RUTGERS
School of Nursing

DOCTOR OF NURSING PRACTICE (DNP) PROGRAM

A DNP PROJECT

INCREASING COLORECTAL CANCER SCREENING REFERRALS IN AN URBAN CLINIC

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Abstract

Colorectal cancer (CRC) screening strategies can decrease mortality and morbidity by identifying precancerous lesions that can be removed before progression to an advanced stage (Lin, n.d). Despite this knowledge, screening rates in the United States (U.S.) remain low. Low rates of screening result in disparities in mortality and survival. The primary goal of this QI project was to increase referral rates at an urban health clinic by implementing an educational session for staff and the use of a pre-visit checklist to aid the staff in identifying patients who met CRC screening criteria. As a result of the educational interventional there was an improvement in staffs' attitudes towards CRC screening. Additionally, there was a 13% increase in CRC referrals given by the clinic one-month post-intervention. However, the use of the pre-visit checklist did not show to be effective due to interruption in the usual workflow.

Introduction

CRC is the second most commonly diagnosed cancer and the fourth leading cause of cancer related mortality worldwide (ACS, 2017). According to the World Cancer Research Fund Inc. (2019), in 2018, there were 1.8 million new cases of CRC worldwide. CRC is predominantly preventable with routine screening, detection, and removal of adenomas that could potentially develop into cancer over 5 to 15 years (Bevan & Rutter, 2018). The slow progression of CRC further highlights the value of early detection and prevention. Preventive health screening is one of the most valuable health care practices that promote early diagnosis and treatment, improves the quality of life, and reduces mortality (Bevan & Rutter, 2018). The number of people who are nonadherent with recommended CRC screening remains relatively high despite the known benefits (CDC, 2018). PCPs and office staff can address the need for

CRC screening with every interaction when a patient is seeking care. These interactions are valuable and present the opportunity for staff to determine if a patient is due for screening and to educate on the available options. This proposal outlines a quality improvement (QI) project evaluating the effect of providing education about screening options to primary care providers (PCPs), medical assistants (MAs), and secretaries and the use of a pre-visit checklist in an urban health clinic in Paterson, New Jersey. According to Local Data for Better Health (2016), residents of Paterson, NJ, between the ages of 50 to 75 had less than 45% adherence to CRC screening.

Background and Significance

The American Cancer Society (ACS) estimates that in the U.S. there will be 104,610 new cases of colon cancer, 43,340 new cases of rectal cancer and 53,200 deaths linked to CRC in 2020 (Siegel et al., 2020). It was estimated that as of January 1, 2019, more than 1.5 million Americans are living with a history of CRC **(**Miller et al., 2019). According to the CDC (2018), in the U.S., 66% of individuals ages 50 to 75 were up to date with recommended CRC screening. However, 21.7 million adults between the ages of 50 to 75 were still not up to date with recommended CRC screening. Those least likely to get tested are Hispanics, American Indians or Alaska Natives, Asians, those 50 to 64, and those with less education and lower-income (Siegel et al., 2020). Other factors associated with low screening adherence included residence in the U.S. for fewer than 10 years, being uninsured or insured by Medicaid (Siegel et al., 2020).

CRC incidence also disproportionately affects some racial groups more than others. African Americans compared to Caucasians have higher CRC incidence, related mortality, and are more likely to develop it at an earlier age **(**Augustus & Ellis, 2018). Environmental factors

also play a role in the development of CRC. Factors linked to CRC include obesity, physical inactivity, intake of red and processed meat, tobacco use, and heavy alcohol intake (Tan & Chen, 2016).

The incidence and mortality from CRC can be substantially reduced when patients are screened appropriately (Shaukat, Allen, & Ahlquist, 2015). Survival depends on the stage at which diagnosis occurs. CRC Screening identifies precancerous lesions before they become malignant and detects cancer before it becomes advanced or metastasizes (Lin, n.d.). Advanced screening options include yearly fecal immunochemical test (FIT) and guaiac-based fecal occult blood test (gFOBT), as well as the multi-targeted stool DNA test (MT-sDNA), which can be performed every three years, or colonoscopy every 10 years (Simon, 2018).

CRC is largely preventable through routine screening. Routine disease screenings reduce mortality and disability by detecting illnesses and diseases in their initial, more curable stages, which substantially decrease sickness, disability, premature death, and medical costs (U.S Department of Health and Human Services, n.d.). Lack of knowledge, anxiety related to having a colonoscopy, fear of the unknown, unease related to being diagnosed with CRC, and inadequate provider communication regarding screening methods were all expressed as barriers to screening (Winterich et al., 2008). However, better communication about CRC screening and a recommendation from PCPs might help to decrease fears about CRC screening **(**Winterich et al., 2008; Feldstein et al., 2012).

Problem Statement

Lack of provider referral contributes to low rates of CRC screening. At the project site, PCPs did not initiate screening referrals for patients who met criteria for CRC and thus, patients

did not complete the recommended CRC screening. The electronic health record (EHR) used by the clinic, Athena Health, has a tab that alerts providers of needed screenings and vaccinations. The providers at the clinic were not acknowledging the alert in the EHR and an additional way to identify patients who met screening criteria was needed. The PCPs did not discuss CRC screening because of the acute nature of the visit, lack of an organized way of tracking eligibility for screening, or because they believe patients do not want the screening. Additionally, the demographic population of the clinic is majority Hispanic/Latino, lower-income individuals, those with Medicaid and uninsured, people, who are less likely to be current with CRC screening (Siegel et al., 2020).

Clinical Question

Among PCP and staff members at an urban health clinic (P), how will education about screening guidelines along with the implementation of a pre-visit checklist (I), compared to usual practice (C), affect provider and staff attitudes about CRC screening and the number of patients who receive CRC referrals (O), over one month (T)?

Needs Assessment

The needs assessment included an analysis of the strengths, weaknesses, opportunities, and threats related to the clinic.

Strengths. Strengths included the user-friendly EHR and accessibility to functions such as the report builder that allowed easy auditing of charts. Another strength was the support from the site. The stakeholder and the DNP team member offered project ideas based on the clinic's areas of need. After meeting with the DNP team member, the principal investigator (PI) then

narrowed the focus of the project to the improvement of the clinic's CRC referral rates. Additionally, through discussion with the DNP Chair, the pre-visit checklist was developed to provide the clinic with a clear and concise way to identify patients that qualify for a CRC referral.

Weaknesses. One weakness was time constraints due to the clinic's busy schedule; PCPs may see 20-40 patients a day. The high volume of patients requires a shorter time allotted to individual patient visits and result in less time to address health screenings (Kikano, Zyzanski, Gotler, Stange, & Kikano, 2000). The shorter acute visits and the acute nature of visits prevent PCPs from discussing CRC screening options and making a CRC referral.

Another weakness identified through the review of a sample of charts was poor documentation in the EHR. A random sample of 10 charts of male and female patients ranging in age from 50 to 75 years old revealed that five patients had not been screened for CRC and the other five charts lacked documentation about CRC screening.

The investigator asked three patients during their visit to the clinic whether they had a colonoscopy and if not, the reason(s). All three patients were not screened and expressed fear as the main reason; patients also said that they were against "having anything going up their butts." When other options, such as stool testing, were presented to the patients, they stated that they were unaware of such options. The PCP at the clinic was interviewed and said that "patients, especially African American patients, will not go for a colonoscopy because they don't want anything going up their butts." PCP's statement is consistent with the patients' voiced concerns.

Opportunities. The DNP team member contributed the information that a protocol to initiate CRC screening aligned with the United States Preventive Services Task Force's

(USPSTF) recommendations and Medicare and Medicaid EHR incentive programs, also known as Meaningful Use. CRC screening is one measure that is part of the Merit-based Incentive Payment System (MIPS): Quality Program 2019. The Centers for Medicare and Medicaid Services (CMS) offer financial incentives to healthcare providers who met national benchmarks for quality, safety, and efficiency of patient care.

Threats. One obstacle that was anticipated was possible pushback from staff due to a busy work environment. The MAs will implement the pre-visit checklist, so if they are unwilling to use the checklist when assessing the patient, the checklist will not be effective. The clinic's busy work environment may result in the unwillingness of the staff to participate in QI interventions. Providers may also find the checklist time consuming to review and may return to their usual practice. Another obstacle identified was being able to coordinate the lunch sessions to include all potential participants during the educational sessions.

The findings from the needs assessment indicate that documentation was incomplete and it was unclear whether patients who met screening criteria had been appropriately referred for CRC screening. In addition, fear, lack of education about screening options, and lack of provider referral were barriers that prevented patients from completing CRC screening. While trying to coordinate lunch sessions, the PI identified obstacles due to staffs' varying work schedules. The PI also needed to anticipate workflow issues when implementing the pre-visit checklist.

Aims and Objectives

This QI project aims to increase colorectal cancer (CRC) screening referral rates by educating staff at the clinic regarding current CRC screening guidelines and methods in addition to implementing the use of a pre-visit checklist. Objectives to achieve this aim include:

- Conduct an education session for PCPs and all staff about current CRC screening guidelines and methods.
- Implementation of a checklist for CRC screening.
- Measure the frequency of use of the checklist by the MAs.
- Identify how many patients qualified for CRC screening.
- Measure how many CRC qualified patients received a referral, as documented in the EHR.
- Measure the number of referrals before and after the educational intervention and use of the pre-visit checklist.

Review of Literature

Databases searched included the Cumulative Index of Nursing and Allied Health Literature (CINAHL), PubMed, and The Cochrane Library. In CINAHL, the key term "*colorectal cancer screening*" yielded 6,198 results. Exclusion criteria limited the search to studies in the U.S. and Canada, studies in English from January 2013- March 2019 for a yield of 1,714 studies. Advanced search inclusion criteria included English language studies from the last 5 years with a sample of PCPs, in an urban setting, and included the word "education" reduced the yield to 216 studies. The final studies selected for this literature review were based on their relevance to the PICOT question, if the research focused on interventions to improve screening rates in primary care settings, and research that focused on educating PCPs and staff. After applying all criteria, the final yield was eight articles (See Appendix A for the PRISMA diagram outlining the search). See Appendix B for the table of evidence that summarizes the eight studies.

PCP Education about CRC Screening

A CRC screening educational intervention increased the NP participant's knowledge about screening options and increased patients' screening rates. Nurse Practitioners (NPs) were educated about four screening options (colonoscopy, gFOBT, fecal immunochemical test (FIT), sigmoidoscopy) (Slyne, Gautam, & King, 2017). Before the education intervention, 71% of patients had completed CRC screening; after the educational intervention, 3,851 of 5,160 patients (75%) adhered to CRC screening recommendations, resulting in a 4% improvement post-education. The 4% increase resulted in the screening of 206 additional patients, which may indicate that provider education provides a limited but clinically significant effect on screening. Additionally, the NP's perception of effectiveness regarding gFOBT screening and immunochemical fecal test screening 90 days post the education intervention improved (Slyne, Gautam, & King, 2017).

PCPs need to be knowledgeable about the most recent guidelines and screening methods and providing CRC education to PCPs is associated with an increase in colonoscopies (Dignan et al., 2014). In a randomized control study focused on educating PCPs instead of patients due to the awareness that a recommendation for screening from a physician was a primary predictor of patient adherence with screening recommendations. Primary care practices, a control group (n=33) and an experimental group (n=33), were provided with an educational intervention that covered screening efficacy, patient counseling, creating a screening-friendly practice environment, CRC risk factors and burden, and the advantages of screening modalities in an educational intervention for PCPs. Both groups received an educational intervention. The intervention group receiving the education only initially; the control group received the intervention again after six months. Results showed an increase in screening from 62.9% to

79.7% in the intervention group and the control group screening rate increased from 61.7% to 71.2%. Rates of documented screening increased for both groups at the six-month follow-up; however, the intervention group experienced a 15.7% increase in colonoscopy rates compared to a 2.4% in the control group (Dignan et al., 2014). Providing education and FIT kits to patients and medical residents improved CRC knowledge scores from 48.1% to 96.3% post-intervention. It resulted in a 25% increase in adherence to CRC screening, demonstrating the impact of provider education on CRC screening adherence (Bakhai, et al., 2018).

In a quasi-experimental trial, participants were divided into two groups (Dolan, et al., 2015). In the first group, patients were shown an educational video before their appointment with their physician; the physicians also received QI and communication skills training. In the second group, only the physicians received the educational intervention. The group that received both physician and patient education had higher rates of CRC screening discussions (61.1 %) compared to physician education only groups (50.3%). Although providing education to both patients and physicians is more beneficial, there is still some improvement in CRC screening with physician education alone.

Offering Patients Options

When providers discuss options with patients, it allows patients to be involved in decision making, and they are more likely to adhere to screening (Dolan et al., 2015; Martin et al., 2017; Myers et al., 2014). Providers rarely mentioned other forms of CRC screening and regularly recommended patients to get colonoscopies. A study of 503 patients found that only 143 (28.4 %) reported a discussion of colonoscopy, while only 21 (4.2 %) reported a discussion of both colonoscopy and stool tests (Dolan et al., 2015). Recommending screening choices may be

particularly important in communities with limited access to health care and barriers to colonoscopy (Dolan et al., 2015).

Research indicates there are higher rates of adherence to screening with tailored screening options to meet participants' needs (Myers et al., 2014). African American participants (n=764) who met eligibility for CRC screening were placed into either the control group (n = 380) or the intervention group (n = 384) (Myers, et al., 2014). Participants completed a baseline telephone survey about the sociodemographic background, perceptions related to CRC screening, and preferred screening method. The control group received a FIT kit in the mail, CRC screening informational booklet, and a reminder letter to schedule a colonoscopy. The intervention group also received a CRC screening informational booklet in addition to information on their preferred screening method and a phone call from a trained navigator. The trained navigator reviewed the mailed materials, reassessed the participants preferred screening method, discussed concerns or barriers to testing, helped to develop a plan to complete the CRC screening, and arranged a follow-up call. The intervention group had a statistically significantly higher level of six-month screening adherence than the control group (38.0% vs. 23.7%, $p = .001$) (Myers et al., 2014).

Colonoscopy remains the gold standard of CRC screening because it is more likely to visualize, detect, and facilitate the removal of precancerous or cancerous lesions. It only has to be performed every 10 years compared with yearly stool testing (Dolan et al., 2015). However, it can be expensive and is not always easily available for the uninsured or those with limited access to transportation. Stool testing options may also appeal to patients who are fearful of having colonoscopies due to its invasiveness (Bakhai, Ahluwalia, Nallapeta, Mangat, & Reynolds, 2018; Martin et al., 2017). When patient navigators provided patients with education about an

immunochemical fecal occult blood test (iFOBT), the iFOBT kit, and an instructional DVD, screening rates increased from 30% to 57% (Martin et al., 2017). The accessibility of iFOBT and ease of use from home were important factors that promoted the use and appealed to populations with limited access and barriers such as lack of insurance, time constraints, and lack of transportation (Martin et al., 2017). A QI project conducted by Bakhai et al. (2018) at an urban hospital that provided care for an underserved, predominately African American (68%) patient population, the patients (n=407) were given FIT kits and provided with education to patients. Of the 407 patients, 252 patients completed the test, and within 12 months, the QI project increased CRC screening rates at the hospital from 50% to 75%. In this QI project, the use of FIT testing increased patient adherence with CRC screening.

