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Improving Colonoscopy Bowel Preparation in Adults Undergoing Screening Through Health Literacy Education

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This is to certify that the doctoral study by

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has been found to be complete and satisfactory in all respects,
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Walden University
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Abstract

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MS, Walden University, 2015

BS, Georgia State University, 2011

Project Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Nursing Practice

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Abstract

Colorectal cancer (CRC) is the third leading cause of cancer-related deaths among men and women in the United States. Colonoscopy is the gold standard for CRC screening; however, the diagnostic efficiency of a colonoscopy is highly dependent on bowel preparation (prep) quality. Up to 30% of colonoscopy patients present with poor bowel prep. Poor bowel prep is a significant clinical practice problem that can lead to missed lesions, increased risk for CRC, increased risks for procedure-related complications, ineffective use of resources, and increased health care costs. A huge barrier to effective colonoscopy is low health literacy. This quality improvement project aimed to evaluate the effectiveness of health literacy teaching to staff nurses and its impact on bowel preparation in patients undergoing colonoscopies, using the health literacy framework as a guide. Retrospective bowel prep scores (December 2020; January 2021; February 2021) were compared to prospective bowel prep scores (May 2021; June 2021; July 2021) 3 months before and after health literacy teaching was given to the endoscopy staff. Bowel prep quality percentages significantly improved from month to month after health literacy teaching. Findings from the project conclude that health literacy teaching effectively improved bowel prep scores at the facility to the United States Multi-Society Task Force recommended benchmark of 85% in patients undergoing screening colonoscopies. Improved bowel prep increases the diagnostic efficiency of a colonoscopy, leading to decreased CRC related mortality among patients undergoing screening. Decreasing the incidence of CRC can lead to a healthier community capable of positive societal contributions.

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Dedication

I dedicate this work to my five wonderful children, Daijasia, Deashawn, Prince, Kamari, and Kimora-Marie. You have motivated me to accomplish great things, and I thank you. To my husband, Clinton, you are my rock. Thank you for supporting me in everything that I do. I love you all.

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The support I received throughout my educational journey was monumental. It is impossible to thank everyone personally; however, I would like to give my sincere gratitude to my parents, grandmother, siblings, and friends who were instrumental in this process. Thank you all for the love and support. I hope I have made you proud.

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Section 1: Nature of the Project

Introduction

Health literacy is an important determinant of health disparities among individuals (Rikard et al., 2016). Health literacy is defined as a set of literacy skills that motivates and enables patients to access, understand, and appraise health information to make health care decisions to promote health and prevent disease (Wittink & Oosterhaven, 2018). Patients with limited health literacy skills find it challenging to read, write, understand numeracy, and communicate effectively, leading to limited access to and understanding of health care information (Wittink & Oosterhaven, 2018). As a result, patients with limited health literacy are at risk for adverse health outcomes due to the inability to make effective health care decisions. Limited health literacy can constitute a barrier to effective screening colonoscopies. Colonoscopy instructions are complex, and patients with limited health literacy tend to have difficulty understanding patient education instructions (Liu et al., 2017). To improve bowel preparation (prep) in patients undergoing screening colonoscopies, staff education using a health literacy PowerPoint presentation was provided to the staff members in the endoscopy suite. The purpose of the doctoral project was to evaluate whether there was improved bowel prep among patients undergoing screening colonoscopy before and after the health literacy education. Section 1 of the paper will include the problem statement, purpose statement, the nature of the doctoral project, significance, and summary.

Problem Statement

Poor bowel prep is a common problem at the practice facility among patients undergoing a screening colonoscopy because of their limited health literacy. Most patients require tailored instructions that are consistent with their level of health literacy to carry out patient-related tasks. A large portion of the patients encountered are of low socioeconomic status at the practice facility, which is a known predisposing factor for poor bowel prep (Davis et al., 2017). Often, patients with limited health literacy fail to ask for clarification of instructions, likely due to self-consciousness or embarrassment (Menendez et al., 2017). Currently, there is no health literacy policy or procedure in place to address bowel prep. Nurses provide standard education from the colonoscopy preparation instruction sheet, and if the patients do not ask for further clarification, none is given. For this reason, the health literacy PowerPoint presentation was distributed to the endoscopy staff to increase their knowledge of limited health literacy and enable them to deliver patient education more effectively. The health literacy education PowerPoint is of great value to this organization and the patients they serve. The quality improvement project evaluated bowel prep quality before and after staff education to determine if the staff education improved bowel prep.

According to the American Cancer Society (2019), colorectal cancer (CRC) is the third leading cause of cancer-related deaths among men and women in the United States. Although there has been a decline in the death rate from CRC over the last several decades, CRC is estimated to have caused about 51,020 deaths in 2019 (American Cancer Society, 2019). The decline in CRC mortality is related to increased CRC screening and

detection and removal of precancerous polyps (American Cancer Society, 2019) by colonoscopy. The diagnostic capability of a colonoscopy is highly dependent on the bowel prep quality (Davis et al., 2017). Inadequate visualization of the colon mucosa can lead to missed precancerous lesions (Davis et al., 2017) and risk for developing CRC. The lifetime risk of developing CRC is about 1 in 22 (4.49%) for men and about 1 in 24 (4.15%) for women (American Cancer Society, 2019). Therefore, improving prep quality has great potential to decrease CRC and improve the community's health.

Nurses play a pivotal role in improving the health of the community. Improving the community's health will require increased awareness and participation in health promotion and disease prevention initiatives as recommended by *Healthy People 2030,* The Institute of Medicine (2004), *and The National Action Plan to Improve Health Literacy* (2010). Nurses must ensure that their patients are well informed and equipped with the knowledge and skills to make good health care decisions. Communication challenges related to low health literacy exist in all clinical settings, which justifies a need for continued health literacy education for nurses at every level (Wittenberg et al., 2018). Poor bowel prep is a significant nursing practice challenge and can have significant health consequences on the community. Identifying effective strategies to improve bowel prep can help identify nursing practice gaps and contribute to a healthier community. The ability of nurses to adapt to communication challenges associated with low health literacy and assess the patient's understanding is essential in providing high-quality nursing care (Wittenberg et al., 2018).

Purpose Statement

The purpose of this quality improvement project was to evaluate the effectiveness of health literacy education on improving colonoscopy bowel prep in patients undergoing screening colonoscopy. Adequate bowel prep has a significant impact on the accuracy and diagnostic yield of a colonoscopy. However, the literature reports that up to 30% of patients undergoing screening present with poor bowel prep (Davis et al., 2017). Optimal colonoscopy is dependent on adequate bowel prep, which allows for clear visualization of the colon to facilitate appropriate detection and removal of pre-cancerous lesions, which increases the effectiveness of the colonoscopy (Basch et al., 2014). If the bowel prep is inadequate, the endoscopist cannot visualize the colon adequately, increasing the risk of missing precancerous lesions that can potentially be harmful to the patient. Optimizing bowel prep quality is a significant component in improving the diagnostic yield of colonoscopies. The gap in practice was the ineffective delivery of patient education instructions and a lack of understanding of the preparation instructions by the patient. Patients with limited health literacy may have difficulty understanding written instructions and may require patient education to match their education level. The doctoral project contributed to filling the gap in practice by providing insight into the effectiveness of health literacy intervention and its role in addressing bowel prep quality.

The practice-focused question for the DNP project was, is health literacy education effective at improving bowel prep quality to the recommended 85% in adults undergoing screening colonoscopies? Poor bowel prep presents significant health and

financial implications, including increased health care costs and increased patient risks (Bechtold et al., 2016). A significant amount of research has been conducted over the years to address bowel prep (Bechtold et al., 2016), yet the challenge of meeting bowel prep recommendations is still evident. Bowel prep quality remains a significant indicator of a quality colonoscopy and timing of surveillance interval (Bechtold et al., 2016). This evidence-based project evaluated the effectiveness of health literacy education by determining if bowel prep improved.

Nurses must understand the need to use universal health literacy precautions with every patient and assume that every patient has low health literacy. Clinical staff must ensure that patients understand written instructions before leaving the facility and before their procedure. The Institute of Medicine (IOM) posited that even well-educated people with sufficient reading and writing skills might have difficulty comprehending medical instructions related to prescription drugs or procedures (IOM, 2004). Therefore, patients who can read and write adequately may still struggle to understand medical jargon and other medical-related terms. Research on health literacy suggests writing prep instructions at the fifth-grade level, which further enhances patient understanding of prep instructions (Bechtold et al., 2016). Ensuring that patients understand their prep instructions is a crucial nursing role. Empowering patients with the knowledge and tailored patient education instructions can lead to positive patient outcomes by improving health within the community. Also, community resources will be used more effectively, allowing for more adequate and timely screenings among citizens. Improving bowel prep can lead to decreased mortality from CRC, improved health among the population, and

more positive contributions to society, which is a significant contribution to the field of nursing practice.

Nature of the Doctoral Project

A literature review was conducted to understand the impact of education on limited health literacy and bowel prep. Sources of evidence for the doctoral project were obtained from EBSCOhost, Medline with full text, CINAHL Plus with full text, Academic Search Complete, Science Direct, and ProQuest. In addition, information collected from credible websites, such as the Centers for Disease Control and Prevention and the Agency for Healthcare Research and Quality, was used to guide the project. The search terms that were used are *inadequate colonoscopy preparation, suboptimal bowel preparation, poor bowel cleansing, poor bowel preparation, limited health literacy*, and *patient education instructions*.

