A Novel Educational Intervention: Improving Abdominal Pressure Strategies during Colonoscopy

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Abstract

Gastroenterology (endoscopy) procedures continue to increase in volume as innovative therapeutic endoscopy procedures are performed to meet the increasing demand for minimally invasive procedures. During endoscopy procedures, staff assists physicians with therapeutic techniques that require skill-specific training to ensure staff competency. Performing these therapeutic techniques often poses ergonomic challenges to staff related to patient positioning and repositioning, prolonged standing, leaning, and awkward body postures. The most common endoscopic procedure is screening, surveillance, and diagnostic colonoscopies. A typical therapeutic technique performed during a colonoscopy that is also an ergonomic challenge is manual abdominal pressure. Gastroenterologists frequently utilize abdominal pressure techniques to decrease colon movement and bowel looping to achieve a completed colonoscopy. Currently, there is a lack of standardization, education, and training on abdominal pressure strategies. Identifying, developing, and launching clinical staff training for endoscopy-specific therapeutic maneuvers is time-consuming and requires dedicated and educated clinicians. Without proper training, staff performing abdominal pressure techniques can cause injuries to patients and themselves with downstream adverse effects, including staff work culture and absenteeism, patient satisfaction, room utilization, and unit financial performance. The Doctorate of Nursing Practice project focused on developing an evidence-based interactive course to improve staff efficacy and confidence in the application of abdominal pressure strategies during colonoscopy procedures.

Keywords: abdominal pressure strategies, simulation training, endoscopy, patient safety, clinical staff competency assessment, safe patient handling

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Section I. Introduction

Background

Gastroenterology (endoscopy) procedures continue to increase in volume as innovative therapeutic endoscopy procedures are performed to meet the increasing demand for minimally invasive procedures (Ugalmugale & Swain, 2021). During endoscopy procedures, staff assists physicians with therapeutic techniques that require skill-specific training to ensure staff competency. Performing these therapeutic techniques often poses ergonomic challenges to staff related to patient positioning and repositioning, prolonged standing, leaning, and awkward body postures.

A common therapeutic maneuver performed during colonoscopy procedures is abdominal pressure. Without proper training, staff performing abdominal pressure techniques can cause injuries to patients and themselves with downstream adverse effects, including staff work culture and absenteeism, patient satisfaction, room utilization, and unit financial performance. Currently, there is a lack of standardization, education, and training on abdominal pressure strategies due to a lack of resources (Crockett et al., 2016). Identifying, developing, and launching clinical staff training for endoscopy-specific therapeutic maneuvers is time-consuming and requires dedicated and educated clinicians.

A constant challenge in healthcare is identifying methods to improve clinical staff training to ensure achievement of competency and clinical skills retention (Frank et al., 2020). In healthcare institutions, clinical staff orientation and annual competency assessment, including new skills and equipment training, are frequently performed in the patient care setting. In contrast, pre and post-licensure nursing programs incorporate simulation training into their

clinical course curriculums to integrate theory with practice in a safe learning environment (Berger et al., 2018; Kiernan, 2018).

Tenets in nursing practice, The Institute of Medicine's (IOM) Future of Nursing, and Benner's From Novice to Expert Theory both support closing the educational gap between academia and professional practice (Benner, 1982; Institute of Medicine [IOM], 2011). Healthcare systems need to follow the lead of educational institutions to improve clinical staff education and competency to promote patient safety, patient-centered care, quality improvement, and evidence-based practice at the bedside.

Evidence-based research supports simulation training in pre-licensure clinical courses as it improves the students learning experience, confidence, skills, and retention of learned skills (Luk et al., 2020). Simulation training in healthcare provides staff with practical experience in skill development and competency with expert feedback in a safe learning environment without the fear of patient harm (Leighton et al., 2015). Healthcare organizations and employers need to develop staff education and competency assessment specific to the staff's job description and role expectations and provide staff with the ability to practice these skills in a simulation learning environment.

The Institute of Medicine (IOM) published three pivotal documents to support safer clinical skills training methods: To Err Is Human: Building a Safer Health System (2000), Keeping Patients Safe: Transforming the Work Environment of Nurses (2004), and The Future of Nursing (2011). These publications challenged academic and healthcare institutions to improve clinical education through innovative technology and reduce practicing skills on patients, to promote a culture of safety. To comply with these directives, educational intuitions designed and integrated simulation-based training into the clinical curriculum (Frank et al., 2020;

Kiernan, 2018). Healthcare institutions have lagged in adopting these evidence-based practice initiatives due to a lack of resources, including access to simulation training centers.

Although simulation-training benefits are undeniable, healthcare systems have limited resources to offer simulation-based training to clinical staff (Frank et al., 2020). The Society for Simulation in Healthcare (SSH) (2021) supports a global community to improve education innovation. Since its inception in 2002, SSH has accredited over five hundred and fifty simulation-training facilities in hospitals and universities throughout the United States. There are currently six thousand one-hundred hospitals throughout the United States, equating to less than ten percent of simulation centers being hospital-based (American Hospital Association [AHA], 2020).

Without access to a simulation-learning center, training options for healthcare professionals are limited to practicing new skills and competency assessments through role-playing or during patient care. A majority of healthcare systems are aligned with academic institutions to provide their students with various patient care experiences (Kiernan, 2018). Without access to a simulation center, healthcare systems could consider restructuring their collaboration with academic institutions to be bidirectional. Developing an intraprofessional cross-collaboration of learning would provide healthcare students with direct patient care experience and access to simulation technology to healthcare professionals (Kiernan, 2018; Luk, 2020; Trotter et al., 2019).

Students pursuing healthcare-related degrees or certification cannot learn or master every procedure, surgery, or patient care skill before their program completion. Most clinical curriculums focus on core skills and patient safety based on the role's scope of practice. After completing an educational program, new graduate training becomes the responsibility of the

hiring healthcare organization. During orientation, healthcare professionals are trained on specialty-specific skills depending on their scope of practice, role, and specialty (Frank et al., 2020; Kiernan, 2018).

Nursing and physician leadership managing gastroenterology (endoscopy) procedural departments are challenged with developing and maintaining staff orientation-based and annual competencies. Gastroenterology (GI) procedures are highly technical. GI healthcare professionals manage patients in several phases of care during endoscopy procedures and perform procedure-specific skills, including administering moderate sedation medications, managing intricate endoscopic accessories and specimens, and performing supportive maneuvers like abdominal pressure (Davies et al., 2018). Training of these techniques during endoscopy procedures is a common practice. Learning advanced techniques during patient procedures does not support the IOM's directive to limit practicing on patients, improve the culture of safety, or utilize technology for staff education (IOM, 2000; IOM, 2004; IOM, 2011).

Providing simulation-based training is a challenge for GI nursing leaders, physicians, and educators due to the lack of access to a simulation center (Fu et al., 2019). Due to the complexity of endoscopic procedures, GI clinicians would benefit from developing an educational curriculum that integrates simulation-based training, hands-on education, and team collaboration with expert feedback. The development of standardized training of practical skills in a simulation laboratory would benefit GI staff, providers and patients, and the healthcare system. The Doctorate of Nursing Practice (DNP) project developed an evidence-based interactive course to improve efficacy and confidence in the application of abdominal pressure strategies during colonoscopy procedures in collaboration with the health system's ergonomics department and nursing school's Center for Nursing Discovery.

The DNP project partner organization is the gastroenterology division of a large academic-based healthcare system located in central North Carolina. This organization is known for providing world-class, innovative care, as highlighted by their achievement of the triannual accreditation by The Joint Commission and the American Nurses Association (ANA) Magnet designation status since 2014 (American Nurses Association [ANA], n.d.; The Joint Commission [JCAHO], 2020). The health system is a non-profit and for-profit entity comprised of a medical and nursing school, four hospitals, and physician-owned outpatient practices. Gastroenterology physicians perform endoscopy procedures at three hospital-based endoscopy departments and three ambulatory endoscopy clinics. The gastroenterology team consists of physicians, fellows, support staff, and advanced practice providers, including a Clinical Nurse Specialist.

The health system has a long-standing history of supporting community development and healthcare initiatives. Supporting healthcare needs throughout North Carolina, the project partner has collaborated and partnered with several hospitals to improve patient access and outcomes in rural communities. The project partner bases its mission, vision, and core value statements on the concept of caring. As an academic medical center, promoting evidence-based learning is a priority for trainees, providers, and healthcare professionals. To endorse the mission of *caring for their patients, staff, and loved ones,* the organization must balance promoting learning and maintaining clinician competency while ensuring patient and staff safety. Due to the expense and limited access, only medical trainees, residents, fellows, nursing students, and attending physicians of the project partner can access simulation-based training applications at the medical school, college of nursing Center for Nursing Discovery, and fellow's training center.

Organizational Needs Statement

As a healthcare innovator, clinical education at the project partner organization should also be innovative and evidence-based. Training complex clinical skills through the mentor-mentee premise are no longer acceptable (Davies et al., 2018; Kiernan, 2018). The level of training in endoscopy procedures requires interdisciplinary educational and interactive courses to promote staff competency. The development and launch of an innovative multi-media simulation educational course will standardize the educational support and competency training for endoscopy staff.

Endoscopy departments at the project partner organization collaborate with the nursing education department to provide staff with initial hospital-based patient care and electronic health record (EHR) training. At the project partner, staff competencies and clinical ladder progression are based on Benner's theory from Novice to Expert (1947). The staff achieves competency in the skills once all the required training modules and observations are met. Initial orientation-based competency assessment and training are completed through in-person and computerized modules before the unit-specific training transitions to an assigned unit preceptor.

During the orientation period, the staff frequently meet with their nurse manager and preceptor to assess their learning progress. Core and job-specific competencies are assigned to the staff based on their role and scope of practice. Current competencies include moderate sedation administration, patient assessment, safe patient handling, disinfection processes, endoscope management, specimen collection, EHR documentation, and endoscopic therapeutic maneuvers.

The most common GI endoscopic procedure is screening, surveillance, and diagnostic colonoscopies (Kothari et al., 2019). A typical therapeutic technique performed during a

colonoscopy is manual abdominal pressure. Manual abdominal pressure is a technique of specific hand positioning by GI clinicians on a patient's abdomen during a colonoscopy (Prechel et al., 2015). Physicians request abdominal pressure during technically difficult colonoscopies to decrease colonic movement and loop formation, which assists in colonoscope advancement. Currently, endoscopy staff orientation and annual competencies at the project partner do not include manual abdominal pressure techniques or strategies. Abdominal pressure training at the project partner varies from a preceptor or physician training, verbal guidance, training from industry representatives, and no training.

The lack of training in abdominal pressure techniques is not unique to this organization. The training of endoscopy providers and clinicians in abdominal pressure techniques and strategies is inconsistent due to insufficient training resources (Crockett et al., 2016). There is no evidence of a published formal educational curriculum, training guidelines, or competency validation tools for abdominal pressure strategies available through GI or nursing societies or healthcare educational companies.

Perceived as inconsequential, abdominal pressure techniques, when performed incorrectly, can result in injuries to patients, staff, providers and can damage endoscopic equipment (Crockett et al., 2021). Improper strategies include excessive manual force, duration, and improper hand positioning. Recently published literature highlights the severe consequences of improper abdominal pressure, directly associating these techniques to patient injury and staff pain (Crocket et al., 2021; Shacket et al., 2021).

Staff injuries result from awkward body posture, excessive force, and prolonged manual pressure exerted on a patient's abdomen. This force can range from 29 to 112 pounds of pressure for over three minutes. The resulting patient injuries include skin tears, bruising, vague

abdominal pain, splenic injury, and hematoma development (Crockett et al., 2021; Kothari et al., 2019; Prechel & Hucke, 2009; Shacket et al., 2021). Published data describes that splenic injuries resulting from abdominal pressure techniques occur in 4.5 per 10,000 colonoscopies (Kothari et al., 2019). There is limited data regarding direct patient and staff injury due to abdominal pressure at the project partner organization. The lack of data may be due to numerous variables when patients seek care after colonoscopy and the protected health information of patients and staff.

Practice standards and benchmarking influence and promote evidence-based practice changes to promote safety in healthcare. The American Society for Gastrointestinal Endoscopy (ASGE) and the American College of Gastroenterology (ACG) Task Force on Quality in Endoscopy and the US Multi-Society Task Force publish specific colorectal cancer practice standards and physician benchmarks to promote excellence in GI care (Gupta et al., 2020; Lieberman et al., 2012). The project partner's gastroenterology division follows these standards to develop practice-specific guidelines and physician benchmarks as credentialing criteria ([project site] personal communication, July 14, 2020). Quality indicators for colonoscopy include adenoma detection rate, bowel preparation quality, polyp resection, patient follow-up management, and cecal intubation rates. Quality indicators ensure the delivery of high-quality colonoscopy, improve physicians' practice, and promote patient safety (Gupta et al., 2020; Lieberman et al., 2012).

High-quality colonoscopies decrease colon cancer morbidity and mortality rates and improve GI disease detection and management (Gupta et al., 2020). The project partner’s GI division collects and reports each physician’s quality measure indicators monthly. The 2021

fiscal year GI physician benchmarks for colonoscopy at the project partner organization are outlined in Appendix A ([project site] personal communication, July 14, 2020).

Many variables contribute to the achievement of a high-quality colonoscopy. Physician and staff training, education, and team communication and collaboration are the most influential variables that improve patient care and increase the rate of high-quality colonoscopies (Fu et al., 2019). Clinicians who are proactive in managing abdominal pressure strategies can assist the endoscopist and directly improve cecal intubation rates and decrease incomplete procedures (Prechel et al., 2015).

Improving the rates of high-quality colonoscopies impacts the rates of colon cancer detection (Gupta et al., 2020). Colon cancer rates in the United States continue to decrease due to the promotion and education of colonoscopy and stool testing as effective screening tools to prevent and detect colon cancer (American Cancer Society [ACS], 2021). The American Cancer Society (2021) estimates that in the United States, 104,270 new colon cancer cases and 43,230 new colorectal cancer cases will be diagnosed this year. Colon cancer related diagnoses and deaths have decreased by over fifty–five percent over the past three decades; however, colon cancer is still the second leading cause of cancer death in Americans. To continue the downward trajectory of colon cancer rates, healthcare societies and systems, providers, and clinical staff must support all aspects of quality improvement initiatives related to colonoscopy procedures (Fu et al., 2019).

The Task Force on Quality in Endoscopy, The US Multi-Society Task Force, and the project partner's colonoscopy quality indicators align with the Institute for Healthcare Improvement (IHI) Triple Aim and Healthy People 2020 initiatives. The IHI Triple Aim focuses on improving population health and the patient experience while decreasing per capita cost (IHI,

2020). High-quality screening and surveillance colonoscopy procedures decrease colon cancer morbidity and mortality rates and support the Healthy People 2020 initiatives by improving preventative healthcare services (US Department of Health and Human Services [USDHHS], 2020). North Carolina healthcare systems that perform high-quality colonoscopy procedures support the Healthy North Carolina 2020 initiative - Health Indicator 21, increasing life expectancy from an average of 77.6 to 82 years of age (North Carolina Department of Health and Human Services [NCDHHS], 2020).