Barriers to Screening

Barriers exist that prevent African American and Hispanic/Latino American participants from getting routine CRC screening (Dignan et al., 2014; Dolan et al., 2015; Kiviniemi, Klasko-Foster, Erwin, Jandorf, & Freedland, 2018; Wong, Bloomfield, Crookes, & Jandorf, 2013). However, PCPs can directly influence the health prevention behaviors of their patients, even in underserved communities (Dignan et al., 2014). Examples of barriers include inadequate health literacy about CRC and screening options, lack of knowledge, lack of provider recommendation, fear of getting cancer, embarrassment linked with procedures, cost or lack of insurance, time constraints and lack of transportation (Dignan et al., 2014; Wong, et al.,2013; Dignan et al., 2013). Patients reported that their providers' recommendation greatly impacted their decision of whether or not they completed screening tests (Dignan et al., 2014). Despite the financial barriers faced by the study population, patients who received recommendations from their PCP were still had colonoscopies (Dignan, et al., 2014). Many barriers can be addressed and potentially

resolved through provider and patient collaboration to tackle potential hurdles that are preventing the patient from completing the recommended screening.

Socioeconomic status and perceived benefits of screening influenced participants' screening adherence (Kiviniemi et al., 2018). In the community-based study by Kiviniemi et al., 2018, higher levels of education were positively associated with greater screening uptake. Higher levels of education and income were also associated with an understanding of the benefits of screening, greater self-efficacy to get screened, greater knowledge about CRC and CRC screening (Kiviniemi et al., 2018). Participants with higher education and income also reported fewer barriers to screening, had fewer negative associations with screening and were less likely to express fear of colonoscopy (Kiviniemi et al., 2018). Having health insurance also influenced participants' adherence to CRC screening. The lack of health insurance resulted in patients' avoiding preventative screening due to a lack of financial resources to cover testing (Kiviniemi et al., 2018). Also, access to transportation and the ability to cover transportation costs are a greater concern for those with limited means (Kiviniemi et al., 2018).

In a randomized controlled trial conducted by Jandorf et al. (2013), the use of patient navigators was studied to evaluate the effect of patient navigators on African American patients' adherence to CRC screening. The participants were divided into three navigation groups: peer navigators who were over the age of 50 and had recently undergone a colonoscopy, professional navigators who held a Bachelor's degree and had research experience, and standard navigation group who scheduled procedures and answered questions. All navigators were African American and were asked to include how CRC specifically impacted African Americans in addition to scheduling and giving instructions on bowel prep. Peer navigators were asked to talk to participants to talk about their personal colonoscopy experiences. The researchers in this study

hypothesized that racially-matched peer navigators would help participants address anxieties about colonoscopy screening and increase adherence with CRC screening. The study did not find any statistically significant difference in CRC completion between the groups; however, there was an increase in colonoscopy completion, with 75.7% overall completion. Results indicated that unemployed participants(p=0.022), those with incomes less than $10,000 (p=0.017) or insured through CMS (p=0.019), were significantly less likely to complete the recommended screening (Jandorf et al., 2013). Higher income was the main factor that influenced participants screening adherence because it was associated with other socioeconomic factors, such as employment, educational level, and insurance status (Jandorf et al., 2013). Despite the study not showing a significant difference in the use of peer, professional, and standard patient navigators, the results of 75.7% CRC screening completion show that opportunities exist to assist patients in overcoming the barriers that they may face in regards to CRC screening completion. Sometimes the barriers can be as simple as assisting patients in making appointments, educating them regarding CRC and the screening process, and providing them with support and easing anxiety.

Theoretical and Conceptual Framework

The Plan, Do, Study, Act (PDSA) model was used to implement this QI project. The PDSA cycle (see Appendix C) offers a systematic approach to addressing a problem (Shakman, Bailey, & Breslow, 2017). This model is often used for QI projects because of its ease of use and functionality when evaluating and developing a change. The PDSA framework has four phases (Shakman, Bailey, & Breslow, 2017). The first phase of this model is the Plan phase. During this phase, ideas, solutions, and strategies are formulated to address an area of needed

improvement (Shakman, Bailey, & Breslow, 2017). The second phase of this model is the Do phase. During this phase, the proposed change can be tested or piloted (Shakman, Bailey, & Breslow, 2017). The third phase is the Study phase. During this phase, data is reviewed and the implemented change is evaluated (Shakman, Bailey, & Breslow, 2017). The fourth phase is the Act phase when the plan is either adjusted, adopted, or abandoned (Shakman, Bailey, & Breslow, 2017).

The planning phase of this QI project involved a needs assessment that identified areas of needed improvement. During the planning phase, the DNP team member and PI were able to determine a need to improve CRC referral rates. The Do phase of this project included two educational sessions offered during the PCPs and staff's scheduled lunch break. Before the educational sessions and one month after, the PCPs and staff completed the Questionnaire of Attitudes Towards CRC Screening (QATCS) (see Appendix D). The pre-visit checklist (see Appendix E) was also introduced to staff during the lunch sessions allowing for feedback and questions.

The Study phase took place twice weekly for one month; the PI visited the site and addressed any issues with completion of the pre-visit checklist. The Act phase is where the PI analyzed the results, identified any need for improvements or adjustments, and evaluated changes in CRC referral rates as a result of the intervention. One example of refinement was the need to visit the site twice weekly to make sure there were enough copies of the pre-visit checklist. The PI noticed that if she did not make more copies of the checklist, the participants forgot to use it. Also, the PI saw that the pre-visit checklists initially were not being used because they were not attached to the billing forms the MAs used. The lack of checklists was addressed

by talking with the secretaries at the front desk and notifying them to attach the form to all patient billing slips before handing them to the MA.

Methodology

This QI project used a retrospective and prospective chart review to measure the effectiveness of the CRC educational intervention and pre-visit checklist on CRC referrals. In addition, a pre and post questionnaire was administered to the participants immediately before and one month after the implementation of the CRC education and pre-visit checklist. The pre and post questionnaire measured the attitudes of the providers and clinical staff towards CRC screening. The educational intervention and pre-visit checklist were implemented after the completion of the retrospective chart review of CRC referral rates. One month after implementing the project, the prospective chart review was conducted to assess the effect of the educational intervention and the pre-visit checklist on CRC referral rates.

Setting

The setting for this project was an urgent care clinic that also treats primary care patients in Paterson, New Jersey. The clinic draws its patients from the area's population of 148,678, which is Hispanic/Latino (60.7%), Black/African American (25.7%), White (8.5%), and Asian (3.9%) (U.S. Census Bureau, 2017). The majority of residents have only a high school education (72.6%). The median household income of residents in the area is $36,106 and 29% of residents live below the poverty level. The patients seen at the clinic are primarily Hispanic/Latino and African American and the majority use publicly funded insurance.

The clinic sees approximately 14,000 patients a year who are age 16 years and above (CEO of the clinic, 2019). The clinic is open seven days a week and provides services ranging from primary care to hematology and oncology services. Services include laboratory testing,

electrocardiograms, echocardiograms, ultrasounds, pulmonary function tests, infusions, and bone marrow aspiration and biopsy.

The clinic providers spend an average of 15 minutes with patients and see 20- 40 patients in a day. The secretaries check patients in and notify the MAs of patients ready to be seen. The MAs have multiple responsibilities, including taking vitals, drawing labs, administering immunizations, and starting intravenous lines for infusions. The MAs also ask the patient the reason for their visit, which they document on a post-it and stick it to the front of the patients billing form and then line it up in front of the PCPs desk in order of patients' appointment time. The eight MAs at the clinic all speak Spanish fluently, which is an important skill at the clinic due to the large number of Hispanic patients seen by the clinic, of which many are not English speaking.

Project Population

For the educational intervention, the sample for this project consisted of two MDs, three NPs, eight MAs, four secretaries, and two clinical office staff. The MDs and NPs are primarily responsible for making the referral for CRC screening; therefore, their role in screening is essential. The MAs have a crucial role in documenting the patient's need for screening using the pre-visit checklist. The secretaries and clinical office staff are essential to this project because they are responsible for attaching the pre-visit checklist to patient charts before handing it to the MAs. Inclusion criteria included all medical providers and office staff at the clinic that are in direct contact with patients. Exclusion criteria were those unwilling to participate.

The retrospective and prospective chart review was a purposeful sample of male and female patients aged 50 to 75 years old to assess for the use of International Statistical Classification of Diseases 10th revision (ICD-10) billing code of Z12.11, which indicates a

Screening Encounter for Malignant Neoplasm of the Colon. Inclusion criteria were the charts of patients seen one month before the educational intervention and then the one month after the educational intervention. Exclusion criteria were patients who have a current diagnosis of cancer and are under the care of the oncologist at the clinic. No patient identifiers or personal information was collected; the only data collected was the frequency of the ICD-10: Z12.11.

Participant Recruitment

Information about the CRC education was shared via a recruitment flyer (see Appendix F) displayed in the office break room, reception desk, and staff bathrooms. Efforts to recruit were also made via one on one meetings with providers and staff during clinic visits by the principal investigator (PI). Recruitment was completed one week before the education session from January 7th to January 13th, 2020. Potential participants were informed that participation in the program was voluntary and their decision regarding participation will not impact their employment.

Consent Procedure

Informed consent was obtained in accordance with the Rutgers University IRB requirements (see Appendix G). The Rutgers IRB suggested template for consent was customized according to this project's objectives. Participants were given the opportunity to read the consent form. Participants were reassured that there is no risk to their employment or confidentiality by participating in the project. Participants were informed that they could withdraw from the project at any time and that withdrawal from the project would not affect their employment. Participants were also be allowed to ask questions at any time. Staff members and providers signed consent forms indicating their voluntary participation before the education

sessions.

Risks/Harm

There was no anticipated discomfort for participants in this study. There was no physical, psychological, social, economic, confidentiality, or legal risks associated with this project. Participation in this project was voluntary, and participants could withdraw from the project at any time. The benefit of participation in this project was improved knowledge and attitudes about CRC screening that may improve current patient care and adherence to recommended guidelines for CRC screening.

Subject Costs and Compensation

There was no cost to participate in this project. Subjects did not receive monetary compensation for their participation in the project; however, lunch was provided at the educational sessions in appreciation for participants' time.

Project Interventions

Implementation of the educational sessions occurred on January 14th and 15th, 2020, during staff lunchtime from the hours of 12 pm to 2 pm to ensure that all office staff that qualified were included and reached. The educational intervention included a PowerPoint presentation about CRC and screening methods (see Appendix H). Topics that discussed were colorectal cancer statistics, colorectal cancer screening methods and CRC screening guidelines according to the USPSTF. Time was also allotted for question-and-answer after the presentation. During the educational intervention, the use and purpose of the pre-visit checklist were explained to participants, and additional time was spent with MAs to ensure that they understood how to complete the pre-visit checklist correctly. For those who needed further clarification, the PI

explained the project interventions and purpose during individual meetings with participants.

Outcomes to be Measured

Outcome measures. Change in attitudes was defined as staff and PCPs recognizing the value of giving a CRC referral. Change in the referral rate was defined as the difference in the number of referrals before and after the implementation of the pre-visit checklist and educational intervention.

Data collection tools. The QATCS was used to measure changes in staff and PCPs' attitudes toward CRC screening and to measure the outcome of the educational intervention. The QATCS questionnaire was developed by López-Torres Hidalgo et al. (2013), to collect data about the attitudes of health care providers towards CRC screening and patient and PCP barriers that impact participation in CRC screening. The QATCS was evaluated for validity and acceptable internal consistency was verified (Cronbach's alpha: 80.1 %) by a cross-sectional study (López-Torres Hidalgo et al., 2013).

Permission to use the questionnaire from the study was granted to the PI, by Jesus López-Torres Hidalgo via email correspondence (see Appendix I). The QATCS includes 12 multiple choice questions asking for participant's views about the effectiveness and cost-effectiveness of screening, acceptance by both PCPs and patients, the importance of PCPs and MAs role in screening, and barriers to both patient and PCP participation. The QATCS was administered before the educational session and again one month after the implementation of the education session.

The pre-visit checklist was used by the MA to identify patients that qualified for a CRC screening referral. The pre-visit checklist included the reason for the visit and items about health maintenance such as colonoscopy, mammogram, hemoglobin A1C, vaccinations, and tobacco

use. Under colonoscopy, parentheses with the ages 50 to 75 alert the MA the appropriate age to screen. Additionally, that section also prompts the MA to ask if previously screened and if the answer is "yes," the MA will also ask the patient the date of screening and the name of their GI specialist. If the answer is "no," the MA will give the patient a choice of screening methods: colonoscopy, FIT, Stool DNA, FOBT, CT, or Refused. For purposes of data collection, the checklist also asks that if a screening referral was documented in the EHR, the PCP would circle "yes" or "no." This response allowed the PI to assess if the pre-visit checklist prompted the PCP to make a CRC referral. The number of checklists collected should match the number of patient visits.

The report builder function of the EHR was used to measure the number of referrals made by the PCPs before and after the implementation of the pre-visit checklist and educational intervention. The report builder function was used to search patient visits with ICD-10 billing code of Z12.11 that indicated a CRC referral was given to the patient. Retrospective data was collected between December 13th, 2019, to January 13th, 2020, to determine the number of CRC referrals that the clinic had given one month before the QI project. Prospective data were collected one month after the implementation of the educational intervention and pre-visit checklist from January 14th to February 14th, 2020, to identify how many patients were given referrals for CRC screening following the intervention. On February 14th and February 17th, 2020, one month after the educational intervention and implementation of the pre-visit checklist, participants were re-assessed using the post- questionnaire to assess for change in attitudes and retention of knowledge regarding CRC screening guidelines.

Project Timeline

This quality improvement project took approximately one year to complete from the process of planning to the completion of data collection and analysis (see Appendix J). IRB submission was completed in September 2019 and Rutgers IRB approval (see Appendix K) was obtained on December 10th, 2019. The retrospective chart review was conducted from December 13th, 2019, to January 13th, 2020. Staff recruitment was performed from January 7th to January 13th, 2020. The implementation of the educational session and pre-visit checklist was initiated on January 14, 2020. The prospective chart review and data analysis were conducted from February 15th to February 21st, 2020. The project proposal was completed in March 2020. Presentation and Dissemination of the final project occurred from April- May 2020.