Next, I analyzed and synthesized the literature to gain insight. The staff was given a self-administered health literacy PowerPoint education presentation (Appendix A) highlighting the impact of limited health literacy and how it can impact patient outcomes by limiting their abilities to follow patient education instructions. The education information reflected evidence-based strategies recommended by the Agency for Healthcare Research and Quality (AHRQ) Health Literacy Universal Precautions Toolkit (2015). The AHRQ recommends using universal health literacy precautions, assuming that all patients lack health literacy; thus, communication should be delivered in a comprehensible way (AHRQ, 2015). The educational information also addressed the importance of improving health literacy within the facility, the effects of limited health

literacy on bowel prep, and its relation to health care costs. The effectiveness of the self-administered staff education PowerPoint was evaluated to determine whether the education contributed to improved bowel prep quality. Retrospective data on bowel prep 3 months before the educational session was compared to prospective data obtained 3 months after the educational PowerPoint was given. The de-identified data were obtained from the manager of the endoscopy clinic for analysis.

Poor bowel prep is well documented in the literature as the most frequently cited cause for inadequate colonoscopy (Davis et al., 2017). A strong predictor of poor bowel prep is the inability or lack of comprehension to follow patient instructions (Davis et al., 2017). Furthermore, the literature has correlated limited health literacy to the inadequate interpretation of health information, insufficient adherence to screening recommendations, poorer health outcomes, and increased health care costs (Davis et al., 2018). The purpose of the doctoral project was to evaluate whether there was improved bowel prep among patients undergoing screening colonoscopy before and after the health literacy education.

Significance

Stakeholders for the quality improvement project include doctors and nurses in the endoscopy suite, the patients, and the entire local community. The patients are the primary stakeholders. Improved bowel prep will benefit the patients by decreasing procedure-related harm due to frequent unnecessary testing (Liu et al., 2017). In addition, improving the diagnostic yield of colonoscopies can lead to increase detection of precancerous polyps (Basch et al., 2014), early diagnosis of CRC, and decrease mortality

related to CRC (American Cancer Society, 2019). Doctors and nurses in the endoscopy suite are secondary stakeholders. They will benefit from improved diagnostic yield, better patient outcomes, and meet current bowel prep recommendations outlined by multiple gastroenterology societies. Improving bowel prep will also benefit the community by allowing for more effective and timely screenings among community residents and decreased CRC within the population leading to a healthier community.

Improving health literacy and clinical outcomes is essential in nursing practice. Nurses are at the forefront in most healthcare settings. One of the significant core functions in nursing is to provide adequate education to patients that will allow and empower them to make meaningful healthcare decisions to improve overall health. Evaluating the effectiveness of education on limited health literacy and its impact on poor bowel prep can help identify gaps in nursing practice and allow for more appropriate strategies to address bowel prep challenges. This quality improvement project has the potential to help nurses identify their own limitations and better understand the challenges of delivering practical patient education instructions. The project can also contribute to nursing practice by highlighting and bringing awareness to the impact of limited health literacy and its relationship to poor bowel prep. Increased awareness of the impact of education on limited health literacy and poor bowel prep can play a significant role in developing future nursing interventions. Nurses do not routinely receive health literacy education as part of their professional training (Wittenberg et al., 2018), contributing to inadequate skills to manage those vulnerable patients who lack health literacy. In addition, studies have suggested that nurses are well aware of the importance

of health literacy but lack the education and skills (Wittenberg et al., 2018) necessary to support their effort to deliver health literate care.

Evaluating the impact of education on improving clinical practice challenges is applicable in every healthcare setting. The current quality improvement project evaluated the effectiveness of education on limited health literacy and its impact on poor bowel prep in the endoscopy suite; however, the same concept can apply to other clinical settings. For example, in primary care settings, chronic disease management is dependent on patient literacy. To manage chronic disease, individuals must have the ability to understand, evaluate, and use health information (Van der Heide et al., 2018). If patients do not adhere to treatment regimens due to the inability to comprehend teaching, chronic diseases are likely to be poorly managed.

The quality improvement project aimed to address poor bowel prep, which has several potential implications for positive social change. First, improved bowel prep improves diagnostic efficiency, leading to decreased mortality among patients undergoing colonoscopy (Liu et al., 2017). Decreasing the incidence of CRC can lead to a healthier community capable of positive societal contributions. Second, improving bowel prep will decrease unnecessary repeat screenings, allowing for more effective use of community resources, which is sometimes scarce, especially in low-income communities. Improving bowel prep will help to cut healthcare spending and increase the availability of resources, which can potentially increase the number of patients participating in CRC screening, improving the community's health. Evaluating the effectiveness of education on limited health literacy and improving bowel prep is

valuable among patients undergoing colonoscopy and poses significant implications for positive social change. Improving the community's overall health will have a substantial impact on promoting social change within the local community.

Summary

CRC remains a leading cause of cancer-related deaths among men and women (American Cancer Society, 2019). CRC mortality has declined in recent years due to increased screening tests such as colonoscopies. Effective screening colonoscopies can help to decrease CRC related mortality; however, a significant barrier to adequate screening is poor bowel prep. One of the major contributors to poor bowel prep is the patient's inability to understand procedure-related instructions due to limited health literacy. Poor bowel prep can negatively impact patient outcomes by increasing harm to patients during frequent repeat procedures and can increase the risk of CRC due to missed lesions. To improve bowel prep, health literacy intervention is critical. Evaluating the effectiveness of health literacy education helped to determine whether it improved staff knowledge, enhanced delivery of colonoscopy prep instructions, and ultimately improved bowel prep among patients presenting for colonoscopy. Section 2 will discuss the concepts, models, and theories, relevance to nursing practice, local background and context, and role of the DNP student.

Section 2: Background and Context

Introduction

According to the American Cancer Society (2019), CRC is the third leading cause of cancer-related deaths among men and women in the United States. Over the last several decades, there has been a significant decrease in CRC related deaths due to increased use of screening methods such as colonoscopies; however, despite the decline in mortality, CRC was estimated to have caused about 51,020 deaths in 2019 (American Cancer Society, 2019). The reduction in recent mortality is related to an increase in CRC screening and detection and the removal of precancerous polyps with colonoscopy (American Cancer Society, 2019). Adequate bowel prep is a significant factor in optimizing the diagnostic yield of colonoscopy. The effectiveness of colonoscopy is highly dependent on the patient and their comprehension of procedure-related instructions. Patients with limited health literacy require simple instructions to match their cognitive ability. Health literacy education can improve patient outcomes (AHRQ, 2015) by improving the way patient education is delivered, which can result in improved patient compliance, a better understanding of bowel prep instructions, and improved bowel prep in patients undergoing screening colonoscopy. The purpose of the DNP project was to evaluate the effectiveness of health literacy education on improving bowel prep in patients ages 50-75 years old undergoing screening colonoscopy. The practice-focused question for the DNP project is, was health literacy education effective in improving bowel prep quality to the recommended 85% in adults undergoing screening

colonoscopies? Section 2 addresses concepts, models and theories, relevance to nursing practice, local background and context, and role of the DNP student.

Concepts, Models, and Theories

The conceptual framework that informs the doctoral project is the health literacy framework developed by the IOM (2004). The constructs of the framework include literacy, health literacy, the individual, health care contexts, and healthcare outcomes and costs. Literacy is the basic skills such as reading, writing, mathematics, speech, and comprehension skills, and is identified as the foundation of health literacy (IOM, 2004). The IOM defined health literacy as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health care decisions" (2004, p. 32). The individual is the person who seeks care within the health care context. The health care context is any facility or media that the individual interacts with regarding health care needs and includes the physician, practitioners, nurses, and other healthcare staff. Such facilities should provide necessary health information in a manner appropriate for the individual (IOM, 2004). Health care outcomes measure the impact or result of health care services, and costs are related to healthcare expenditure.

The framework link health literacy to individual attributes, positing that an individual's cognitive ability and skills vary, and those with limited health literacy tend to have difficulty navigating the health care context. Health literacy is the active mediator between individuals and the health care context (IOM, 2004). As a result, patients with limited health literacy will likely have difficulty in comprehending patient education

materials and making educated health care decisions to improve their health. The health care context (healthcare organization) has a responsibility to ensure patients have adequate education to assist them in carrying out patient-related tasks.

The IOM identified three critical sectors as potential intervention points, which can possibly improve health literacy, that include the health care system, culture and society, and the education system (2004). Culture is the shared ideas, values, and beliefs acquired within the community. These views and values can play a significant role in motivating and encouraging patients to act on health-related activities. The education system includes the school system, which is grades K-12, education programs, and any higher education attainment; K-12 is the foundation of necessary literacy skills, which is responsible for the comprehension of more challenging skills that include understanding and interpreting (IOM, 2004). The education system is a critical component of developing health literacy and can provide some insight as to why those of low socioeconomic status and low educational attainment will likely experience limited health literacy. Lastly, the health care system or context, which includes the staff who provide patient care and education, also plays a significant role in addressing an individual's health literacy needs. The IOM holds the view that health literacy improvement is the responsibility of all three sectors (2004).

