Don't Be a Fool, Checking your Stool is Cool

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Acknowledgments

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Abstract

Background: Colorectal cancer (CRC) is the third most common cause of cancer deaths in the United States (American Cancer Society, 2021). CRC can lead to devastating events; therefore, early detection is vital, as evidence shows high curative rates if caught early (CDC, 2020). CRC incidence and mortality can be reduced through screening tests, but screening participation is suboptimal for racial/ethnic minorities and even more for those with limited English proficiency (Tong et al., 2017). **Purpose:** The purpose of this quality improvement DNP project was to develop and implement an educational brochure to increase colorectal cancer screenings metrics in a local primary care practice to promote shared decision-making between clinicians and their patients. **Methods:** The principal investigator (PI) developed and implemented an educational brochure that was given by the Certified Medical Assistant (CMA) during the rooming process to adults aged 45-75 that presented for annual wellness exams for three months to evaluate if its use increased colorectal cancer screenings. **Results:** The study concluded that the educational brochure either increased CRC screenings or the quality metrics were unchanged after implementing the educational brochure. **Recommendations and Conclusion:** This project implies that education is critical in increasing CRC screening rates. Disbursement of educational material on high mortality conditions should be increased in all healthcare settings.

Keywords: colorectal cancer, colorectal cancer screening, primary care, educational brochure

Background and Significances

Cancer is a disease in which cells in the body grow out of control and overcrowd normal cells (American Cancer Society, 2015). Colorectal cancer (CRC) is when this abnormal growth occurs in the colon or rectum (CDC, 2020). Most colorectal cancers (CRC) begin as a benign noncancerous growth called a polyp. However, not all polyps are precancerous, but the ones growing into the lining of the colon or rectum and turning cancerous are called adenocarcinoma. The stage of colorectal cancer depends on how deep it extends into the wall and if it has spread outside the colon or rectum (American Cancer Society, 2021). As the disease progresses, there can be some signs and symptoms such as weight loss; this comes from inadequate absorption of nutrients and water in the affected intestinal tract, pain, constipation, and fatigue, to list a few. Colorectal cancer can be present and asymptomatic; therefore, early detection is essential to catch the disease before it progresses.

Colorectal cancer is the third leading cause of cancer-related deaths in the United States (American Cancer Society, 2021). The American Cancer Society's estimate for the number of colorectal cancer cases in the United States for 2021 included 104,270 new cases of colon cancer and 45,230 new cases of rectal cancer, potentially resulting in about 52,980 deaths during 2021. Overall, the national incidence of colorectal cancer has declined. However, in 2015 by the American Cancer Society, researchers found that 11 counties in the Northeastern part of NC, Western NC, West Virginia, East Kentucky, Southwest Virginia, East Tennessee, and the lower Mississippi delta make up a " hotspot" of colorectal cancer mortality for the nation (Siegel et al., 2015). Colorectal cancer imposes a significant economic burden on patients and the healthcare system. The financial burden associated with CRC and its management is affected by several factors, including stage of disease at diagnosis, patient age, time studied, oncologic therapy choice, and point of view (Zadlo, 2018). In 2018 it was estimated that the initial cost of care for

colorectal cancer was 6.9 million dollars, continuing care cost was $4.7 million and the price for the last year of life was 5 million dollars (National Cancer Institute, 2020). CRC can lead to devastating events; therefore, early detection is vital as evidence shows high curative rates when caught early (CDC, 2020).

Several governing bodies offer guidelines on when CRC screenings should begin. The American Cancer Society (ACS) has guidelines for colorectal cancer screening and recommends people at average risk for colorectal cancer start screening at age 45 (American Cancer Society, 2021). The ACS updated its CRC screening guidelines in 2018 due to the rise of CRC in younger people. In 2021The Center for Disease Control and Prevention (CDC) lowered the recommended CRC screening age from 50 to 45. The change occurred after the US Preventive Service Task Force (USPSTF) reviewed new data and concluded that screening for colorectal cancer in adults who are 45 to 49 years old could be helpful (CDC, 2022). Both agencies agreed that adults aged 76 to 85 should have a shared decision-making conversation with their providers to discuss if they should be screened (CDC, 2022). The U.S. Multi-Society Task Force of Colorectal Cancer (MSTF), which represents the American College of Gastroenterology, the American Gastroenterological Association, and The American Society for Gastrointestinal Endoscopy, continues to recommend CRC screening in adults aged 50 to 75 who have not already initiated screening (Gupta et al., 2019). In addition, the MSTF recommends that African American patients undergo screenings at age 45 due to higher CRC incidence (Gupta et al., 2019). As stated earlier, early detection and appropriate treatment can achieve excellent survival rates from colorectal cancer. Thus, primary practitioners should be aware of these changes and the new, current national guidelines and changes and encourage screening of their patients for better outcomes.

The principal investigator (PI) attended the Fall 2020 clinical rotation at a local primary care practice and sat in on a staff meeting. The medical director discussed their CRC quality metrics with the staff. The primary care office was in an urban town with one medical doctor, the medical director, three physician assistants, and one APRN. After the meeting, the quality metrics were discussed with the medical director. He was passionate about increasing their rates as only one provider achieved their quality metric goal of 74% for colorectal cancer screenings. Therefore, improving screenings was essential to meeting metrics and vital to their patient population.