Budget

Costs for this project included recruitment material, printing costs, and lunch for participants. The total cost was $400 (Appendix L). The PI was responsible for all costs associated with the project.

Evaluation Plan

The PI administered a Likert scale project evaluation questionnaire after the QI project was completed to evaluate the effectiveness of the project (Appendix M). Questions included participant evaluation of the educational session and usefulness of the pre-visit checklist in daily practice and the project's effectiveness in increasing CRC referral rates.

Data Maintenance and Security

Consent forms were stored in a locked box with a key. Only the PI and Chair had access to the data and consent forms. Names of participants were not collected on the data collection instruments to ensure the privacy and confidentiality of the data. No patient identifiers were collected on the pre-visit checklist to protect confidentiality. Data was stored in an encrypted drive. The pre-visit checklists were reviewed twice weekly by the PI to keep a count of the number of checklists generated, and then a comparison was made with the number of referrals charted in the EHR. Upon completion of this project, all data was destroyed in accordance with Rutgers University guidelines. Hard copies of consents are housed in the locked office of the DNP Chair at Rutgers University (65 Bergen Street, Newark, NJ 07107).

Data Analysis

Once the data collection was complete, the data was entered into IBM SPSS Statistical software (Version 26.0). One of the first steps in the data analysis was to understand the distribution of the data because some statistical tests rely on central tendency while others may focus on frequency. If the correct test is not used, it will not accurately represent the data.

QATCS. A Shapiro-Wilk's test ($p > .05$) and a visual inspection of the histograms, normal Q-Q plots, and box plots for the exams show that the test scores approximated a normally distributed curve for both pre and post questionnaires (see Appendix N) (Yamanappa, Sudeep, Sabu, & Rajan, 2018). The pre-QATCS data sample showed a skewness of -0.299 (SE=0.536) and kurtosis of -0.665 (SE=1.038) (see Appendix O). The post-QATCS data sample showed a skewness of -0.620 (SE=0.536) and kurtosis of -0.585 (SE=1.038) (see Appendix O). Since all

four z-values for pre and post questionnaires lie within +/-1.96, it can be concluded that the data do not differ significantly from normality.

Each question was given a numerical value and was scored accordingly to analyze data from the pre and post QATCS. A tally of all the scores of each question determined the overall score for the test. Once all the scores were input into SPSS, the PI was able to derive the mean and standard deviation of the pre and post QATCS. The distribution of the data was normalized, which is important because this determines which statistical test will be used to analyze the data. Because the data was normal, a parametric test was used to assess the data. In regards to the pre and post QATCS data, the Paired-Samples T-test was used (Shi, 2019). This test is used when two populations are related, and in this case, they are because it is the same individuals who are taking the pre and post QATCS. When evaluating the Paired-Samples T-test (see Appendix P), the critical value of *t* can be obtained from the distribution table based on the confidence level and degrees of freedom. When this is performed using the sample size of 18 participants and a 95% confidence level, the value obtained is 1.739607.

The responses to the question regarding fecal occult blood testing effectiveness were analyzed between PCPs and MAs. When looking at the frequency distribution of the data in a histogram, it can be seen that the data does not have a normal distribution (see Appendix Q). Due to the distribution of the data, a non-parametric test must be used to compare the means. Since the samples are related, the Wilcoxon signed ranks test was used.

Pre-visit Checklist. A Shapiro-Wilk's test ($p < .05$) and visual inspection of the histograms and normal Q-Q plots show that the data is not normally distributed for both periods pre and post implementation of the pre-visit checklist (see Appendix R). The sample characteristics showed a skewness of 2.809(SE=0.427) and kurtosis 6.308(SE=0.833) for the

period before the checklist implementation. The period post checklist implementation showed a skewness of 1.112(SE=0.427) and kurtosis of -0.824 (SE=0.833). Three out of the four z-values lie outside +/-1.96, so it can conclude the data does differ significantly from normality. The Mann Whitney U test was used to compare the two independent samples. This statistical test will provide a mean rank value and then compare them (Corder & Foreman, 2014).

Findings

From the retrospective chart review that was conducted from December 13, 2019, to January 13, 2020, one month before the QI project, it was found that out of thirty eligible patients, three CRC referrals were made. Through the prospective chart review that was conducted from January 14th to February 14th, 2020, one month after the start of the QI project, it was discovered that out of thirty eligible patients, seven CRC referrals were made. There was a 13% increase in referrals after the implementation of the QI project.

The first question on the QATCS asked the staff their opinion about whether CRC screening with fecal occult blood testing was effective. Before the educational session, most MAs 87.5% (n=7) answered "I don't know" and most PCPs 75% (n=3) answered very effective. When the QATCS was filled out post intervention, all MAs 100% (n=8) and all PCPs 100% (n=4) answered "very effective". A significant change was observed in the staff's attitude towards fecal occult blood testing (p=.004); thus, the null hypothesis can be rejected (see Appendix Q).

To score participants' answers in regards to potential barriers to CRC, a score of five represented "very important" and a score of zero represented "not important at all". When filling out the questions on potential barriers to CRC screening, all MAs (n=8) selected "fear of colonoscopy" and "lack of knowledge on colorectal cancer" as main barriers that inhibited

patients from completing recommended CRC screening. Another barrier that was identified by the MAs as very important was “provider’s lack of time.” In contrast, the PCPs rated the barriers “fear of colonoscopy,” “lack of knowledge on colorectal cancer,” and “provider’s lack of time” with lower ratings of importance than the MAs. The majority of PCPs (n=3) scored “fear of colonoscopy” a three out of five, representing moderately important. All PCPs 100% (n=4) rated “lack of knowledge on colorectal cancer” a two out of five, representing somewhat important.

Additionally, half of the PCPs 50% (n=2) rated “providers’ lack of time” as a one out of five, representing of little importance. The other half of the PCPs 50% (n=2) rated it zero out of five, representing not important at all. While in contrast majority of the MAs 75% (n=6) rated the barriers “fear of colonoscopy,” “lack of knowledge on colorectal cancer,” and “provider’s lack of time” with a score of five out of five, representing very important. Additionally, 25% of MAs rated these barriers with a score of four out of five, representing important. A total score of 93 represented the highest score obtainable and represented a positive attitude toward CRC screening. The pre-QATCS mean score was 60.78, and the post-QATCS mean score was 66.53, representing a nine percent increase in scores post intervention. When the data collected from the pre and post QATCS was analyzed using the Paired-Samples T-test, the value 12.022 (see Appendix P) was obtained and is greater than the critical value of *t* that is 1.739607. These data points lead us to reject the null hypothesis and conclude that the intervention resulted in a significant improvement in staff’s overall attitudes towards CRC screening (p= .000).

The number of checklists used was assessed twice weekly by the PI and compared to the number of patient visits. The PI collected a total of 30 completed checklists, of which 5 CRC referrals were prompted and resulted in five patients receiving a referral (p=0.098). It can be

concluded that there was no significant difference between the periods prior to the checklist implementation and after.

Discussion

The educational session about current screening guidelines and information regarding different screening options available seemed to be new and interesting information for MAs. However, PCPs verbally expressed their understanding of the covered material. The educational session seemed to most benefit the MAs because much of the information was new information for them, whereas the PCPs were knowledgeable about the topic. During the educational session and discussion with the CEO of the practice and the office staff, it was discovered that stool testing kits were not used by the clinic. The CEO stated that he was willing to order stool kits and provide them as an option to patients. The PI then spoke with the office manager and 10 FIT kits were ordered for the office. Initially, the stool kits were not being offered because not all the staff were aware of the availability of the kits. The PI then individually updated all the PCPs and MAs at the clinic that FIT kits were available to be given to patients who were eligible for CRC screening. One month after the implementation of the project, two stool kits were given out. One PCP at the clinic stated that he usually would only offer colonoscopy as an option. Another PCP noted that some patients preferred getting the colonoscopy because it was more accurate and if a positive stool result would just mean they would have to have a colonoscopy anyway. The PCPs and patients at the clinic more frequently chose colonoscopy as the method of screening, which is supported by research as the most commonly chosen method (Dolan et al., 2015). However, now that the stool kits are available at the clinic, they can be offered as an option for those who may be reluctant to have a colonoscopy. Offering patients an option increases the likelihood of patients completing the recommended CRC screening and is substantiated by the currently

available research (Dolan et al., 2015; Martin et al., 2017; Myers et al., 2014). The implementation of the project resulted in a practice change at the clinic with the addition of FIT kits. More time is needed to see whether the addition of the FIT kits as a screening option will increase patient adherence to CRC screening and whether or not PCPs will offer the kits as an option to their patients. FIT testing is an excellent CRC screening option for patients who are unwilling or unable to have a colonoscopy (Myers et al., 2014).

Initially, all of the MAs found the pre-QATCS confusing to fill out and required many clarifications from the PI. One MA stated that the questions were out of their scope of practice, specifically in regards to questions regarding the effectiveness of fecal occult blood testing. Additionally, from discussions with the MAs, it was discovered that the MAs were able to not only relate to the patients on a personal level, but the patients also found it easier to voice their concerns to the MAs. The findings from the completion of the pre-QATCS were that the MAs were more in tune with the barriers that patients faced. This finding was significant because it emphasizes the importance of the MA's role in CRC screening and supports involving clinic staff in identifying patients eligible for preventative screening.

During each visit, the PI would drop off more checklists and assess to see if the checklist was being used and would speak with MAs regarding ease of use. One MA reported that she would use the checklist; however, it was not being attached to the patient's billing slip by the secretary before being seen by the MA. Another MA reported that they are very busy and found the checklist time consuming to complete. As time progressed, the checklist was being used less.

There was a "yes" or "no" response on the pre-visit indicated whether or not a referral was made in the chart, allowing the PI to assess if the pre-visit checklist prompted the PCP to make a CRC referral. The goal was to have the number of checklists collected be as close as

possible to the number of patient visits. It was anticipated that with the implementation of the educational intervention and pre-visit checklist, the staff would be more aware of patients who met the criteria for screening. It was anticipated that through completion of the pre-visit checklist MAs would not miss patients who qualified for screening, and PCPs will be prompted to screen patients and make a referral. However, the pre-checklist was shown not to be effective, the reasons behind the lack of effect were its infrequent use by the MAs because of increased workload and technology, making paper charts increasingly obsolete. MAs found completing the checklist to be tedious and time consuming, resulting in delays getting patients checked in.

The participants found the pre-visit checklist time consuming, and many of patients were unaware if they were up to date with their preventative screening, which resulted in the MAs searching charts for the information. One MA stated that it was “too much with their already lengthy responsibilities.” Another MA stated that they found it “took too much time.” The pre-visit checklist may have been more successful if it only addressed CRC screening instead of covering other preventative screening measures. The PI added other areas of preventative screening to increase the likelihood that the checklist would be able to be adapted into the clinic's daily use. However, the additional preventative screening items increased the MAs’ workload and resulted in the MAs not using the pre-visit checklist. Because the checklist increased the time MAs took to check a patient in, it could potentially delay workflow and increase patient wait time. Time is a factor when patient satisfaction is factored in; patients will be increasingly dissatisfied if they are required to wait longer before being seen (Xie & Or, 2017). Had the checklist been successful, it had potential to prevent a missed screening opportunity and allow the PCP to spend more time focusing on the diagnosis, treatment, and prevention of colorectal cancer. (Eden, 2016).

The PIs goal was to increase referrals by 5% that was obtained. However, more time may be required to gage the true effect of the QI project. It is important to keep in mind that the QI project was conducted during holiday months, which could have influenced the number of referrals that were administered both pre and post intervention.

Through the Project evaluation survey, all 18 participants found that the educational session was very informative, with 12 participants selecting "strongly agree" and 6 participants selecting "agree". Similarly, all participants selected that they "strongly agreed" that the pre-visit checklist was a useful tool for identifying patients who qualified for CRC screening. However, despite the staff finding the pre-visit checklist to be a useful tool, most participants replied that they would not continue to use the pre-visit checklist at the clinic.

Implications

Economic benefit

Cancer not only affects the health of patients and survivors but furthermore has a substantial financial bearing. The cost associated with cancer care can be overwhelming for patients and their families. In 2014 approximately $4 billion out-of-pocket costs was paid by patients for cancer treatments (Singleterry, 2017). A large portion of U.S. health care expenditures was used for cancer treatments and care. The U.S. spent approximately $87.8 billion in 2014 for cancer-related health care (Singleterry, 2017). These expenses were covered by employers, insurance companies, Medicare and Medicaid, and cancer patients. Prevention and early detection is the most effective way to reduce the cost associated with cancer treatment. Healthier patients will result in decreased financial burden and healthcare costs. It is more cost effective to provide CRC screening to patients than to provide cancer treatment or no screening (Patel, Kilgore, & Patel, 2015).

Impact on Healthcare quality

Adherence to preventative screenings is influenced by multiple factors, that can either prevent or facilitate adherence. These factors, as discussed earlier, include patients' socioeconomic status, health literacy, time constraints, and external factors such as provider recommendation. PCPs need to be aware of the barriers faced by the patients, so that they can find ways to assist their patients in obtaining their needed preventative care. However, PCPs are met with challenges such as time constraints that decrease their ability to effectively address the educational needs and barriers faced by their patients. The use of MAs to assist the PCPs could increase a practice's ability to provide patients with the education and assistance they need to complete their preventative screening. In the study by Horne et al. (2015), the use of peer navigators who guided patients through scheduling and addressed barriers encountered by patients seeking screening, increased the completion of CRC screening.

Additionally, one of the findings from this QI project was that MAs were more in tune with patients and patients also felt more comfortable voicing their concerns to MAs. Patients' willingness to communicate with MAs further substantiates the use of MAs assisting PCPs, which will improve the quality of care provided by the clinic. The use of the MAs in screening empowers the MAs to be involved in the identification of the need for preventive services. Ultimately, empowering MAs to screen contributes to the goal of providing better healthcare outcomes for patients.

In New Jersey, physicians must complete 100 continuing medical education credits every two years and NPs must complete 30 continuing education credits every two years (State Board of Medical Examiners, n.d.). The educational session used for this QI project can be submitted for approval to be used by staff towards their continuing education credits. This incentive may

encourage PCPs to attended the educational session. The educational session could also be conducted through an online website for accessibility. Providing educational sessions for all staff at the clinic ensures that clinical practice is based on current CRC screening guidelines according to the USPSTF. Educating the staff can empower employees and increase their knowledge, leading to high overall job satisfaction.

Sustainability

The healthcare system has moved more towards technology with the use of smart devices and promoting patients to be active in their healthcare (Cole et al., 2015). Providing patients with access to patient portals enables them to check test results, increase communication with PCPs, and supports the strategy for shared decision making. The practice currently offers patients access to a patient portal. This portal can be linked to the EHR, which can be used to track patients' screening eligibility and to send automated email reminders regarding when they are due for CRC screening. Additionally, the opportunity exists to incorporate the pre-visit checklist into the EHR, enabling the PCP to click patients' eligibility and generate the ICD 10 for a CRC screening encounter.