The health literacy framework aligns perfectly with the doctoral project to address limited health literacy and improve bowel prep through education and the understanding of shared responsibilities. The health literacy framework supports the DNP project as it highlights the importance of health literacy and its relationship to patient outcomes.

Although a causal relationship between health literacy and patient outcomes is not yet established, there is an acknowledgment that suggests a causal connection between the two (IOM, 2004). The framework also supports the notion that the health care system has a responsibility to address health literacy by empowering patients with the knowledge and skills needed to carry out healthcare-related tasks. The concepts within the health literacy framework supports the DNP project by demonstrating that healthcare organizations have a critical opportunity to ensure that health literacy is recognized as a necessary component in the delivery of high-quality patient care services.

Relevance to Nursing Practice

Improving the quality of colonoscopy bowel prep is relevant to nursing practice as evident by continued reported rates of inadequate bowel cleansing. Poor bowel prep is a significant problem in the clinical setting today, with evidence reporting that up to 30% of patients undergoing colonoscopy present with poor bowel prep (Hernández et al., 2019; Davis et al., 2017). Inadequate bowel prep is a significant issue as bowel prep is one of the most important factors when evaluating the quality of a colonoscopy (Hernández et al., 2019). Poor bowel prep decreases the diagnostic yield of a colonoscopy, which puts patients at increased risks for cancer (Hernández et al., 2019; Liu et al., 2017). In addition, poor bowel prep leads to prolonged procedure times, shorter follow up interval, and increased colonoscopy cost (Elvas et al., 2016). Limited health literacy is a known contributor to poor bowel prep (Ojinnaka et al., 2015), affects patient care in almost every health care setting, and is essential to managing chronic diseases (Van der Heide et al., 2018). As chronic diseases increase globally, lawmakers and

healthcare professionals place new emphasis on addressing health literacy, understanding that health literacy is an important determinant of disease management and patient outcomes (Van der Heide et al., 2018). Health literacy is often considered as an individual attribute; however, to improve the health of the population and patient outcomes, nurses must view health literacy as a dynamic construct that involves the patients, the organization, the healthcare system, and healthcare professionals (Van der Heide et al., 2018).

Nurses are universally recognized in healthcare as patient educators and must clearly understand limited health literacy and its impact on patient outcomes. Nurses must understand how limited health literacy correlates to the patient's understanding of education materials. Health literacy is vital in nursing and all practice settings and is considered a fundamental component of patient education. For instance, several professional organizations (AHRQ, 2015; HHS, 2010; IOM, 2004) have taken a stance on how patient education is delivered, citing that education materials should be delivered using health literacy universal precautions. Universal precautions include avoiding medical jargon, simplifying instructions, and using the teach-back which cycle (Wittink & Oosterhaven, 2018). Wittink and Oosterhaven (2018) cited a systematic review that concluded that limited health literacy is associated with increased hospitalizations and increased emergency room services use. The authors further posited that limited health literacy was associated with suboptimal use of preventative services such as screening mammograms and participating in influenza vaccinations (Wittink & Oosterhaven, 2018). There were also reports of insufficient ability to demonstrate appropriate

medication techniques, inability to interpret health labels and messages, and overall inferior health status and mortality rates among the elderly (Wittink & Oosterhaven, 2018). Thus, limited health literacy affects nursing care at all levels and is a top priority in healthcare.

More than 80% of U.S. adults have limited or marginal health literacy (Ojinnaka et al., 2015), limiting their ability to use health information adequately (Institute of Medicine, 2004). Limited health literacy is identified in the literature as a barrier to effective screening colonoscopy (Ojinnaka et al., 2015); it can negatively affect patient safety and result in poor health outcomes (Klingbeil, & Gibson, 2018). Limited health literacy correlates to inadequate screening colonoscopy rates, especially in those patients with lower educational attainment (Ojinnaka et al., 2015). As previously reported, inadequate bowel preparation in patients undergoing screening colonoscopy is about 30% (Hernández et al., 2019; Liu et al., 2017). The United States Multi-Society Task Force (USMSTF), which includes members from the three major gastrointestinal societies, has an established benchmark for prep quality of 85% for endoscopy centers (ASGE, 2014). Hence, the target goal for endoscopy suites as set by multiple gastroenterology societies is about 10-15% (Hernández et al., 2019). As a result, endoscopy suites are not meeting targeted goals when it comes to quality colonoscopies. One recommendation to improve patient care outcomes is to improve communication style among nurses and other support staff in clinical practice by enhancing education delivery to facilitate sufficient comprehension.

Health literacy in the context of patient-centered care is one of the most challenging issues within healthcare today (Klingbeil & Gibson, 2018). Patient education instructions delivered during patient encounters should be delivered in a way that is understandable; otherwise, the information is useless. Nurses hold the responsibility of ensuring that patients understand patient education materials. Nurses will require appropriate knowledge and training to address the day-to-day clinical challenges surrounding limited health literacy. Training nursing in effective communication techniques is warranted to improve health outcomes. The literature reports that great emphasis is emerging on system-wide interventions to enhance communication among nurses, patients, and their families (Klingbeil & Gibson, 2018). Previous health literacy strategies analyzed included using plain language, writing prep instructions in plain, basic, and uncomplicated form (Bechtold, 2016), and using teach back methods. The use of open-ended questions with every patient regardless of their perceived health literacy level is highly recommended (Klingbeil & Gibson, 2018). Other studies highlighted strategies that included enhanced education, adjusting the timing of bowel prep, splitting the dose of the prep into two, and taking the last half of the prep 3 to 5 hours before the colonoscopy versus one single dose (Hernández et al., 2019; Liu et al., 2017). The use of various laxatives and adjuvants have also been studied (Hernández et al., 2019).

The doctoral project aimed to evaluate the effectiveness of health literacy education on improving bowel prep quality in patients undergoing screening colonoscopy. The knowledge gained from evaluating the effectiveness of health literacy education will help to improve the clinical processes among patients undergoing

screening colonoscopies. Effective communication by health care providers is identified as a cornerstone intervention for enhancing patient instructions during health-related encounters (Klingbeil & Gibson, 2018). Improving the way nurses communicate to their patients can ensure that patients leave the healthcare setting knowing what is expected of them, leading to improved safety and quality of health care supported by the national action plan to improve health literacy (Klingbeil & Gibson, 2018).

Local Background and Context

Health literacy is a strong determinant of health outcomes (Hughes, 2017). Limited health literacy is a national problem that has prompted local and federal entities to develop initiatives to help combat the problem. In the region where the clinic is located, the governor declared October the month of health literacy to bring awareness among health care providers. During October, various educational sessions are held to bring awareness to limited health literacy and its impact on patient outcomes. Training sessions are conducted to assist health care providers with practical strategies to use in the clinical setting.

The local clinic, a public facility, is located in a large metropolitan healthcare facility in the Southeast and provides services to many uninsured and underserved minority patients. Due to the large homeless population that the clinic serves, there is a considerable problem with limited health literacy and inadequate support to complete patient-related tasks. Most of the patrons who are served at the local clinic have low education attainment, are unemployed, have Medicaid insurance, or have no insurance. Poverty stricken individuals tend to lack adequate knowledge to navigate the complex

healthcare system (Williams et al., 2018). Most of the homeless population are subjected to mental illness and drug and alcohol abuse (Dolce et al., 2018), which can also play a role in using health-related screenings and compliance with health-related instructions. At the current facility, the most frequently reported barrier identified among those presented with poor prep on the day of colonoscopy is inadequate understanding of patient education instructions. Inability to follow patient education instructions are consistent with the literature as limited health literacy is frequently cited as a common factor associated with poor bowel preparation (Davis et al., 2017).

The National Action Plan to Improve Health Literacy is a national initiative developed by the United States Department of Health and Human Sciences (HHS) (2010). The plan outlines several goals and practical strategies to help achieve them. One of the plan's strategies includes promoting health care changes that will improve health information, communication, informed decision making, and access to healthcare services. Other essential strategies include expanding local efforts to provide adult education and culturally appropriate health information services in the community, increase basic research and the development, implementation, and evaluation of practices and interventions to improve health literacy. Also highlighted is the importance of increasing the dissemination and use of evidence-based health literacy practices and interventions (U.S. Department of Health and Human Sciences, 2010). These strategies describe actions that organizations and health care professionals can employ to target limited health literacy and improve outcomes effectively. Gastroenterology societies have conceded regarding the importance of adequate bowel prep and the role health literacy

plays in comprehending patient education instructions (ASGE, 2014). The CDC has also outlined the importance of proper bowel cleansing and healthcare providers' need to address barriers that limit effective bowel cleansing. The CDC's factors include ensuring that prep instructions are written at appropriate literacy levels and with appropriate patient navigators to ensure that patient barriers are limited (CDC, n.d.).