Problem Statement

Competency-based training is integral to close the gap between a student to a healthcare professional (IOM, 2004). Healthcare professionals who select the specialty of GI endoscopy are expected to competently and safely support patients and physicians during procedures. Currently, there is a lack of standardization, education, and training resources on abdominal pressure strategies. Without proper training, staff performing abdominal pressure techniques can cause injuries to patients and themselves with downstream adverse effects, including staff work culture and absenteeism, patient satisfaction, room utilization, and unit financial performance. The Doctorate of Nursing Practice project developed an evidence-based interactive course to improve efficacy and confidence in the application of abdominal pressure strategies during colonoscopy. The project outcomes focused on improving staff knowledge and confidence in abdominal pressure strategies while improving patients' procedure tolerance.

Purpose Statement

Abdominal pressure training at the project partner organization is neither structured nor evidence-based. There is a lack of training resources to support an educational initiative in improving abdominal pressure strategies. The DNP project included developing and

implementing a multi-media, simulation-based abdominal pressure educational course in collaboration with the healthcare system's ergonomics department and college of nursing simulation center faculty. This project aligns with the healthcare system's *Commit to Zero* initiative and the GI Division's colonoscopy quality benchmarks.

Section II. Evidence

Literature Review

There was limited published literature, research, guidelines, position statements, and resources on staff training, education, ergonomic considerations, and injuries related to abdominal pressure strategies. The majority of information related to abdominal pressure and ergonomic considerations for endoscopy staff focused on proper hand techniques and the use of supportive devices, including abdominal compression devices, abdominal binders, and supportive pillows. The last publication of evidence-based abdominal pressure techniques developed by an endoscopy technician was over five years ago. Conversely, there is substantial published evidence and data related to ergonomic challenges for gastroenterologists.

The initial search process for supportive literature included current practice guidelines on quality colonoscopy, physician benchmarks for colonoscopy, evidence-based abdominal pressure techniques, and the United States and North Carolina initiatives on colorectal cancer prevention. Subject-specific literature searches included change process and nursing theories, simulation training, clinical competency, clinical education, interdisciplinary education, safe patient handling, and staff endoscopy ergonomics. Steps in the literature search process included utilizing a literature search log to develop and document medical subject headings (MeSH) through PubMed and key search terms for the Cumulative Index to Nursing and Allied Health Literature (CINAHL) database.

The initial subject-specific search yielded four hundred and twenty-two articles. The project lead utilized the inclusion and exclusion criteria for search terms which resulted in forty-one articles. The project lead then reviewed each article’s abstract for relevance. The final reference list included twenty-five articles, six referenced government websites, three executive

summaries from the Institute of Medicine, and one evidence-based simulation training survey tool. As the project concluded, two relevant articles were published, a case study and a randomized control study, which were included as supporting evidence.

PubMed database literature search terms inclusion criteria included:

- Colonoscopy and abdominal pressure
- Quality colonoscopy measures
- Abdominal pressure device and cecal intubation
- Abdominal pressure device and difficult colonoscopy
- Abdominal Compression Device
- Abdominal pressure techniques and colonoscopy
- Simulation training and endoscopy assistants
- Simulation training and nurses and confidence
- Clinical simulation and nursing education and self-efficacy
- Simulation-based instruction and clinical competency, and interprofessional
- Abdominal pressure hand techniques
- GI, gastrointestinal, endoscopy, endoscopy, gastroenterology
- Simulation training and simulation training for continuing education
- Quality Colonoscopy Measures, guidelines, benchmarks
- Colon cancer statistics, United States

PubMed database literature search terms exclusion criteria included:

- Duplication of articles
- Articles related to colon surgery, surgical procedures, or diagnosis related to abdominal pressure as a symptom

- Articles related to bowel preparation quality, colon cancer screening options, and methods to improve colon cancer screening rates
- Articles related to airway intubation
- Articles related to undergraduate nursing education

CINAHL database search terms included:

- (MH “Simulations”) OR (MH “Patient Simulation”)
- (MH “Hand Off (Patient Safety”)
- (MH “Clinical Competence”)
- (MH "Education, Competency-Based") OR (MH "Education, Clinical") OR (MH "Learning Environment") OR (MH "Learning Environment, Clinical") OR (MH "Nursing") OR (MH "Adult Education")

The referenced articles and research studies were reviewed and assigned a level of evidence based on Melnyk and Fineout-Overholt's (2019) Levels of Evidence. Referenced literature included Level I, II, II-2, III, and IV with one systematic review (Appendix B).

For both PubMed and CINHL databases, the search criteria included:

- Research text availability: full text
- Article type: a meta-analysis, randomized control trial, reviews, and systematic review
- Publication date: five years or less
- Language: English
- Age: adult 18 years plus
- Species: human

Current State of Knowledge

Many GI nursing leaders and educators in healthcare institutions have limited resources to train staff on role-specific skills in a simulation training center. Unfortunately, there is also a lack of reproducible evidence-based endoscopy education, training materials, and competency tools available to support the development of a skill-specific competency. Due to the lack of resources, endoscopy staff are frequently taught complex therapeutic techniques, like abdominal pressure, through the mentor-mentee process during patient procedures. The lack of resources widens the educational gap between students and healthcare professionals and negatively impacts the ability to provide high-quality patient care (Benner, 1982).

Current Approaches to Solving Population Problem(s)

There is growing evidence to support training endoscopy personnel in simulation training centers with dedicated educators (Yu & Roh, 2018). Endoscopy simulation allows the learners to perform the practical application of therapeutic maneuvers at their own pace (Davies et al., 2018). Literature describing GI competency-based education and simulation courses utilize the Society for Gastrointestinal Nurses and Associates (SGNA) Core Curriculum textbook to ensure the learners received consistent, evidence-based knowledge (American Operating Room Nurses [AORN], 2020). Providing learners with both classroom and simulation practical application of endoscopy skills support adult learners' needs and removes the patient, time, and preceptor variables from training (AORN, 2020; Davies et al., 2018).

As endoscopy procedures increase in complexity, the project partner's GI physician leadership has identified restructuring the staff competency training as a priority. The restructuring focuses on identifying how to train endoscopy staff outside of the procedure room by clinical experts and educators. The GI physicians have voiced their concern that they do not

feel supported in managing their procedure volume when working with novice staff. Fu et al. (2019) noted that colonoscopies assisted by inexperienced support staff increase the length of the procedure and the number of patient position changes during technically difficult colonoscopies. Novice staff cannot effectively assist with technically challenging colonoscopies due to their lack of training, skills, and confidence.

Staff ineffective techniques are attributed to the lack of training and confidence in the required skill (Crockett et al., 2016). Therefore the course was specifically designed for adult learners with various teaching strategies to promote active and engaged learners (Cunningham et al., 2017/2018). The project team developed the course objectives and educational content to include GI anatomy, ergonomics, safe patient handling, patient assessment, team communication, abdominal compression device inclusion and exclusion criteria, and manual abdominal pressure strategies. Course faculty presented the content through lectures, videos, group discussions, and simulation training with case studies. The course content aligns with the project partner's organizational *Safe Patient Handling and Zero Harm* quality and safety initiatives.

Evidence to Support the Intervention

Endoscopy skills are complex; mastery of these skills requires both didactic education and practical application. Abdominal pressure techniques are both a concept and a learned skill. Providing healthcare professionals with a course that supports various teaching styles to support the adult learner is critical in competency-based education (Davies et al., 2018). Combining classroom didactic and simulation center experience to practice these skills provides a safe learning experience, where learners can practice without the fear of patient harm (Berger, 2018;

Deutsch et al., 2016). Simulation-based education is a best practice for healthcare professionals supporting lifelong learners, critical thinking, confidence, and retention of learned skills.

Evidence-Based Practice Framework

Change in healthcare is challenging but crucial in maintaining a competitive edge in a demanding industry (Hussain et al., 2018). Changes considered and implemented in healthcare need to incorporate the Institute for Healthcare Improvement (IHI) Triple Aim (2020) initiatives to improve population health and the patient experience while decreasing per capita cost. Healthcare professionals and providers are overwhelmed and fatigued with the rapid rate and number of changes from improving patient care processes, learning and utilizing electronic health record systems, and expanding clinician's role expectations in the current healthcare environment (Camilleri et al., 2019). Healthcare innovators who manage change must be well versed in the importance of engaging stakeholders in the change and understand that identifying all aspects of change management can be challenging and time-consuming. However, without a well-developed plan, change is an expensive lesson learned.

As a psychologist, Dr. Kurt Lewin (1947) examined the process of change, group dynamics, leadership styles, and conflict resolution through his research in field theories. Lewin's Model of Change outlines three stages in the change process: unfreezing, moving, and freezing or refreezing (Burnes & Bargal, 2017). Lewin's theory (1947) outlines how change affects people through the stages in field forces: driving forces, refraining forces, and equilibrium.

The first stage of Lewin's Change Theory, unfreezing, is a critical step in the change process. During unfreezing, stakeholders need to learn to reject previously learned skills, knowledge, and beliefs (Burnes & Bargal, 2017). Those directly affected by the change may

experience anger and need time to process and accept the proposed changes. Developing peers as stakeholders or project champions helps support the change through transparent communication and education, which improves acceptance (Hussain et al., 2018). During the unfreezing stage, project leads can conduct focus groups and interviews to collect valuable insight into the stakeholders' ideas and concerns, as this provides pathways to acceptance.

The project lead also involved the GI leadership in all communications related to the project's development, launch, and results. Gaining leadership support was an essential step in the success of this practice change. Additionally, the project lead shared the course objectives and outline with the project site administrator, nurse manager, and medical directors to engage leadership in the change process. The project lead worked one-on-one with the site's nurse managers to discuss the project and develop staff training schedules. Transparent communication helps early adopters in the change process begin the stage of unfreezing (Lewin, 1947).

During the second stage, moving, the practice change will be set into action (Burnes & Bargal, 2017). The project team launched the course as a pilot program at the project partner's two ambulatory endoscopy clinics. Launching a change as a pilot program allows for adjustments to the project to ensure continued success.

As the staff completed both the educational course and simulation training, they transitioned into the moving phase. Throughout the course, the educational concepts presented and practiced provided the staff with evidence-based education and practical skills that supported their practice change. The staff maintained engagement in the course as they could relate to the content as it directly affected them and their career. Group discussions also provided peer support as they shared their negative experiences in performing abdominal pressure techniques.

The freezing stage, referred to as refreezing, is the final step in Lewin's Model of Change. Staff and providers transition into the freezing stage when they experience the positive results of the newly learned skills. Freezing is complete when the team accepts and integrates the change into their workflow and patient care practices. The project lead supported this stage through procedure observations completed over twelve weeks at both endoscopy sites. The freezing stage will conclude when the changes in abdominal pressure techniques, team collaboration, and patient assessment are accepted standards across the healthcare system.

In addition to utilizing Lewin's Change Model, the project lead identified a quality improvement framework to support the development of the DNP project. Utilizing a validated project framework was essential to ensure the project team completed the critical steps in change management. The Plan-Do-Study-Act (PDSA) model, developed by Associates in Process Improvement, provided a step-by-step approach to developing a change, enacting the change, reviewing the effects, and revising the change based on data and stakeholder feedback (IHI, 2021). The project lead selected the PDSA model as it provided a logical process to identify and implement action-oriented change related to a healthcare improvement initiative. The PDSA framework allowed the project team to quickly develop and test the quality improvement initiative as the educational intervention was curated using several PDSA cycles.

Ethical Consideration & Protection of Human Subjects

As the DNP project focused on improving safety, it was equally important that the project lead ensured the safety and privacy of the staff and patient populations involved. The university and project partner organization outlined the required processes and training for quality improvement and research projects. Before submitting this DNP project to the healthcare systems' Institutional Review Board (IRB) Committee, the project lead completed all required

training. The project lead completed the health system's Collaborative Institutional Training Initiative (CITI) modules and system training courses before completing the IRB project application. Completing the educational modules provided direction in the data collection process, participant protection, and ethical considerations for this project.

Before submitting the project application to the project partner's IRB Committee, both the project site's Director of Nursing Research and the university's faculty advisor reviewed the completed IRB application and supporting documentation. The Director of Nursing Research submitted the IRB application packet to the project partner's IRB Committee on behalf of the project lead. The project site's IRB Committee approved the DNP project as an Exempt 2 status (Appendix C). The Exempt 2 status required the project lead to submit the project partner's IRB approval letter application packet and Quality Program Evaluation Self-Certification Tool to the University's IRB Committee for a limited final review. The universities' IRB chair approved the proposed project as an exempt status 2C (Appendix D).

This project's target groups were the endoscopy clinical staff and patients scheduled for a colonoscopy procedure with nurse administered moderate sedation at the two identified pilot sites. There were no inequalities to address in either target population. There was no potential harm or risk to the target populations. The patient risks and benefits of screening, surveillance, or diagnostic colonoscopy were unaffected by the data collection process or practice change. Simulation training was completed utilizing a low-fidelity training manikin, and training was not performed on the staff or patients.

All endoscopy staff who manage patient care during an admission for a colonoscopy procedure were invited to attend the educational and simulation course on a volunteer basis. Endoscopy staff invited included licensed practical and registered nurses and non-licensed

technicians. The training was not mandatory, and the staff could decline the training invitation. The project lead collected staff data through four surveys administered through the project partner's Qualtrics® application and sent to the staff via their work email address. The staff completed all surveys using an anonymous and unique identifier to ensure anonymity. The recommended identifier was the first three letters of their favorite color, their birthday (day, not month or year), and the first three letters of the city they were born. The descriptive data collected from the questionnaire and survey was disseminated as aggregate findings. Staff data was not shared with the project partner's physician or nursing leadership, nor was it considered part of the staff's performance review.

The patient procedure data was captured through a retrospective chart review. The project lead collected data on one-hundred charts of patients who had a colonoscopy scheduled with nurse-administered moderate sedation at the pilot sites one month before the course began and two months after the course concluded. Collected data did not include protected health information (PHI). The patient's electronic health record was accessed once at the time of data collection. The project lead collected patient data from the pre-procedure assessment, physician procedure report, nurse documented procedure log, and vital signs flowsheet.

Section III. Project Design

Project Site and Population

The two pilot sites were selected based on the volume of performed colonoscopy procedures with nurse administered moderate sedation. The GI divisional physicians are the only providers who perform procedures at both sites. The patient population for this project included all patients scheduled for a colonoscopy procedure performed under moderate sedation. Patients scheduled at these locations must meet the ambulatory endoscopy guidelines of medical and sedation history, age, and body mass index. Patients excluded from the data collection included those having multiple procedures, anesthesia-provided sedation, or no sedation.

The abdominal pressure course and simulation training sessions were scheduled on various dates at three different locations. The project team presented the classroom portion of the course in a conference room with audio-video projection capabilities. The simulation training was performed at both pilot sites' endoscopy procedure units in a closed procedure room. The GI leadership supported and paid the staff their hourly rate to attend both the classroom and simulation training sessions. The project team members were also paid to attend all project meetings and practice sessions.

Due to the support of the project partner's GI Division Clinical Chief, Medical Directors, and nursing leadership, the only minor project barrier was related to the COVID-19 pandemic. These barriers included conference room availability, class size restrictions, and staffing restraints. The project required a significant amount of time to coordinate staff schedules, classroom and simulation training, team meetings, and rehearsals, including the nursing school's simulation manikin's availability due to these restrictions.