EHR has the capability of generating reports and creating alerts that can notify the PCP and office staff of eligible individuals who are overdue for, or who have never completed, CRC screening (Baker et al., 2015). The EHR can be used to generate lists of patients due for their CRC screening and then these patients can be reached by either phone calls, automated emails, or text messaging (Baker et al., 2015). Additionally, the use of the EHR to aid in closing the loop on referrals is another potential implication. In a study conducted by Ramelson et al. (2018), the use of automated referral tracking made it easier for the office staff and PCPs to track referrals to specialists and identify if there was a breakdown in the referral process. In addition to increasing

referrals, the referrals should be followed up with and the information obtained from the screening can be reviewed and discussed with the patients.

The use of the FIT kits at the clinic is an acceptable screening option and is a recommended form of CRC screening for patients who are unwilling or unable to have a colonoscopy. The demographic population of the clinic included many patients with lower-income, those with Medicaid and the uninsured, groups that have been identified by the literature to be associated with less adherence of CRC screening. The FIT method of CRC screening is sustainable for the clinic to use and is cost effective (Castro et al., 2014).

Translation

This QI project can be easily adapted and implemented by other primary care settings. The educational intervention, pre-visit checklist, QATCS, and supplemental articles can be made available to the public through a website that will allow the provider to download the material.

Dissemination and Professional Reporting

Possible ways of disseminating the work from this QI project would be a publication in the American Journal of Gastroenterology, the American Journal of Cancer Research, or the Clinical Journal of Oncology Nursing. The results of this project will also be shared with the CEO of the clinic. In addition, the project will be presented at the Rutgers school of nursing poster day on April 20th, 2020.

Summary

This project aimed to increase CRC referral rates by improving the knowledge of staff at the clinic and implementing a pre-visit checklist that would provide structure when assessing patients. Implementing an educational intervention along with the involvement of all staff at the

clinic increased the number of referrals and positively improved the staffs' attitudes towards CRC screening. Despite the pre-visit checklist not showing any statistically significant effect, the idea behind a systematic tool to screen patients for preventative screening can be useful and effective. A tool or template built into the EHR rather than a paper screening tool could potentially aid staff in promptly and efficiently screening patients. Additionally, the use of MAs to assist with preventative screening could improve the care and experience of patients (Eden, 2016).

To improve decision making in regards to preventive health screening, PCPs and staff should be knowledgeable and familiar with the latest guidelines and currently available testing. PCPs are a major facilitator in CRC screening; therefore, PCP education is further substantiated so that they are better able to assist patients in making decisions regarding their health care. Providing MAs with education regarding CRC and involving them in screening may increase patient awareness of CRC screening and prevent a missed screening encounter. Additionally, greater awareness and education provide PCPs and staff with the essential skills to understand and address the barriers faced by their patients.

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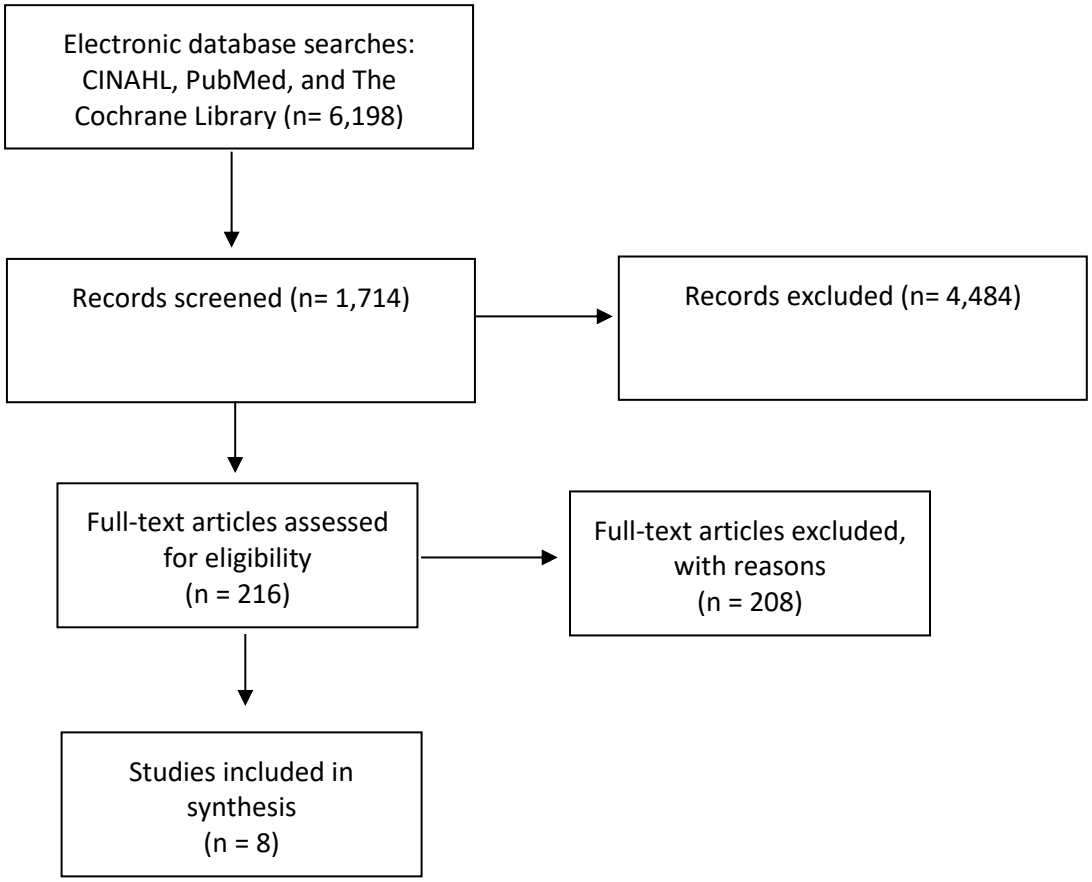
Appendices:

Appendix A:

PRISMA Flow Diagram



Appendix B: Table of Evidence						
1	Martin, et al., 2017	Pilot study	Black American patients 50 to 75 years of age at average colon cancer risk, defined as having no family history of colon cancer, and no known inflammatory bowel disease or prior personal history of colon cancer Demographics of the clinic population at the time of this project were 79% Black, 70% under the federal poverty level, 59% Medicaid, and 26% uninsured.	Under our single navigator and one step iFOBT model, 43 of 52 patients (82.7%) completed iFOBT screening, while 185 of 335 (55.7%) completed screening under our team navigator and multistep iFOBT program. The overall rate of 56.7% represented an approximate twofold increase in CRC screening compared to the baseline rate (30%–57%).	not collect participant demographic data. Our method of enrolling patients, however, namely, in-person contact at the conclusion of a routine clinic appointment, may have selected for the most resilient, well-educated, and motivated patients, with overall better insurance status and fewer work or transportation barriers given the simple fact that they were all able to make their scheduled clinic appointments. If this is true, it could bias our results toward higher screening rates.	Level III Good quality
2	Dignan et al., 2014	Randomized controlled trial	Sixty-six primary care practices: 33	Using academic detailing to reach rural primary care	. Study took place in Appalachian Kentucky, a rural area that	Level I, Good quality

			intervention and 33 control Data were from 3844 medical records at baseline and 3751 at the six-month follow-up.	providers with a CRC screening intervention was associated with an increase in colonoscopy. Across all screening modalities, the intervention practices increased rates of documented results from 62.9% to 79.7%, while the delayed intervention practice increased rates from 61.7% to 71.2% ($p = 0.06$). This finding is consistent with numerous reports in the literature indicating that provider recommendation is one of the most important elements in encouraging patients to obtain screening	experiences higher rates of cancer. Unemployment and lack of insurance coverage is high in this area, in addition to lower levels of educational attainment.	

3	Wong, Bloomfield, Crookes, & Jandorf, 2013	Meta-Analysis A mixed quantitative –qualitative methodology	A purposive sample of 29 African-Americans ≥50 years old with average risk of colorectal cancer (CRC) was recruited from CRC education programs in an urban setting (June 2011–April 2012). The sample consisted of 17 people who completed a colonoscopy and 12 who had not. Mean age was 68 years; 79 % completed at least high school, and all had health care coverage and had visited a physician within the last year.	Suboptimal adherence to colonoscopy screening in our sample reflects an overall desire for more information about the procedure and not necessarily a rejection of CRC screening.	Our limitations, however, emphasize the strengths of our study. Despite recruiting a sample that lacks common barriers to screening (e.g., 100 % had health insurance) and shares facilitators to completing colonoscopies (e.g., 100 % had had a medical visit in the past year), 41 % of our sample remained non-adherent to colonoscopy.	Level I Good quality

			senior centers and churches in Harlem, New York.			
4	Jandorf et al., 2013	Randomized, controlled trial	were randomized into three navigation groups: peer-patient navigation (*n* = 181), pro-patient navigation (*n* = 123), and standard (*n* = 46).	Consistent with prior studies, completers were more likely to have higher socioeconomic status (employment, income > $10,000), private or self-pay insurance (vs. Medicare and/or Medicaid), and medical visits in the recent past.	Study limitations include the use of only one cultural group from an inner-city population in which all subjects had health care coverage and more than 90% had a regular physician. Therefore, this study's colonoscopy completion rate may be more than the rate in populations with less optimal health care coverage or in other minority groups. Future studies are encouraged to compare our findings with different cultural groups (e.g., Hispanics) or more diverse populations for greater generalizability.	Level I: High quality
5	Myers et al., 2014	Randomized control trial	764 African American (AA) patients who were age 50 to	Findings from "as treated analyses" showed that	The current study included AA patients from primary care practices in one large	Level 1 High quality

			75 years, were eligible for CRC screening, and had received care through primary care practices in Philadelphia Study sites included three primary care practices of [redacted] and 10 primary care practices affiliated with the [redacted] in Philadelphia.	screening adherence at six months in the Tailored Navigation Intervention (TNI) group among those who were navigated was substantially higher than those who were not navigated (45.7% vs 12.4%, respectively). We observed an adherence difference of similar magnitude at 12 months (50.9% vs 19.1%, respectively).	city. Thus, results may not be generalizable to other settings. Generalizability may also be limited because participants volunteered to participate in the study. Intervention impact may be underestimated because patient navigators were unable to contact all participants in the TNI group. Moreover, patient navigators were not authorized to schedule colonoscopy appointments.	
6	Dolan et al., 2015	quasi-experimental trial	The mean age of patients completing both pre-test and post-visit	The study findings in the article demonstrate how to increase the rate of colonoscopy	Use of patient self-portal to collect data. The patient may not have recalled the discussion	Level III: Good quality

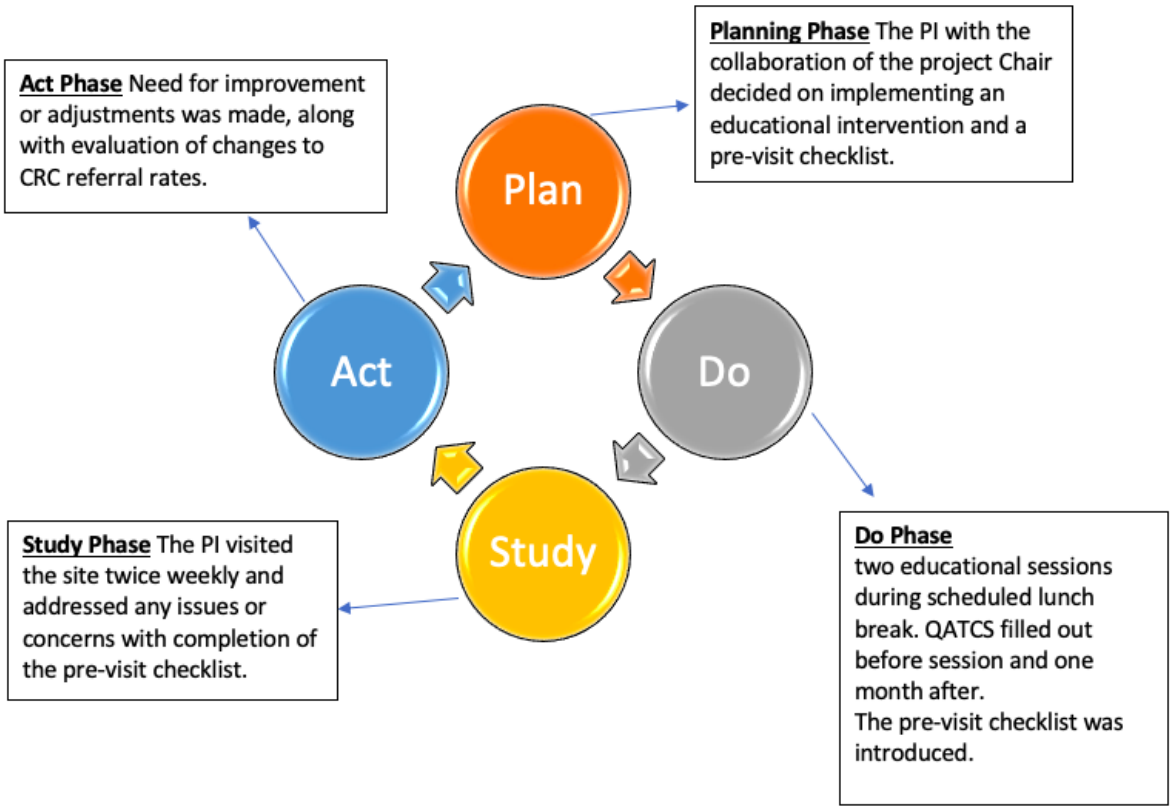
			surveys was 57.8 years (SD = 0.28); 74.0 % were female, 54.2 % were Non-Hispanic Black, 45.8 % were Hispanic/Latino, 66.8 % had household incomes of less than $20,000, 39.0 % had inadequate health literacy, and 30.4 % had no insurance.	screenings in a medical facility which is the primary goal in my DNP project. It is highlighted that providing options to patients increases the likelihood that they will have a screening done. The study also shows that education for the physician as well as the patient are just as important to each other in order to increase the rate of screenings done.	and therefore not added it to the self-portal. Focus on one patient visit. It's quite possible a doctor may have recommended the screening at a future appointment.	
7	Bakhai,, Ahluwalia, Nallapeta, Mangat, & Reynolds, 2018)	Quality Improvement	A total of 407 patients received FIT kits. This population had a mean age of 61.3, was 49.4% female, 64.9% were African-Americans, 30.7% were white while 4.4% were classified as other race.	This study shows how much progress can be made when you look at this problem question from many different angles. This multifaceted approach is a powerful driver with achieving higher screening rates. The incorporation of Information	We reported the data for this QI at 12 months, and it was difficult to have significant improvements in CRC screening rates using colonoscopy due to a long waiting period for the test. This QI was performed in a safety-net primary care clinic in patients with multiple comorbidities, so the barriers and interventions identified in this QI may	Level IV: Good quality

				Technology, patient and staff education, workshops, and a close look at teamwork help with increasing screening rates. Options for screening is a very important theme in this study. FIT is a good screening option for those who are fearful of a colonoscopy	not be generalizable to other settings.	
8	Kiviniemi, Klasko-Foster, Erwin, Jandorf, & Freedland, 2018	Cross sectional study	Survey of 2,015 African American participants ages 50 and older	Socioeconomic status was related to both screening compliance and the decision-making constructs. Bootstrap modeling of the indirect effect showed that the total effect of the SES-screening behavior relation included an indirect effect via social cognitive decision-making constructs.	Due to the cross-sectional study design results must be interpreted as correlations between socioeconomic status, decision-making constructs, and prior screening behavior, and not evidence for causal relations between any of the predictors and outcomes. Second, colonoscopy screening behavior is based on self-report and thus is subject to the limitations and recall biases of self-report behavioral data.	Level III Good quality

					Third, the community/organization-based recruitment and delivery procedure used here may tend to attract participants with characteristics (e.g., community engagement) that differ from the population as a whole.	