Role of the DNP Student

As an advanced practice registered nurse working in gastroenterology, I am well aware of the clinical challenges surrounding limited health literacy. I have a combined nursing experience of 10 years, which includes five years as a critical care bedside nurse working in the surgical intensive care unit. Subsequent years of experience consist of advanced practice nursing, working as a nurse practitioner in the outpatient gastrointestinal clinic at the practice site. I have spent extensive time working with the uninsured and underserved population, with most of them lacking adequate health literacy.

As the project leader, my role was to evaluate the effectiveness of health literacy education by analyzing retrospective data on the facility's bowel prep quality 3 months prior to education and comparing it to prospective data 3 months after education was given. I developed and distributed an evidence-based staff education PowerPoint addressing the importance of health literacy and demonstrated how limited health literacy correlates to poor adherence to bowel cleansing instructions (King-Marshall et al., 2016). Evaluating the effectiveness of health literacy education helped to determine the effectiveness of staff education in the clinical setting to improve patient understanding of

procedure instructions, ultimately improving bowel prep. Health literacy interventions can ultimately lead to a greater understanding of procedure instructions and improve bowel prep quality (King-Marshall et al., 2016). I assessed the effectiveness of the education by comparing retrospective bowel prep data 3 months prior to staff education to prospective bowel prep data 3 months post education to determine if the staff education session had any impact on improving bowel prep quality. The bowel prep data include the total number of patients scoped for a particular month and the number of patients who requires follow up colonoscopy due to inadequate prep at the time of study.

My current role as a gastroenterology nurse practitioner has motivated me to conduct this project. There is a frequent repetition of patients referred to the clinic due to inadequate screening colonoscopy secondary to poor bowel prep. Inadequate screening leads to an excessive number of referrals for repeat screenings, which can negatively impact the facility's use of resources and indirectly cause longer wait times for patients to be seen. Most of the patients admit that they did not understand the prep instructions during these patient encounters. Given the frequency of occurrence, I was motivated to conduct this project to identify barriers and possible interventions to rectify the organization's issues.

My passion for caring for those with limited health literacy and the desire to improve clinical outcomes may present a particular bias. However, when implementing the project, I plan to limit bias by avoiding personal subjective views and relying only on proven scientific data (Murad, 2017). By utilizing scientific evidence and avoiding personal opinions, bias can be limited. Using evidence-based guidelines and interventions

with proven benefits when developing the educational materials will also help limit bias (Murad, 2017).

Role of the Project Team

The project team consists of myself as the project leader and the nurse champion. The nurse champion is the nurse manager in the endoscopy suite. Nurse champions are resourceful in that they can be effective agents of change by promoting project-related improvements (Sloan & Dudjak, 2020). The nurse champion was responsible for collecting and providing de-identified data to the project leader. The nurse champion also delivered the Power Point presentation to each staff member in the endoscopy suite through electronic mail. The Nurse champion was resourceful given that she is well connected to the organization's staff and resources (Luz et al., 2021).

Summary

The health literacy framework is an appropriate framework to address the literacy challenges surrounding bowel prep as inadequate bowel prep is strongly associated with inadequate literacy skills, a known barrier to prep compliance. The health literacy framework's constructs align well with the DNP project and serve as a practical guide when evaluating the effective of health literacy education and its impact on poor bowel prep. Health literacy and the ability to comprehend patient education instructions are very relevant to every nursing practice setting. To promote high-quality care, nurses must understand the role that health literacy plays in achieving quality patient outcomes. The practice site's local background and context are important to better understand how the practice issue impacts the community and the patients that receive care. Patient

demographics at the practice facility are important factors to consider when analyzing the barriers contributing to poor bowel prep, allowing for appropriate interventions. The local background and contextual issues surrounding poor bowel prep and limited health literacy is a national problem. Analyzing national agendas and guidelines to address poor bowel prep and limited health literacy offers appropriate interventions to rectify issues locally. Section 3 addresses the collection and data analysis methods used to support the project question. The sources of evidence used to support the DNP project are discussed. Finally, an analysis and synthesis of the evidence that supported the project question are provided.

Section 3: Collection and Analysis of Evidence

Introduction

CRC is preventable if adequate and timely screenings are done. Colonoscopy remains the gold standard screening method (Spada et al., 2018), and is highly effective at identifying and removing early precancerous lesions. Adequate bowel prep is mandatory to maximize the benefit of colonoscopy, yet the literature reports up to 30% of patients undergoing screening presents with poor bowel prep (Davis et al., 2017). Inadequate bowel prep leads to missed lesions; increases risks for procedure-related complications due to frequent and unnecessary repeat procedures; ineffective use of resources; and increased health care costs (Basch et al., 2014; Liu et al., 2017). An important strategy to achieving optimal bowel prep is to deliver patient education instructions in a way that is appropriate for the patient's cognitive ability. Patients with limited health literacy tend to have difficulty with bowel prep compliance due to difficulty understanding patient education instructions (Liu et al., 2017). The DNP project aimed to evaluate the effectiveness of health literacy education given to staff nurses and its impact on bowel prep. Health literacy education familiarized the staff on the impact of limited health literacy and provided them with evidence-based strategies to deliver effective patient education. Section 3 restates the practice-focused question, highlights the sources of evidence, discusses analysis and synthesis, and summarizes the doctoral project.

Practice-Focused Question

Since colonoscopies are the gold standard for CRC prevention, optimal delivery of patient education is necessary to ensure adequate patient compliance with procedure-related instructions. The local practice facility experiences challenges meeting the USMSTF recommended 85% bowel prep quality benchmark for endoscopy centers (ASGE, 2014). There are frequent referrals for patients to re-screen at sooner intervals due to inadequate bowel prep, which is the most frequently cited cause for unsatisfactory colonoscopy procedures (Davis et al., 2017). A known barrier for achieving adequate bowel prep is patient noncompliance due to limited health literacy and inability to carry out patient-related tasks. Hence, the practice-focused question for the DNP project is, was health literacy education given to staff nurses effective at improving bowel prep quality to the recommended 85% as recommended by the USMSTF in adults undergoing screening colonoscopies?

Poor bowel prep is a serious clinical issue and can negatively impact the quality and effectiveness of colonoscopies. Bowel prep instructions can be challenging to understand, especially for patients with limited health literacy. A patient's understanding of procedure-related instructions is essential, and the inability to comprehend and effectively carry out patient-related tasks is a strong predictor of poor bowel prep (Davis et al., 2017). The health literacy education PowerPoint was distributed to the endoscopy staff to make them aware of the impact of limited health literacy and the impact it has on patient outcomes, and their ability to carry out patient related tasks. The effectiveness of this education was evaluated to determine if the education was successful at improving

the facility's bowel prep quality. The health literacy education was given to the staff nurses to help simplify the way colonoscopy instructions are delivered to patients. Addressing limited health literacy and providing more effective communication strategies to the endoscopy staff will help them deliver education effectively.

Operational Definitions

Bowel prep quality: The bowel prep quality is described using the following terms recommended by the USMSTF on CRC screening. An "adequate or optimal" examination means masses or lesions greater than five millimeters (mm) were generally not obscure based on bowel prep (Davis et al., 2017). An "inadequate or suboptimal" exam means that masses or lesions five mm or larger could have been missed due to poor preparation (Davis et al., 2017), requiring repeat colonoscopy for optimal study.

Sources of Evidence

The evidence that supports the DNP project was obtained using multiple search engines and databases, including EBSCOhost, CINAHL Plus with full text, ProQuest, Medline with full text, Academic Search Complete, and Science Direct. The search terms that were used were *limited health literacy, low health literacy, health literacy, inadequate bowel preparation, poor bowel preparation, colonoscopy bowel preparation, screening colonoscopy, colonoscopy barriers,* and *health literacy education*. The initial search was limited to only full-text articles, peer-reviewed scholarly journals, and publication dates between 2015 to 2020. Exclusion criteria included articles that were not written in the English language and bowel prep strategies that did not have education as

an intervention. A total of 343 articles were reviewed, of which 25 were selected based on the inclusion criteria to support the project.

Shah-Khan et al. (2017) used the plan-do-study-act approach to improve bowel preparation at the Department of Digestive Diseases at West Virginia University. The researchers assessed the main factors that contributed to inadequate bowel prep by interviewing staff members who participate in the colonoscopy process (Shah-Khan et al., 2017). During the assessment, it was determined that patients, nurses, and physicians lacked adequate knowledge and understanding of the bowel prep process (Shah-Khan et al., 2017). Education was given to the staff verbally, followed by written handouts. Baseline measurement of prep quality was analyzed from November 2016 to January 2017 with an average of 19% inadequate prep. following staff education, the percentage of poor prep decrease to 11% the month following the intervention. Additional interventions included direct verbal patient education to address the importance of adequate bowel cleansing at the beginning of the third month. A patient education handout was also distributed to the patients. Bowel prep recorded at the end of the month following the education was 12% which was also lower than the 3-month average (19%) before any intervention. This study aligns well with the DNP project as it highlights the impact of education to nurses, providers, and patients as a critical component in decreasing the rate of poor prep (Shah-Khan et al., 2017).

