220. <https://doi.org/10.1007/s00345-017-2109-2>
- Garfinkle, R., Savage, P., Boutros, M., Landry, T., Reynier, P., Morin, N., Vasilevsky, C.-A., & Filion, K. B. (2019). Incidence and predictors of postoperative ileus after loop ileostomy closure: A systematic review and meta-analysis. *Surgical Endoscopy, 33*(8), 2430–2443. <https://doi.org/10.1007/s00464-019-06794-y>
- George, D., & Mallery, P. (2019). *IBM SPSS statistics 26 step by step: A simple guide and reference*. Routledge.
- Hammad, N., Ndlovu, N., Carson, L. M., Ramogola-Masire, D., Mallick, I., Berry, S., & Olapade-Olaopa, E. O. (2023). Competency-based workforce development and education in global oncology. *Current Oncology, 30*(2), 1760–1775. <https://doi.org/10.3390/curroncol30020136>

Hsu, Y.-C., & Szu, S.-Y. (2022). Effects of gum chewing on recovery from postoperative ileus:

A randomized clinical trial. *Journal of Nursing Research*, 30(5).

<https://doi.org/10.1097/jnr.0000000000000510>

Journal for Nurses in Professional Development. (n.d.-a). *Aspire convention program brochure*.

<https://brochure.com/anpd/anpd-aspire-convention-program-brochure/>

Journal for Nurses in Professional Development. (n.d.-b). *Online submission and review system*.

<https://edmgr.ovid.com/jnsd/accounts/ifaauth.htm>

Kalff, J. C., Wehner, S., & Litkouhi, B. (2021, June 30). *Postoperative ileus*. *UpToDate*.

[https://www.uptodate.com/contents/postoperative-](https://www.uptodate.com/contents/postoperative-ileus?search=ileus&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1)

[ileus?search=ileus&source=search_result&selectedTitle=1~150&usage_type=default&disp](https://www.uptodate.com/contents/postoperative-ileus?search=ileus&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1)

[lay_rank=1](https://www.uptodate.com/contents/postoperative-ileus?search=ileus&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1)

Khawaja, Z. H., Gendia, A., Adnan, N., & Ahmed, J. (2022). Prevention and management of postoperative ileus: A review of current practice. *Cureus*.

<https://doi.org/10.7759/cureus.22652>

Koch, K. E., Hahn, A., Hart, A., Kahl, A., Charlton, M., Kapadia, M. R., Hrabe, J. E., Cromwell, J. W., Hassan, I., & Gribovskaja-Rupp, I. (2021). Male sex, ostomy, infection, and intravenous fluids are associated with increased risk of postoperative ileus in elective colorectal surgery. *Surgery*, 170(5), 1325–1330

<https://doi.org/10.1016/j.surg.2021.05.035>

Louis, M., Johnston, S. A., Churilov, L., Ma, R., Christophi, C., & Weinberg, L. (2021).

Financial burden of postoperative complications following colonic resection. *Medicine*, 100(27). <https://doi.org/10.1097/md.00000000000026546>