Purpose

The purpose of this quality improvement DNP project was to develop and implement an educational brochure to increase colorectal cancer screenings metrics in a local primary care practice to promote shared decision-making between clinicians and their patients.

Review of Current Evidence

Colorectal cancer is the third leading cause of death in the United States. Its relatively slow natural history and lengthy and eminently treatable premalignant phase make it highly suitable for screening (Bevan & Rutter, 2018, p. 46). Increasing CRC screenings are an effective way to reduce this mortality. This literature review seeks to illustrate the effectiveness of education in increasing the frequency of CRC screenings. The UNCG librarian was utilized in the planning phase of the literature review. The key search terms used to gather data for the DNP project were colorectal cancer, screenings, primary care, testing, educational brochure, educational material, interventions, increase, improve, influence, and lastly, shared decision making in CRC screening. The key search terms were imputed into several databases: Google Scholar, PubMed, UpToDate, and CINAHL. The search produced several articles that were

included in this literature review. In addition, research studies from other countries were included in the literature review to avoid biases. Furthermore, papers that discussed CRC and screenings, CRC education, and different methods to increase CRC screenings were reviewed and utilized. Also, the articles included patients of all ethnicities who were over forty-five years of age. Finally, the PI had reports addressing CRC screenings and shared decision-making between providers and patients. The exclusion for this literature review included articles that were published greater than five years ago unless it was a foundational article in the field of this study or added value. This literature synthesis reviewed twenty-five peer-reviewed journal articles, including conference proceedings, blog posts, and online newspaper articles. After the reviewed, the literature was categorized into three main themes. The importance of CRC screening, barriers to screening, and how to overcome the barriers included shared decision making, education, and quality improvement initiatives.

The Importance of CRC Screening

In the United States, CRC is the third most common cancer and the third leading cause of cancer-related death in adults under age 50 (Patel et al., 2022, p. 286). There is a substantial population that participates in screenings. Screening is the most influential public health tool to reduce mortality (Ladabaum et al., 2020). The US Preventive Services Task Force recommends CRC screening for people at average risk using either stool-based tests (fecal immunochemical test [FIT], fecal occult blood test [FOBT], multi-targeted stool DNA test [FIT-DNA]) or tests that directly visualize the colon (colonoscopy, sigmoidoscopy, or computed tomographic colonography [CTC]) (DeGroff, 2018). Despite the availability of these tests, a significant proportion of Americans remain unscreened; in 2016, only 67.3% of age-appropriate adults were up to date with screening. Hitchcock et al., (2021) noted that CRC screenings decreased

incidence by 25.5% and mortality by 52.4%. Missed opportunities to prevent the disease or diagnose it before metastasis or its progression to a life-threatening condition are responsible for morbidity and mortality in colorectal cancer (Slyne et al., 2017). Colorectal cancer screening entails multiple modalities, but any chosen screening tool promotes better health outcomes.

Barriers to CRC Screening

The incidence of CRC has decreased over the past several years for adults aged 50-75 but has increased in the less than 50 age group. Per the National Cancer Institute, (2020), the rate of colorectal cancer has more than doubled among adults younger than 50 since the 1990s. Even with all the available screening tools, there continue to be millions of people in the United States who are not getting screened (CDC, 2020). The PI found many barriers to screening that existed and included but are not limited to the patient perception, providers' context, and financial aspect.

According to Muthukrishnan et al., (2019), only about 60% of age-eligible adults are up to date on CRC screening. The study conducted by them described patients' self-reported barriers to screening within federally qualified health centers. The reported barriers for not screening included being unaware of the need to screen, lack of symptoms, or adverse family history of CRC. They found other common barriers had fear or worry about the procedure or its outcome, financial challenges such as lack of insurance or cost of testing, and logistic challenges such as transportation and time (Muthukrishnan et al., 2019). The study concluded that cost and lack of insurance were the highest barriers, but fear was the most common. Another barrier that can hinder patients is cultural barriers, whereby some people believe that natural remedies or foods are protective against CRC (Dominitz, 2021). In addition, the appalling thought of stool, prep for procedures, and endoscopic screening tests may be thought of as improper for some people.

Dominitz, (2021) also revealed that the lack of internal motivation is another barrier to CRC screening. Some persons put other priorities and concerns over screening. The different preferences have been especially true during the COVID-19 pandemic (Dominitz, 2021). Several elective procedures and surgeries have been avoided to reduce exposure to Covid-19. In addition to all the barriers stated, language is also a barrier. As a barrier, language affects the understanding of instructions the patient's ability to make and keep appointments. Diaz et al., (2008) examined the relationship between language and receipt of CRC screening tests among Latinos and non-Latinos using a geographically diverse, population-based sample of adults. After their study, they found 33% of Latinos responding-in-Spanish reported having had CRC testing, whereas 51% of Latinos responding-in-English and 62% of English-speaking non-Latinos reported test receipt (Diaz et al., 2008). Thus, language can negatively affect CRC screening rates if the information is not provided in the patient's native language. Implementation of a translator in practice could remove the language barrier or utilize a portable translator device.