Appendix C:

The Plan, Do, Study, Act (PDSA) model



Appendix D:
Questionnaire of Attitudes Towards CRC Screening (QATCS)

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Questionnaire of attitudes toward CRC screening

Job title:
☐Primary care provider ☐ Medical assistant ☐ Secretary ☐ Office staff

In your opinion, is colorectal cancer screening with fecal occult blood testing effective?
1☐ Very effective
2☐ Quite effective
3☐ Rather ineffective
4☐ Not effective at all
5☐ I don't know

In your opinion, the cost-effectiveness of colorectal cancer screening is:
1☐ High
2☐ Moderate
3☐ Low
4☐ I don't know

How likely are patients to undergo fecal occult blood test?
1☐ High
2☐ Moderate
3☐ Low
4☐ I don't know

How likely are patients willing to undergo a colonoscopy when fecal occult blood is found?
1☐ High
2☐ Moderate
3☐ Low
4☐ I don't know

Would you recommend to your patients a screening program based on fecal occult blood testing (plus colonoscopy when appropriate) for early colorectal cancer detection in subjects older than 50 years of age?
1☐ Yes, to those older than 50 years
2☐ Yes, but only in some cases
3☐ No
4☐ I don't know

How likely are patients willing to participate in a population-wide screening program for early colorectal cancer detection in subjects older than 50 years of age?
1☐ High (over 60%)
2☐ Moderate (between 40 and 60%)

Version #: 2
Version date: 11/10/19

[redacted]

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3☐ Low (below 40%)
4☐ I don't know

Do you consider the cooperation of family doctors significant for the successful development of a colorectal cancer screening program?
1☐ Highly significant
2☐ Quite significant
3☐ Rather non-significant
4☐ Not significant at all

Do you consider the cooperation of medical assistant is significant for the successful development of a colorectal cancer screening program?
1☐ Highly significant
2☐ Quite significant
3☐ Rather non-significant
4☐ Not significant at all

Please score from 0 (not important at all) to 5 (very important) each of the potential barriers for the population to participate in a screening program for colorectal cancer

Fear of colonoscopy	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
Lack of knowledge on colorectal cancer	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
Fear of colorectal cancer identification	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
Displeasure with fecal sample handling	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
No perceived benefits from the program	0☐ 1☐ 2☐ 3☐ 4☐ 5☐

Please score from 0 (not important at all) to 5 (very important) each of the potential barriers for primary care providers to participate in a screening program for colorectal cancer

The procedure's invasive nature should colonoscopy be required	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
Anxiety problems in patients because of false positive FOBT results	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
False feelings of safety from potential false negative FOBT results	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
Providers' lack of time	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
Difficulty discussing screening procedures with patients	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
Providers lack of knowledge about screening programs	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
Providers lack of knowledge about colorectal cancer	0☐ 1☐ 2☐ 3☐ 4☐ 5☐
Lack of resources for screening implementation	0☐ 1☐ 2☐ 3☐ 4☐ 5☐

Version #: 2
Version date: 11/10/19

[redacted]

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How frequently do you recommend fecal occult blood testing to asymptomatic patients older than 50 years of age?

1☐ Frequently
2☐ Sometimes
3☐ Never

Do you think you need more knowledge on colorectal cancer screening?

1☐ Yes
2☐ No

Version #: 2
Version date: 11/10/19

[redacted]

Appendix E: Pre-Visit Checklist

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FastMed

PRE-VISIT CHECKLIST

DATE: _____ ROOM #: _____

REASON FOR VISIT: _____
___Month F/U ___Weeks F/U ____ER/Hospital F/U____PE ____Pre-OP _____Injection
_____Vaccine _____Referral _____Lab/Test Result _____New Patient _____Sick

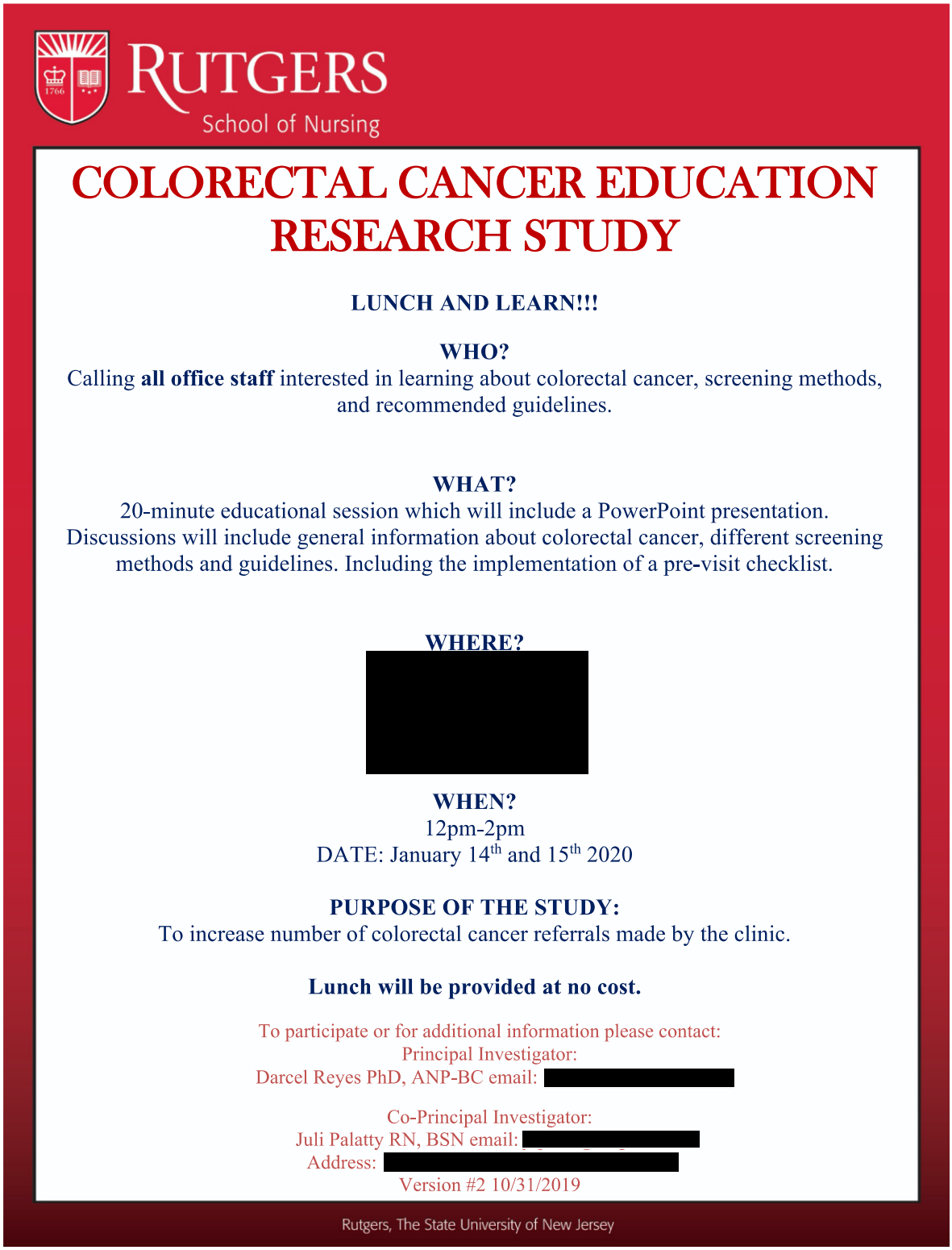
BP: _____ HR: _____ RR: _____ Temp: _____ HT: _____ WT: _____

CLINICAL INDICATOR	**DUE**
Colonoscopy (age 50-75) Q 10 years or earlier for repeat surveillance Previously Screened: YES NO (Add documentation to EHR) Date of Screening: _____ GI specialist: _____ Screening Method Chosen: Colonoscopy FIT Stool DNA FOBT CT Refused **Screening Referral made in EHR:** YES NO	
Mammogram (females 40-75) Done yearly	
HgbA1C Q3months ALL Diabetic patients Patients that have insulin requiring diabetes will have a FSBS	
Microalbumin (once a year for DM patients)	
Immunzations Flu (yearly) Pneumovax (starting age 65)	
Pap Smear results in chart (Female patients age 21-64 every 3-5 years)	
Bone Density results in chart (Female patients >65 or Male patients >70)	
Tobacco Use Assessed Amount:	

Version #: 1
Version date: 10/4/19

[redacted]

Appendix F: Recruitment flyer



Appendix G: Participant consent form

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CONSENT TO TAKE PART IN A RESEARCH STUDY

TITLE OF STUDY: Increasing Colorectal Cancer Referrals in an Urban Health Clinic
Principal Investigator: Darcel Reyes, Ph.D., ANP-BC
Co-Principal Investigator: Juli Palatty, RN, BSN

STUDY SUMMARY: This consent form is part of an informed consent process for a research study and it will provide information that will help you decide whether you want to take part in this study. It is your choice to take part or not.

The **purpose of the research** is to: Increase Colorectal Cancer referral rates. If you take part in the research, you will be asked to participate in an educational intervention and answer a pre and post questionnaire, in addition you will be ask to participate in the completion of a pre-visit checklist prior to a patient's scheduled visit. Your time in the study will take a total of 20 minutes and will occur during staff's regular scheduled lunch break.

There are **no anticipated harms or burdens** of taking part in the study and possible benefits of taking part may be increased knowledge of colorectal cancer and screening guidelines.

Your alternative to taking part in the research study is not to take part in it.

The information in this consent form will provide more details about the research study and what will be asked of you if you choose to take part in it. If you have any questions now or during the study, if you choose to take part, you should feel free to ask them and should expect to be given answers you completely understand. After all of your questions have been answered and you wish to take part in the research study, you will be asked to sign this consent form. You are not giving up any of your legal rights by agreeing to take part in this research or by signing this consent form.

Who is conducting this research study?
Juli Palatty is the Co- Principal Investigator of this research study. A Co- Principal Investigator has the overall responsibility for the conduct of the research. However, there are often other individuals who are part of the research team.

Juli Palatty may be reached at [redacted].

[redacted]

The Co-Principal investigator or another member of the study team will also be asked to sign this informed consent. You will be given a copy of the signed consent form to keep.

Why is this study being done?
This study is being done to increase knowledge primary care provider and staff knowledge regarding current colorectal cancer screening guidelines in addition to increasing the number of patients being referred to get colorectal cancer screenings.

Who may take part in this study and who may not?
All staff working at the clinic. Those that do not wish to participate will be excluded.

Why have I been asked to take part in this study?
You have been asked to take part in this study because you are staff at the clinic and play a great role improving patient care but assessing and identifying those in need of preventative screening.

How long will the study take and how many subjects will take part?
The study will be implemented over a one-month period and there will be approximately 18 subjects, which include primary care providers, medical assistance, secretaries and other clinical staff. After a one-month period charts of patients from ages 50-75 will be audited to assess for colorectal cancer referrals, no patient information will be collected.

What will I be asked to do if I take part in this study?
If you take part in this study you will be asked to complete a pre questionnaire that consist of 12 questions and to watch PowerPoint on colorectal cancer and screening guidelines. The educational intervention will include information regarding CRC, screening guidelines, and screening methods. The total commitment time is 20 minutes. The medical assistant will also be asked to use the pre-visit checklist to evaluate patients prior to being seen by the primary care providers. After a month you will be asked to complete a post-questionnaire that consist of the same 12 questions as the pre-questionnaire. The pre/post questionnaire will take 5 minutes to complete and contains questions regarding your opinion regarding available screening methods and potential barriers to screening. At the completion of this study you will be asked to complete a 4 question evaluation questionnaire which will take 2 minutes to complete. The evaluation questionnaire contains questions regarding the effectiveness of the educational session, pre-visit checklist, and the overall project.

What are the risks of harm or discomforts I might experience if I take part in this study?
There are no risks or discomforts associated with the study.

Are there any benefits to me if I choose to take part in this study?
The benefits of taking part in this study may be increased knowledge on Colorectal cancer and screening guidelines. However, it is possible that you may not receive any direct benefit from taking part in this study.

What are my alternatives if I do not want to take part in this study?
There are no alternatives available. Your alternative is not to take part in this study.

[redacted]

How will I know if new information is learned that may affect whether I am willing to stay in the study?
During the course of the study, you will be updated about any new information that may affect whether you are willing to continue taking part in the study. If new information is learned that may affect you after the study you will be contacted.

Will there be any cost to me to take part in this study?
No, there is no cost to take part in this study.

Will I be paid to take part in this study?
You will not be paid to take part in this study.

How will information about me be kept private or confidential?
All efforts will be made to keep your personal information in your research record confidential, but total confidentiality cannot be guaranteed. All questionnaires used will not require a name and will only be interpreted by the Co-PI. All information will be kept in an encrypted drive and stored in a locked desk that is only accessible to the Co-PI and PI.

What will happen to my information collected for this research after the study is over?
The information collected about you for this research will not be used by or distributed to investigators for other research.

What will happen if I do not wish to take part in the study or if I later decide not to stay in the study?
It is your choice whether to take part in the research. You may choose to take part, not to take part or you may change your mind and withdraw from the study at any time.

Your decision to participate or not participate will not affect your employment status. If you do not want to enter the study or decide to stop taking part, your relationship with the study staff will not change, and you may do so without penalty and without loss of benefits to which you are otherwise entitled.

You may also withdraw your consent for the use of data already collected about you, but you must do this in writing to Juli Palatty, RN, BSN [redacted]

Who can I call if I have questions?
If you have questions about taking part in this study or if you feel you may have suffered a research related injury, you can call the study chair and Prinicipal investigator: Dr. Darcel Reyes, PhD, ANP-BC

If you have questions about your rights as a research subject, you can call the IRB Director at: Newark HealthSci (973)-972-3608.