- Migita, R., Yoshida, H., Rutman, L., & Woodward, G. A. (2018). Quality improvement methodologies. *Pediatric Clinics of North America*, 65(6), 1283–1296.
<https://doi.org/10.1016/j.pcl.2018.07.011>
- Mishra, P., Pandey, C. M., Singh, U., Keshri, A., & Sabaretnam, M. (2019). Selection of appropriate statistical methods for data analysis. *Annals of Cardiac Anaesthesia*, 22(3), 297. https://doi.org/10.4103/aca.aca_248_18
- Pajnkihar, M., Štiglic, G., & Vrbnjak, D. (2017). The concept of Watson's carative factors in nursing and their (dis)harmony with patient satisfaction. *PeerJ*, 5, e2940.
<https://doi.org/10.7717/peerj.2940>
- Peters, E. G., Pattamatta, M., Smeets, B. J., Brinkman, D. J., Evers, S. M., Jonge, W. J., Hiligsmann, M., & Luyer, M. D. (2020). The clinical and economical impact of postoperative ileus in patients undergoing colorectal surgery. *Neurogastroenterology & Motility*, 32(8). <https://doi.org/10.1111/nmo.13862>
- Peterson, S.J. and Bredow, T.S. (2013). *Middle range theories: Application to nursing research*. Lippincott Williams and Wilkins.
- Quiroga-Centeno, A. C., Jerez-Torra, K. A., Martin-Mojica, P. A., Castañeda-Alfonso, S. A., Castillo-Sánchez, M. E., Calvo-Corredor, O. F., & Gómez-Ochoa, S. A. (2020). Risk factors for prolonged postoperative ileus in colorectal surgery: A systematic review and meta-analysis. *World Journal of Surgery*, 44(5), 1612–1626.
<https://doi.org/10.1007/s00268-019-05366-4>
- Ravaghi, H., Alidoost, S., & Mannion, R. *et al.* (2020). Models and methods for determining the optimal number of beds in hospitals and regions: A systematic scoping review. *BMC Health Services Research*, 20, 186. <https://doi.org/10.1186/s12913-020-5023-z>

- Rodrigues Pessoa, R., Urkmez, A., Kukreja, N., & Baack Kukreja, J. (2020). Enhanced recovery after surgery review and urology applications in 2020. *BJUI Compass*, *1*(1), 5–14. <https://doi.org/10.1002/bco2.9>
- Routray, S. K., & Mohanty, S. (2022). Smart classroom-based innovative solution toward uninterrupted education. *International Journal of Virtual and Augmented Reality*, *6*(1), 1–14. <https://doi.org/10.4018/ijvar.306689>
- Rubin, D. S., Huisingh-Scheetz, M., Ferguson, M. K., Nagele, P., Peden, C. J., & Lauderdale, D. S. (2021). U.S. trends in elective and emergent major abdominal surgical procedures from 2002 to 2014 in older adults. *Journal of the American Geriatrics Society*, *69*(8), 2220–2230. <https://doi.org/10.1111/jgs.17189>
- Samuel, O. (2018). Cost effectiveness analysis of duration of nonoperative management for adhesive bowel obstruction in a developing country. *Malawi Medical Journal*, *30*(2), 90. <https://doi.org/10.4314/mmj.v30i2.7>
- Shen, Y., Hao, Q., Zhou, J., & Dong, B. (2017). The impact of frailty and sarcopenia on postoperative outcomes in older patients undergoing gastrectomy surgery: A systematic review and meta-analysis. *BMC Geriatrics*, *17*(1), 188. <https://doi.org/10.1186/s12877-017-0569-2>
- Sharma, A., Sharp, D. M., Walker, L. G., & Monson, J. R. (2008). Stress and burnout in colorectal and vascular surgical consultants working in the UK National Health Service. *Psycho-Oncology*, *17*(6), 570–576. <https://doi.org/10.1002/pon.1269>
- Sitzman, K. & Watson, J. (2014). *Caring science, mindful practice: Implementing Watson's human caring theory*. Springer.

- Sugawara, K., Kawaguchi, Y., Nomura, Y., Suka, Y., Kawasaki, K., Uemura, Y., Koike, D., Nagai, M., Furuya, T., & Tanaka, N. (2017). Perioperative factors predicting prolonged postoperative ileus after major abdominal surgery. *Journal of Gastrointestinal Surgery*, 22(3), 508–515. <https://doi.org/10.1007/s11605-017-3622-8>
- Tang, G., Huang, W., Tao, J., & Wei, Z. (2022). Prophylactic effects of probiotics or synbiotics on postoperative ileus after gastrointestinal cancer surgery: A meta-analysis of randomized controlled trials. *PLOS ONE*, 17(3).
<https://doi.org/10.1371/journal.pone.0264759>
- Tessier, L., Guilcher, S. J. T., Bai, Y. Q., Ng, R., & Wodchis, W. P. (2019). The impact of hospital harm on length of stay, costs of care and length of person-centred episodes of care: A retrospective cohort study. *Canadian Medical Association Journal*, 191(32).
<https://doi.org/10.1503/cmaj.181621>
- U.S. National Library of Medicine. (n.d.). *Medical encyclopedia*.
<https://medlineplus.gov/encyclopedia.html>
- Vaismoradi, M., Tella, S., A. Logan, P., Khakurel, J., & Vizcaya-Moreno, F. (2020). Nurses' adherence to patient safety principles: A systematic review. *International Journal of Environmental Research and Public Health*, 17(6), 2028.
<https://doi.org/10.3390/ijerph17062028>
- Watanabe, J., Miki, A., Kotani, K., & Sata, N. (2021). Effect of postoperative coffee consumption on postoperative ileus after abdominal surgery: An updated systematic review and meta-analysis (protocol) V1. *Current Oncology*.
<https://doi.org/10.17504/protocols.io.bymmpu46>