Numerous studies exist on barriers to CRC screening in all populations, but few focus on the rural population. In 2019, Wang et al. utilized a systematic review of 27 articles to identify those specific barriers in the rural population systematic review so appropriate interventions could be designed to improve CRC screening. After their study, they found that the significant obstacles encountered by the rural populations are not as different from those identified for the urban people. However, some specific barriers were placed in the rural population: privacy and confidentiality issues, lack of prevention attitude, and structural barriers related to the availability of specialists and distance to screening facilities (Wang et al., 2019). The authors' suggestions for future projects include providing public health education, reducing costs, and increasing access

to specialists that may be most effective in rural areas to promote CRC screening. Health literacy is another barrier to CRC screening. Health literacy is broadly defined as an individual's capacity to assess, understand and use the information to make informed decisions in health care (Woudstra & Suurmond, 2019). Patients must be equipped with the knowledge to have the ability to make an informed decision about their care and its management. Thus, their health literacy should be considered when delivering information to patients. In addition, as stated by Woudstra & Suurmond, (2019), communication must be culturally sensitive and be presented in an accessible and understandable format to reduce inequalities.

There are some CRC screening barriers in primary care that are provider-related. The inadequate knowledge levels among nurses and physicians may be barriers affecting CRC screening (Muliira et al., 2016). Enhancing providers' knowledge about CRC and its screening should be a primary intervention to promote CRC screening and prevention. A study conducted in Turkey found similar findings as Muliira et al., 2016. The researchers, Sahin et al., (2017), detected obstacles of low levels of knowledge, awareness, and advice that were not compatible with screening guidelines. They also noted barriers perceived by primary care providers, which included patients' inability to access factual medical information, deficiencies in the reminder system, and patients' lack of interest in CRC screening. Patient and provider barriers were noted in a study conducted in a low-income urban community in Mexico City. Lack of CRC knowledge among health care professionals, risk perception, low health literacy, and fear of participating in screening activities and finding out about a severe disease were patient barriers (Unger-Saldaña et al., 2020). Another study by Ghai et al., (2020) encompassing primary care providers in four healthcare systems revealed several main points. The main finding of their research was that provider beliefs about test effectiveness and recommended screening intervals

varied by healthcare systems, which affects patients screening commitment. Another reported finding was that provider knowledge, and perceptions of disparities in colorectal cancer by race/ethnicity and socioeconomic status may have impacted their beliefs and recommendations. They compared providers' perceptions that cared for patients with insurance to providers of the noninsured and found that providers of noninsured, low socioeconomic status patients perceived the patients as being unable to afford to screen, having difficulty getting to the screening site, and not perceiving cancer as a threat, as well as the health system lacking the resources to perform screening as significant barriers to screening. Ghai et al., (2020) revealed if primary care providers believed in the effectiveness of one screening test over another and only recommended that one, they might lose patients to screening if patients are against that screening test. However, the ACS recommends that patients be allowed to choose a testing strategy, thus increasing the likelihood of adherence (Wolf et al., 2018).

Although the American Cancer Society now recommends starting CRC screening at age 45 years, insurers are not currently required by federal law to cover the cost of CRC screening for patients under age 50 years (Bone et al., 2020). In addition, federal law does not require state Medicaid programs to cover the costs of CRC screening in asymptomatic individuals, which varies by state (Bone et al., 2020). These mandates by insurance providers play a significant part in low screening rates. Spataro et al., (2017) revealed in their study that using FIT as an alternative to colonoscopy can overcome some barriers. They found that patients were more willing to undergo CRC screening when the FIT was offered as a non-invasive and cost-effective option.

How to Overcome Barrier

Barriers are overcome with different methods. The PI's strategies to overcome the CRC screenings' obstacles were shared decision making, education, and other quality improvement initiatives. Evidence-based practice methods are the most beneficial to closing gaps and barriers that exist in low CRC screening percentages. Evidence-based practice (EPB) strategies allow nurse practitioners (NPs) and other health care providers to translate research findings into clinical practice (Melnyk, 2021). The implementation of EBP improves patient outcomes, which is a goal of this DNP project.