Description of the Setting

There are many variations in the patient population, sedation type, and procedures performed at the hospital-based versus ambulatory outpatient endoscopy centers. Therefore, the project team selected two outpatient centers as the project pilot sites due to the site's patient population and colonoscopy procedure volume. The two sites are for-profit ambulatory endoscopy centers owned and managed by the project partner. The pilot sites are free-standing endoscopy centers located in a multi-specialty medical building in the same city in North Carolina. Each center performs an average of ten endoscopy procedures per room per day. Procedures performed at both centers include screening, surveillance, and diagnostic colonoscopy, enteroscopy, esophagogastroduodenoscopy (EGD), and flexible sigmoidoscopy. The majority of procedures performed at both sites are colonoscopies.

The first location, identified as endoscopy center A, has four endoscopy procedure rooms with separate pre and post-admission areas. Endoscopy center A performs procedures with monitored anesthesia care provided by an anesthesia care provider one day a week and moderate sedation administered by trained endoscopy registered nurses four days a week. This site has a state-issued certificate of need to provide procedural services to Medicare, commercial, private, and self-pay patients. The leadership structure for site A includes a physician - medical director, administrator, and nurse manager. Endoscopy team members include GI divisional physicians, endoscopy registered nurses, licensed practical nurses, non-licensed technicians, and clerical staff.

The second location, identified as endoscopy center B, has two endoscopy procedure rooms with combined pre and post-admission areas. Endoscopy center B performs all endoscopy procedures with moderate sedation administered by trained endoscopy registered nurses five

days a week. Center B accepts commercial, private, and self-pay patients only. Medicare patients are not scheduled at endoscopy center B as this site does not have a state-issued certificate of need. Due to this site's insurance limitation, the majority of the endoscopy patients are less than 65 years of age. The leadership structure for site B includes a physician-medical director, administrator, and nurse manager. Endoscopy team members include GI divisional physicians, endoscopy registered nurses, licensed practical nurses, technicians, and clerical staff.

Description of the Population

The two populations included in the data collection for this project were the procedure patients and the pilot site staff. The learners were the endoscopy staff who care for patients in the pre and intra-procedure phases of care. The endoscopy staff invited to the training included endoscopy registered nurses, licensed practical nurses, and non-licensed technicians. The staff's endoscopy experience ranged from novice to expert, and their level of education ranged from new graduate to 30-year veteran. There was thirty staff invited to participate in the educational classroom and simulation training sessions. The patients included in the data collection process were scheduled for a screening, surveillance, or diagnostic colonoscopy procedure performed by a GI divisional provider with nurse-administered moderate sedation at endoscopy center A or B.

Project Team

Selecting effective team members is critical to the team's success in developing and launching a project that will sustain a practice change. After the DNP proposed project was accepted, the project lead outlined the clinical roles most affected by the proposed practice change. The project lead collaborated with the site champion to identify team roles and then discussed the project with endoscopy nurse managers to identify prospective team members.

Prospective team members needed to believe in the practice change to be influential stakeholders and support their peers and physicians through the change process. The project lead scheduled individual meetings with identified staff who met the criteria to discuss the project, timeline, expectations, and time commitment. After several weeks of communication, the project lead identified and invited team members who represented the stakeholders, was dedicated to the practice change and accepted the project commitment.

The project team consisted of the project lead, university faculty advisor, GI physician (site champion), an endoscopy nurse and technician, a certified professional ergonomist (CPE), two simulation faculty, and an industry partner. The project lead was the Clinical Nurse Specialist (CNS), who worked for the project partner's GI Division. All team members, except the industry partner, worked for the same health system. The endoscopy nurse and technician worked at different endoscopy sites, and the CPE supports the hospital-based endoscopy centers. The industry partner developed the only abdominal compression device marketed for colonoscopy procedures.

The expectations of each team member varied based on their role. The project lead scheduled and facilitated all team meetings, developed meeting agendas, completed meeting notes, distributed the course materials, and managed all project communication. Team members attended biweekly project development meetings, reviewed and developed pre and post-course surveys, and collaborated on the classroom and simulation training content and presentations. The project lead, CPE, and industry partner developed the educational presentations and simulation scenarios.

The project site champion is a gastroenterologist for the project partner's GI Division. His role was to advise and mentor the project lead and team members and review and appraise

the classroom and simulation content utilizing the PSDA framework. The project site champion attended all team meetings and met with the project lead 1:1 biweekly to discuss the project's progress and structure, review the steps in the PDSA cycles, and review and evaluate the required DNP project forms and time logs. The university's faculty advisor was also an integral project team member. The faculty advisor supported the project lead through the project partner's and university's IRB process and clarified project intent, structure, data collection, outcomes, poster, presentation, and progress over four semesters.

Project Goals and Outcome Measures

Identifying project goals and outcomes measures are essential to determine a DNP project's clinical significance (American Association of Colleges of Nursing [AACN], 2021). The project's primary goal was to develop an educational intervention to improve abdominal pressure strategies during colonoscopies, demonstrate these strategies to stakeholders, and integrate the strategies into practice. The project's process measures were to decrease cecal intubation time and dose of administered procedural sedation medication. The outcome measures were to improve the patient's tolerance and the staff's knowledge, skills, and confidence in abdominal pressure strategies. The project's balance measure was to decrease the total endoscopy procedure time.

Description of the Methods and Measurement

The project lead invited endoscopy staff from both pilot sites to attend the course on a volunteer basis via email (Appendix E). Attendance of the educational course was encouraged but not mandatory. Once the staff registered for the course, the project lead emailed the learners the course information and a hyperlink to the pre-course demographic characteristic and knowledge base survey. Immediately after completing the simulation training session, the staff

received a QR code to complete the Modified Simulation Effectiveness Tool (SET-M) via their smartphones or work computers (Appendix F). After completing both the classroom and simulation training, the project lead emailed the learners the post-course knowledge base survey via their work email.

The Modified Simulation Effectiveness Tool is a validated and reliable tool to measure simulation effectiveness in clinical competency training (Leighton et al., 2015). The tool measures attendees' perceived learning through simulation training on a three-point scale (Shin et al., 2020). The SET-M tool captures learner data from the responses from twenty-five questions related to their experience with pre-briefing, learning, confidence, and debriefing (Leighton et al., 2015). Dr. Kim Leighton granted the project lead permission to utilize the SET-M survey for this DNP project (Appendix G).

The project lead collected procedure data through retrospective chart audits utilizing the project's data collection tool (Appendix H). The data included the patient's gender, age, pertinent abdominal surgical history, prescribed medications, cecal intubation time, the Richmond Agitation Sedation Score (RASS), pain level, the amount and type of moderate sedation medication administered for the colonoscopy, procedure tolerance, and endoscopists assigned identifier. Trends identified in the pre and post-course data determined if the staff's improved knowledge and confidence in abdominal pressure techniques affected the project's process, outcomes, and balance measures.

Discussion of the Data Collection Process

For this DNP project, the project lead collected the data from the patient and learner population through various methods. The project lead collected the patient data utilizing the project partner's virtual private network gateway (VPN). The project lead determined the data

collection points to support the project outcomes and discussed the data plan with both the site champion and faculty advisor. Although the project lead identified twenty-nine data points on the data collection tool, each provided insight into the potential implications of supporting the practice change. The project lead utilized a monthly data report provided by the project partner's performance service team and updated the file to include the additional data points outlined on the project data collection tool. The project lead updated the excel file adding the procedure data utilizing the project partner's electronic health record application. The project lead reviewed each patient chart to collect the additional data from the nursing documentation, including the pre-procedure assessment, intra-procedure narration log, flowsheets, and physician's procedure report.

At the conclusion of the last simulation training session, the project lead emailed each learner to acknowledge and thank them for their participation in the project course with a hyperlink to the post-course knowledge survey. The learners had three weeks to complete the survey. The project lead then downloaded the pre and post-course learner responses from the survey application into an excel file for review and dissemination at the end of the course.

Implementation Plan

After months of planning, content development, review, revisions, and rehearsals, the project team implemented the abdominal pressure classroom and simulation training course. The project lead coordinated the classroom and simulation course dates with the pilot sites' nurse managers to ensure staff attendance would not impact patient care. The project lead then emailed all staff to select their preferred training dates, times, and locations.

The project lead organized and scheduled eight classroom sessions at an off-site conference center owned by the project partner. The class size was limited to four presenters and

six learners to accommodate social distancing. The project lead facilitated the classroom sessions, and the project lead, CPE, and industry partner presented educational content based on the course outline. Presentations were live and recorded and included PowerPoint slides, videos, product demonstrations, and group discussions with open-ended questions.

At the end of each class session, the project lead provided time for learners to discuss the course and provide feedback for improvement. Then the project team met to review the learner's comments and discuss their perceptions of the class and suggestions for change. The project lead utilized the team's suggestions to update the course content and presentation style to improve learner engagement, relevant content, and flow. PSDA cycle one included removing duplicate content, which allowed more time for learner discussion utilizing open-ended questions embedded throughout the presentation. The format change significantly impacted the class dynamics, providing the learners time to share their personal experiences and challenges with abdominal pressure and sustained injuries.

After the conclusion of eight classroom sessions, the staff attended the simulation training. The initial project plan was to schedule the simulation training at the project partner's college of nursing Center for Nursing Discovery. Due to staffing shortages and COVID-19 scheduling restrictions, the project lead partnered with the endoscopy nurse managers to identify an alternative training location. The nurse managers identified an endoscopy procedure room at each site for the simulation training sessions. This change offered the learners a realistic training setting, decreased their travel time, and provided staffing flexibility for the endoscopy unit.

The staff who attended the classroom session were invited to attend one of six two-hour simulation training sessions scheduled on two separate days. The project lead did not invite the project site nurse managers to attend the simulation training to ensure a safe learning space for

the staff. The project lead developed a training schedule assigning each staff member to a learner group (Appendix I).

The project team members set up the assigned procedure room with a low-fidelity simulation manikin, a training colonoscope, procedural supplies, and two trainer large intestines models designed by the project lead (Appendix J). At the start of each simulation training session, the project lead conducted a pre-brief huddle with the industry partner, project team members, and all scheduled learners. During the pre-brief, the project lead reviewed the session logistics, learner objectives, expectations, outcomes, behaviors, and training schedules with learner assignments. The pre-brief huddle is the foundation of the simulation learning experience and supports the training and debriefing meeting (Solli et al., 2020). During the pre-brief, the facilitator prepared the learners for the experience and explained the training scenarios, environment, and equipment to create a safe learning space.

Assigned to a specific training schedule, each group of learners attended two training stations for 30-minutes: (1) pre-procedure and intra-procedure patient assessment, team communication, and manual abdominal pressure techniques and, (2) abdominal compression device inclusion and exclusion criteria, device selection, application, and adjustment. During the second hour of training, the project team led the students through two thirty-minute simulation case scenarios. The case scenarios incorporated the classroom education theory and training station techniques. Each staff member in the group rotated through the various endoscopy roles. The project lead, project team member, and industry representative provided expert feedback to the team to ensure their actions included proper abdominal pressure strategies, manual pressure techniques, team communication, anticipatory skills, and patient assessment based on the provided scenario.

After the simulation session, the project lead conducted a debrief huddle with each learner group. Debriefing focuses on providing expert feedback about the learners' skills, open-ended questions to facilitate discussion about the session, and time for learner reflection (Secheresse et al., 2021). During debriefing, the team had time to review each scenario and discussed the team's actions, a plan to implement the learned skills into practice and address their concerns about the practice change and physician feedback.

After the debrief, the project lead ask the learners for open feedback, comments, or concerns related to the simulation training. The project lead conducted a post-course huddle with the project team to discuss potential changes to the simulation training content. Suggestions included updating the training materials for clarity related to the patient scenarios. The project lead completed changes to the simulation materials before the second simulation training day. The changes streamlined the simulation scenarios and allowed the learners to focus on their roles and application of knowledge.

Timeline

The development of a project timeline provided structure to this extensive DNP project. The DNP project timeline followed the steps in the PDSA cycle, starting with identifying a project idea, defining the project aims and goals, developing a project team and course content, launching the classroom and simulation training, revising the project, and data collection and analysis (Appendix K). The planning phase was completed from May 2020 through September 2020. This phase included forming the project team, developing the project aim, statement, goals, and drafting the learner surveys and course outlines. During the planning phase, the project lead performed several literature searches and appraised and synthesized the literature. The project lead also completed the CITI training modules to complete the project partner and

university's IRB applications. Finally, from September 2020 through November 2020, the project team developed, reviewed, and rehearsed the course content.

During the next phase, Do, the project team launched the educational and simulation training sessions from December 2020 through January 2021. The project lead coordinated the course dates and times with the nursing school faculty, project team, conference center, and endoscopy nurse managers. Learners completed all classroom and simulation training by the end of January 2021. The project lead continued to support the learners with onsite observations over twelve weeks from January 2021 through April 2021. After the project concluded, the project lead collected and reviewed pre and post-course retrospective chart audits and learner pre and post-course knowledge, SET-M, and demographic characteristics surveys from April to May 2021. The project lead met with both the site champion and faculty advisor to discuss the collected data and its relevance to the project outcomes and intent during May 2021.

Section IV. Results and Findings

The primary goal of this DNP project was to develop an evidence-based simulation course to improve staff efficacy and confidence in abdominal pressure strategies while reducing procedure time. The project outcomes were developed to align with the IHI Triple Aim (2020) and Healthy People 2020 initiatives to improve the patient experience, reduce healthcare costs, and improve population health. The project lead employed descriptive statistics, frequencies, and percentages to evaluate and compare pre and post-patient and learner findings. Learners who attended the course and completed the surveys provided invaluable data to support the intervention. Although the patient outcome measures of procedure time, cecal intubation time, and sedation medication dose were not affected, there were post-course improvements in procedure tolerance, nursing documentation, learner knowledge, skills, and confidence in abdominal pressure strategies.

The project team met the project's primary goal with the successful launch of eight classroom and six simulation training sessions. Thirty endoscopy staff were invited to participate in the abdominal pressure strategies course. Twenty-eight learners (93%) attended the didactic class, and twenty learners (71%) who attended the didactic class also attended the simulation training (Appendix L). The site nurse managers (two) were not invited to attend the simulation training sessions to ensure a safe learning environment for their staff. In addition, six learners that attended the classroom course opted not to attend the simulation training sessions due to work and personal conflicts.

The response rates of the pre and post-course knowledge and SET-M surveys were inconsistent, but the completed survey data supported the project outcomes. The difference in the survey distribution processes was attributed to the variation in response rates. Twenty-eight staff

attended the classroom training, but only twenty-five or 83% completed the pre-course knowledge and learner demographic characteristic survey. Of the twenty learners who attended both the classroom and simulation training, only fifteen (54%) completed the post-course knowledge survey. The response rate of the SET-M survey was the highest, as nineteen of the twenty learners who attended the simulation training (95%) completed the survey. The response rate of the SET-M survey is credited to asking the learners to complete the survey immediately after the simulation post-brief on their smartphones using a QR code.

The pre-course survey captured the learners' demographic characteristics, training, knowledge, and confidence level with abdominal pressure techniques. The pre-course demographic characteristics identified the learners' wide range of educational and endoscopic procedure experience (Appendix M). The majority of learners were over 30 years old (92%), were registered nurses (76%), and had ten or more years of endoscopy experience (40%).