- Wei, H., & Watson, J. (2018). Healthcare interprofessional team members' perspectives on human caring: A directed content analysis study. *International Journal of Nursing Sciences*, 6(1), 17–23. <https://doi.org/10.1016/j.ijnss.2018.12.001>
- Wells, C. I., Milne, T. G., Seo, S. H., Chapman, S. J., Vather, R., Bissett, I. P., & O'Grady, G. (2021). Post-operative ileus: Definitions, mechanisms and controversies. *ANZ Journal of Surgery*, 92(1–2), 62–68. <https://doi.org/10.1111/ans.17297>
- Wu, Y., Brettle, A., Zhou, C., Ou, J., Wang, Y., & Wang, S. (2018). Do educational interventions aimed at nurses to support the implementation of evidence-based practice improve patient outcomes? A systematic review. *Nurse Education Today*, 70, 109–114. <https://doi.org/10.1016/j.nedt.2018.08.026>
- Wu, A. W., & Busch, I. M. (2019). Patient safety: A new basic science for professional education. *GMS Journal for Medical Education*, 36(2), Doc21. <https://doi.org/10.3205/zma001229>
- Younas, A., & Quennell, S. (2019). Usefulness of nursing theory-guided practice: An integrative review. *Scandinavian Journal of Caring Sciences*, 33(3), 540–555. <https://doi.org/10.1111/scs.12670>

Appendix A : Literature Matrix

First Author/Year	Purpose/ Problem/ Objective/ Aims	Study Design	Sample (Setting)	Data Collection Measures	Results	Strengths/ Limitations	Relationship to Project	Level of Evidence/ Quality Ranking
Freese et al., 2017	The study aimed to demonstrate the benefits of enhanced recovery after surgery protocols (ERAS) over standard protocols (SP) when preventing gastrointestinal complications after abdominal surgery.	Randomized controlled trial	This study was conducted using 27 postoperative patients who underwent radical cystectomy (RC) and urinary diversion in the hospital setting.	The data was collected before and after surgical procedures for patients with bladder cancer (BC). Face-to-face interviews by trained staff and patient-initiated diary, experience, and satisfaction questionnaires were utilized.	The implementation of ERAS significantly affects the length of stay for postoperative patients undergoing RC. Overall, patients had a 6.1-day reduction in hospital stay and achieved a faster bowel recovery process by shortening the first bowel movement and flatus production time.	Strengths of this study include strong and relevant inclusion criteria as well as the implementation of both objective and subjective data. Furthermore, data was collected consistently using face-to-face interviews and patient reporting systems. Limitations associated with this study include a small sample size as well as uneven distribution of patients in both groups due to consent withdrawal from three patients.	This article offers evidence to support the implementation of enhanced recovery after surgery protocols (ERAS) in the selected units. Education on such protocol offers nurses the opportunity to better understand related interventions thus reducing complication and prolonged hospital stay.	This randomized controlled trial article is a Level I offering high-quality evidence.
Garfinkle et al., 2019	This systematic review aimed to determine the incidence of postoperative ileus (POI) after loop ileostomy closure. Furthermore, the authors attempted to understand and identify risk factors associated with POI development.	Systematic review and meta-analysis	The article focused on studies conducted in the hospital setting for patients who underwent loop ileostomy closure and experienced or reported an incidence of POI. A total of 67 experimental or non-standard articles were selected after applying exclusion criteria.	Data collection was executed via literature search by two reviewers using a standardized data extraction form. The selected articles were evaluated using quality analysis tools. The reviewers systematically searched for literature referring to POI published in MEDLINE, PubMed, The Cochrane Central Register of Controlled Trials, etc.	Although more evidence and review are needed, it was determined that the 30-day cumulative incidence of POI was 8%. Potential factors associated with POI include hand-sewn small bowel anastomosis and longer surgery length.	Strengths of this systematic review included strong selection criteria and a higher level of evidence. The reviewers used a random-effects model to mitigate limitations. Limitations associated with this article included heterogeneity between the selected articles and the fact that a retrospective approach was observed in most of the selected studies.	This article offers a better understanding of POI by offering a higher level of evidence. Information such as potential risk factors, definitions, the severity of complications, and incidence can be obtained from the evidence presented.	This systematic review with meta-analysis of both randomized controlled trials and quasi-experimental studies is a Level I offering high-quality data.