Hernández, et al. (2019) reviewed several studies that analyzed the risk factors associated with poor bowel prep and shared strategies to improve bowel prep. Educational interventions were cited as an appropriate intervention to enhance bowel

prep. Two meta-analyses found significantly better bowel prep quality in patients who received enhanced educational interventions to increase knowledge and awareness than those who received traditional education alone (Hernández et al., 2019). In addition, the review highlighted several randomized controlled trials that reported improved bowel prep when additional individualized verbal education was given by trained staff such as nurses or physicians (Hernández et al., 2019). This article aligns well with the DNP project because it shows the importance of literacy interventions and their impact on bowel prep quality as described in the project. The article also brings awareness that for staff members to educate their patients properly, they must also be educated and trained appropriately, which empowers them to be effective teachers.

Davis et al. (2017) aimed to improve colonoscopy bowel prep by evaluating the effectiveness of a health literacy-directed bowel prep instruction sheet. The study found that the patients who received the simplified instructions, which consisted of literature written at the 6th-grade level, had better prep quality, were significantly more prepared for their procedures, and were less likely to cancel their procedure (Davis et al., 2017). Implementing a simplified instruction sheet is highly cost-effective and could be beneficial in facilities where finances are limited. This study supports the DNP project by demonstrating that health literacy interventions can effectively improve bowel prep in colonoscopy patients while lowering costs. The study also supports the idea that many patients have low health literacy and simplifying instructions can help to promote better compliance with bowel prep, thus improving its quality.

Liu et al. (2020) conducted a randomized controlled study to determine whether the education provided to ward nurses would improve bowel prep among inpatients undergoing colonoscopy. One hundred ninety patients who underwent colonoscopy from March 2019 to March 2020 were randomly chosen for the study and placed into two groups. The control group (nurses who did not receive additional training) had 101 patients, and the educated group (nurses who received the enhanced education) had 89 patients. The study concluded that the patients in the informed group had significantly better bowel prep quality than the control group resulting in lower rates of adverse events (Liu et al., 2020). This study supports the DNP project by demonstrating that enhanced education and staff nurse training has the potential to improve bowel prep and lead to better patient outcomes among colonoscopy patients.

Alvarez-Gonzalez et al. (2016) conducted a randomized, single-blind study, which aimed to determine if a diabetic-specific protocol would improve bowel prep among patients with diabetes undergoing colonoscopy. The study highlighted the importance of adequate bowel preparation and diagnostic capabilities of colonoscopies. The study included 150 patients who were randomly placed into two groups, the control group (conventional prep) and the diabetes-specific group (Alvarez-Gonzalez et al., 2016). The diabetes-specific group received multiple strategies, including an educational intervention consisting of a face-to-face visit with a qualified staff nurse who provided written and oral education on bowel preparation, low fiber diet, and specific medication adjustments. The control group did not receive the educational intervention (Alvarez-Gonzalez et al., 2016). The study found the group who received the educational

intervention showed a threefold reduction in the rate of inadequate bowel prep (Alvarez-Gonzalez et al., 2016). This article supports the DNP project because it demonstrates how education provided by qualified, trained nurses can effectively improve bowel cleansing in patients undergoing colonoscopy. The DNP project aimed to improve bowel prep by evaluating the effectiveness of health literacy education given to staff nurses. By educating and training nurses on the importance of limited health literacy, they will be better prepared to train and educate their patients, leading to increased comprehension and reinforcing adherence (Alvarez-Gonzalez et al., 2016) to colonoscopy prep instructions.

Elvas et al. (2017) completed a randomized control study comparing patients in two groups to determine if specific targeted instructions and education from a nurse improved bowel prep among colonoscopy patients. The control group received standard instructions, including verbal dietary instructions and written instructions on drinking the colon prep. The intervention group received personalized instructions from a staff nurse, in addition to a more extensive itemized list of acceptable foods and clarification on any questions or concerns related to the bowel prep (Alvarez-Gonzalez et al., 2016). The study found that those who received personalized instructions from the staff nurse had significantly better preparations than those in the control group. This study aligns with the DNP as it demonstrates that effective patient education from qualified, trained nurses effectively improves bowel prep quality. The researchers discussed the inadequacies of handing out pamphlets and leaflets to patients and assuming they will understand and comprehend what is being asked of them. The study also highlights the importance of

adequate bowel prep related to health care cost and patient safety, which is also discussed as a priority in the DNP project.

A randomized prospective study design was implemented in a hospital setting to determine if an educational booklet effectively improved bowel preparation in patients undergoing colonoscopy (Ergen et al., 2016). One group received an evidence-based educational booklet written in clear language and focused on the concept of health literacy (Ergen et al., 2016), while the control group did not receive the brochure. The study found that the group who received the educational booklet successfully achieved adequate bowel prep as compared to the control group (Ergen et al., 2016). The study supports the DNP project by highlighting the importance of health literacy techniques when providing bowel prep instructions. Writing education materials in plain language can help to ensure patients understand the task at hand. Allowing the patient to ask questions is also a technique that supports increased literacy. The DNP project focuses on evaluating the effectiveness of health literacy education, which increases staff knowledge on the need to use communication as recommended by the AHRQ Health Literacy Universal Precautions Toolkit (2015).

The teach-back technique is an evidence-based strategy that has been known to improve communication during healthcare interactions (Klingbeil & Gibson, 2018). Klingbeil and Gibson (2018) examined the impact of an educational intervention for staff on health literacy knowledge and the teach-back technique during patient education sessions. The study found that teach-back is extremely valuable in clinical practice and effectively improves patient safety, enhances quality of care, and aligns well with the

National Action Plan to Improve health literacy (HHS, 2010; Klingbeil & Gibson, 2018). This article supports the DNP project because it documents the challenges of low health literacy and how it can adversely affect patient care and increase overall health care expenditure. This article further highlights the importance of health literacy interventions, precisely the teach-back method, and how it can effectively improve patient-provider communication and patient comprehension. The AHRQ recommends the teach-back method as an effective intervention to improve health literacy.

Evidence Generated for The Project

Participants

The data generated for the project were obtained from medical records and not through actual patient or staff participation. The education that is evaluated was given outside of the scope of the project. The staff members in the endoscopy suite consist of 12 bedside nurses, one nurse manager, and seven endoscopists. All nurses are registered professionals who maintain active licenses certified through the Board of Nursing. Endoscopists are medical doctors who specialize in the field of gastroenterology. In addition, there are multiple support staff that include one coordinator, one patient access representative, and six patient care technicians. The endoscopy suite serves patients ages 18 years and older. The medical records analyzed included patients aged 50 to 75 years undergoing colonoscopies screening. The specified age group was selected based on recommended age criteria for CRC screening. The practiced-focused question evaluated the effectiveness of health literacy education given to staff nurses and its impact on bowel

prep among patients aged 50-75 undergoing screening. As a result, bowel prep data of patients younger than 50 or older than 75 years were not included.

Procedures

The nurse manager maintained a daily record of patient demographics and procedure outcomes. She kept a daily electronic count of how many patients participated in screening colonoscopies and how many patients were placed on the list for repeat procedures due to sub-optimal or inadequate bowel prep. The data was reported on a month-to-month basis. Once IRB approval was obtained, retrospective and prospective de-identified bowel prep data were sent by secured email from the nurse manager. The data was collected for 3 months prior to distributing the health literacy education PowerPoint to staff nurses and 3 months after. The health literacy PowerPoint was distributed in March 2021; thus, the retrospective monthly data was analyzed for December 2020, January 2021, and February 2021. The data was kept on my personal laptop, password-protected and not available to the public.

The retrospective data was compared to de-identified prospective data 3 months after the health literacy education was given. Due to the nature of the education delivery, ample time was allowed to ensure adequate time for staff review. Prospective de-identified bowel prep data was obtained for May 2021, June 2021, and July 2021. The bowel prep data was sent to me from the nurse manager by secured email, stored on my personal computer, password protected, and not accessible to the public.

Protections

To ensure the project meets ethical standards, Walden's IRB form A was completed, submitted, and approved. In addition, other protective measures included de-identified data, which masked identifying information of the patients. The name and location of the practice site were not disclosed within the project. The data generated for the project was kept secured on my personal computer which is password protected. The project posed minimal risks to participants, which protected participants from harm (Wendler, 2020).

Analysis and Synthesis

Analysis of retrospective and prospective bowel prep data 3 months before and 3 months after the health literacy education were compared to determine the effectiveness of the health literacy education given to staff nurses and its impact on bowel prep quality. The bowel prep data for each month were reported as the total number of patients scoped, total inadequate preps, and the total adequate preps. Retrospective bowel prep data for December 2020, January 2021, and February 2021 were analyzed and calculated as a percentage and were compared to the established benchmark for prep quality of 85% for endoscopy centers (ASGE, 2014). The prospective data for May 2021, June 2021, and July 2021 were analyzed and calculated to reflect the percentage for each month following the education and compared to retrospective data to determine if bowel prep quality scores improved. The percentage was also compared to the established benchmark of 85% to determine if the facility met prep quality goals set forth by USMSTF. The use of visual graphs and tables were used to display the data.