Shared Decision Making

Shared decision making (SDM), the process by which clinicians and patients work together to make health care decisions that align with patients' goals, preferences, and values—is an ideal outcome of patient-clinician relationships. (Yahanda & Mozersky, 2020). Shared decision-making (SDM) involves bidirectional information flow between the clinician and the patient (Schrager et al., 2017). During the shared decision conversation, the provider provides information about the topic, and the patients share their thoughts and beliefs on the subject. A recommendation from a physician is the most influential factor in determining whether a patient is screened for CRC (Alberti et al., 2015). Poor shared decision-making is associated with worse patient-reported health outcomes (Hughes et al., 2018). While in recent years, there has been a push toward shared decision-making between clinicians and their patients. This new practice is opposed to the traditional paternal relationship that was the standard for decades. A systematic review of literature on the effects of shared decision-making on cancer screening by Lillie et. al (2014) yielded varied results. The literature found that in 2 or 3 studies, patients who received "decision aids," educational materials that often are given to patients to help inform their

treatment or screening decisions, had higher knowledge scores but did not improve the patient's ability to participate in making decisions (Lillie et al., 2014). Lillie et al. also found that the literature varied on the impact of shared decision-making on decisive action. A study found that shared decision-making improved patients' ability to choose a colorectal cancer screening method, increased decision satisfaction, and grew CRC screening intention and behavior. Two other studies showed SDM interventions made no difference at all. More research has been explored and shown an association with shared decision-making and improved CRC screenings. Pieterse et al., (2019) highlighted that more people live longer with multiple chronic conditions and care has become more complicated, and shared decision-making is essential in caring for patients in these complex situations (Pieterse et al., 2019). Research has shown a strong association between provider communication with patients about colorectal cancer screening and increased compliance with such screening (Underhill & Kiviniemi, 2012). In a qualitative research study that explored factors related to the longitudinal adherence of screening behavior in CRC screening, the authors found that the subjects showed a low understanding of cancer screening (Benito et al., 2018). After the study, the participants stated that consulting a general practitioner was an essential factor that mediated their final decision or influenced their screening behavior.

A 2017 roundtable discussion of a diverse panel of experts illustrated the impact of CRC screening modalities to improve patient outcomes. They focused on developing better value-based medical policies and payment procedures identifying knowledge, practice, and access deficits related to CRC screening (Bone et al., 2020). The panelist discussed recommendations for increasing CRC screening rates through evidence-based strategies, such as patient navigation, reminders, education, and awareness. Bone et al., (2020) noted that the experts felt that a shared

decision between providers and patients eligible for screening was of the utmost importance. They indicated that shared decision-making is a potentially practical approach between the individual qualified for screening and their provider to overcome CRC screening barriers and increase screening compliance (Bone et al., 2020). Therefore, the roundtable participants indicated that primary care providers should involve their patients in shared decision-making and provide education on the available CRC screening modalities, which may influence choice and increase screening adherence (Bone et al., 2020). Shared decision-making is an essential component to increase CRC screening and an opportunity to improve patient and clinician communication and lead to increased patient satisfaction. Pieterse et al., (2019) spotlighted the importance of being able to and choosing to spend time understanding what truly matters to patients when making decisions together is an achievement that makes the work of clinicians meaningful and rewarding. Although SDM has been beneficial, one issue exists the time required for providers to spend with their patients. The article by (Yahanda & Mozersky, 2020) found that efficient SDM might be achieved using standardized decision aids or tailored questions. Decision aids are standardized, validated tools that can better facilitate SDM by augmenting rather than replacing interpersonal exchanges (Yahanda & Mozersky, 2020). Decision aids, they stated, can come in different forms, such as printed text, audio recordings, or videos, and their use added a median of 2.6 minutes to office visits (Yahanda & Mozersky, 2020).

Education

Education is a crucial component in increasing CRC screening rates and enhancing public awareness about the importance of screenings. Education can vary in medium, ranging from a simple brochure to a recorded seminar. But all have had success growing screenings and,

therefore, early detection of potentially life-threatening illnesses. In addition, numerous studies have illustrated the value of education in increasing patient screenings for various disease states.

Agide et al. (2018) found that health education increased cervical cancer screenings. Though the focus of the study was not colorectal cancer, their study does indicate that health education interventions have immense contributions in boosting the screening uptake. Lack of education can exist in providers and patients, and both have effects on colorectal cancer screening rates. Slyne et al., (2017) pilot study aimed to analyze whether an educational intervention for nurse practitioners would increase their awareness of colorectal cancer screening and increase patients' participation in screenings. Their study demonstrated that a colorectal cancer screening educational intervention increased NPs' knowledge of screening procedures and subsequently increased their patients' screening rates by 4%. A study employed by Christy et al., (2019) examined and compared two interventions side by side, a targeted, low-literacy intervention informed by the Preventive Health Model (photo novella and DVD plus fecal immunochemical test [FIT]) and a non-targeted intervention (standard educational brochure plus FIT). Although there were no differences in the groups after the study, both targeted and non-targeted CRC education materials effectively produced durable changes in awareness and health beliefs (Christy et al., 2019). Seoane et al. (2020) investigated an educational telephone intervention's clinical and economic impacts on colonoscopy attendance outside colorectal cancer screening programs in a randomized controlled trial. The results of their intervention were published in December 2020 in *the World Journal of Gastroenterology*. Results exhibited the educational telephone nurse intervention improves attendance, protocol compliance, and patient satisfaction in the intervention group compared to a non-intervention control group. Militello et al. (2014) designed a study to assess whether their one-page brochure would increase awareness

of CRC, screening options, and openness to screening. Their one-page educational brochure contained information from the Centers for Disease Control and Prevention (CDC) and national guidelines and drew from human factors and behavioral economics (Militello et al., 2014). Their study showed a significant change that educational materials increase knowledge of and openness to CRC screening, $t(146) = 13.37$, $p < .0001$ (Militello et al., 2014). Furthermore, they found that the one-page brochure was just as effective as the traditional multi-page brochure. Militello et al., (2014) found there are practical advantages to a one-page brochure in that it is easier to print, view on a screen, and perhaps less daunting to read. Numerous educational methods can assist patients with gaining knowledge and increasing screenings. For this DNP quality improvement project, the PI utilized an educational brochure.