Hsu & Szu, 2022, 2017	This study aimed to measure and contrast the effects of chewing gum on POI incidence and prevention.	Randomized controlled trial	The article followed 30 colorectal patients in the inpatient setting who underwent colon resection surgery.	Xylitol chewing gum was given to the patients (one piece every 15 minutes, three times daily) on day one postoperative. The authors followed the participants' overall functional status from enrollment to discharge using Karnofsky Scale. Primary end points included stool production and passing flatus. The researchers personally auscultated bowel sounds, and flatus was self-reported by the patients.	The study revealed that patients who had significantly less complications. Evidence also suggests that chewing gum may be associated with faster stool production and passing of flatus after colorectal surgery.	Strengths of this article included consistency with measuring strategies. The researchers personally observed the patients chew gum for 15 minutes before asking them to stop. Furthermore, sample criteria and selection process were carefully monitored.	This article offers critical evidence and a possible unit-driven intervention that has no overall negative effects. Interventions such as chewing gum are a crucial part of the teaching plan that does not increase cost and can prevent the development of POI.	This randomized controlled trial article is a Level I offering high-quality evidence with an adequate sample size.
Koch et al., 2021	The aim of this study was to investigate "whether acute kidney injury (AKI) was associated with intravenous fluid (IVF) restriction in the setting of an enhanced recovery protocol (ERP) with isovolemic bowel preparation and oral hydration before surgery" (Koch et al., 2021, p. 1326)	Retrospective Cohort Study	The sample included in this study was comprised of 464 patients aged 18 years or older, who had had an elective colorectal resection at a tertiary care academic medical center	The data used in this study was collected from the institutional database; only data recorded in the period January 2015 to March 2018 was included	The results from this research indicated that being male, receiving a high quantity of intravenous fluid after operation, having postoperative infections, and undergoing colostomy construction and ileostomy/ileorectal anastomosis increase a postoperative patient's risk of developing POI significantly (Koch et al., 2021)	The most significant limitations associated with this study are its retrospective design and using a sample population from a single institution. A notable strength is that it offers valuable information to healthcare professionals and patients regarding the risk of POI during an elective resection.	The value of this article is that it offers important information regarding the risk of POI during an elective resection, as well as factors that may increase a patient's stay at the hospital (Koch et al., 2021).	This study used a retrospective cohort study design, classifying it under Level III evidence