The learners' responses concerning their training on abdominal pressure skills highlighted the inconsistent training processes of staff working in the same GI division. Twelve learners (60%) acknowledged they were mentored by a peer for various lengths of time, while eight learners (32%) reported they had never received training on abdominal pressure techniques. Thirteen learners (52%) responded that they were *very confident or confident* about their current abdominal pressure skills. In comparison, ten learners (40%) reported they were either *slightly, somewhat, or not at all confident* in their skills (Appendix N). As expected, the learners' pre-course confidence in abdominal pressure techniques varied due to the range in their endoscopy experience and skills training.

The project team utilized the SET-M post-simulation survey to assess the relationship between the simulation training experience and the learners' acquired confidence and knowledge

of the learned skills. The SET-M survey is based on a four-point scale to assess the learners' perceived confidence and knowledge in assessment, skills, and team communication (Leighton et al., 2015). The simulation faculty assisted the project lead with aggregating and reviewing the SET-M learner data.

Responses to all twenty-five questions of the SET-M survey were overwhelmingly positive (Appendix O). Eighteen learners (95%) strongly agreed that the simulation experience improved their knowledge and confidence in patient safety interventions, team communication, and the application of evidence-based abdominal pressure techniques. While all learners (100%) strongly agreed that the simulation experience improved their confidence and knowledge of safe patient handling practices.

The pre and post-course survey contained seven duplicate multiple-choice questions to assess the learners' knowledge attainment as an outcome measure (Appendix P & Q). Comparing the survey responses demonstrated significant improvement in the learners' knowledge after attending the course. For example, no learner answered all pre-course knowledge questions correctly, while four learners answered all post-course knowledge questions correctly with an average learner knowledge improvement of 30%.

The retrospective chart audits also revealed unintended outcomes related to the educational intervention similar to the learner data. The data collected from the endoscopy procedure charts were reviewed and calculated to determine if the pre and post-practice changes affected the defined process and outcome measures. The documented time to the cecum and total procedure time was calculated and averaged. The post-intervention only improved the total procedure time by an average of one minute and did not improve the average time to the cecum (Appendix R). The one-minute improvement time likely does not have any clinically significant

impact on procedure volume or staffing. The sedation medication doses of both midazolam and fentanyl were calculated and averaged. There was no difference in the average amount of medication administered to the patient for procedural sedation in the pre and post-course data.

Current, standard physician practice is to document the patient's tolerance and incomplete procedures in the procedure report. Since physician variables can influence patient outcomes, the project lead ensured that the same physicians were represented in the pre and post-patient sample. The physician determines and documents the patient's procedure tolerance utilizing standard options in the endoscopy report writer. The report selections are *tolerated well, fairly well,* or *did not tolerate.* If a physician did not reach the cecum, the procedure was documented as incomplete.

After completing the chart reviews, the project lead compared the patient data related to procedure difficulty, incomplete procedures, and procedure tolerance. The project lead calculated the percentage of each selected procedure tolerance descriptor to differentiate from the three report options. There was an overall improvement in the outcome measure of procedure tolerance (Appendix S). Completed versus incomplete procedures percentages were compared pre and post-course.

Physicians documented procedure tolerance in 99% of the endoscopy procedure reports. In the post-intervention reports, the number of patients with a documented procedure tolerance of *tolerated well* increased by sixteen patients (8%), *tolerated fairly well* decreased from twelve to one patient and *did not tolerate* the procedure decreased from four to zero. Documented t*echnically difficult* procedures decreased from ten to four, and incomplete procedures decreased from two to zero.

During the simulation training, the project lead reviewed the standards on therapeutic maneuvers documentation. A majority of the nurses were unaware that abdominal pressure should be documented in the procedure log and where to locate the information. The project lead provided the learners with the education during the course and the post-course observation sessions. Since abdominal pressure is a therapeutic maneuver performed during colonoscopy, all nurses are expected to document if abdominal pressure was performed, including the type – manual, reposition, or the use of the abdominal compression device and the results of the technique. During the chart review process, the project lead noted the positive impact on nursing documentation. Pre-intervention chart audits revealed the nurse did not document abdominal pressure techniques as a therapeutic maneuver in 83% of the patient's charts (Appendix T). Conversely, in the post-intervention chart audit, the nurse documented information about abdominal pressure in 48% of the charts, decreasing the undocumented rate by 31%.

Discussion of Major Findings

This project was developed and implemented in a multi-tier approach to promote evidence-based practices to improve patient care and promote a culture of safety in endoscopy procedures. During the development of any quality improvement project, ideally, the time and effort invested are realized in the data. This project became more than data, as the educational course opened the door to critical conversations on a previously disregarded topic. There are many hypotheses about the lack of support for abdominal pressure training courses, including the lack of resources, evidence-based practice guidelines, education curriculum, training materials, time, and subject matter experts. However, perhaps the real issue is the lack of awareness of the problem.

The education disseminated through this project encouraged conversations with GI leadership, physicians, nurses, and technicians about best practices in abdominal pressure strategies, the potential impact on patient and staff safety, and the importance of simulation training in endoscopy competencies. Although the project intervention did not impact the length of procedures, time to the cecum, or the sedation medication dose, the data related to the staff's knowledge and confidence in abdominal pressure skills and patient's procedure tolerance supported the dedication of resources to sustain this educational initiative.

Throughout the implementation of this project, the endoscopy staff became empowered to prepare for a potentially challenging colonoscopy through improvements in patient assessment and team communication which resulted in individualized patient care. Empowering clinical staff with the education to deliver evidence-based practice at the bedside supports the Institute of Medicine's initiative on the importance of clinical competency and is noted as a gold standard of any Magnet organization. Providing the clinical staff with both the knowledge and practical application to deliver safe and effective patient care allowed the staff and physicians to accept the practice change and move through the refreezing change process (Lewin, 1947). Since the majority of staff attended the training, they were able to articulate the evidence-based education to peers and providers to support the practice change.

Section V. Interpretation and Implications

Costs and Resource Management

Healthcare systems constantly struggle to balance increasing healthcare costs with decreasing insurance reimbursement rates to provide safe and effective patient care. The impact of this DNP project far exceeded the budgetary costs. The budget to implement this project was $5,500 (Appendix U). The costs related to this project included staff's hourly rate and staff lunches. Additional costs were related to the printing of training materials and products used during the simulation training session. Costs related to the COVID-19 pandemic included additional cleaning supplies, facemasks, shields, gowns, and gloves. The highest cost associated with this DNP project was the hourly rate of the staff and project team members to attend team meetings and the educational and simulation course sessions. As a student project, the cost associated with the development of this project was not included in the budget. If another healthcare system duplicates this project, budgetary considerations would need to include resources to develop, implement, and sustain the course.

Cost-Benefit Analysis

Clinical staff who work in endoscopy procedures require extensive training to safely and efficiently assist the endoscopists with therapeutic maneuvers. The support of an experienced nurse or technician is invaluable to the physician, unit, and healthcare system as the process of hiring and training clinical endoscopy staff to function independently can span several months. The gastroenterology leadership at the project site understands the compounding cost of staff attrition. Therefore, the GI leaders and health system strive to provide a supportive work environment to promote staff's emotional and physical health and improve staff retention. Clinical staff turnover is fiscally and emotionally expensive to endoscopy departments and is

directly related to work-related stress and the lack of continuing education and advancement opportunities (Palmer et al., 2019). Providing staff with continuing education based on the principles of ergonomics and safe patient handling while increasing staff knowledge, confidence, and autonomy through an evidence-based practice change has sweeping and long-lasting effects on retention rates, professionalism, and positive work culture.

Resource Management

In the development of a simulation course, there are various resources to consider. It is critical to identify an educated endoscopy clinician who can critically evaluate evidence-based research, translate the research, and develop the training materials and educational content, including presentations, handouts, and simulation scenarios. Doctorally prepared nurse clinicians are well-positioned to lead healthcare systems to develop large-scale projects that support scientific inquiry and practice change (AACN, 2021).

Clinical staff and nurse educators can support this educational project by coordinating staff course schedules, teaching the course, and supporting the learners. These roles are essential to the launch and sustainability of an abdominal pressure course. In addition, if the healthcare system did not have access to a simulation training center, developing an interprofessional collaboration with the faculty of a certified simulation center would be vital in planning a successful simulation course. Simulation faculty are experts in developing a safe learning experience through pre-brief and debrief and practical simulation scenarios that mirror clinical care (Berger et al., 2018). Additional resources required for this project include a conference room with audiovisual equipment and abdominal pressure simulation training supplies.

Implications of the Findings

The development of a simulation course on abdominal pressure strategies promotes best practice and standardization of endoscopy staff competencies. The positive impact on the staff's outcomes supports the further development of additional endoscopy competencies through simulation training. This DNP project highlights the importance of integrating simulation training into endoscopic competencies with an outlined project from inception to dissemination and can be duplicated at any endoscopy center or healthcare system.

Implications for Patients

The ability to deliver evidence-based care at the bedside is essential to support the Institute of Medicine's (2011) and Institute of Healthcare Improvement's Triple Aim initiatives to provide evidence-based patient care at the bedside, improve patient satisfaction, and reduce healthcare costs. Healthcare societies promote colonoscopy as the gold standard for colon cancer screening. To support this gold standard, endoscopy unit nursing leaders need to promote staff continuing education and training to ensure patients receive safe, effective, and high-quality care. In addition, improving team communication, comprehensive patient assessments, and evidence-based therapeutic maneuvers like abdominal pressure promote individualized care, anticipatory skills, and decrease the potential of adverse patient events and staff injuries.

Implications for Nursing Practice

Nursing is not a task-based profession. Nursing processes include patient education, assessment, triage, and advocacy. The nurse's role is to advocate and practice evidence-based care for their patients, peers, and the healthcare system. This project highlighted the variability in training and education of endoscopy healthcare professionals in the concepts related to abdominal pressure strategies, inconsistent team communication, and documentation processes.

Nurse-driven quality improvement projects support the spirit of inquiry in clinical staff and engage learners in assessing every patient care process to influence practice change and support professional growth.

This project promoted nursing practice through interprofessional collaboration, team communication, the development of anticipatory skills, the promotion of evidence-based research, and the advancement of clinical knowledge. Reexamining clinical skills, workflow, patient care, and documentation must be a continual process to break the cycle of healthcare professionals stating *because we've always done it that way*. Throughout this project, the project lead supported the pilot site's clinical staff in processing ideas to improve patient care through all phases of endoscopy procedures. This project inspired and supported improvements to the EHR, including developing a pre to intra-procedure hand-off report, colonoscopy pre-procedure huddle form, and pre-admission assessment to identify patients with abdominal pressure risk factors (Appendix V).

Impact for Healthcare System(s)

Promoting evidence-based care at the bedside is the best practice in patient care and is supported by The Institute of Medicine, healthcare societies, and nursing organizations. Practicing evidence-based care supports the Triple Aim initiative and Healthy People 2020 by improving healthcare quality and reliability, patient outcomes and satisfaction, and reducing healthcare costs (Mazurek-Melnyk et al., 2016). Developing evidence-based simulation training courses for healthcare professionals will impact healthcare through improved patient and employee satisfaction and retention rates, reduction in staff and patient injuries, and healthcare costs.

The promotion of evidence-based care can also influence quality indicators such as incomplete colonoscopy rates, adenoma detection rates (ADR), and preventable adverse events. These quality measures are reportable and impact insurance contracts and the number of covered lives for healthcare systems. The cost of a patient skin tear, hematoma, or splenic injury directly related to improper abdominal pressure may vary from outpatient treatment to a life-threatening injury (Shacket et al., 2021). Staff injuries related to years of improper techniques can be career-ending and financially challenging to healthcare systems. GI leaders need to identify resources to support the development and sustainability of a simulation-based abdominal pressure course. If an abdominal pressure educational program was the standard for all endoscopy staff, the resulting practice change could impact millions of patients and endoscopy staff annually throughout the United States.

Sustainability

Sustainability needs to be considered throughout the development of any practice change; otherwise, the dedicated resources were wasted. Due to the complexity of this course, without physician leadership and an engaged project team, this project would be challenging to duplicate. The project lead was a CNS with twenty years of endoscopy procedure experience and a knowledge base in managing project teams and facilitating change. The experience and education of the project lead, the structure of the DNP program, and the support of the project site champion and faculty advisor were the keys to the success of this DNP project.

Steps to ensure project sustainability include involving leadership and stakeholders, transparent communication, staff support through the change process, identifying site champions, and integrating educational technology. An option for sustaining the course is transferring the course content from in-person to interactive videos with case studies concluding with in-person

simulation training sessions and a knowledge assessment. As the project partner is a magnet-designated healthcare system, nurses who obtain clinical ladder progression must manage a divisional project to support their advanced designation and associated pay increase. An excellent clinical ladders project would be converting the in-person class content into a video presentation or developing a role for abdominal pressure site safety champions to support physicians and peers in education, training, competency assessment, and practice change. Additionally, the GI CNS can mentor identified site champions as a succession plan for sustaining the program. Nursing educators in healthcare systems can also develop this course into a standard for endoscopy staff orientation and support the nurse managers in annual competency training and evaluation.

Dissemination Plan

Every day, nurses develop and launch exceptional quality improvement projects and programs throughout the United States. However, few invest the time to disseminate their work. Sharing evidence-based practices are essential in advancing the nursing profession and showcasing the dedication of nurses in the improvement of patient care. Nurses who advanced their education through a doctor of nursing practice program must be the leaders of change by translating evidence-based research into practice and developing quality improvement initiatives that influence change and health outcomes for patients.

Nurse leaders need to disseminate reproducible best practice initiatives. As publications and presentations about the ergonomic impact in the endoscopy setting are increasing expediently, an educational program to promote provider and staff safety related to zero harm initiatives is timely. The plan to disseminate this project will be tiered. The project lead completed and presented the project poster at the university’s DNP scholarly poster presentation

day on July 13, 2021. The DNP paper will be published in the University's ScholarShip repository.

The project lead presented the project's impact to the project partner's GI Clinical Chief, Pilot site's Medical Directors, and Nurse Managers. Finally, the project team developed a podium presentation and manuscript to highlight the importance of interprofessional practice and simulation training to standardize endoscopy competency assessment. The project team submitted the manuscript to the Society of Gastroenterology Nurses and Associates publication *Gastroenterology Nursing*. The project lead has submitted an abstract for a podium presentation to The Society of Gastroenterology Nurses and Associates (SGNA) 2022 Annual Course.

Section VI. Conclusion

Limitations and Facilitators

Change is difficult especially when the change affects various healthcare professions and physicians that have performed these specific skills for decades. Physician and staff attitude towards abdominal pressure was a significant barrier for this project. Physicians questioned the validity of the training methods and techniques taught to the staff while staff questioned their training needs. In addition, physicians had a negative perception concerning using the abdominal compression device as they voiced the device was like using training wheels and equated to being an inexperienced endoscopist. Physicians also underestimated the amount and time of abdominal pressure they request of the staff and the potential resulting staff injuries, leading to questions concerning the necessity of the practice change.

As the project progressed and the staff attended the training courses, their feedback changed as they embraced the idea of decreasing patient and self-injury. Additionally, the staff supported each other in the change and provided education to the endoscopists. At the conclusion of the project, GI physicians requested the project lead repeat the educational course for other endoscopy centers in the healthcare system. The implementation of this project occurred during the height of the COVID-19 pandemic; however it was not a project barrier. The project lead made adjustments in the course to manage issues caused by the pandemic, including class size limitations, additional training sessions to support staffing, alternative training locations, and additional supplies.