Summary

The purpose of the DNP project was to evaluate the effectiveness of health literacy education given to staff nurses and its effect on bowel prep. Evidence for the project was generated by searching multiple databases, including EBSCOhost, CINAHL Plus with full text, ProQuest, Medline with full text, Academic Search Complete, and Science Direct. A total of 343 articles were reviewed, of which 25 were selected from the literature review process. Eight articles supported the project, demonstrating that education is a critical component to improving bowel prep. Retrospective bowel prep data were compared to prospective bowel prep data before and after staff nurses received the health literacy education. The outcome was analyzed to determine the effectiveness of health literacy education and its impact on bowel prep quality. Section 4 re-introduced the practice problem, discusses findings and implications, and discusses recommendations to address gaps in practice.

Section 4: Findings and Recommendations

Introduction

Poor bowel prep is a significant clinical practice issue. The USMSTF recommends a benchmark of 85% for prep quality for endoscopy suites (ASGE, 2014). The literature report that up to 30% of patients presenting for colonoscopy present with poor prep (Davis et al., 2017). As a result, endoscopy centers continue to struggle with meeting guideline recommendations regarding prep quality for patients undergoing colonoscopy. Colonoscopy remains the gold standard procedure for detecting and removing precancerous lesions (Spada et al., 2018). Bowel prep is a significant component of a quality colonoscopy; thus, poor bowel prep can significantly impact a colonoscopy's diagnostic yield, leading to missed lesions and increased risk for CRC (Basch, et al., 2014). Locally, the endoscopy clinic demonstrated a significant challenge with achieving adequate bowel prep due to the number of patients referred for repeat procedures. The gap in practice was the ineffective delivery of bowel prep education and the lack of adequate interventions to improve patient understanding and compliance. The practice-focused question for the identified clinical problem of poor bowel prep was, was health literacy education given to staff nurses effective at improving bowel prep quality to the recommended 85% as recommended by the USMSTF in adults undergoing screening colonoscopies? This quality improvement project aimed to evaluate the effectiveness of health literacy education given to staff nurses in the endoscopy suite and its impact on bowel prep quality. Section 4 will address the findings and implications, recommendations, contribution of the project team, and limitations.

Findings and Implications

Effectiveness of Health Literacy Education

The quality improvement project was implemented to assess the effectiveness of health literacy teaching given to staff nurses outside of the project to determine if bowel prep quality improved. The health literacy framework was successful in guiding the evidence-based project. The health literacy framework highlights the impact of the individual's health literacy level and how it correlates to their ability to carry out patient-related tasks effectively, and the responsibility of the healthcare institutions in ensuring that patients are equipped with the knowledge required to complete expected tasks. Prior to the health literacy teaching to improve bowel prep quality scores, all 3 months were below the USMSTF recommended benchmark of 85% (Table 1). The data reflect the total number of patients scoped each month, the number of adequate preps, the number of inadequate preps, and the final bowel prep quality score for the month, which is displayed as a percentage (%). The 3-month average prep quality score prior to health literacy teaching was 75%.

Table 1

Retrospective Bowel Prep Data Prior to Health Literacy Education

Months	Total # scoped	Adequate prep	Inadequate prep	Prep quality %
December 2020	370	283	87	76
January 2021	349	270	79	77
February 2021	430	308	122	71

After the health literacy education was delivered to staff nurses in March 2021, prospective bowel prep data was collected for 3 months (Table 2). The data indicates that health literacy education was effective at improving bowel prep scores. Although there

was a slight decrease in the prep quality score in May 2021, the 3-month average prep quality score after health literacy teaching was 92%.

Table 2

Prospective Bowel Prep Data After Health Literacy Education

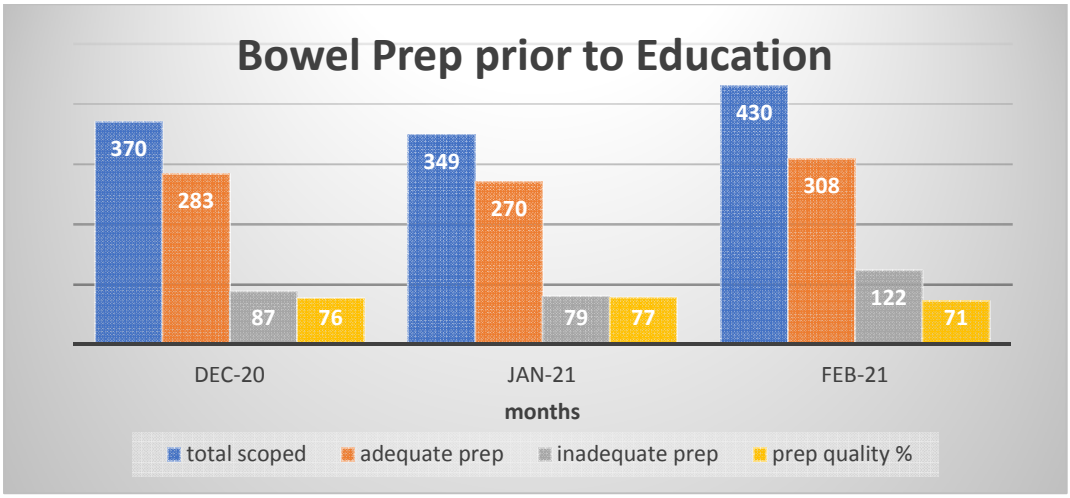
Months	Total # scoped	Adequate prep	Inadequate prep	Prep quality %
May 2021	503	467	36	92
June 2021	419	377	24	89
July 2021	435	414	21	95

Improvement of Bowel Prep Quality

The project began by analyzing bowel prep quality data three months prior to delivering the health literacy PowerPoint education to staff nurses and comparing it to bowel prep data three months after education was given. Bowel prep data were obtained from the nurse manager in the endoscopy suite by secured email and transferred to an Excel spreadsheet for analysis. The bowel prep scores for December 2020, January 2021, and February 2021 were 76%, 77%, and 71% respectively (Figure 1). Prior to health literacy teaching, retrospective data reflect an average bowel prep quality score of 75%, which is below the recommended benchmark of 85% as set by the USMSTF. It can also be seen that there was an average of 96 patients presented each month with inadequate bowel prep.

Figure 1

Bowel Prep Prior to Education



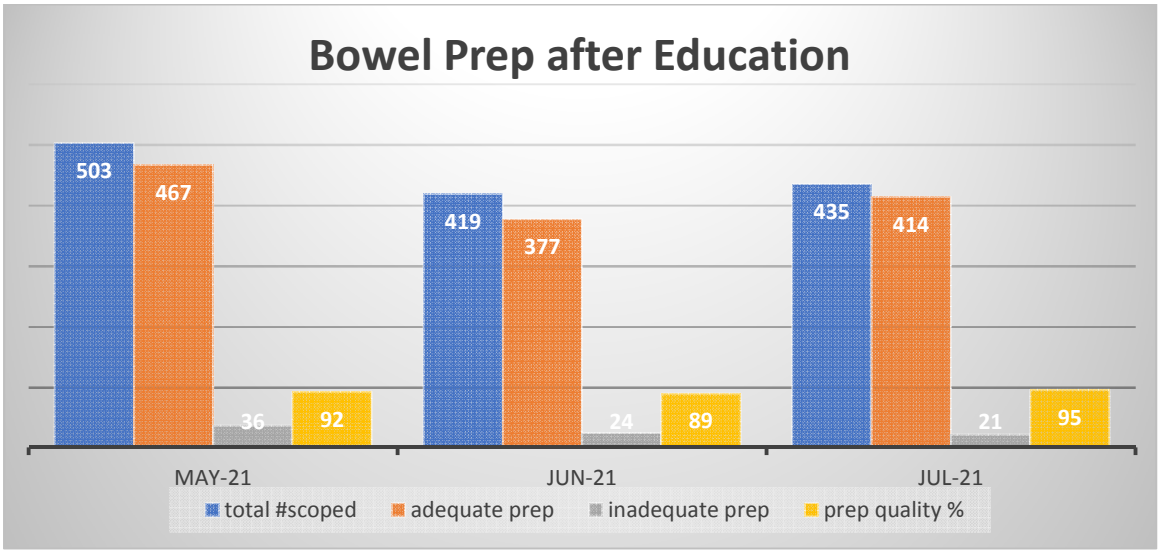
Bowel Prep After Education

The health literacy education was distributed to endoscopy staff by email in early March 2021. The staff was allowed the remainder of March and the entire month of April to review the information. Bowel prep data were collected for 3 months after health literacy education was delivered to staff nurses to determine if bowel prep improved. The prospective bowel prep data was collected for May, June, and July 2021, respectively. The prospective bowel prep data analyzed is consistent with an average quality prep score of 92%, which is an improvement when compared to 75% in the retrospective sample. In addition, bowel prep was consistently above the USMSTF recommended benchmark of 85% in all 3 months; the prep quality score was 92% in May 2021, 89% in June 2021, and 95% in July 2021 (Figure 2). The bowel prep quality score also improved

over time; the number of patients who presented with poor prep showed a consistent decreased from month to month.