Peters et al., 2020,	The purpose of this study was to examine the incidence, and prevalence, of inflammatory processes in patients who experience colorectal surgery. These researchers also purposed to investigate the effect of POI on both short and long-term quality of life.	Randomized Control Trial	The sample included in this research was comprised of 265 patients; these patients, who had to be 18 years or older and have undergone elective segmental colorectal resection with primary anastomosis, were randomly assigned to either the intervention or control group (Peters et al., 2020).	Data on costs and quality of life was collected using self-reported questionnaires. Blood samples were also collected from the research respondents on the eve of the surgery, and 4, 24 and 48 hours after surgery (Peters et al., 2020).	The results of this study reveal that patients who have undergone colorectal surgery and developed POI have a higher level of inflammatory biomarkers, reduced quality of life, longer hospital stay and higher healthcare costs.	A major strength of this article is that the researchers collected data prospectively, as part of a randomized control trial. Moreover, the fact that analyses were conducted on the whole sample, as well as a select group which developed POI, means that the results of the study represent the general population who experience colorectal surgery.	This article offers vital, and novel, information regarding POI as a unique complication of colorectal surgery. Unlike other studies which investigate an amalgamation of postoperative complications, this study focuses on POI and its impacts on the quality of life and cost of healthcare.	This randomized controlled trial article is a Level I offering high-quality evidence.	
Quiroga-Centeno et al., 2020,	The purpose of this study was to assess available literature in order to determine the risk of prolonged postoperative ileus (PPOI) among patients who have undergone elective colorectal surgery.	Systematic review and meta-analysis	The sample included in this study was comprised of 42 studies derived from PubMed, EMBASE and Scielo databases. The 42 studies described 29,736 patients who experienced colorectal surgery in the period 1996-2017.	Data in this study was collected using a data extraction form. Three reviewers used the forms to collect information on several variables, for instance, the articles' study design, reference, country, sample, year of research, mean age of sample, definition of PPOI and gender distribution.	The results of this research, based on the GRADE Approach, revealed that the use of laparotomy increases a patient's risk of PPOI significantly during a colorectal operation.	The major strength of this article is that it offers valuable information on how healthcare professionals may identify patients who are at high risk of PPOI early.	The major limitations in this study were the use of a lack of a uniform definition of PPOI across the studies.	This article is related to the project because it offers crucial information regarding the comprehensive assessment of patients who have experienced colorectal surgery in order to identify their risk of PPOI and create patient-specific plans of intervention-before and after surgery.	This systematic review with meta-analysis of randomized controlled trials and retrospective cohort studies is a Level II offering good-quality evidence.
Sugawara et al., 2017	The purpose of this study was to invent a model that would allow	Randomized Control Trial	The sample included in the study was comprised of 841	Data was collected from the patients through the use of databases that offered information on	The results of this study revealed that colorectal surgery,	The greatest strength of this article is that it highlights a useful probability-	This article offers critical evidence and a possible nomogram	This randomized controlled trial article is	