The project team’s knowledge, dedication, and enthusiasm were driving forces for this DNP project. The project champion is a GI physician but was also the GI Division’s safety officer and was well versed in both research and quality improvement initiatives. His knowledge,

time, and commitment to patient safety provided constructive support to the project lead and the entire team.

Another motivating force for this project was the interprofessional collaboration of the project team and the Center for Nursing Discovery faculty. The faculty provided shadowing experiences, identified a validated simulation evaluation tool (SET-M), and supported the team in developing the simulation day, including scenarios, pre and post-brief processes, and feedback during the team's simulation dress rehearsal. Additionally, the faculty allowed the project lead to borrow a low-fidelity manikin and simulation supplies for use in the off-site training sessions.

Recommendations for Others

Education on abdominal pressure strategies, including proper manual abdominal pressure techniques, should be considered a standard competency for all endoscopy staff. Integrating simulation training with endoscopy education for therapeutic techniques is supported by the literature and has long-term safety implications for patients, providers, staff, and healthcare systems. Healthcare systems considering developing a course on abdominal pressure strategies need to identify project champions and key stakeholders, including physician and nursing leadership, endoscopy staff, ergonomist, nurse educators, and simulation faculty to ensure success with this endeavor.

The interdisciplinary project team needs to be skilled in completing research, developing educational content, and launching and sustaining an abdominal pressure course. A quality improvement framework like Plan-Do-Study-Act (PDSA) will support the project team through the four phases of the framework planning, implementing, studying, and improving. Developing a timeline will keep the team on track as this project requires multiple resources and dedicated time for development. Simulation training should not be reserved for educational institutions

only. Endoscopy clinical staff orientation and competency training assessments must shift from the procedure room to the simulation training center.

Recommendations Further Study

Due to this project's nature and potential implications, further studies on patient and staff injuries should be conducted. Patients who seek follow-up care related to vague abdominal pain, skin bruising, skin tears, hematomas, and splenic injury should be reported within thirty days of a colonoscopy. All adverse events should be thoroughly reviewed to include a chart audit to identify any relationship with performing abdominal pressure techniques. Staff turnover rates, fatigue, absenteeism, and work-related injuries should also be studied and correlated with available evidence-based education and competency validation on abdominal pressure strategies and ergonomics initiatives.

Final Thoughts

It is estimated by the year 2024 that thirteen million colonoscopies will be performed annually in the United States (Joseph et al., 2016). Colonoscopy is the gold standard for colon cancer prevention. Unfortunately, colon cancer ranks as the second leading cause of cancer deaths in Americans, with approximately 145,000 cases diagnosed annually (ACS, 2021). Although colonoscopy is considered a low-risk procedure, therapeutic techniques performed during endoscopy procedures have become increasingly complex and impact colon cancer detection and patient outcomes.

Abdominal pressure is a technique that provides external counter-pressure support on the patient’s abdominal muscles through various hand techniques, position changes, or an abdominal compression device application to improve cecal intubation rates (Crockett et al., 2021). These techniques assist the endoscopist in advancing the colonoscope to achieve cecal intubation.

Mentors frequently teach these techniques through on-the-job training. Current literature, educational institutions, and healthcare societies support the Institute of Medicine's directive to improve clinical education through technology and reduce training on patients, which promotes a culture of safety (IOM, 2011).

The Doctorate of Nursing Practice project developed an evidence-based interactive course to improve efficacy and confidence in the application of abdominal pressure strategies during colonoscopy procedures in collaboration with the health system's ergonomics department and nursing school's Center for Nursing Discovery. This project brought the issues related to a daily struggle to the surface, sparked clinician conversations, improved staff knowledge and confidence in abdominal pressure skills, and promoted standardization of patient care. The staff who attended the course expressed their gratitude for shining a light on the issue surrounding their struggle with abdominal pressure and providing them with an avenue to improve their practice. As the project lead, it is gratifying to implement an evidence-based educational initiative that will change the trajectory of abdominal pressure training. The DNP degree afforded me the time and support to research, develop, launch, and revise this project and provided the structure to improve staff and patient outcomes for years to come.

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Appendix A

Provider Quality Indicators

Colonoscopy Quality Indicator	Definition	Target	Procedure Minimum
Cecal Intubation Rate	Percent completed screening or surveillance colonoscopy	90 %	30
Appropriate follow up 10-year measure	Percent of patients aged 50 and older receiving screening colonoscopy without biopsy or polypectomy who had a recommended follow up interval of at least 10 years documented in their colonoscopy report	90 %	30
Adenoma Detection Rate	Percent of average-risk patients age 50 years and older with at least one adenoma during screening colonoscopy	25 %	30

Note. ([project site] personal communication, 2020, July 1).

Appendix B

Literature Matrix

Authors	Year Pub	Article Title	Theory	Journal	Purpose and take home message	Design/Analysis/Level of Evidence	IV DV or Themes concepts and categories	Instr. Used	Sample Size	Sample method	Subject Charac.	Comments/critique of the article/methods GAPS
Benner, P.	1982	From Novice to Expert	Patricia Benner's From Novice to Expert	The American Journal of Nursing	Nursing students and nurses progress through various stages of learning throughout education and their profession. These levels need to be supported through education and mentoring.	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Berger, J. D., Kuszajewski, M., Borghese, C., & Muckler, V. C.	2018	A quality project using high-fidelity simulation training to improve clinical knowledge among critical care transport nurses.	N/A	Clinical Simulation in Nursing	Simulation training for clinical professionals supports clinical excellence.	Quality Improvement Project Level III	IV: simulation training DV: pre and post test scores and retention of learned skills	Pre-test and Post-test	N/A	N/A	N/A	N/A
Fu, L., Dai, M., Liu, J., Shi, H., Pan, J., Lan, Y.,Ye, B.	2019	Study on the influence of assistant experience on the quality of colonoscopy: A pilot single-center study	N/A	Medicine	Purpose: To measurement of the training level of the endoscopy assistant based on the quality metrics of colonoscopy - ADR, cecal intubation, prep quality. The experience tech group had a higher patient satisfaction score (unsedated) and less time to cecum time	Single Center Randomized control Trial Level of Evidence: II	IV: single center location, unsedated colonoscopy DV: 2 endoscopy assistants, patient variables - age, health status, sx history, bowel prep		331 patients divided into two groups: experienced assistant group (n = 179) and the inexperienced assistant group (n = 152). Ages 18-85 years old	Data - time, number of specimens obtained and documented pain score using 0- 10 and prep quality using the Boston Prep Quality Scale. Patient satisfaction measured 0-3 scale	Patients undergoing unsedated colonoscopy, at a single site, randomized to have their procedure performed with a more experienced versus less experienced endoscopy assistant	Further studies should be conducted at multiple sites. Colonoscopy performed without sedation are very limited versus sedated procedures. There was no mention of a procedure nurse, unsure the role of the assistant
Burnes, B., & Bargal, D.	2017	Kurt Lewin: 70 years on	Lewin's Change Theory	Journal of Change Management	Review of Lewin's change theory process	N/A	Concepts	N/A	N/A	N/A	N/A	N/A
Burnes, B., & Bargal, D.	2017	Change management process utilizing Lewin's Theroty of Change	Lewin's Change Theory	Journal of Change Management	Review of Lewin's change theory process in respect to process change in clinical setting	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Camilleri, J., Cope, V., & Murray, M.	2019	Change fatigue: The frontline nursing experience of large-scale organizational change and the influence of teamwork	N/A	Journal of Nursing Management	Survey of nursing professionals who experienced large-scale change in both an established and non established nursing team and resulting experienced fatigue	Descriptive Correlational Study Level of Evidence: III	IV: Change event DV: nurses response to change measured as fatigue	survey questionnaire	two cohorts n=225 and n=521	nurses who experienced a large-scale change and either work with an established nursing team or those who don't	frontline nurses who all work in the same hospital in various clinical care areas	the perception of teamwork doesn't have any impact on experienced or report fatigue related to change management
Fu, L., Dai, M., Liu, J., Shi, H., Pan, J., Lan, Y., Shen, M., Shao, A., & Ye, B.	2019	Study on the influence of assistant experience on the quality of colonoscopy	N/A	*Medicine*	Comparing experienced versus inexperienced endoscopy clinical support and the effects on unit effiency, colonoscopy quality indicators and physician satisfaction in unsedated colonoscopy procedures	Single-center randomized controlled trial Level of Evidence: II-2	IV: Endoscopy physicians DV:Clinical support staff, experience, key quality indicators, patients	chart review of defined quality indicators	331	random assignment of patients scheduled for unsedated colonoscopy - one cohort has their procedure performed by a physician supported by an inexperienced clinical staff and the other cohort the physician was supported by an	Clinical Staff: Experienced verses inexperienced endoscopy staff	Patients with their procedure performed with the physician with the experienced clinical staff achieved high rates of the documented quality indicators
Hussain, S. H., Hussain, S. T., Lei, S., Akram, T., Haider, M. J., & Ali, M.	2018	Kurt Lewin's change model: A critical review of the role of leadership and employee involvement in organizational	Lewin's Theory of Change	Journal of Innovation & Knowledge	Transformational leadership can support staff through organizational change with transparent communication, focus groups and change champions	Opinion Level of Evidence: III	N/A	N/A	N/A	N/A	N/A	Transformational leaders can support staff through change. Utilizing Lewin's steps in his change theory can help leaders with change initiatives
Lewin, K.	1947	Frontiers in group dynamics: Concept, method and reality in social science; social equilibria and social change.	Lewin's Change Theory	Human Relations	Theorist description of the Change Theory and processes within the theory	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Prechel, J. A., & Hucke, R.	2009	Safe and effective abdominal pressure during colonoscopy	N/A	Gastroenterology Nursing	Instruction on specific abdominal pressure hand techniques to improve abdominal support techniques while decrease potential patient and staff injury	Opinion Level of Evidence: III	N/A	N/A	N/A	N/A	N/A	Changing endoscopy staff to utilize the new techniques requires initial training and continued to support to improve staff's techniques
Prechel, J. A., Sedlack, R. E., Harreld, F. A., & Sederquest, M. M.	2015	Looping and abdominal pressure	N/A	Gastroenterology Nursing	Supportive abdominal pressure strategies to improve cecal intubation rates and decrease potential for staff and patient	Opinion Level of Evidence: III	N/A	N/A	N/A	N/A	N/A	Improvement in abdominal pressure are evolving and staff must continue to be trained on the use of best practice techniques
Welsch, L. A., Hoch, J., Poston, R. D., Parodi, V. A., & Akpinar-Elci, M.	2018	Interprofessional education involving didactic TeamSTEPPS® and interactive healthcare simulation: A systematic review.	N/A	Journal of Interprofessional Care	Purpose: to review the idea of clinical staff training incorporation both TEAM STEPPS program and simulation based learning to understand if educators should consider curriculum development based on these two concepts for clinical	Systematic Review Level of Evidence: I	IV:articles, inclusion and exclusion criteria and review tools DV: researchers	Medical Education Research Study Quality Instrument and Newcastle-Ottawa Scale-Education were used to appraise the 11 studies and each article was scored by both	11 articles reviewed after inclusion and exclusion criteria were met and duplicate articles were removed	N/A	2 independent researchers completed systematic search of various databases	Article inclusion criteria has to use pre and post test design, did not include any student work only published studies

Camilleri, J., Cope, V., & Murray, M.	2019	Change fatigue: The frontline nursing experience of large-scale organizational change and the influence of	N/A	Journal of Nursing Management	Survey of nursing professionals who experienced large-scale change in both an established and non established nursing team and resulting experienced fatigue	Descriptive Correlational Study Level of Evidence: III	IV: Change event DV: nurses response to change measured as fatigue	survey questionnaire	two cohorts n=225 and n=521	nurses who experienced a large-scale change and either work with an established nursing team or those who don't	frontline nurses who all work in the same hospital in various clinical care areas	the perception of teamwork doesn't have any impact on experienced or report fatigue related to change management
Crockett, Cirri, Kelapure, Galanko, Martin & Dellon	2016	Use of an Abdominal Compression Device in Colonoscopy: A Randomized, Sham-Controlled Trial	N/A	*Clinical Gastroenterology and Hematology*	Purpose: Identify if a commercially developed abdominal compression device can reduce large intestine looping, during a colonoscopy, to reduce procedure time, patient's perceived pain, repositioning and need for manual abdominal pressure. Recommendations: Utilization of an abdominal compression device did not improve cecal intubation rates. There was a decrease in the need for manual abdominal pressure and position changes in the abdominal binder group, but the data was not statistical significant. The majority of patients who benefitted from the use of the binder were mildly to moderately obese. There was no	Randomized, blinded, sham controlled clinical trial. Level of Evidence: I	IV: Colowrap™ abdominal compression device and sham device DV: Cecal intubation time, patent's perceived pain, need for repositioning, and manual abdominal pressure	Variables - summary statistic and histogram. Cecal intubation rates for abdominal compression binder versus sham binder group compared with Student *t*- tests. Results of required patient repositioning and manual abdominal pressure provided by staff was analyzed using X^2 [Fischer exact test].	350 patients; 175 in both study arms. 216 women and 134 men.	Patients meeting the inclusion criteria completed study survey, consented, and enrolled into the study. Patients were randomized into sham or intervention arm. Study coordinators fit the patient with the binder based on their assigned group. Procedure MD, staff and anesthesiologists were blinded to patient assigned arm.	Outpatients undergoing a colonoscopy at a hospital based or ambulatory surgical center. Age ranges 40 - 80 years old. Date range April 2013 - March 2014. Inclusion criteria: ASA Class I-III, who completed bowel preparation, read and speak English,. Exclusion criteria: previous incomplete colonoscopy, pregnancy, previous issues with sedation, multiple procedures scheduled, non-intact abdominal skin, unsedated procedures, known GI diseases/disorders, previous abdominal surgeries, and needed to meet specific BMI and waist circumference	The commercially developed abdominal compression binder was not available in sizes above an XL at the time of the study. The company now has developed and launched XXL, and bariatric sizes. Since there was a noted decrease in the need of position changes and manual abdominal pressure in the mildly to moderately obese study participants - a repeat study could collect data on the use of this binder in obese patients to decrease manual abdominal pressure required in the obese population.
Crockett, S. D., Dellon, E. S., Biggers, L., & Ernst, D.	2021	Use of patient abdominal compression device reduces staff musculoskeletal pain associated with supporting colonoscopy.	N/A	Gastroenterology Nursing	Manuel abdominal pressure is not appropriate for every colonoscopy procedure. Utilizing	Randomized, sham controlled clinical trial. Level of Evidence: I	IV: Colowrap™ abdominal compression device DV: Perceived musculoskeletal pain reported by the endoscopy clinical staff related to the amount of abdominal pressure required for the colonoscopy	Patient assessment tool, staff assessment tool pre and post procedure	350 participants	Patients meeting the inclusion criteria completed study survey, consented, and enrolled into the study. Patients were randomized into sham or intervention arm. Study coordinators fit the patient with the binder based on their assigned group. Procedure MD, staff and	patients with a BMI between 30 - 40 and the endoscopy clinical staff providing care	An abdominal compression device decreases the amount of manual abdominal support during colonoscopy. The reduction or elimination of abdominal pressure reduces staff perceived or real musculoskeletal pain
Cunningham, S., Foote, L., Sowder, M., & Cunningham, C.	2017/2018	Interprofessional education and collaboration: A simulation-based learning experience focused on common and complementary skills in an acute care environment.	N/A	Journal of Interprofessional Care	Purpose: To identify if simulation training early with students improved communication and the ability to work as a team. Skills were reinforced with hands on learning. Development of teamwork between two different professions Nursing and PT	Mixed Method Research Design Level of Evidence: IV	IV: simulation experiences, simulation lab DT: students, educational background, learning styles	Readiness for Interprofessional Learning Scale was completed by all students before the simulation training. Six week course	20 PT Students and 63 Nursing Students	Pre and Post Survey, Post Focus Group Interviews	Nursing Student and Physical Therapy (PT) students from 3 different institutions/universities	There are noted concerns about the readiness survey's validity.