Figure 2

Bowel Prep Quality Scores After Health Literacy Education



The number of patients scoped increased significantly from the retrospective sample compared to the prospective sample. For example, the highest number of patients scoped in the retrospective sample was 430 patients in February 2021, compared to 503 patients in the prospective sample in May 2021. The smaller sample size could have been secondary to the number of canceled procedures due to the current coronavirus pandemic. The nurse manager reported an increased number of elective procedure cancellations in 2020 and early 2021 due to increasing patient infections. Policies and procedures were implemented in the endoscopy suite to screen every patient for coronavirus 48 hours prior to their procedure. As a result, the number of canceled procedures increased, explaining the lower volume of patients in the retrospective sample. The fluctuation in the total

number of scoped patients does not significantly impact the findings. For example, in February 2021 (430 scoped) and July 2021 (435 scoped), a similar number of patients were scoped; however, the prep quality score was still higher in July (95%) when compared to February (71%).

Implications

The findings from the project suggest that health literacy education given to staff nurses was effective at improving bowel prep quality in patients undergoing screening colonoscopy. The stakeholders for the DNP project were the patients, their families (communities), and nurses and physicians (healthcare institutions). Individual implications of improved bowel prep include improved health outcomes, increased adenoma detection rates due to better colonic visualization, decreased risks for procedure-related complications, and frequent unnecessary repeat procedures (Basch et al., 2014; Liu et al., 2017). Improved bowel prep also increases the diagnostic efficiency of colonoscopies (Davis et al., 2017), which results in a lower incidence of CRC and healthier communities.

Institutions benefit from improved bowel prep because the need for unnecessary repeat procedures decreases, which lowers costs (Kingsley, et al., 2016). Colonoscopy can be a cost-effective screening strategy assuming individuals are screened per guideline recommendations every 10 years. However, when bowel prep is inadequate, guidelines recommend earlier repeat procedures which increase costs and burdens the healthcare system. Medicare reimburses at the same rate for colonoscopies whether the prep is adequate or not (Kingsley et al., 2016); therefore, when patients present with poor prep,

the cost is still the same. Frequent repeat colonoscopies resulting from inadequate prep can lead to limited access to care and poor use of resources (Basch et al., 2014; Liu et al., 2017). Ineffective use of resources can negatively impact institutions with low resources leading to longer wait times for screening of additional patients, which can negatively impact health. Improved bowel prep will allow for adequate use of institutional resources and improve healthcare outcomes.

Recommendations

Approximately 14 million Americans undergo screening colonoscopies each year (Kurlander et al., 2016). The effectiveness of screening colonoscopies is highly dependent on adequate bowel prep to visualize the colon and detect and remove adenomas which can lead to CRC; however, a significant number of patients still present with inadequate bowel prep (Kurlander et al., 2016). A significant gap in practice is the ineffective delivery of patient education instructions. Evidence suggests that training healthcare professionals to deliver health-literate care has improved communication and support for patients with low health literacy (Kurlander et al., 2016). Increasing evidence correlates low health literacy to poor patient outcomes (Sanders et al., 2018). Patients with limited health literacy often need tailored education instructions and health literacy strategies to help them understand the tasks ahead. As a result, training healthcare professionals is conducive to learning.

The findings from the DNP project conclude that health literacy teaching to staff nurses was effective at improving bowel prep in patients undergoing screening colonoscopies. A proposed solution to address the current gap in practice is to develop an

organization-wide policy to address limited health literacy. The health literacy framework identifies the health system as a primary intervention point for those with limited health literacy. Nevertheless, research suggests that health systems are less responsive to the challenges of low health literacy (Farmanova et al., 2018). Each year, every nurse must complete several mandated continuing education modules to remain in compliance. These modules usually include training in cultural competence, sexual harassment, workplace violence, fall awareness, and several other important topics. Health literacy awareness training should be included in all nurses' annual mandated continuing education courses. Implementing a mandatory health literacy curriculum within the organization will assist healthcare professionals in developing relevant knowledge and skills to improve patient health literacy (Saunders et al., 2018).

Other solutions include adding a health literacy curriculum in all nursing programs. The health literacy framework identifies the education system as another point of intervention for addressing challenges with low health literacy. The extent to which health literacy education is included in the current nursing curriculum in the United States is unknown (Scott, 2016); however, low health literacy is unfamiliar to many nurses (Scott, 2016). Health literacy teaching in nursing programs could be beneficial later in clinical practice. Healthcare professionals who have not had any health literacy training can unintentionally create adequate patient health literacy barriers through ineffective communication (Saunders et al., 2018). Introducing health literacy concepts in the nursing program curriculum will provide nurses with the necessary skills and

techniques to provide effective patient education and interact with patients at all literacy levels (Scott, 2016).

Contribution of the Doctoral Project Team

The DNP project team consisted of the nurse manager in the endoscopy suite and the DNP student as the project leader. Several other executives were involved in the project's final approval; however, these individuals were not directly involved with the project. Quality initiatives require a collaborative approach from frontline leaders and administrative executives to facilitate success (Navacci & Lockwood, 2020). The nurse manager played a critical role in the implementation process. Nurse managers are familiar with the day-to-day activities in clinical practice and are essential in leading and coordinating quality improvement initiatives (Sjolie et al., 2020). The nurse manager initially met with the project leader to discuss the clinical issues surrounding poor bowel prep and the proposed DNP project. She immediately offered her support and approval to conduct the project in the endoscopy suite. The nurse manager was responsible for delivering the health literacy teaching to her staff by email communication. In addition, she was responsible for collecting and storing de-identified bowel prep data. Nurse managers are key leaders to liaise with staff and reinforce quality improvement initiatives (Navacci & Lockwood, 2020). Once the project leader obtained final IRB approval, the nurse manager sent a secured message with the de-identified data to the project leader for analysis.

Strengths and Limitations of the Project

There were several limitations and benefits noted from the DNP project. First, the project was instrumental in raising awareness of limited health literacy among staff nurses and the impact on patient compliance with procedure instructions and overall health outcomes. Many nurses are not familiar with limited health literacy, posing a massive barrier to patient-nurse communication (Saunders et al., 2018). Second, the project was valuable as it helped gain insight into the effectiveness of health literacy teaching to staff which could be an effective strategy to help improve the quality of bowel prep in patients undergoing colonoscopy. Research has shown that patient-focused educational interventions have effectively improved patients' knowledge and bowel prep quality (Liu et al., 2020). However, very few studies examined direct educational interventions for nurses and the effects on quality bowel prep in patients undergoing colonoscopies. Lastly, the project was beneficial in that it was very cost-effective. There was no cost to the institution due to the implementation of the project.

Although the project provided valuable insights, there are some limitations. First, the project was conducted in one single endoscopy center, making it difficult to generalize findings to other institutions with different characteristics such as resource availability, staffing ratios, patient demographics, and policies and procedures. Second, staff knowledge was not directly assessed during the project; therefore, learner knowledge was implied based on the notable decrease in poor prep. Future quality improvement initiatives could focus on assessing staff knowledge and the effects of bowel prep by conducting pre-and post-tests prior to educational interventions. Another

critical aspect to consider is the objective nature of grading bowel prep quality. The bowel prep score is rated based on the physician's observation, which could vary from physician to physician (Shah-Khan et al., 2017). In addition, several bowel prep scales are available to use. Most endoscopists at the practice facility use the Boston Bowel Prep Scale; however, the facility does not have a current policy to use one specific standardized grading scale. To help limit bias, future projects may be conducted using one standardized scale when grading bowel prep quality and adding an external third party to verify the ratings (Shah-Khan et al., 2017).

Section 5: Dissemination Plan

Introduction

The DNP project provided insight into the effectiveness of health literacy teaching among staff nurses and its impact on bowel preparation in patients undergoing screening colonoscopies. The project showed that health literacy education effectively improved bowel prep at the practice facility. The insights gained from the quality improvement project need to be disseminated to the institution and to a broader audience capable of impacting the field of nursing. Dissemination helps to incorporate meaningful clinical practice change and promote knowledge transfer. Section 5 will describe the dissemination plan at the practice facility and clarify appropriate audiences and venues to disseminate the project findings to the nursing profession.

Institution Plan

The findings from the qualitive improvement initiative were shared with the nurse manager in the endoscopy suite. After completing the data analysis and developing recommendations, I met with the nurse manager to review the information. I provided her with a copy of the tables and graphs that I created to demonstrate that health literacy teaching effectively improved bowel prep at the facility. The nurse manager played a crucial role in implementing the quality improvement initiative, and it was essential to disseminate the findings to her. Nurse leaders are critical in knowledge transfer, which can help bridge knowledge to practice gaps, improve health outcomes, and strengthen the health care system (Steinskog et al., 2016). The manager plans to disseminate the findings to her staff during their daily huddle and discuss the initiative with her

leadership team to figure out how to develop a unit base policy to incorporate annual health literacy training for the endoscopy staff. In addition to sharing the information with the nurse manager, the information will be presented to the nursing research council at the facility during their quarterly research meeting. During the project approval process, the facility requested that the results be shared with the facility's research team.