[redacted]

AGREEMENT TO PARTICIPATE

1. Subject consent:

I have read this entire consent form, or it has been read to me, and I believe that I understand what has been discussed. All of my questions about this form and this study have been answered. I agree to take part in this study.

Subject Name:_____

Subject Signature:_____ Date:_____

2. Signature of Investigator/Individual Obtaining Consent:

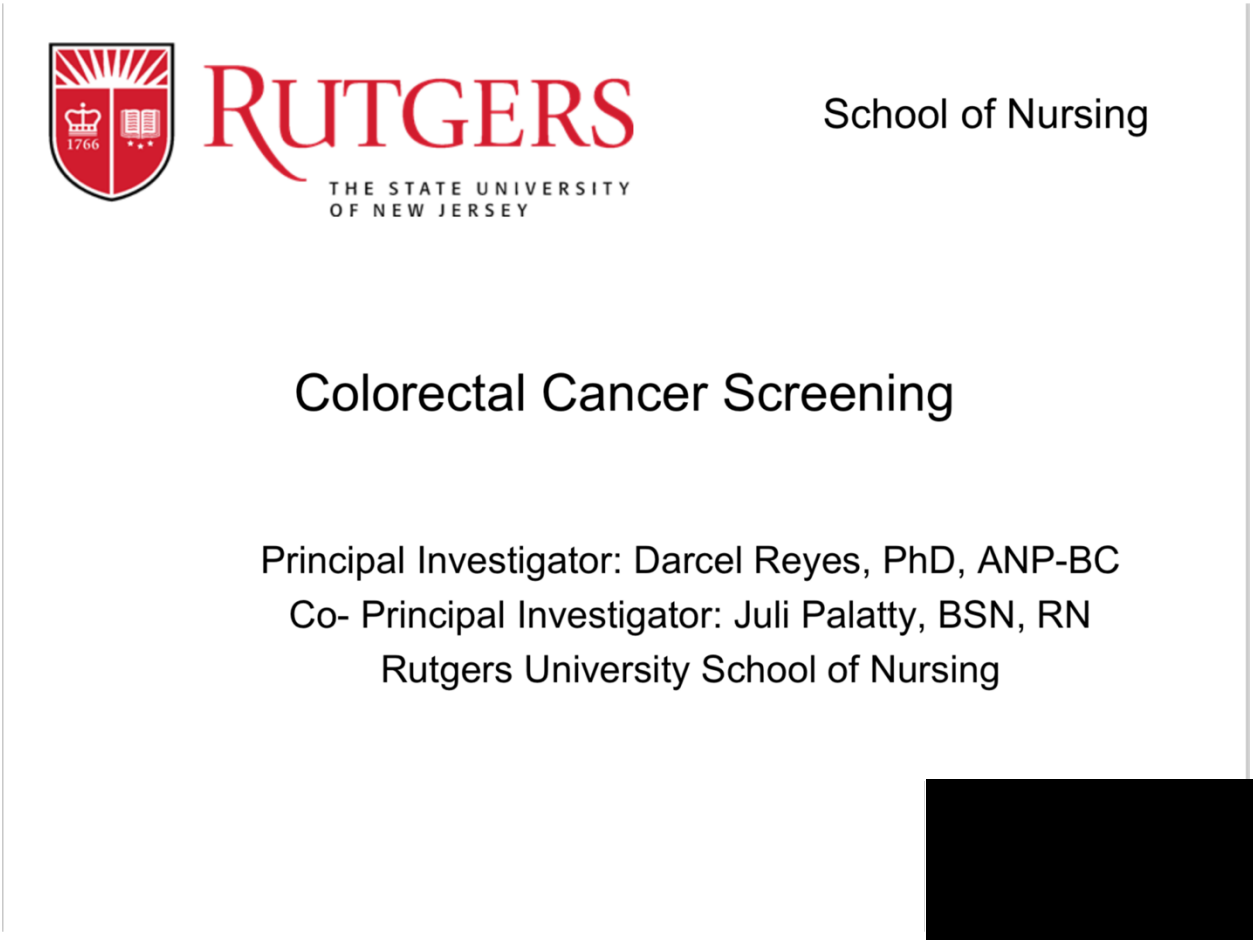
To the best of my ability, I have explained and discussed all the important details about the study including all of the information contained in this consent form.

Investigator/Person Obtaining Consent (printed name):_____

Signature:_____ Date: _____

[redacted]

Appendix H:
PowerPoint Presentation for educational intervention



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Introduction

- This presentation will focus on providing high-quality testing for those who are screened.
- Many eligible patients are not being screened.
- Efforts to raise screening rates should be enhanced.

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Cancer Rates

- The American Cancer Society's (ACS) estimates that in the United States (U.S) there will be 101,420 new cases of colon cancer, 44,180 new cases of rectal cancer and 51,020 deaths linked to CRC in 2019 (ACS, 2017).
- According to the CDC (2013) approximately 1 in 3 adults in the U.S between 50 and 75 years old are not getting recommended testing, approximately 23 million.
- Those least likely to get tested are Hispanics, American Indians or Alaska Natives, men, those 50 to 64, and those with less education and lower income (CDC, 2013).

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High Risk Patients

You are high risk if:

- You have a history of adenomatous polyps.
- over the age of 50.
- History of inflammatory bowel disease (IBD)
- Family history of colorectal cancer

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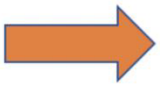
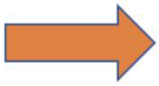
Screening Patients with a Family History

- If patient has either:
  - CRC or adenomas in a first -degree relative diagnosed at age ≥60 OR
  - Two second-degree relatives with CRC



Begin Screening at age 40 with any test recommended for average risk; repeat at usual intervals based on type of test and findings.

- If patient has either:
  - CRC or adenomas in a first -degree relative diagnosed before age 60 OR
  - Two or more first-degree relatives diagnosed at any age (with family history not suggestive of genetic syndrome)



Colonoscopy every 5 years starting at age 40, or 10 years before the youngest case in the family was diagnosed, whichever comes first.

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[redacted]

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Patients at Average Risk: Colorectal Cancer Screening Strategies

- Stool-Based Tests
  - Highly sensitive gFOBT — every year
  - FIT — every year
  - FIT-DNA — every 1 or 3 years
- Visualization Tests
  - Colonoscopy — every 10 years
  - CT colonography — every 5 years
  - Flex Sig — every 5 years
  - Flex Sig with FIT — Flex sig every 10 years plus FIT every year

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[redacted]

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Multi-Targeted Stool DNA Testing(FIT-DNA)

- Combines a FIT with a stool DNA test.
- Higher single-test cancer and polyp detection than FIT alone.
- Lower specificity than FIT alone, resulting in more false-positive results and more diagnostic colonoscopy.
- Insufficient evidence on the appropriate follow-up of positive findings after a negative colonoscopy.
  - May lead to overly intense surveillance due to concerns over the DNA component.
- Medicare reimburses every 3 years.

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CT Colonography (Virtual Colonoscopy)

- Requires bowel preparation.
- Sensitive for polyps ≥6mm and cancer.
- Incidental extracolonicfindings (ECFs) are common, but most do not require additional evaluation.
- ECFs have potential for both benefit and harm.
  - Limited evidence about potential benefits (e.g., discovery of abdominal aortic aneurysms and extracolonic cancers) and harms (overdiagnosis and overtreatment).
- Facility should have capacity to provide same-day colonoscopy when needed to remove polyps.
- As of July 2016, not covered for screening by Medicare, but coverage is being reconsidered.
- Covered for screening by some private insurers.

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[redacted]

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Know Your Enemy

- Educating the public about exposure to certain cancer causing stimulus can be very effective in preventing cancer.
- Its very important when seeing a patient to ask about family history and inquire about past cases of cancer.

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[redacted]

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Improving quality of life

- The sooner you can find and treat cancer the better your chances are for living a longer life
- Cancer is the second leading cause of death in the US.
- Cancer will develop in nearly half of all men and 1/3 of the women in the US.
- Colorectal cancer can take years to develop.

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[redacted]

Appendix I: Approval to use Questionnaire

Requesting permission to reference your study Inbox ×

Juli Palatty Thu, Apr 11, 11:19 PM (

Hi [redacted] My Name is Juli Palatty. I am a current student at Rutgers, the State University of New Jersey in the USA

[redacted] Fri, Apr 12, 11:47 AM (4 days ago)

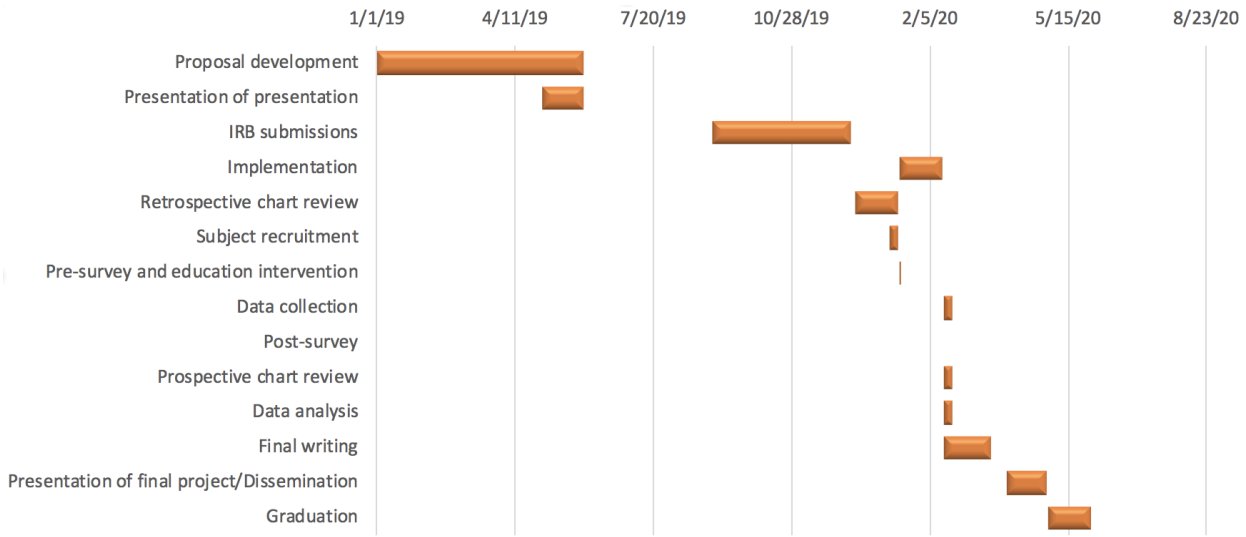
to me

Dear Juli,
Of course, you have my permission to use the questionnaire.
Good luck with the investigation
Best regards

[redacted]

Appendix J: Project Timeline

Project Timeline



Appendix M: Project evaluation questionnaire

RUTGERS
School of Nursing

Project Evaluation Questionnaire

Date: _____

Instructions: Please indicate you level of agreement with the statements listed below.

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1. I found the educational session to be very informative.	1	2	3	4	5
2. I found the pre-visit checklist to be a useful tool at identifying patients qualifying for Colorectal cancer screening.	1	2	3	4	5
3. I will continue to use the pre-visit checklist at the clinic.	1	2	3	4	5
4. I found this project to be effective at increasing Colorectal cancer referral rates at the clinic.	1	2	3	4	5

Version #: 1
Version date: 10/4/19

[redacted]