Note. Level of Evidence referenced Melnyk, B. M., & Fineout-Overholt, E. (2019).

Appendix C

Project Partner's IRB Approval

[redacted]

[redacted] INSTITUTIONAL REVIEW BOARD DECLARATION OF EXEMPTION FROM IRB REVIEW

The [redacted] IRB has determined that the following protocol meets the criteria for a declaration of exemption from further IRB review as described in 45 CFR 46.101(b), 45 CFR 46.102 (f), or 45 CFR 46.102 (d), satisfies the Privacy Rule as described in 45 CFR 164.512(i), and satisfies Food and Drug Administration regulations as described in 21 CFR 56.104, where applicable.

Protocol ID: Pro00107149
Reference ID: Pro00107149-INIT-1.0
Protocol Title: Developing Training to Improve Abdominal Pressure Techniques during Colonoscopy

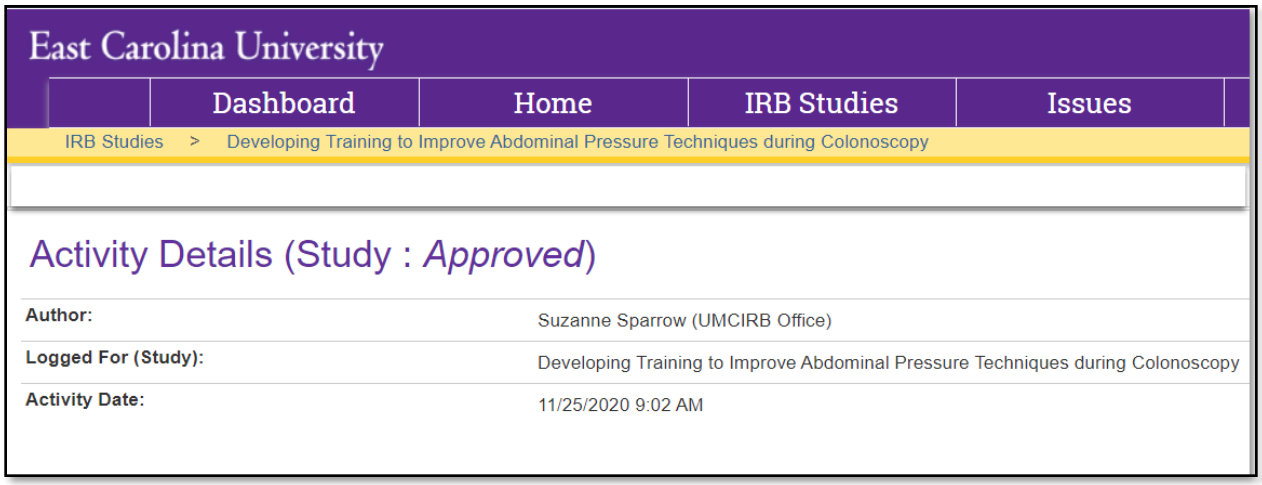
Principal Investigator: [redacted]
Review Date: November 04, 2020
Expiration Date: **Does not expire*
Exempt Category: Category 2: Research that only includes interactions involving educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior (including visual or auditory recording) if at least one of the following criteria is met: i. The information obtained is recorded by the investigator in such a manner that the identity of the human subjects cannot readily be ascertained, directly or through identifiers linked to the subjects; ii. Any disclosure of the human subjects' responses outside the research would not reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, educational advancement, or reputation; or iii. The information obtained is recorded by the investigator in such a manner that the identity of the human subjects can readily be ascertained, directly or through identifiers linked to the subjects, and an IRB conducts a limited IRB review to make the determination required by .111(a)(7).

*This Declaration of Exemption from further IRB Review is in effect from November 04, 2020 and does not expire. However, changes to the proposed research will require an amendment requesting re-review for exemption. Reportable serious adverse events and unanticipated problems related to the research that place subjects or others at risk of physical, psychological, economic, or social harm must be promptly reported to the IRB and will result in reconsideration of the activity's exempt status.

[redacted]

Appendix D

University's Institutional Review Board Approval



East Carolina University

Dashboard | Home | IRB Studies | Issues

IRB Studies > Developing Training to Improve Abdominal Pressure Techniques during Colonoscopy

Activity Details (Study : *Approved*)

Author:	Suzanne Sparrow (UMCIRB Office)
Logged For (Study):	Developing Training to Improve Abdominal Pressure Techniques during Colonoscopy
Activity Date:	11/25/2020 9:02 AM

Appendix E

Course Invitation

[project site] Gastroenterology is offering a new course for all endoscopy clinicians at the ambulatory endoscopy centers - Abdominal Pressure Strategies during Colonoscopy. [project lead and project team] will teach the course. This is a two-part course, and each session is two hours in length. Part One will be held at The [project site] Conference Center, and Part Two is scheduled at both ambulatory endoscopy centers. There will be several dates available to select. Attendance to the course is voluntary, and you will be paid for attending the course sessions. Attached is the list of classroom and simulation dates. Please open the word document and enter your name into the learner field. Once you select a date, you will receive an email confirmation, calendar invitation for your scheduled sessions, and a link to complete the pre-course survey. Thank you for participating in this course.

Note. Email information sent to the endoscopy staff at the pilot sites introducing the course and inviting the staff to participate

Appendix F

Simulation Effectiveness Tool - Modified

Simulation Effectiveness Tool - Modified (SET-M)

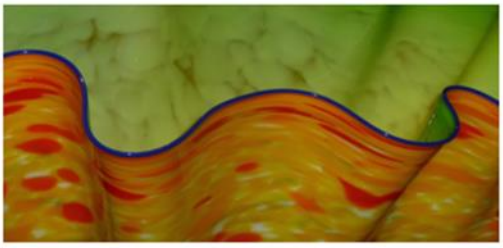
After completing a simulated clinical experience, please respond to the following statements by circling your response.

PREBRIEFING:	**Strongly Agree**	**Somewhat Agree**	**Do Not Agree**
Prebriefing increased my confidence	3	2	1
Prebriefing was beneficial to my learning.	3	2	1
SCENARIO:			
I am better prepared to respond to changes in my patient's condition.	3	2	1
I developed a better understanding of the pathophysiology.	3	2	1
I am more confident of my nursing assessment skills.	3	2	1
I felt empowered to make clinical decisions.	3	2	1
I developed a better understanding of medications. (Leave blank if no medications in scenario)	3	2	1
I had the opportunity to practice my clinical decision making skills.	3	2	1
I am more confident in my ability to prioritize care and interventions	3	2	1
I am more confident in communicating with my patient.	3	2	1
I am more confident in my ability to teach patients about their illness and interventions.	3	2	1
I am more confident in my ability to report information to health care team.	3	2	1
I am more confident in providing interventions that foster patient safety.	3	2	1
I am more confident in using evidence-based practice to provide nursing care.	3	2	1
DEBRIEFING:			
Debriefing contributed to my learning.	3	2	1
Debriefing allowed me to verbalize my feelings before focusing on the scenario	3	2	1
Debriefing was valuable in helping me improve my clinical judgment.	3	2	1
Debriefing provided opportunities to self-reflect on my performance during simulation.	3	2	1
Debriefing was a constructive evaluation of the simulation.	3	2	1
What else would you like to say about today's simulated clinical experience?			

Note. (Leighton et al., 2015)

Appendix G

SET-M Tool Permission



Evaluating Healthcare Simulation

April 13, 2021

Dear Kelly,

The authors of the Simulation Effectiveness Tool - Modified (SET-M) are pleased to grant permission for you to use this instrument for your DNP project incorporating endoscopy clinical staff competencies with simulation training. To ensure you have the most current version (4/3/20), please download from the website Evaluating Healthcare Simulation at sim-eval.org. The subscales are also delineated there.

Please don't hesitate to reach out with any questions.

Warm regards,

Kim

Kim Leighton, PhD, RN, CHSE, CHSOS, ANEF, FSSH, FAAN
huskerrn@gmail.com
+974 5032 7202

Appendix H

Patient Data Collection Tool

Pilot Site	Procedure Date	Day of Week	Patient Gender	Patient Age	Abdominal Surgical History	Number of Abdominal Surgery

Use of High Risk Medications	Colonoscopy Completed	Time in Room	Colonoscopy Start Time	Cecal Intubation Time	Colonoscopy Completed	Total time to Cecum	Total Endoscopy Procedure Time

Total Endoscopy Procedure Time	Abdominal Pressure Technique Charted	Abdominal Pressure Technique	Abdominal Pressure Technique	Versed Dose in mg	Fentanyl Dose in mcg	Benadryl Dose in mg

Patient Tolerance per Procedure Report	Patient Tolerance Description	Procedure Difficulty	RASS 2 minutes	RASS 2 minutes	RASS 2 minutes	RASS 2 minutes	RASS 2 minutes	Pain Level

Appendix I

Simulation Training Schedule

Pilot Site A and B
Simulation Training Schedule

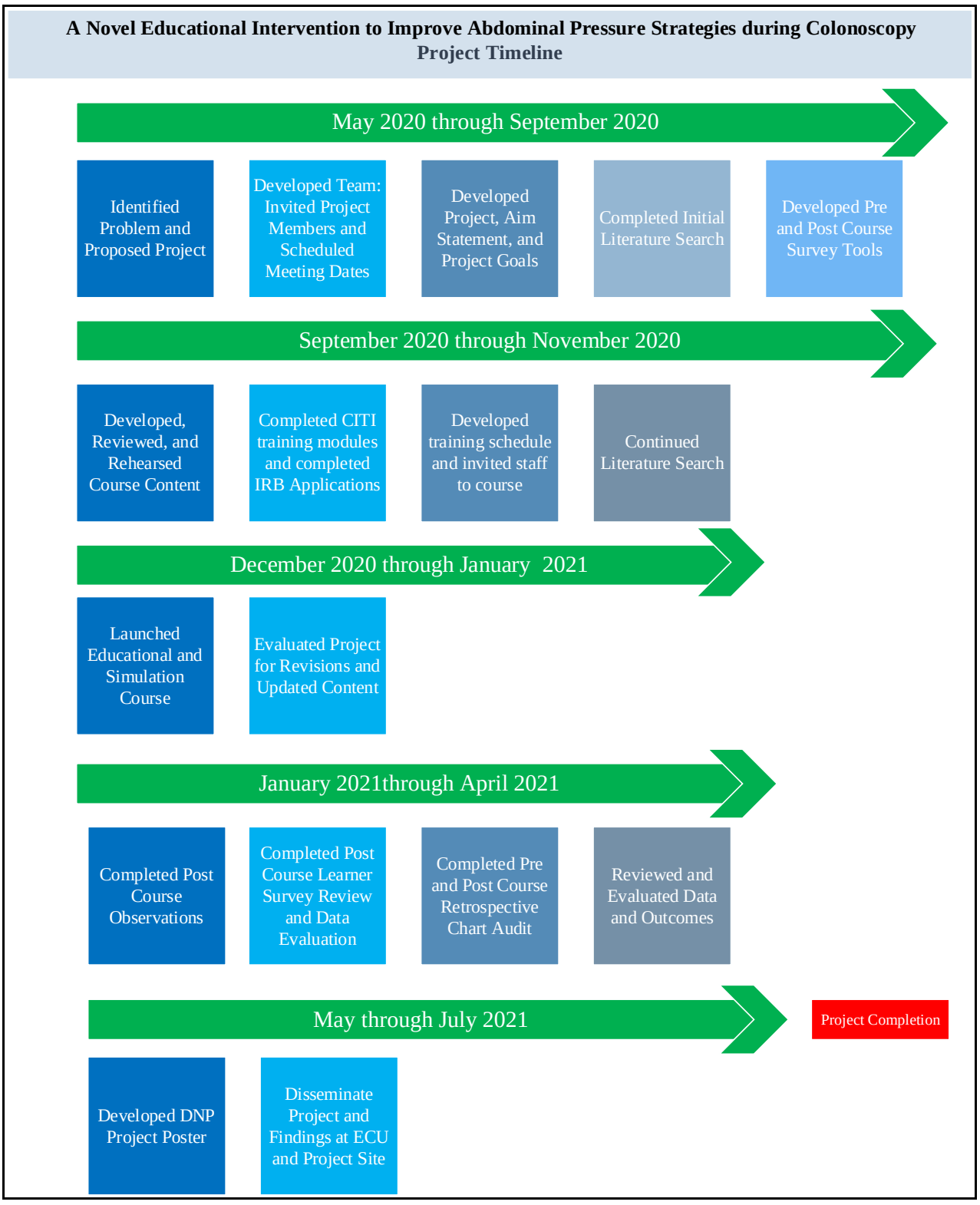
Group	Staff Name	Welcome, Training Schedule, and Pre-Brief	Abdominal Compression Device	Manual Abdominal Pressure Techniques	Break	Simulation Session	Post Course Debrief and Evaluation
Group 1		8:00 am to 8:15 am	8:15 am to 8:45 am	8:45 am to 9:15 am	9:15 AM	9:30 am to 10:30 am	10:30 am to 10:45 am
		8:00 am to 8:15 am	8:15 am to 8:45 am	8:45 am to 9:15 am	9:15 AM	9:30 am to 10:30 am	10:30 am to 10:45 am
		8:00 am to 8:15 am	8:15 am to 8:45 am	8:45 am to 9:15 am	9:15 AM	9:30 am to 10:30 am	10:30 am to 10:45 am
		8:00 am to 8:15 am	8:15 am to 8:45 am	8:45 am to 9:15 am	9:15 AM	9:30 am to 10:30 am	10:30 am to 10:45 am
Group 2		10:45 am to 11:00 am	11:00 am to 11:30 am	11:30 am to 12:00 pm	12:00 PM	12:30 pm to 1:30 pm	1:30 pm to 1:45 pm
		10:45 am to 11:00 am	11:00 am to 11:30 am	11:30 am to 12:00 pm	12:00 PM	12:30 pm to 1:30 pm	1:30 pm to 1:45 pm
		10:45 am to 11:00 am	11:00 am to 11:30 am	11:30 am to 12:00 pm	12:00 PM	12:30 pm to 1:30 pm	1:30 pm to 1:45 pm
		10:45 am to 11:00 am	11:00 am to 11:30 am	11:30 am to 12:00 pm	12:00 PM	12:30 pm to 1:30 pm	1:30 pm to 1:45 pm
Group 3		1:45 pm to 2:00 pm	2:00 pm to 2:30 pm	2:30 pm to 3:00 pm	3:00 PM	3:15 pm to 4:15 pm	4:15 pm to 4:30 pm
		1:45 pm to 2:00 pm	2:00 pm to 2:30 pm	2:30 pm to 3:00 pm	3:00 PM	3:15 pm to 4:15 pm	4:15 pm to 4:30 pm
		1:45 pm to 2:00 pm	2:00 pm to 2:30 pm	2:30 pm to 3:00 pm	3:00 PM	3:15 pm to 4:15 pm	4:15 pm to 4:30 pm
		1:45 pm to 2:00 pm	2:00 pm to 2:30 pm	2:30 pm to 3:00 pm	3:00 PM	3:15 pm to 4:15 pm	4:15 pm to 4:30 pm

Appendix J

Large Intestine Models and Simulation Set-up

Appendix K

Project Timeline



Appendix L

Educational and Simulation Course Participation

Course Staff and Survey Invitation Data	N	Course Attendance and Survey Return Rate	N Percent
Staff invited to educational class	30	Educational Class Attendance	28 (93 %)
Staff invited to simulation training	28*	Simulation Training Attendance	20 (71 %)
Pre-course surveys distributed	30	Pre-course surveys received	25 (83 %)
Post-course surveys distributed	28	Post-course surveys received	15 (54 %)
SET-M Simulation surveys distributed	20	Simulation surveys received	19 (95 %)

Note. * Project Site Nurse Managers were not invited to the simulation training sessions.