Quality Improvement Initiatives

Scholars share the same sentiment that colorectal screenings need to be increased to reduce mortality. Inadomi et al. (2019) believed that CRC screening is a multistep process that requires collaboration with multiple members. Inadomi et al. (2019) stated the most effective interventions to increase screening include outreach with mailed or in-person distributed fecal blood tests; and patient navigation. Kim et al. (2020) also agreed and stated that single-level interventions are often insufficient to lead to sustainable changes. Multilevel interventions with multiple components will affect the desired outcomes and each other. Feldman et al. (2017) conducted an evidence-based quality improvement study to increase cervical, breast, and colorectal cancer screening rates. They utilized components from previously cited studies that suggested quality improvement initiatives based on primary care practices can increase cancer screenings rates (Feldman et al., 2017). Their intervention had three main components; a personalized reminder letter mailed to overdue patients with a message from their primary provider and an educational brochure about screening tests (this intervention was modified as

they experimented with phone calls as an alternate recall method). They provided the providers with individualized feedback on their cancer screening rates and compared them to their peers' screening rates. Lastly, the updated charts with accurate data on the FOBT improved their electronic medical record (EMR) reminder function (Feldman et al., 2017). As a result, they successfully and significantly increased cervical, breast, and colorectal cancer screening rates over six months. According to a study that Hountz et al., (2017) led, using an approach with multiple interventions helped improve CRC screening rates in primary care settings by 13–23%. In addition, they determined using staff input to develop and sustain lasting change, implementing staff and patient reminders, and using data-driven information to provide performance feedback to staff successfully increased CRC screening (Hountz et al., 2017). They added that the overall increase in the number of patients screened for CRC would ultimately lead to a decreased need for CRC treatment which is a significant economic impact on the patients (Hountz et al., 2017). A pilot study conducted at a Federally Qualified Health Center by Martin et al. (2017) aimed to discover what barriers existed and how to improve CRC screening rates. They developed an outreach program that entailed three components: patient and provider education, immunochemical fecal occult blood test (iFOBT) distribution, and patient navigation (Martin et al., 2017). Their study concluded with an increase of 56.7% in CRC screening rates utilizing the three components. Another study executed by Shokar et al., (2016) in an uninsured predominantly Hispanic population observed a significant increase in CRC uptake in the intervention groups compared to control where community-wide education, navigation, and no-cost screening intervention were implemented. They concluded taking a multicomponent approach with a culturally tailored education program can successfully increase CRC screenings (Shokar et al., 2016). A community-based CRC education and screening program conducted by

Woodall & DeLetter, (2018) effectively improved CRC knowledge and screening participation knowledge. They had a positive return on CRC screening kits and captured participants with positive screening results.

Technology is another avenue that has assisted with the increase in CRC screenings. Technology entails multiple outlets that can reach many people at one time. One example of this is mobile patient technology. Miller et al., (2018) employed a randomized clinical trial with 450 patients due for CRC screening and scheduled for an appointment with their primary care provider. The researchers gave the participants an iPad that displayed a CRC screening decision aid that lets patients order their screening tests and sent automated follow-up electronic messages to support them (Miller et al., 2018). They found that a digital health intervention that allowed patients to self-order tests increased CRC screenings at the end of their trial.

Theoretical Framework

The local practice where the DNP project was implemented recognized that a change was needed and was prepared to make changes. They knew the importance of early detection and supported increasing their quality metric rates. Lewin Change Model and Nola Pender's Health Promotion Model (HPM) were used as theoretical frameworks To direct and guide this project; Both models add structure and guidance appropriate for this quality improvement project that used an educational brochure that promoted health.

Change theories describe the effectiveness with which organizations can modify their strategies, processes, and structures (Hussain et al., 2018). Therefore, Kurt Lewin developed Lewin's Change Management Model in 1947. Burnes (2004) stated that even though Lewin built up this three-step model more than 60 years ago, it keeps on being a commonly referred framework to support practice change projects. The three stages are unfreezing, change process, and refreezing. Lewin compared his three stages to a block of ice changing (Cummings et al.,

2016). The unfreezing stage entails recognizing that a change is needed. The next stage is the change stage, which is put into motion. The final stage is the refreeze stage, where the new change is anchored and is the new norm. The office's unfreeze stage was the low-quality metrics scores that assisted them in seeing that a change was needed. It was easy to implement the change stage, and staff accepted the difference with implementing the educational brochures. Staff members continued to give patients the brochures while they waited for their providers and this process was widely accepted and carried out; thus, the refreeze stage was accomplished, and change was established.