	the stratification of the probability of prolonged postoperative ileus (PPOI) in patients going through abdominal surgery. The model was based on the evaluation of factors which are predictive of PPOI.		patients who had experienced major abdominal surgery in the period 2012-2013	the patients' characteristics, operative features, and postoperative outcomes. Eastern Cooperative Oncology Group (ECOG) Performance Status was used to examine the functional status of the patients. Before the patients underwent the operation, the American Society of Anesthesiologists (ASA) Physical Status system was used to classify them into six grades.	and an open surgical approach are all independent predictive factors for prolonged postoperative ileus. It was discovered that patients who have undergone open colorectal surgery and have a history of smoking were 19.6% more likely to develop PPOI than those without such histories.	classification model for predicting PPOI incidence in patients who undergo general surgery. Limitations associated with this article include the relatively small and retrospective nature of patients in PPOI group which may have weakened the analyses, and a lack of robust validation of the established monogram.	probability-classification model for predicting PPOI incidence in patients who undergo general surgery. It also highlights the impact of histories such as smoking and open colorectal surgery on the development of PPOI.	a Level I offering high-quality evidence with an adequate sample size.
Tang et al., 2022	This study was conducted in order to determine the effects that probiotics or synbiotics have on the timely postoperative recovery of gastrointestinal function among patients diagnosed with gastrointestinal cancer.	Systematic review and meta-analysis	The sample in this study was comprised of 21 studies that were selected from four databases, namely: Cochrane Library, EMBASE, PubMed, and Web of Science.	Data was collected by extracting information such as the authors, sample size, primary illnesses, type of surgery, study design, and et cetera, from each of the 21 studies.	The results of this study indicate that the recovery of gastrointestinal function after related cancer surgery may be improved by administering the patient with perioperative probiotics and synbiotics.	The major strengths of this article include the fact that only RCTs were included in the meta-analysis and that the researchers reduced bias by conducting a rigorous literature review. Notable limitations, however, are that some of the studies included in had very small sample sizes and that some outcome measures were also based on a small number of articles.	This article is the first meta-analysis to study the effects that probiotics/synbiotics have on a patient's recovery of gastrointestinal function after a gastrointestinal cancer surgery (Tang et al., 2022).	This systematic review with meta-analysis of randomized controlled trials is a Level I offering high-quality data.
Watanabe et al., 2021	The aim of this study was to investigate the effect that coffee consumption after gynecological, cesarean section, and abdominal surgeries such as colorectal surgery, have on the development of POI.	Systematic review and meta-analysis study	The sample included in this research was comprised of 27 studies derived from a search of five electronic databases namely: PubMed, Cochrane Library, EMBASE, ICTRP, and ClinicalTrials.gov.	Data in this article was collected by two independent reviewers who screened the studies, extracted data and used the Risk of Bias 2 instrument to evaluate the risk of bias (Watanabe et al., 2021). The reviewers also evaluated the quality of evidence in each study.	The results of this study revealed that the postoperative consumption of coffee reduces a patient's time to first defecation and POI after colorectal, abdominal, and gynecological surgeries.	A notable strength of this article is that only RCTs were included in the meta-analysis hence enhancing the quality of evidence. A notable weakness of this article is that the researchers did not examine the dose-response association between the consumption of coffee and the studied	This article offers valuable information regarding the effect of coffee consumption on reducing POI after colorectal and gynecological surgeries.	This systematic review with meta-analysis of both randomized controlled trials is a Level II offering good quality data.

							outcomes. The researchers also failed to clearly report the features of the coffee consumers. Lastly, this study has a limitation because its results may not be generalized to all populations.		
--	--	--	--	--	--	--	--	--	--

Appendix B: Email Communications

Initial Email

To: All nurses from the selected units

Subject: Quality Improvement Project Participation

Dear colleagues,

With great honor, we extend a humble invitation to participate in a qualitative improvement project aiming to STOP postoperative ileus, not peristalsis.

Postoperative ileus (POI) is an ever-growing problem affecting patients who undergo major abdominal surgery. Our goal is to provide the tools needed to identify, help treat, and prevent this deadly complication.

Please [CLICK HERE](#) or scan the QR code below to express your interest or pass by one of our information stations located at 9 and 10 north. Registration will be open until [date here].



For additional information, please call or text (305) 215-6680

Sincerely,

Freddy Pizart, MSN, APRN, FNP-BC

First Email Reminder

To: All nurses from the selected units

Subject: REMINDER - Quality Improvement Project Participation

Dear colleagues,

This is a friendly reminder to voice your interest and participate in a qualitative improvement project aiming to STOP postoperative ileus, not peristalsis.

Please [CLICK HERE](#) or scan the QR code below to express your interest or pass by one of our information stations located at 9 and 10 north. Registration will be open until [date here].



For additional information, please call or text (305) 215-6680

Sincerely,

Freddy Pizart, MSN, APRN, FNP-BC

Final Email Reminder

To: All nurses from the selected units

Subject: THERE IS STILL TIME! - Quality Improvement Project Participation

Dear colleagues,

This is a friendly reminder that this is the last week to voice your interest and participate in a qualitative improvement project aiming to STOP postoperative ileus, not peristalsis.

Please [CLICK HERE](#) or scan the QR code below to express your interest or pass by one of our information stations located at 9 and 10 north. Registration will be open until [date here].