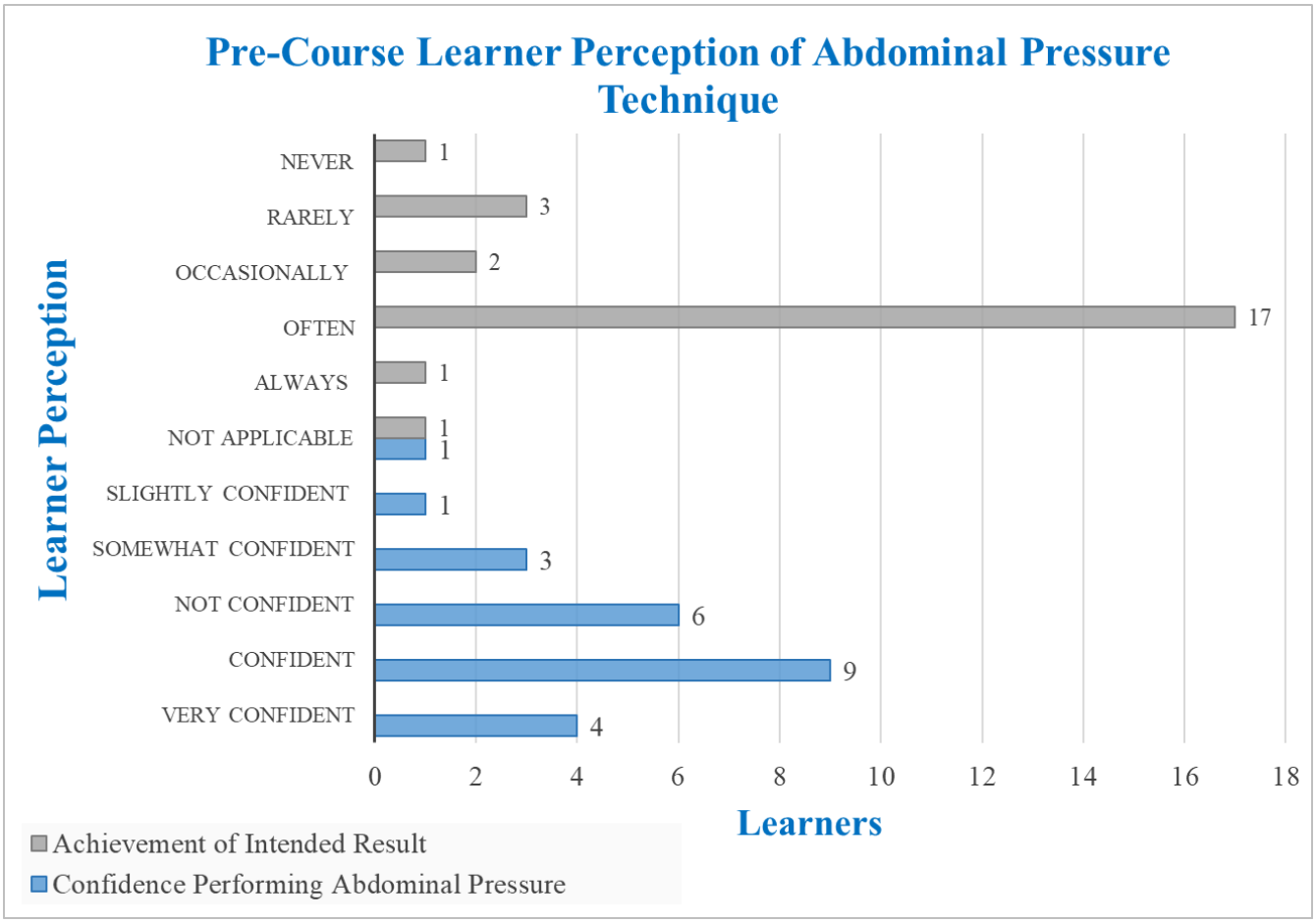
Appendix M

Learner Demographic Characteristics

Learner Demographic Characteristics	Category	n = 25 Percent
Age	Less than 30 years old	8%
	30 - 40 years old	28%
	41 - 50 years old	32%
	Over 50 years old	32%
Role	Technician	20%
	LPN	4%
	RN	76%
Endoscopy Experience	Less than 6 months	16%
	6 months to 3 years	12%
	3 - 5 years	32%
	5 - 10 years	8%
	Over 10 years	32%
Procedure Room Assignment (# Days/Week)	Everyday	16%
	1 - 3 days	28%
	3 - 5 days	36%
	As Needed	12%
	Never	8%

Appendix N

Pre-Course Participant Confidence Self-Assessment



Appendix O

Post –Simulation Learner Responses

Learner Responses: Post-Simulation Survey N= 19	Percent Strongly Agree	Percent Somewhat Agree
Assess patient for technically difficult colonoscopy risk factors	84.21%	15.79%
Demonstrate manual abdominal pressure techniques	94.74%	5.26%
Demonstrate best practices in safe patient handling	100%	0%
Assess patient for abdominal compression device indications	94.74%	5.26%
Demonstrate use of an abdominal compression device	94.74%	5.26%
Utilize team communication	94.74%	5.26%

Appendix P

Pre-Course Demographic and Knowledge Assessment

Unique Identifier:
(First three letters of your favorite color, the date of your birthday (not month or year), and the first three letters of the city you were born)

1. What is your role at [project site] GI?
   - Surgical Technician
   - Endoscopy Technician
   - Medical Assistant (CMA or RMA)
   - LPN
   - RN (ASN, BSN, MSN, CGRN)
   - Other – comment box

2. How many years have you worked in endoscopy procedures
   - Less than 6 months
   - Less than one year
   - One to 3 years
   - 3 – 5 years
   - 5 - 10 years
   - Over 10 years

3. What is your age:
   - Less than 30 years old
   - 30-40 years old
   - 40-50 years old
   - Over 50 years old

4. How often do you work in an endoscopy procedure room?
   - Every day
   - At least three days per week
   - Once a week
   - Only as needed for staff coverage
   - Never

5. What type of training did you receive to be able to perform abdominal pressure techniques?
   - None
   - Mentored by preceptor (technician, nurse, fellow, MD) [Comment]
   - GI conference
   - Formal/Classroom training

6. Weekly, how often do you provide abdominal pressure techniques during a colonoscopy?
   - Never
   - Rarely
   - Occasionally
   - Often
   - Always

7. When performing abdominal pressure, do you feel confident in your techniques (hand placement, pressure)?
   - Not confident at all

- □ Slightly confident
- □ Somewhat confident
- □ Fairly confident
- □ Completely confidence

8. When providing abdominal pressure, how often does the technique yield the intended results?
   - □ Never
   - □ Rarely
   - □ Occasionally
   - □ Often
   - □ Always

9. When asked to provide abdominal pressure, does the MD provide clear instructions about patient positioning, endoscope location, or techniques?
   - □ Never
   - □ Rarely
   - □ Occasionally
   - □ Often
   - □ Always

10. What type of training did you receive on the use of the abdominal compression device?
    - □ None
    - □ Mentored by preceptor (technician, nurse, fellow, MD) [Comment]
    - □ GI conference
    - □ Formal/Classroom training with vendor

11. How confident are you in describing patient inclusion and exclusion criteria for an abdominal compression device?
    - □ Not confident at all
    - □ Slightly confident
    - □ Somewhat confident
    - □ Fairly confident
    - □ Completely confident

12. How confident are you when placing an abdominal compression device on a patient and adjusting it during a procedure?
    - □ Not confident at all
    - □ Slightly confident
    - □ Somewhat confident
    - □ Fairly confident
    - □ Completely confident

13. Which initiative did [project site] Health launch to support safety as a priority for both patients and staff members?
    a. Fall's Champions
    b. Safe Patient Handling
    c. Do No Harm
    *d. Commit to Zero**

14. Patient factors that can attribute to a difficult colonoscopy and looping
    a. Obesity
    b. History of diverticulitis
    c. Previous abdominal surgery
    d. First colonoscopy
    *e. A,B,C**
    f. All of the Above

15. Patient injuries resulting from improper manual abdominal pressure techniques include:
    a. Bruising and skin tears
    b. Splenic rupture and Abdominal Pain
    c. Colonic and liver perforation
    d. A and C
    *e. A and B**

16. When a provider requests manual abdominal pressure, the circulating nurse or technician should first ask?
    a. Where the scope is looped/located
    b. If the provider removed the air in the colon
    c. If the provider withdrew the scope to reduce looping
    d. The patient's relevant medical and surgical history
    e. A and D only
    *f. All of the above**

17. Which of the following question should you ask your patient to best determine their mobility status?
    g. Can you stand?
    h. Do you use a wheelchair?
    *i. How did you get into the wheelchair?**
    j. Can you walk?

18. The purpose of providing abdominal pressure during a colonoscopy is to
    k. Reduce bowel loops that form during the colonoscopy
    l. Prevent loops from forming as the scope is moved throughout the colon
    m. Reduce the patient's sedation requirement
    *n. All of the Above**

Note. Correct answers are noted in italicized font with asterisk

Appendix Q

Post-Course Knowledge Assessment

Unique Identifier:
(First three letters of your favorite color, the date of your birthday (not month or year), and the first three letters of the city you were born)

1. When performing abdominal pressure, do you feel confident in your techniques (hand placement, pressure)?
   - Not confident at all
   - Slightly confident
   - Somewhat confident
   - Fairly confident
   - Completely confident

2. How confident are you in describing patient inclusion and exclusion criteria for an abdominal compression device?
   - Not confident at all
   - Slightly confident
   - Somewhat confident
   - Fairly confident
   - Completely confident

3. How confident are you when placing an abdominal compression device on a patient and adjusting it during a procedure?
   - Not confident at all
   - Slightly confident
   - Somewhat confident
   - Fairly confident
   - Completely confident

4. Which initiative did [project site] Health launch to support safety as a priority for both patients and staff members?
   e. Fall's Champions
   f. Safe Patient Handling
   g. Do No Harm
   *h. Commit to Zero**

5. Patient factors that can attribute to a difficult colonoscopy and looping
   g. Obesity
   h. History of diverticulitis
   i. Previous abdominal surgery
   j. First colonoscopy
   *k. A,B,C**
   l. All of the Above

6. Patient injuries resulting from improper manual abdominal pressure techniques include:
   f. Bruising and skin tears
   g. Splenic rupture and Abdominal Pain
   h. Colonic and liver perforation
   i. A and C
   *j. A and B**

7. When a provider requests manual abdominal pressure, the circulating nurse or technician should first ask?
    o. Where the scope is looped/located
    p. If the provider removed the air in the colon
    q. If the provider withdrew the scope to reduce looping
    r. The patient's relevant medical and surgical history
    s. A and D only
    *t. All of the above**

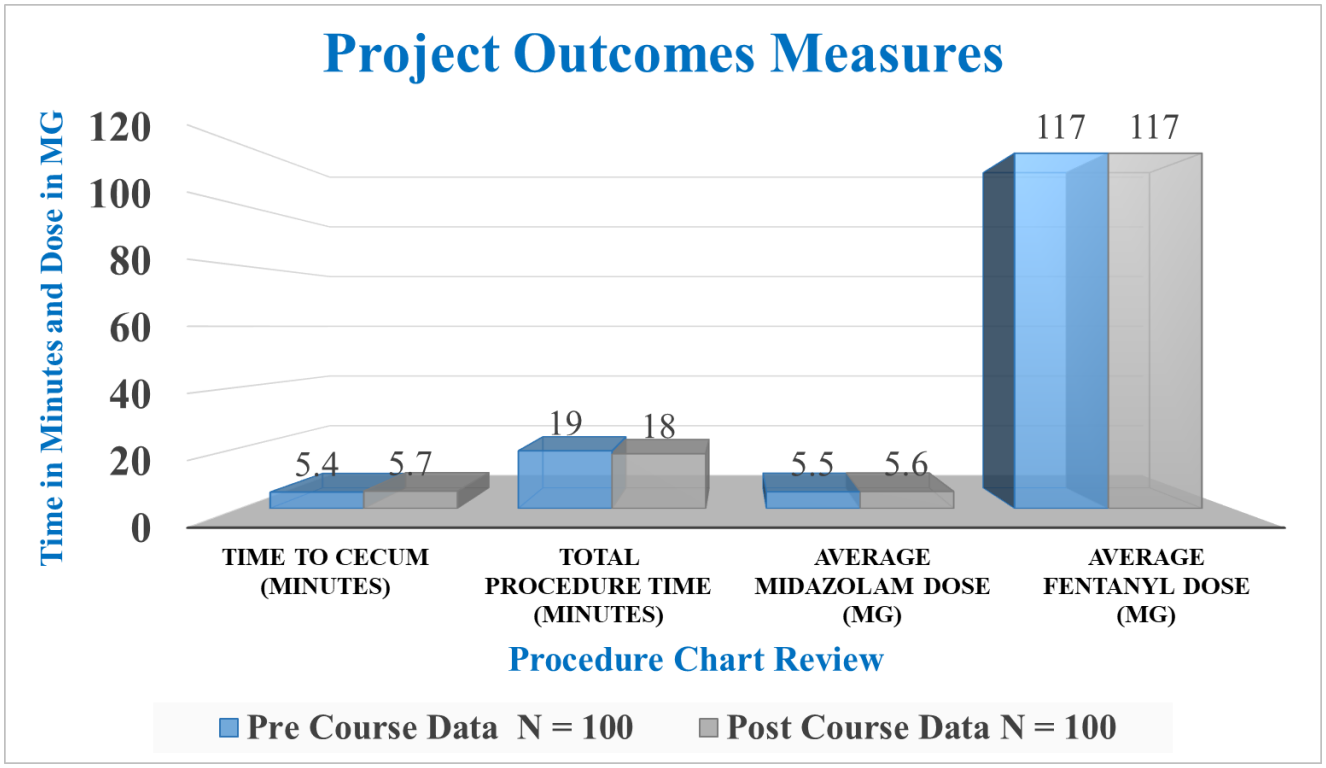
8. Which of the following question should you ask your patient to best determine their mobility status?
    u. Can you stand?
    v. Do you use a wheelchair?
    *w. How did you get into the wheelchair?**
    x. Can you walk?