The Health Promotion Model (HPM) was created by Pender in 1982 and was revised in 1987, 1996, and 2002 (Aqtam & Darawwad, 2018). The HPM incorporates elements of the change process, including a commitment to a plan of action and acknowledgment of competing demands (Walker et al., 1987). Health Promotion Model is one of the most influential models in explaining behaviors towards cancer screening (Topaloglu & Aydogdu, 2021). Healthcare providers can apply the HPM to influence and promote healthy behaviors. At its core, Pender's HPM seeks to influence patients' behavior to encourage positive long-term outcomes. For example, I applied HPM by creating an educational brochure to give to patients hoping that it will inspire autonomy, promote health, and influence them to take on a healthy attitude and get screened. Pender's HPM and Lewin's Change Model together provide the framework for this DNP project by promoting behaviors that improve health with better outcomes.

Translational Framework

Public health officials have long debated various types of interventions for population health. While some may argue that treating individuals on a case-by-case basis may improve population health over time, others believe that large-scale public health initiatives will be more effective. Quality improvement processes in healthcare focus on changes within entire systems,

not just individuals. A quality improvement (QI) process aims to change or improve how care is carried out for better patient outcomes. The PDSA model is widely used and was chosen for my QI project because it allows for testing and evaluating improvement. Walter Shewhart invented the Plan Do Check Act (PDCA) model in 1939, and W. Edwards Deming revised the model to what is now known as the Plan Do Study Act (PDSA) model. Hountz et al. (2017) stated that the Deming Plan-Do-Study-Act (PDSA) Framework, when applied to systems problems, improves morale, organizational effectiveness, and efficiency while reducing costs. For that reason, the principal investigator chose the PDSA model as the guiding framework for this DNP project. PDSA is concise and offers four steps to implement process improvements with evaluations. The first phase in the PDSA framework is the "plan" phase after deciding what change or modification you intend to implement. Next is the "do" phase, where the change/improvement is executed. The third phase is the "study" phase, where post-intervention data is compared to pre-intervention data, and a hypothesis is formulated. Finally, the last phase is the action phase, where you decide to accept or reject the change/improvement you implemented.

Plan

This project's "Plan" phase consisted of identifying literature related to strategies to increase cancer screenings, discovering barriers to screenings, and shared decision making. After a shared decision-making conversation, the office staff and the PI decided to utilize an educational brochure to increase CRC screenings. The brochure contained concise information for patients on CRC and available testing options. In addition, the brochure was meant to be an asset for providers during their busy schedules to reduce the amount of time providing education on CRC and screening options.

The population for this DNP project was patients seen for their annual wellness exam who were between the ages of 45 and 75 years of age at a local primary care practice. After 90 days, quality metrics were collected and compared to pre-implementation metrics. These percentages were analyzed to reveal an increase in colorectal cancer screenings compared to the quality metrics from the same 90-days from the previous year. If successful, this quality improvement can be implemented throughout all primary care practices in the organization that are not meeting their quality metrics in CRC screenings.

The quantitative data in this study will consist of colorectal cancer screening rates between August and November 2020 and be compared to the rates of colorectal cancer screening between August and November 2021. The primary care practice had five providers, four medical assistants, three front office staff, and their office manager who participated in this quality improvement project. After the project was presented to the office manager and medical director, approval was obtained. The PI did recruit a CMA from the practice to be my change champion. This person also served as the liaison between the primary care office and me.

Do (Intervention & data collection)

The "Do" phase consisted of obtaining approval from the site's office manager and medical director. Also, I received IRB approval from The University of North Carolina at Greensboro (UNCG) and the health system where I implemented my project. Afterward, the PI created an educational brochure containing information on colorectal cancer and available screening methods. The brochure was introduced to the staff at their meeting and underwent internal review for several weeks. Before project implementation, the team was briefed on distributing the educational brochure best to capture the subjects better. Also, the CMAs received a ten-minute in-service before execution on obtaining a stool sample for screening to explain to the patients if it is the chosen option. During the wellness exam, the Certified Medical Assistants

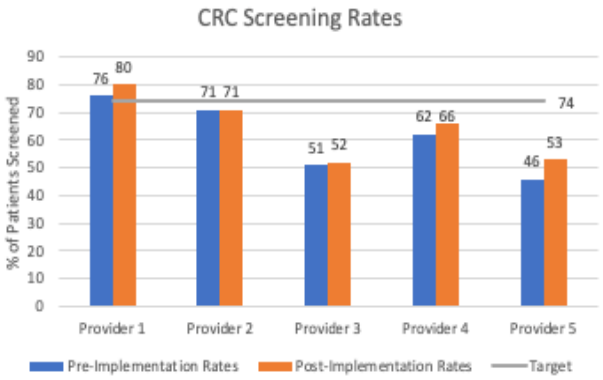
(CMAs) gave all patients who were forty-five to seventy-five years of age the educational brochure for their review while waiting for their provider. After the 90 days, only aggregate quality metric data that showed the percentage of those that had a colorectal cancer screening were analyzed. The rate of those that had a colorectal cancer screening in the three months following the project implementation was compared to the percentage of those that had a colorectal cancer screening at the same time from the previous year. The rate of eligible patients who elected to undergo colorectal cancer screening with implementation will be measured for 90 days compared to the same 90 days from the preceding year.