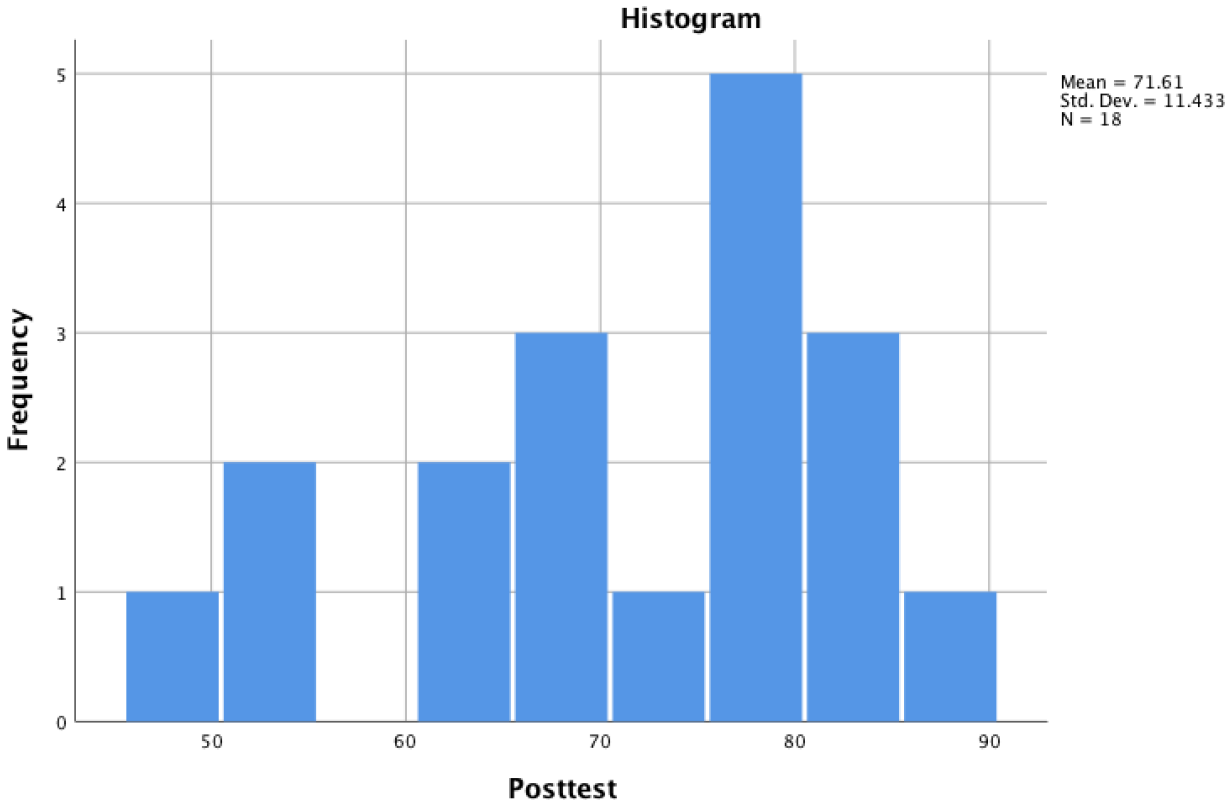
Appendix N: QATCS Data Normality

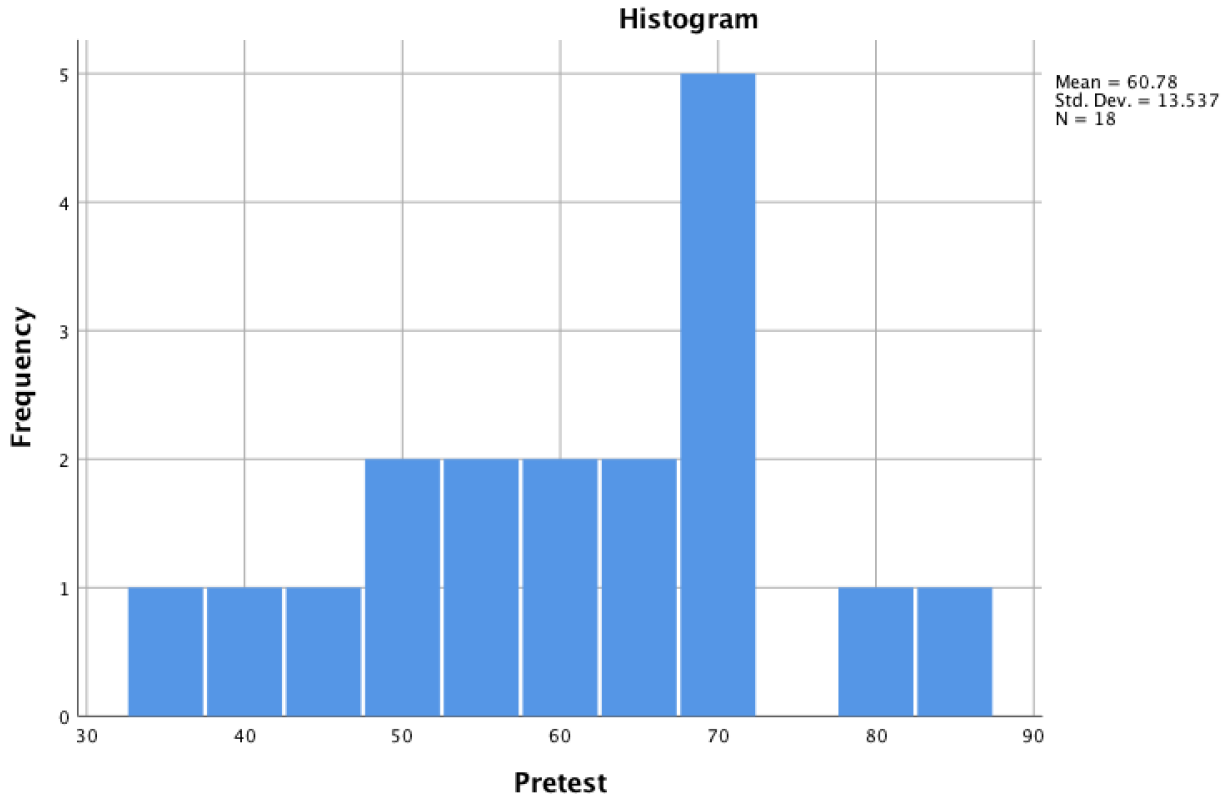
Tests of Normality

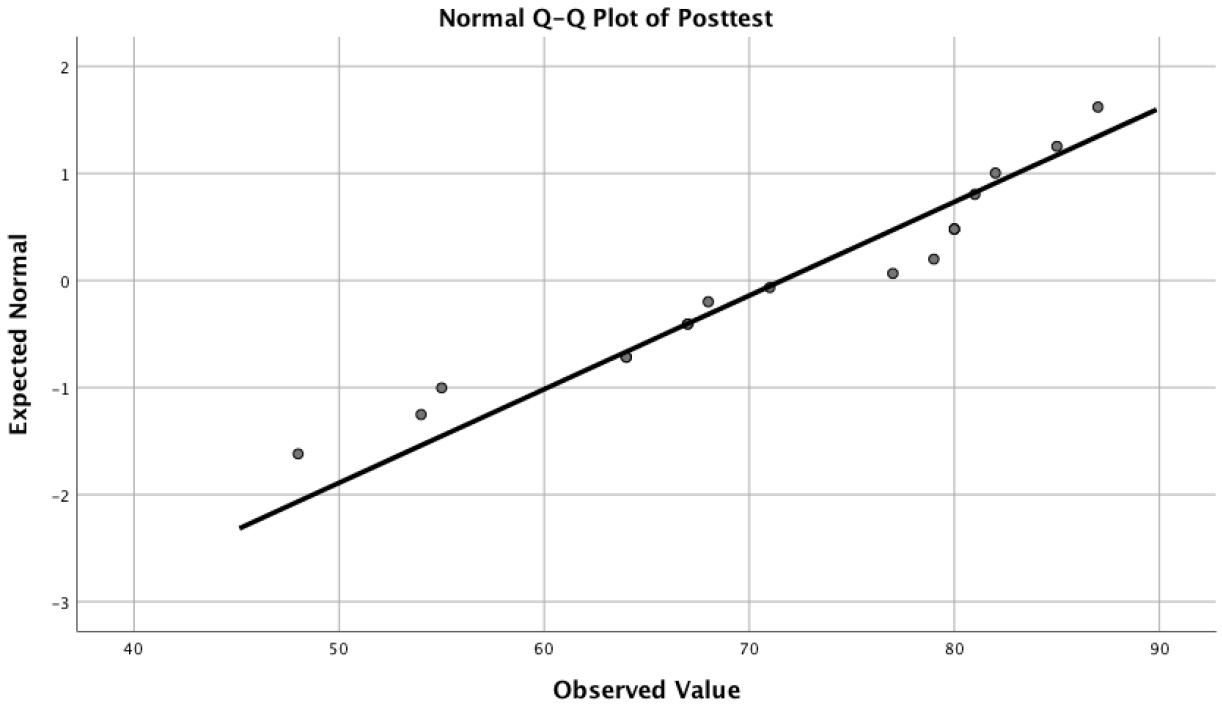
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Posttest	.185	18	.103	.924	18	.149
Pretest	.141	18	.200*	.968	18	.753

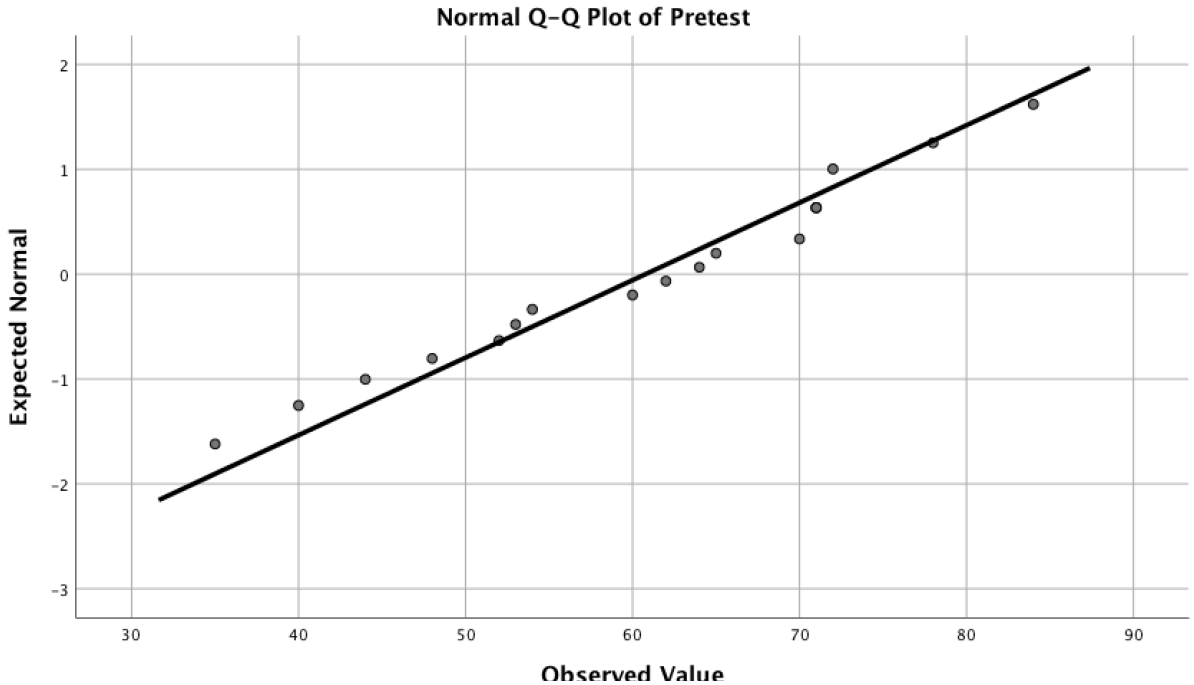
*. This is a lower bound of the true significance.

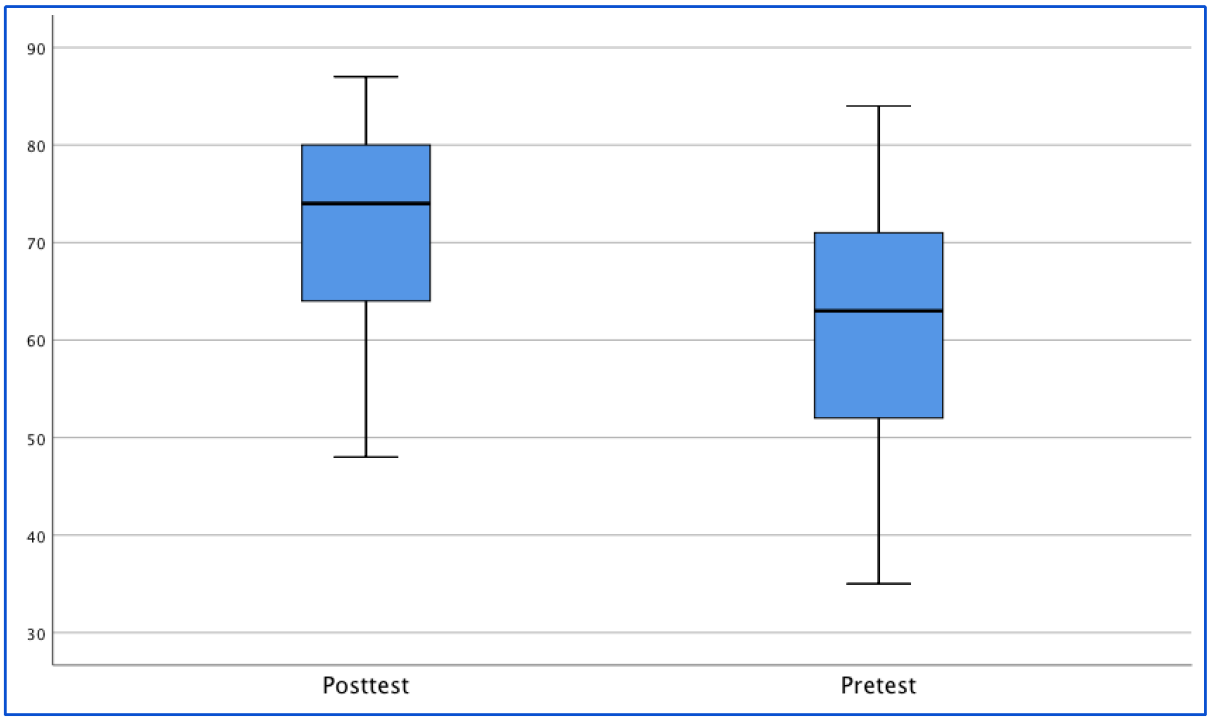
a. Lilliefors Significance Correction




Histogram
Mean = 60.78
Std. Dev. = 13.537
N = 18
Frequency
Pretest
0
1
2
3
4
5
30
40
50
60
70
80
90


Normal Q-Q Plot of Posttest
Expected Normal
Observed Value
2
1
0
-1
-2
-3
40
50
60
70
80
90


Normal Q-Q Plot of Pretest
Expected Normal
Observed Value
2
1
0
-1
-2
-3
30
40
50
60
70
80
90


90
80
70
60
50
40
30
Posttest
Pretest

Appendix O:

Descriptives

			Statistic	Std. Error
Posttest	Mean		71.61	2.695
	95% Confidence Interval for Mean	Lower Bound	65.93	
		Upper Bound	77.30	
	5% Trimmed Mean		72.07	
	Median		74.00	
	Variance		130.722	
	Std. Deviation		11.433	
	Minimum		48	
	Maximum		87	
	Range		39	
	Interquartile Range		16	
	Skewness		-.620	.536
	Kurtosis		-.585	1.038
Pretest	Mean		60.78	3.191
	95% Confidence Interval for Mean	Lower Bound	54.05	
		Upper Bound	67.51	
	5% Trimmed Mean		60.92	
	Median		63.00	
	Variance		183.242	
	Std. Deviation		13.537	
	Minimum		35	
	Maximum		84	
	Range		49	
	Interquartile Range		20	
	Skewness		-.299	.536
	Kurtosis		-.665	1.038