For additional information, please call or text (305) 215-6680

Sincerely,

Freddy Pizart, MSN, APRN, FNP-BC

Appendix C: Registration Form

Thank you for your interest in the quality improvement project titled: Impact of Nursing Education on Postoperative Ileus Prevention in a Tertiary Care Facility.

There are two (2) parts for this electronic enrollment form (general information and consent), please carefully navigate through the questions and provide the best, honest answer. After you complete this process, a member from the research team will screen your responses and reach out with additional information.

For questions or concerns, please reach out to Freddy Pizart at fpiza003@fiu.edu.

Section One – Demographics and Screening

Please enter your full name.

Select your home unit.

- a) 9 North
- b) 10 North
- c) Other: _____

What is your gender?

- a) Male
- b) Female
- c) Transgender
- d) Prefer not to say

What is your age range?

- a) 18 – 24
- b) 25 – 30
- c) 31 – 40
- d) Over 40

Are you of Hispanic, Latino, or Spanish origin?

- a) Yes
- b) No
- c) Prefer not to say

How would you describe yourself? Please select all that apply.

- a) White
- b) Black or African American
- c) American Indian or Alaska Native
- d) Asian
- e) Native Hawaiian or Pacific Islander
- f) Other: _____

What is your highest level of **nursing** education?

- a) ASN/ADN
- b) BSN
- c) MSN
- d) DNP/PhD

Are you currently enrolled in any academic program?

- a) Yes
- b) No

Do you currently hold any professional certification? If yes, please specify.

- a) I do not have any professional certifications
- b) Yes: _____

How many years of experience as a **Registered Nurse** do you have?

- a) Less than 1 year
- b) 1 - 2 Years
- c) 3 - 5 Years
- d) Over 5 Years

What best describes your employment situation:

- a) Staff
- b) Contract/Temporal
- c) Per diem
- d) Other: _____

Are you a current or recently graduated nurse resident?

- a) Yes
- b) No

How long have you been in the institution?

- a) Less than 1 year
- b) 1 - 2 Years
- c) 3 - 5 Years
- d) 5 to 10 Years
- e) Over 10 Years

How long have you been in your current unit?

- a) Less than 1 year
- b) 1 - 2 Years
- c) 3 - 5 Years
- d) 5 to 10 Years
- e) Over 10 Years

How often do you care for postoperative **colorectal, urology, gynecology oncology, or surgical oncology** patients?

- a) Never care for those types of patients
- b) Rarely care for those types of patients
- c) Often care for those types of patients
- d) Almost every day

Appendix D: Informed Consent



ADULT CONSENT TO PARTICIPATE IN A RESEARCH STUDY

Impact of Nursing Education on Postoperative Ileus Prevention in a Tertiary Care Facility

SUMMARY INFORMATION

Things you should know about this study:

- **Purpose:** The purpose of the study is to enhance knowledge on postoperative ileus as well as develop confidence in identifying and treating this complication.
- **Procedures:** If you choose to participate, you will be asked to attend an educational session and complete a pre and post-assessment
- **Duration:** This project will not exceed 50 minutes of participation. Enrollment will take 10 to 20 minutes and the education intervention will take approximately 15-30 minutes to complete.
- **Risks:** There are minimal to no physiological, physical, social, legal, or economic risks associated with this research.
- **Benefits:** The main benefit to you from this research is to enhance your knowledge of postoperative ileus development and management which will impact the quality of care delivered in the selected specialty units.
- **Alternatives:** There are no known alternatives available to you other than not taking part in this study.
- **Participation:** Taking part in this research project is voluntary.

Please carefully read the entire document before agreeing to participate.

PURPOSE OF THE STUDY

The purpose of this study is to enhance acute care nurses' knowledge of postoperative ileus (POI) by implementing an educational plan. The ultimate goal is to reduce extended hospital stays thus reducing the overall cost of care for both the client and the institution.

NUMBER OF STUDY PARTICIPANTS

If you decide to be in this study, you will be one of 25 to 30 people in this research study.