Study

The "Study" phase of PDSA revealed that the plan and utilization of an educational brochure could increase CRC screenings. The improvement was minimal, but any increase in early detection is a success (**FIGURE 1).**

FIGURE 1

Quality Metric Screening Rates by Providers



Most literature shows that a multi-interventional process is most effective. The p-value, $p<0.69323626$, was calculated using Microsoft Excel. The result of the p-value supported and

proved that utilization of an educational brochure does increase colorectal cancer screening. Inferential statistics were employed using the quality metrics data from last year's three months to the same three months post educational brochure implementation. By employing inferential statistics, I could deduce that the provisions of educational brochures increased the likelihood of patients completing a CRC screening. Epic, one of the largest electronic health information technology providers, was utilized to gain quality metric data from August, September, and October 2020 and 2021. The 2020 data was compared to the 2021 data and analyzed using paired *t*-test. The analysis demonstrated the change in CRC screening before and after the introduction of the educational brochure. To evaluate the change in screenings, a paired t-test was used to compare percentages from 2020 to 2021. The use of an educational brochure was expected to increase quality metric scores from August to November in 2021 compared to these same months in the previous year, which was 2020. The following are the results for each provider from 2020 pre-educational brochure implementation and the 2021 post-brochure implementation. Provider #1 was 76% pre-brochure implementation in 2020 and 80 % in 2021, post-brochure implementation. Provider #2 quality metric results were 71% in 2020 and 71% in 2021. Provider #3 quality metric results were 51% in 2020 and 52% in 2021. Provider #4 quality metric results were 62% in 2020 and 66% in 2021. Lastly, provider #5 quality metric results were 46% in 2020 and 53% in 2021. The results illustrated an increase in CRC screening rates, $t(8)=2.31$, $p<0.69323626$. These results indicated that utilizing an educational brochure did increase CRC screenings. Teo et al., (2019) also found similar results in that pamphlets increase uptake for cancer screenings, especially for colorectal cancer.

Act

The " Act" phase of the PDSA cycle disclosed that the educational brochure successfully increased CRC screenings. The usage of an educational brochure could be implemented across

the health system as an effective method to increase screenings. Hopefully, the more providers get patients screened, CRC deaths can be eliminated. I plan on presenting the results of this DNP project to the health system's nursing research council. After the committee sees the relevance of using an educational brochure to increase CRC screenings, they recommend that leadership get the approval to implement its use in all their primary care facilities. The use of the educational brochure is sustainable as it will only require that its information is updated yearly.

Discussion

Colorectal cancer is the third most common cancer, not including some skin cancers. As well as the third leading cause of cancer deaths, with an estimated 52, 980 persons in the US projected to die of colorectal cancer in 2021 (US Preventive Services Task Force, 2021). These statistics make it imperative to increase screenings. In addition, screening with any one of multiple options is associated with a significant reduction in CRC incidence through the detection and removal of adenomatous polyps and other precancerous lesions and with a reduction in mortality through incidence reduction and early detection of CRC (Wolf et al., 2018). The purpose of this quality improvement DNP project was to develop and implement an educational brochure to increase colorectal cancer screenings metrics in a local primary care practice to promote shared decision-making between clinicians and their patients.

The Health Belief Model (HBM) and the Change Model were applied to guide the DNP project. The PI believed the two models were intertwined. The HBM has provided a valuable framework for investigating health behaviors and identifying fundamental health beliefs, has been widely used and has met with moderate success in predicting and changing a range of health behaviors (Conner & Norman, 2021). Developing a brochure with the HBM as guidance provided education to assist patients with understanding what CRC is, why it is essential to test, and what testing options are available. Behavior changes and increasing CRC screenings were

the intent after implementing the educational brochure. The power to change a behavior lies in understanding one's beliefs and views of the situation. The three phases of Lewin's Change Model were applied to the DNP project to monitor the behavior change. Recognition of substandard quality metrics and brochure development were components of the unfreeze phase. Implementing the educational brochure was part of the change phase and continued use of it was the refreeze phase. Thus, the PI utilized two models for guidance for the DNP project. The two were employed because they both promoted increasing CRC screenings.

Several studies pushed for multifaceted approaches to increasing CRC screenings. Some researchers found that they produce more significant results when techniques are combined. The research completed by Subramanian et al., (2018) also supports this. Their study found that when two or more interventions are combined, they yield increased screenings and reduce the CRC burden. Education was an integral feature in the multicomponent interventions. Subramanian et al., (2018) also noted that small media printed materials, such as brochures and newsletters, could inform and motivate individuals to be screened and provide information tailored to specific target groups to enhance patient reminders. Mackey, (2018) also noted that educational information related to CRC screening methods could greet patients upon arrival at the clinic. In addition, some individuals might appreciate further discussion with their provider regarding CRC screening. Mackey, (2018) stated that written information reinforces the importance of regular CRC screening and is another suggestion for improving screening rates. These findings further validate the PIs plan and method to have the CMAs give the educational brochure to patients during the rooming process, and the provider and patient could then have a shared decision-making conversation about CRC screenings.