Broader Nursing Profession

Although the quality improvement project was conducted among a small specific group, the implications for health literacy awareness is essential in all aspects of nursing. Providing health literacy support to patients is regarded as a core nursing skill (Wittenberg et al., 2018). Addressing the challenges of delivering literate health care is a national agenda (Wittenberg et al., 2018). One suggestion by the HHS to improve health literacy, as discussed in The National Action Plan to Improve Health Literacy, was the importance of disseminating evidence-based health literacy practices and interventions (2010). The American Association of Nurse Practitioners has annual conferences that advance practice nurses worldwide attend, which would be an appropriate venue to disseminate the findings from the DNP project and bring awareness to the concept of low health literacy. The implications of poor bowel prep are also crucial in the field of gastroenterology; thus, the findings from the DNP project would also be appropriate to disseminate at gastroenterology conferences. Although these conferences are usually geared toward physicians and physician's assistants, many advanced practice nurses attend. Lastly, the project will be uploaded to ProQuest, a database accessible to nurses worldwide.

Analysis of Self

Practitioner

The completion of the DNP project offered a gratifying and unique experience, as it allowed me to use several academic and leadership skills learned throughout the program. First, as a practitioner, I analyzed a significant practice issue within my organization and developed and implemented a plan to address the issue. I embraced the role of delivering high-quality, safe, and effective patient care through the use of evidence-based practices. During the completion of the DNP project, I was able to step outside of my comfort zone and use newly developed skills to implement a quality improvement initiative to create change at the practice facility. Doctorally prepared nurses must be proficient in quality improvement strategies and sustaining and creating change at the organizational and policy level (AACN, 2006). Conducting this quality improvement project allowed me to use the health literacy framework as a guide to understanding the impact of limited health literacy and how it can contribute to poor bowel prep.

Scholar

A significant amount of research was conducted to address poor bowel prep. The data were analyzed and synthesized to help bridge the gap in practice surrounding poor bowel prep. In addition to the research component, clinical scholarship requires implementation and dissemination, which results in the development of new knowledge (Zaccagnini & White, 2011). Dissemination of the findings from the DNP project has implications for improving practice outcomes. As a scholar, I successfully displayed how

evidence-based practices can support organizational change and improve patient outcomes. There is also a greater understanding that the DNP project will build on prior knowledge and provide a basis for future research (Zaccagnini & White, 2011) and quality improvement initiatives.

Project Manager

As the project manager, I demonstrated practical leadership skills to address bowel prep at the practice facility. The experience of leading the way was a new phenomenon for me as an advanced practice provider. I have had some experience in the past with identifying clinical practice problems; however, none was as comprehensive as this academic journey. I have never had the experience of conducting a needs assessment, identifying stakeholders, assessing facility resources, and using these critical pieces of information to persuade the organization's leaders that the quality improvement proposal will benefit the organizations and the patients they serve (Zaccagnini & White, 2011). The experience I gained from the quality improvement initiative will open doors for future scholarly work.

Challenges and Insights

The scholarly journey was a success; however, there were some notable challenges. The coronavirus pandemic caused significant delays in the project completion due to multiple staff members at the facility contracting the virus, ultimately delaying the approval process. The health literacy education was initially planned for in-person delivery; however, due to the need for social distancing, it was delivered by email. A face to delivery would have allowed better communication between the project leader and the

intended audience. Despite the challenges, there were many lessons learned throughout the educational journey. The concept of collaboration and teamwork was evident throughout the entire process. There is no way I could have completed the project independently; collaboration with the nurse manager was crucial, as she was instrumental in data collection and using her influence to help facilitate project implementation (Zjadewicz et al., 2016). It was also vital for me to develop a trusting relationship with the nurse manager in the project's initial phase. I accomplished a good working relationship by demonstrating subject knowledge and passion when addressing poor bowel prep issues. Identifying roles were also crucial in the process, as this allowed the nurse manager to know how important her role was in the project's success.

Summary

The aim of the quality improvement project was to evaluate the effectiveness of health literacy teaching and its impact on bowel prep. The quality improvement project successfully demonstrated that health literacy teaching effectively improved bowel prep at the facility. Adequate bowel prep is a significant component of quality colonoscopy, regarded as the gold standard for CRC screening (Spada et al., 2018). Poor bowel prep is a significant clinical practice issue contributing to clinical and economic harm (Kurlander et al., 2016). In addition, inadequate bowel prep is a substantial barrier to CRC screening. Inadequate screening increases CRC risk and can negatively impact the community's health. Improving bowel prep has significant implications for social change. Addressing poor bowel prep and limiting practice gaps will require future scholarly work focusing on

the impact of limited health literacy and educational strategies for nurses and clinicians to address patient literacy at every level.

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Appendix: Health Literacy Education PowerPoint

What is Health Literacy?

Please click each link below to watch 2 short videos with examples of why addressing health literacy is so important.

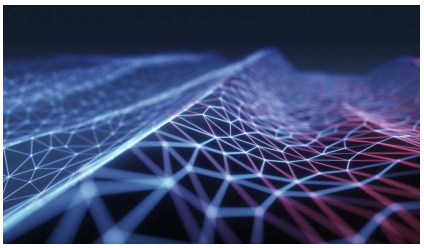
https://youtu.be/pFppi8czr_Y

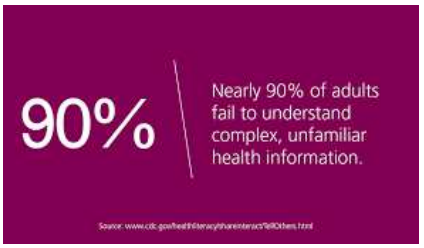
https://youtu.be/XOwmf9nQyUA

What is Health Literacy?

The IOM defined health literacy as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health care decisions" (2004, p. 32).

More than 80 percent of U.S. adults have limited or marginal health literacy (Ojinnaka et al., 2015), limiting their ability to utilize health information (Institute of Medicine 2004) adequately. Limited health literacy can negatively impact patient safety and result in poor health outcomes (Klingbeil, & Gibson, 2018).





- Health literacy is defined as a set of literacy skills that motivates and enable patients to access, understand, and appraise health information to make health care decisions to promote health and prevent disease (Wittink, & Oosterhaven, 2018).
- Health literacy is an important determinant of health disparities among individuals (Rikard, Thompson, McKinney, & Beauchamp, 2016).
- Patients with limited health literacy skills find it challenging to read, write, understand numeracy, and communicate effectively, which ultimately leads to limited access to and understanding of health care information (Wittink, & Oosterhaven, 2018).
- Patients with limited health literacy are at risk for adverse health outcomes due to the inability to make effective health care decisions.
- Those with limited health literacy tend to opt out of important screenings.

Health Literacy Universal Precautions Toolkit

- Limited health literacy is a common problem seen in all sociodemographic groups and is associated with a variety adverse patient outcomes (AHRQ, 2015).
- As a result, the Agency For healthcare Research and Quality (AHRQ, 2015) developed the Health Literacy Universal Precautions Toolkit.
- The toolkit is an evidenced-based guidance to support clinical practices by address health literacy through improved provider communication and increased patient understanding (AHRQ, 2015).
- Experts recommend the use of universal precautions which assumes that every patient may have difficulty with comprehending health information (AHRQ,2015).

ARHQ Strategies to Improve Health Literacy

- **Tool 4- Communicate clearly**
  - Greet patients warmly- maintaining a positive attitude can help build rapport
  - Listen carefully
  - Use plain language and avoid medical jargon
  - Speak slowly and clearly
  - Be specific- avoid using vague terms
  - Show graphics (when appropriate)- illustrations or pictures should be simple

(AHRQ,2015)

AHRQ Strategies to Improve Health Literacy

- **Tool Use the Teac Back Method**
  - studies have shown that 4 80% of medical information discussed during clinical encounters is forgotten immediately and nearly half of the information retained is incorrect (AHRQ,).
  - Teach back method is an effective way to improve patient understanding and adherence.
  - Teach back method can improve patient satisfaction and outcomes
  - Teac back method allows staff to check comprehension of instructions by asking patients to state in their own words what they were instructed to do.

  (AHRQ, 2015).

Impact of Poor Bowel Prep

- Poor bowel prep is a significant issue as bowel prep is one of the most important parameters when evaluating a colonoscopy's quality (Hernández Gimen García, & Quintero, 2019).
- Up to 30% of patients undergoing colonoscopy present with poor bowel prep (Hernánde Gimen García, & Quintero, 2019; Davis et al., 2017).
- Poor bowel prep leads to missed lesions, increased risks for procedu related complications, increased risks for colorectal cancer, shorter screening intervals, and increased screening costs Basc Hillve Basc Lebwol , & Neugu , 2014; Liu et al., 2017).

Improving colonoscopy Bowel Prep through Health Literacy Education

- Colonoscopy bowel prep instructions are quite complex and those who lack adequate health literacy tends to have difficulty with understanding what is being asked of them (Liu et al., 2017).
- The literature identifies limited health literacy as barrier to adequate bowel cleansing (Davis et al., 2017).
- Health literacy education can be used as an effective strategy to address the challenges surrounding poor colonoscopy bowel prep.

Improving colonoscopy Bowel Prep through Health Literacy Education

- The purpose of this presentation was to improve staff knowledge of limited health literacy and improve bowel prep. Providing the clinical staff in the endoscopy suite with health literate education will empower them to effectively deliver patient education instruction consistent with their education and cognitive ability.
- I hope that this information was educational and will provide effective techniques to help during your clinical encounters.
- Health literacy starts with you! I challenge you to become a health literate champion.

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