DURATION OF THE STUDY

Your participation will involve 10 to 15 minutes of enrollment (including signing the consent) and attending one (1) 15 to 30 minutes long educational session that will take place during your scheduled shift. You will not be required to attend additional sessions or commute during your rest days. Total participation will not exceed a total of 50 minutes.

PROCEDURES

If you agree to be in the study, we will ask you to do the following things:

1. Attend an educational session
2. Complete a pre- and post-intervention knowledge assessment.
 - Online form will be completed before the education session
 - Mobile device will be provided for you to complete this step

RISKS AND/OR DISCOMFORTS

This project involves minimal to no physiological, physical, social, legal, or economic risks. Risk is the same as if participants were completing an in-service, questionnaire, or participating in other on-the-job training. However, if you become fatigued during any of the phases of this project, you can opt out.

BENEFITS

The study has the following possible benefits to you:

- Knowledge enhancement on postoperative ileus development and management interventions that can impact the quality of care delivered in the selected specialty units.

The study has the following possible benefits to society:

- Enhance patient safety by guiding healthcare providers in identifying, preventing, and treating postoperative ileus.

ALTERNATIVE

There are no known alternatives available to you other than not taking part in this study. Any significant new findings that may affect your willingness to continue participation developed during the course of the research and/or before you attend the educational session will be communicated to you via email.

CONFIDENTIALITY

The records of this study will be kept private and will be protected to the fullest extent provided by law. In any sort of report we might publish, we will not include any information that will make it possible to identify you. Research records will be stored securely, and only the researcher team will have access to the records. However, your records may be inspected by authorized University or other agents who will also keep the information confidential.

Information about your computer's internet address, also known as IP address, will be recorded during online form completion. Such forms include the registration form and the pre-/post-intervention knowledge assessment. This information will not be stored after the study has ended and it cannot be used to identify and/or capture additional personal information.

USE OF YOUR INFORMATION

- Your responses and the information gathered from them information as part of the research will not be used or distributed for future research studies even if no identifiers are collected.

COMPENSATION & COSTS

You will not receive payment or any other incentives for your participation. There are no costs to you for participating in this study.

RIGHT TO DECLINE OR WITHDRAW

Your participation in this study is voluntary. You are free to participate in the study or withdraw your consent at any time during the study. You will not lose any benefits if you decide not to participate or if you quit the study early. The investigator reserves the right to remove you without your consent at such time that he/she feels it is in the best interest.

RESEARCHER CONTACT INFORMATION

If you have any questions about the purpose, procedures, or any other issues relating to this research study you may contact Freddy Pizart at Florida International University, (305) 215-6680, fpiza003@fiu.edu.

IRB CONTACT INFORMATION

If you would like to talk with someone about your rights of being a subject in this research study or about ethical issues with this research study, you may contact the FIU Office of Research Integrity by phone at 305-348-2494 or by email at ori@fiu.edu.

PARTICIPANT AGREEMENT

I have read the information in this consent form and agree to participate in this study. I have had a chance to ask any questions I have about this study, and they have been answered for me. I understand that I will be given a copy of this form for my records.

Signature of Participant

Date

Printed Name of Participant

Signature of Person Obtaining Consent


Date

Appendix E: Site Approval Letter

**Office of Research Integrity
Research Compliance, MARC 414**

MEMORANDUM

To: Dr. Charles Buscemi
CC: Freddy Pizart
From: Maria Melendez-Vargas, MIBA, Coordinator
Date: April 26, 2023
Proposal Title: "Impact of Nursing Education on Postoperative Ileus Prevention in a Tertiary Care Facility: A Quality Improvement Project"
Approval # IRB-23-0141-AM01
Reference # 112821

A handwritten signature in black ink, appearing to be "W", is located to the right of the "From:" line.

The Florida International University Office of Research Integrity has approved the following modification(s):

- Dr. Buscemi will replace Dr. Gonzalez as principal investigator.

Special Conditions:

For further information, you may visit the FIU IRB website at <http://research.fiu.edu/irb>.

MMV/em