The PIs method of utilizing an educational brochure was consistent with the literature on increasing CRC screening rates. Numerous methods exist in the literature on strategies to increase screenings, but they all include education. The more education patients receive the better they are equipped with knowing when, how, and why screenings are of the utmost importance. Therefore, it is everyone's priority to ensure that educational material is accessible, and the readability level is appropriate. Education is the foundation that patients need to make healthcare decisions to hopefully improve outcomes.

During the three-month implementation period, several factors influenced the project's outcome. First, the monthly check-ins with the project champion were beneficial. Her support was invaluable as she reminded the staff to utilize the educational brochure and ensured they had enough brochures available for the patients. The office underwent several changes that hurt the project's results. The office manager transferred to a different office at the start of the project. Thus, it was challenging to set up a time to meet with the staff to review the implementation process. Also, the office was experiencing a staff shortage and other reverberating effects of an ongoing pandemic.

The project's findings indicated that the employment of the educational brochure did slightly increase CRC screening rates in all the providers except one was unchanged. Data were analyzed using paired *t*-test. The p-value was $p<0.69323626$. The result of the p-value supported and proved that utilization of an educational brochure does increase colorectal cancer screenings. These findings solidify that education is a key component in increasing CRC screening quality metrics. The PI recognized throughout their literature search and review that education is not only needed for patients but providers as well. Healthcare providers must be diligent and increase awareness of the importance of screenings and the utilization of an educational brochure

was one way to achieve this. Providers must empower themselves to stay current on screening and treatment guidelines to ensure the best patient outcomes. Patients must be willing to accept knowledge and engage in a shared decision-making conversation with their providers about available treatment options.

Limitations

This study had several limitations: pandemic interference, staffing shortages, and leadership involvement. Covid-19 affected all processes and changed how we carried out everyday activities. So, it did not surprise me that it affected our healthcare system and how we administer the care we give in the inpatient and ambulatory settings. Therefore, I knew that this would be a limitation that affected my results as people were not going to wellness exams and only sought medical attention if necessary. According to Chen et al., (2021), there was an estimated screening deficit of 9.4 million associated with the COVID-19 pandemic for the US population in 2020 in monthly screening for breast, colorectal, and prostate cancer, and public health efforts are needed to make up the large cancer screening deficit associated with the COVID-19 pandemic. Since the pandemic has increased, staff storage has been a problem in healthcare for years. During the time frame when I implemented my DNP project, the office was down a medical assistant (MA), and this impacted the presentation of the educational brochure as the current MAs took on more tasks. Rosemarie Nelson, a Novant regional manager in Charlotte, NC, called the relationship between the physician and medial assistant a marriage that keeps the office and physician flowing effectively (Nelson, 2018). It was further stated that medical practices could achieve higher levels of patient satisfaction and improve quality care initiatives while optimizing physician time and increasing reimbursement for a profitable operation when a certified MA is utilized. That limitation of adequate medical assistants was impactful since they are so critical and valuable in practice in obtaining healthy outcomes. Finally, the last restriction

I encountered was that the office manager was transferred to a new position doing the initial implementation process. After numerous emails and office visits, we finally connected, and the PI was added to their staff meeting agenda. This obstacle did push back my project start date later than expected, but I will be able to capture my results before the end of the year. During the pre-implementation phase of the project, I secured a project champion which was an excellent assessment. She relayed the project process to the MA that was off on the staff meeting day and biweekly check-ins for updates via text messages.

Conclusion

Colorectal cancer is the third leading cause of cancer-related deaths in the United States (CDC, 2021). An effective CRC screening program in primary care needs a concerted effort between all office staff. Though the increase in the quality metrics was minimal or unchanged after the project implementation, this contributes to the growing research that shows education increases CRC screenings. Even with screening recommendations from a healthcare provider, limited patient awareness of the available screening modalities can decrease compliance. This lack of understanding was one of the driving forces behind utilizing an educational brochure for this DNP project. The educational brochure can be used to close this gap and provide the needed education to patients, and patients will have the necessary information required to make an informed decision.

The information yielded from this DNP project has future implications for continued research on health literature and screening promotion. Before disseminating an educational brochure, staff should ensure it meets the health literacy of their client population. Understanding is vitally crucial as health literacy is defined as the capacity to seek, understand, and act on

health information (Paterick et al., 2017) (Nutbeam, 2008). The brochures need to be accessible and widely distributed throughout the office from check-in to check out.

Future nursing research and projects could implement an educational brochure in different settings other than ambulatory care. For example, to promote CRC screenings, educational brochures could be made available on a broader aspect in urgent care and emergency care facilities. These are high-traffic facilities where numerous patients meeting the guidelines could be reached. Also, several patients without primary care providers utilize these facilities, which could help capture the patients who fall through the cracks.

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Appendix

CRC Educational Brochure