9. The purpose of providing abdominal pressure during a colonoscopy is to
    y. Reduce bowel loops that form during the colonoscopy
    z. Prevent loops from forming as the scope is moved throughout the colon
    aa. Reduce the patient's sedation requirement
    *bb. All of the Above**

Note. Correct answers are noted in italicized font with an asterisk

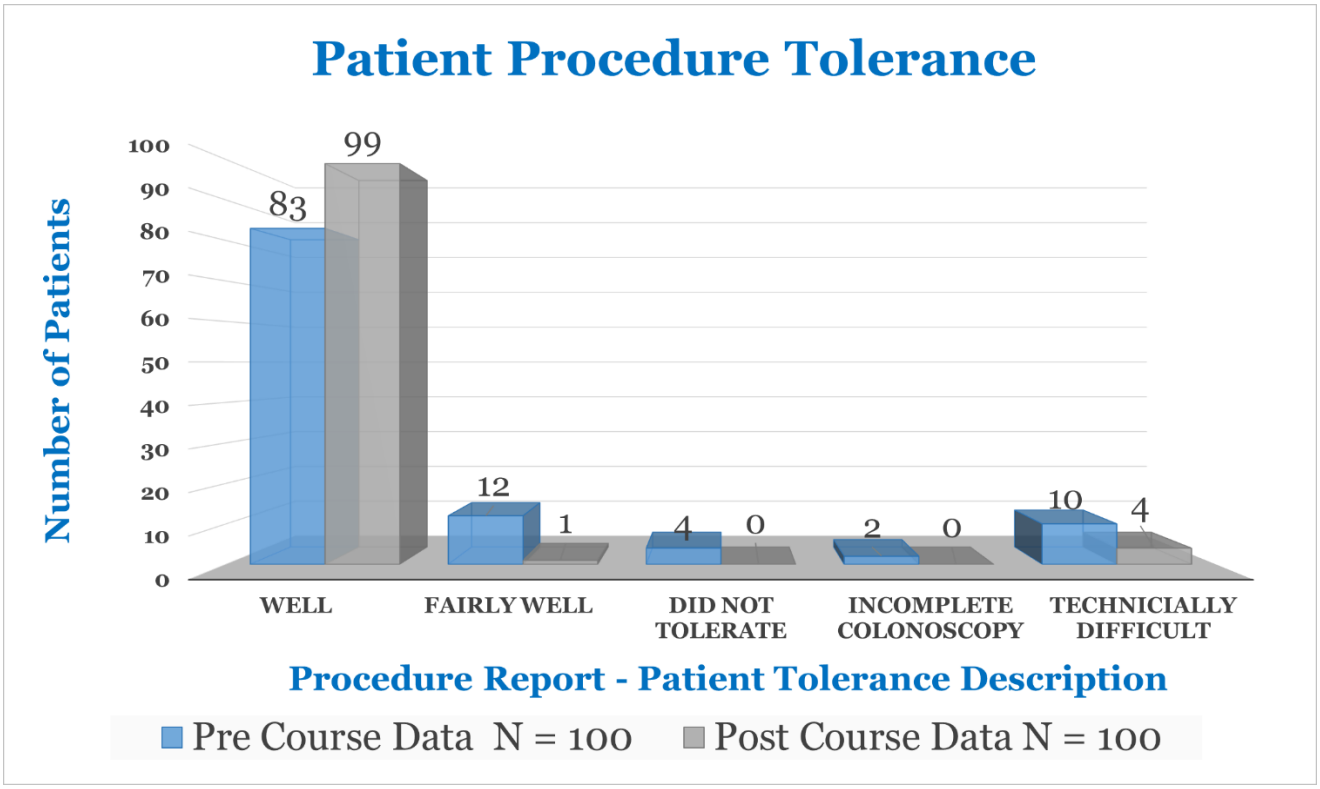
Appendix R

Post-Course Procedure Outcomes



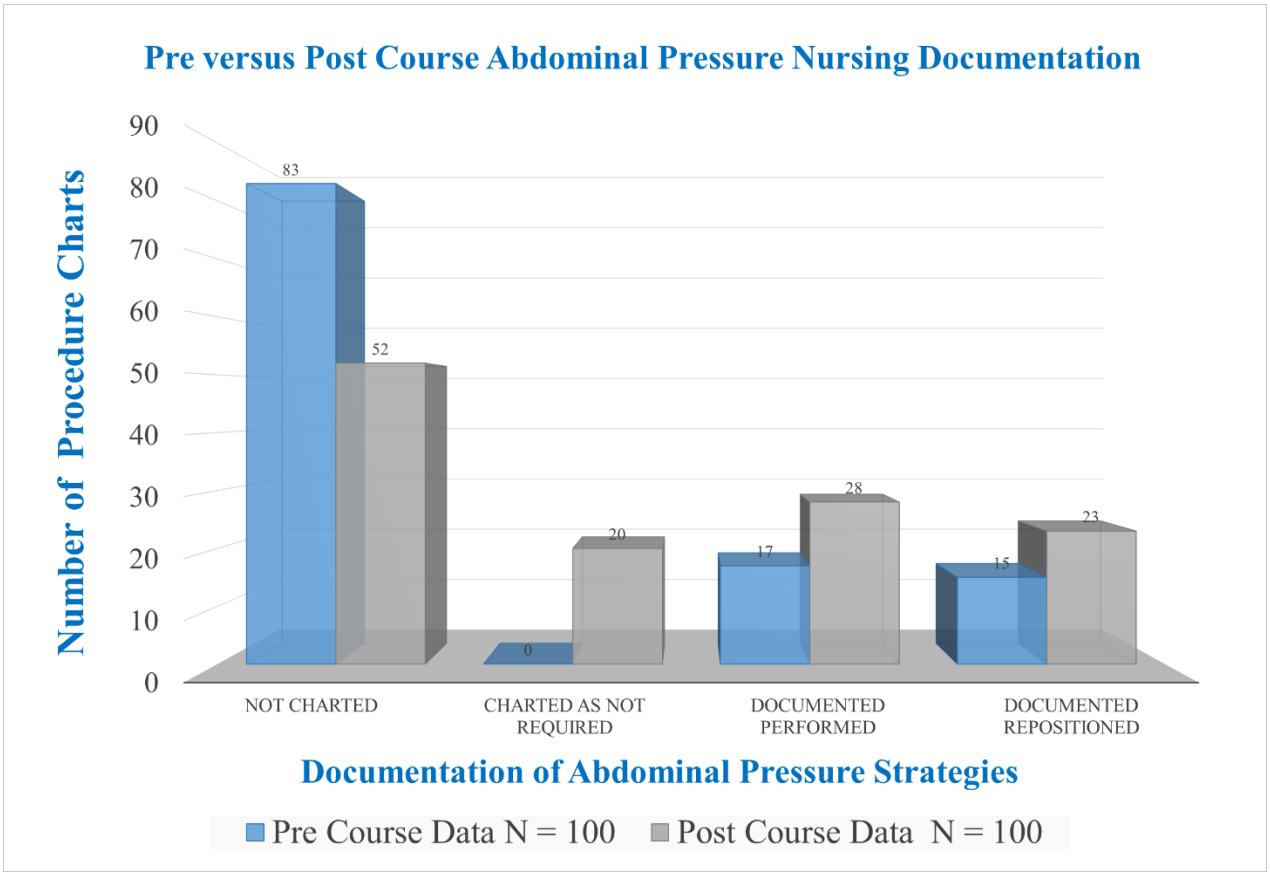
Appendix S

Patient Procedure Tolerance



Appendix T

Pre and Post-Course Nursing Documentation



Appendix U

Project Budget

Abdominal Pressure Educational Course Budget			
Item	**Cost**	**Quantity**	**Total**
Labor			
RN Staff Hourly Rate - Classroom Session (28) Three hours per staff for session and travel	$ 30.00	84	$ 2,520.00
RN Staff Hourly Rate - Simulation Training (20) Three hours per staff for session and travel	$ 30.00	60	$ 1,800.00
Project Team Member Hourly Rate - Meetings (2 people 6 meetings)	$ 30.00	12	$ 360.00
Project Team Member Hourly Rate - Course Three hours for two staff for session and travel	$ 30.00	6	$ 180.00
Simulation Medical Supplies			
Gloves (boxes)	$ 25.59	1	$ 25.59
PPE – Gowns, facemasks, and shields	$ 3.00	50	$ 150.00
Linen	$ 1.00	25	$ 25.00
Cleaning Supplies	$ 10.00	1	$ 10.00
IV Fluid Bag with IV Tubing	$ 5.00	2	$ 10.00
Simulation Training Devices			
Materials for Large Intestines Trainers	$ 25.00	2	$ 50.00
Printing			
Learner Materials - Handouts, Schedule, Case Scenarios	$ 0.07	200	$ 14.00
Lunch			
Pilot Site A - Learners, Faculty, Managers, & Physicians	$ 10.00	25	$ 250.00
Pilot Site B - Learners, Faculty, Managers & Physicians	$ 10.00	15	$ 150.00
Total			**$ 5,544.59**

Appendix V

Pre-Procedure Huddle Form

Colonoscopy Pre Procedure Huddle

Patient Assessment (If > two are checked, discuss use of colonoscopy compression device)

☐ Previous tortuous/difficult colonoscopy ☐ Prior incomplete colonoscopy
☐ Abdominal Surgeries _____ ☐ History of Diverticulitis
☐ Abdominal Hernia ☐ Truncal Obesity ☐ BMI Over 30 ☐ BMI less than 25

Tools

☐ Step Stool ☐ Wedge or Pillows ☐ Room set-up (monitors, IV poles/pumps, anesthesia cart)

Intra-Procedure Team Huddle

☐ Reason for procedure ☐ BMI ☐ Medical and surgical history
☐ History of difficult colonoscopy or incomplete colonoscopy

Immediately prior to manual abdominal pressure

☐ Where is the scope looping? ☐ Feel the patient's abdomen.
☐ Ask the provider to deflate the air in the colon.
☐ Ask the provider does the scope need to be withdrawn
☐ Place a pillow or wedge behind the patient's back for support.
☐ Reposition the patient – turn on side, cross patient's legs.
☐ Assess if you need to move any medical equipment
☐ Do you need a step stool? ☐ Do you need to raise or lower the stretcher height?

Appendix W

Doctor of Nursing Practice Essentials Map

	Description	Demonstration of Knowledge
Essential I ***Scientific Underpinning for Practice***	**Competency** – Analyzes and uses information to develop practice **Competency** -Integrates knowledge from humanities and science into context of nursing **Competency** -Translates research to improve practice **Competency** -Integrates research, theory, and practice to develop new approaches toward improved practice and outcomes	• Completed an extensive literature search and review on ergonomics, abdominal pressure strategies, and simulation training. • Developed a two-hour didactic and simulation course based on evidence-based practice and research.
Essential II ***Organizational & Systems Leadership for Quality Improvement & Systems Thinking***	**Competency** –Develops and evaluates practice based on science and integrates policy and humanities **Competency** –Assumes and ensures accountability for quality care and patient safety **Competency** -Demonstrates critical and reflective thinking **Competency** -Advocates for improved quality, access, and cost of health care; monitors costs and budgets **Competency** -Develops and implements innovations incorporating principles of change **Competency** - Effectively communicates practice knowledge in writing and orally to improve quality **Competency** - Develops and evaluates strategies to manage ethical dilemmas in patient care and within health care delivery systems	• Lead the project team, including a nurse, technician, ergonomic coach, and industry partner. • Presented the proposed DNP project for GI leadership for approval. • Completed CITI training to ensure compliance with IRB processes related to the project. • Coordinated schedules of project team and learners for multiple dates of classroom and simulation training sessions.
Essential III ***Clinical Scholarship & Analytical Methods for Evidence-Based Practice***	**Competency** - Critically analyzes literature to determine best practices **Competency** - Implements evaluation processes to measure process and patient outcomes **Competency** - Designs and implements quality improvement strategies to promote safety, efficiency, and equitable quality care for patients **Competency** - Applies knowledge to develop practice guidelines **Competency** - Uses informatics to identify, analyze, and predict best practice and patient outcomes **Competency** - Collaborate in research and disseminate findings	• Developed colonoscopy huddle form to reinforce staff learning and promote practice change. • Designed educational presentation content. • Designed simulation training content, including patient scenarios, pre-brief, and post-brief. • Presented DNP project outcomes to GI leadership, and ECU faculty. • Submitted podium presentation abstracts to the Society of GI Nurses and Associates and the American College of Gastroenterology.
Essential IV ***Information Systems – Technology & Patient Care Technology for the Improvement &***	**Competency** - Design/select and utilize software to analyze practice and consumer information systems that can improve the delivery & quality of care **Competency** - Analyze and operationalize patient care technologies **Competency** - Evaluate technology regarding ethics, efficiency, and accuracy	• Developed best practice for pre-procedure patient chart review • Initiated electronic health record project to integrate additional clinical assessment and information into the health system's electronic health record

Transformation of Health Care	**Competency** - Evaluates systems of care using health information technologies	
	Description	**Demonstration of Knowledge**
Essential V ***Health Care Policy of Advocacy in Health Care***	**Competency**- Analyzes health policy from the perspective of patients, nursing, and other stakeholders **Competency** – Provides leadership in developing and implementing health policy **Competency** –Influences policymakers, formally and informally, in local and global settings **Competency** – Educates stakeholders regarding policy **Competency** – Advocates for nursing within the policy arena **Competency**- Participates in policy agendas that assist with finance, regulation, and health care delivery **Competency** – Advocates for equitable and ethical health care	• The project outcome supports Health People 2030 and The Triple Aim by improving patient satisfaction, supporting population health, improving screening practices, decreasing patient risk, and decreasing healthcare costs. • This innovative project supports the health system's Magnet and Joint Commission accreditation standards.
Essential VI ***Interprofessional Collaboration for Improving Patient & Population Health Outcomes***	**Competency**- Uses effective collaboration and communication to develop and implement the practice, policy, standards of care, and scholarship **Competency** – Provide leadership to interprofessional care teams **Competency** – Consult intraprofessionally and interprofessionally to develop systems of care in complex settings	• Developed interprofessional relationships with ergonomist and two faculty at the College of Nursing Center for Nursing Discovery
Essential VII ***Clinical Prevention & Population Health for Improving the Nation's Health***	**Competency**- Integrates epidemiology, biostatistics, and data to facilitate individual and population health care delivery **Competency** – Synthesizes information & cultural competency to develop & use health promotion/disease prevention strategies to address gaps in care **Competency** – Evaluates, and implements change strategies of models of health care delivery to improve quality and address diversity	• Utilized Lewin's Change Theory to address barriers in practice change with physicians and clinical staff. • Managed practice change through observations, physician education, and staff support to improve abdominal pressure strategies.
Essential VIII ***Advanced Nursing Practice***	**Competency**- Melds diversity & cultural sensitivity to conduct a systematic assessment of health parameters in varied settings **Competency** – Design, implement & evaluate nursing interventions to promote quality **Competency** – Develop & maintain patient relationships **Competency** –Demonstrate advanced clinical judgment and systematic thoughts to improve patient outcomes **Competency** – Mentor and support fellow nurses **Competency**- Provide support for individuals and systems experiencing change and transitions **Competency** –Use systems analysis to evaluate practice efficiency, care delivery, fiscal responsibility, ethical responsibility, and quality outcomes measures	• Completed 200 retrospective chart reviews to compare pre and post-intervention data related to nursing documentation and patient outcomes • Supported an abdominal compression device trial at both pilot sites to reduce overtime costs, decrease procedure time, and improve unit efficiency.