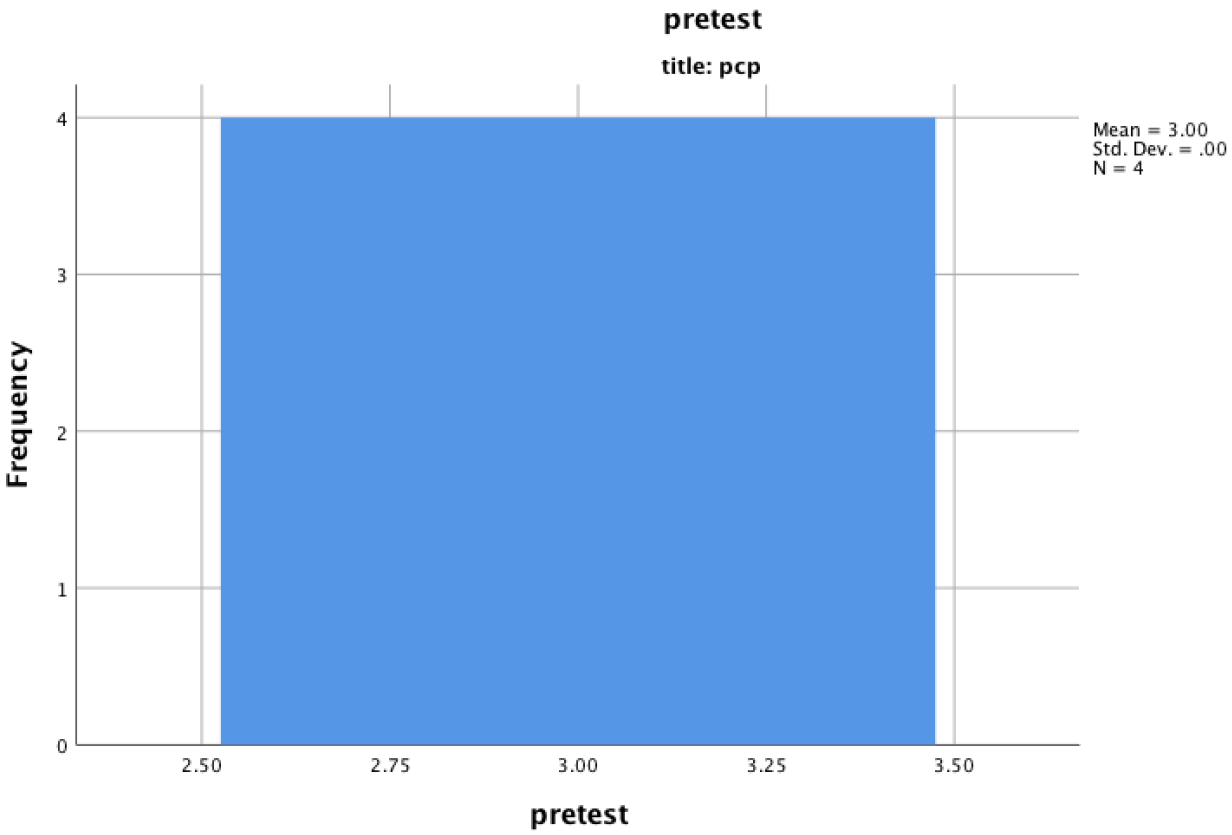
Appendix P: Paired Samples T Test

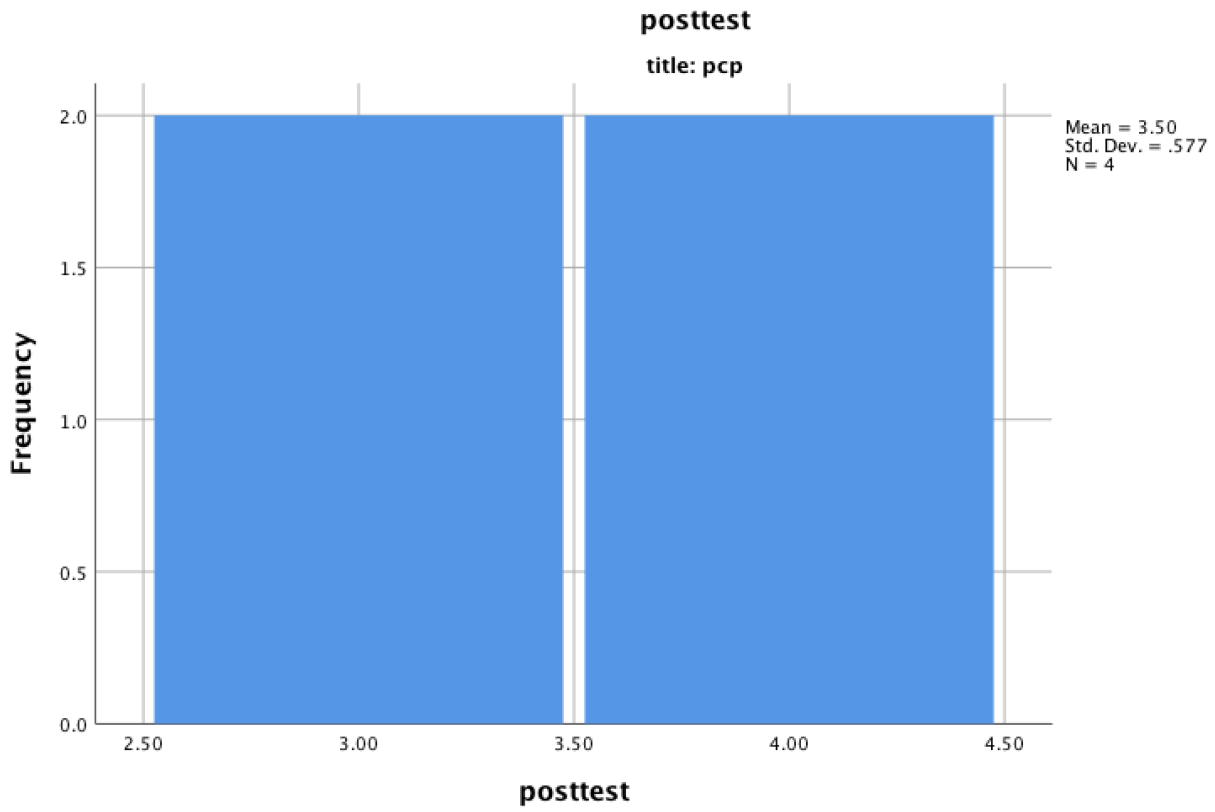
df/p	0.40	0.25	0.10	0.05	0.025	0.01	0.005	0.0005
1	0.324920	1.000000	3.077684	6.313752	12.70620	31.82052	63.65674	636.6192
2	0.288675	0.816497	1.885618	2.919986	4.30265	6.96456	9.92484	31.5991
3	0.276671	0.764892	1.637744	2.353363	3.18245	4.54070	5.84091	12.9240
4	0270722	0.740697	1.533206	2.131847	2.77645	3.74695	4.60409	8.6103
5	0.267181	0.726687	1.475884	2.015048	2.57058	3.36493	4.03214	6.8688
6	0.264835	0.717558	1.439756	1.943180	2.44691	3.14267	3.70743	5.9588
7	0.263167	0.711142	1.414924	1.894579	2.36462	2.99795	3.49948	5.4079
8	0.261921	0.706387	1.396815	1.859548	2.30600	2.89646	3.35539	5.0413
9	0.260955	0.702722	1.383029	1.833113	2.26216	2.82144	3.24984	4.7809
10	0260185	0.699812	1.372184	1.812461	2.22814	2.76377	3.16927	4.5869
11	0259556	0.697445	1.363430	1.795885	2.20099	2.71808	3.10581	4.4370
12	0259033	0.695483	1.356217	1.782288	2.17881	2.68100	3.05454	43178
13	0.258591	0.693829	1.350171	1.770933	2.16037	2.65031	3.01228	4.2208
14	0.258213	0.692417	1.345030	1.761310	2.14479	2.62449	2.97684	4.1405
15	0.257885	0.691197	1.340606	1.753050	2.13145	2.60248	2.94671	4.0728
16	0257599	0.690132	1.336757	1.745884	2.11991	2.58349	2.92078	4.0150
17	0.257347	0.689195	1.333379	1.739607	2.10982	2.56693	2.89823	3.9651
18	0.257123	0.688364	1.330391	1.734064	2.10092	2.55238	2.87844	3.9216
19	0.256923	0.687621	1.327728	1.729133	2.09302	2.53948	2.86093	3.8834
20	0.256743	0.686954	1.325341	1.724718	2.08596	2.52798	2.84534	3.8495
21	0.256580	0.686352	1.323188	1.720743	2.07961	2.51765	2.83136	3.8193
22	0256432	0.685805	1.321237	1.717144	2.07387	2.50832	2.81876	3.7921
23	0256297	0.685306	1.319460	1.713872	2.06866	2.49987	2.80734	3.7676
24	0.256173	0.684850	1.317836	1.710882	2.06390	2.49216	2.79694	3.7454
25	0.256060	0.684430	1.316345	1.708141	2.05954	2.48511	2.78744	3.7251
26	0.255955	0.684043	1.314972	1.705618	2.05553	2.47863	2.77871	3.7066
27	0.255858	0.683685	1.313703	1.703288	2.05183	2.47266	2.77068	3.6896
28	0.255768	0.683353	1.312527	1.701131	2.04841	2.46714	2.76326	3.6739
29	0.255684	0.683044	1.311434	1.699127	2.04523	2.46202	2.75639	3.6594
30	0.255605	0.682756	1.310415	1.697261	2.04227	2.45726	2.75000	3.6460
z	0.253347	0.674490	1.281552	1.644854	1.95996	2.32635	2.57583	3.2905
CI	———	———	80%	90%	95%	98%	99%	99.9%

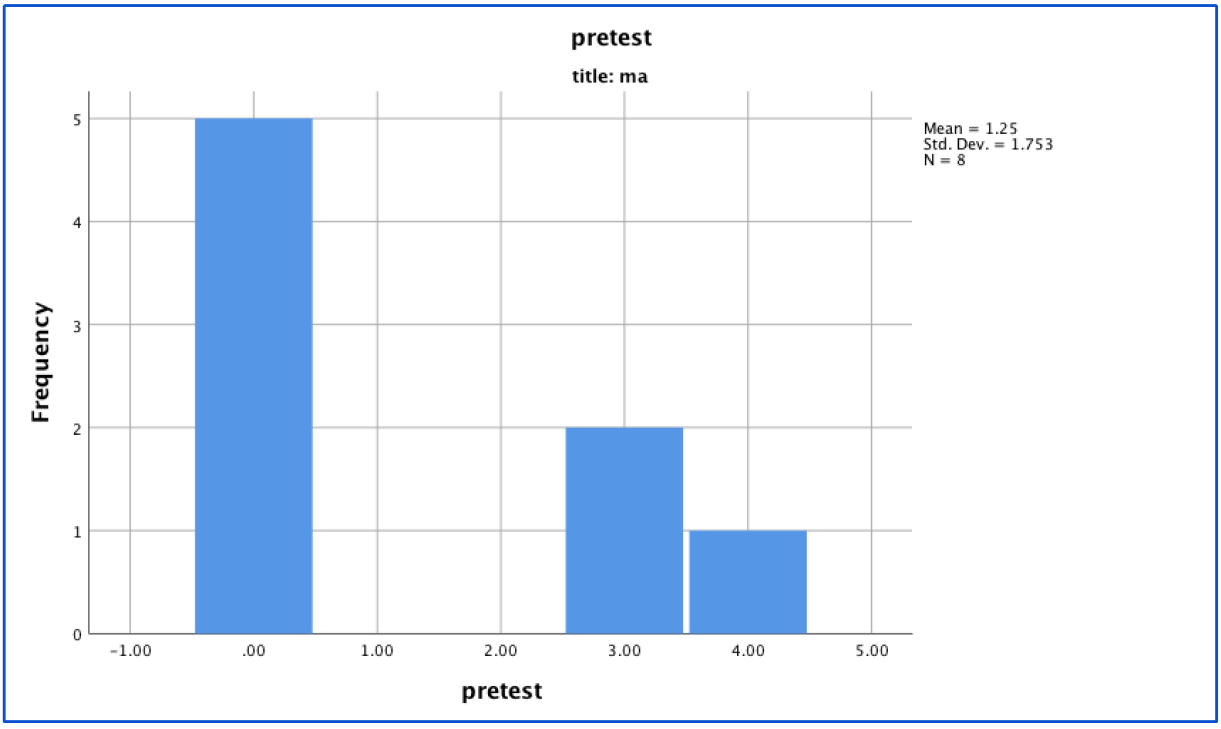
Paired Samples Test

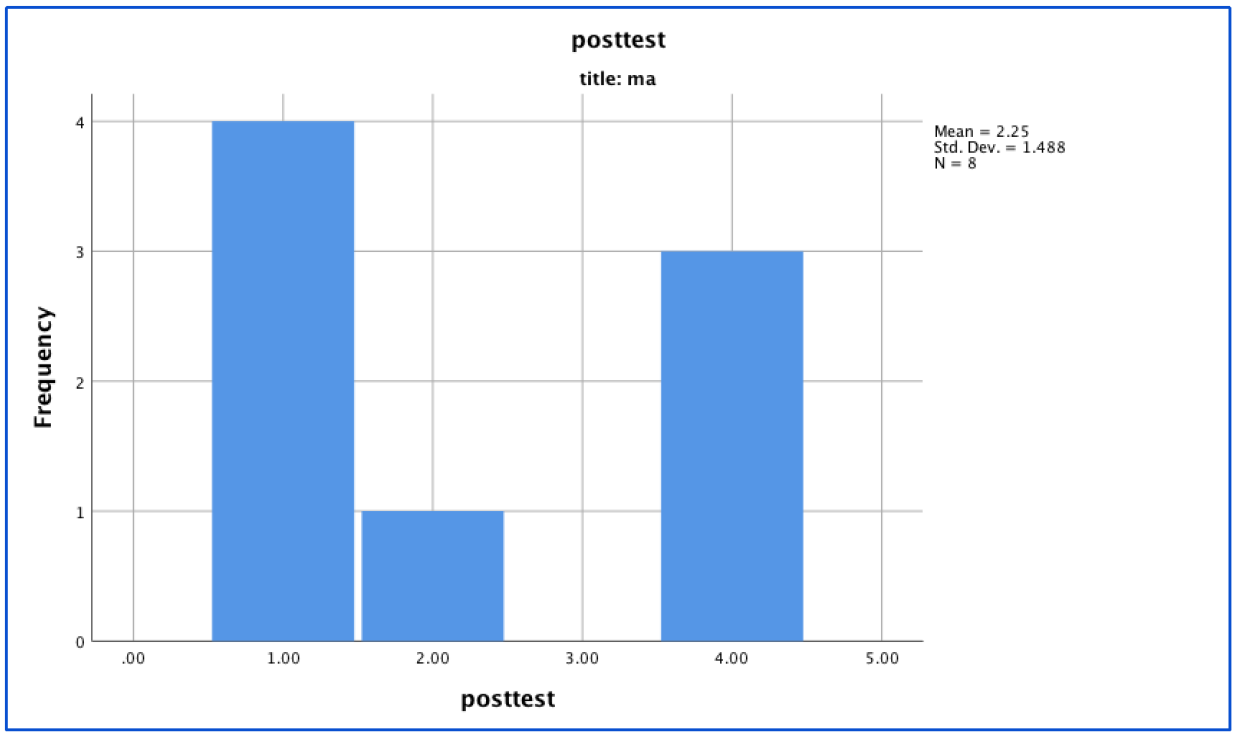
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Pretest - Posttest	-10.833	3.823	.901	-12.735	-8.932	-12.022	17	.000

Appendix Q:




posttest
title: pcp
Mean = 3.50
Std. Dev. = .577
N = 4
Frequency
2.0
1.5
1.0
0.5
0.0
2.50
3.00
3.50
4.00
4.50
posttest


pretest
title: ma
Mean = 1.25
Std. Dev. = 1.753
N = 8
Frequency
5
4
3
2
1
0
-1.00
.00
1.00
2.00
3.00
4.00
5.00
pretest



title = ma

Statistics[a]

		pretest	posttest
N	Valid	8	8
	Missing	0	0
Mean		1.2500	2.2500
Median		.0000	1.5000
Skewness		.770	.477
Std. Error of Skewness		.752	.752
Kurtosis		-1.696	-2.249
Std. Error of Kurtosis		1.481	1.481

a. title = ma

Statistics[a]

		pretest	posttest
N	Valid	4	4
	Missing	0	0
Mean		3.0000	3.5000
Median		3.0000	3.5000
Std. Error of Skewness		1.014	1.014
Std. Error of Kurtosis		2.619	2.619
Skewness			.000
Kurtosis			-6.000

a. title = pcp

Test Statistics[a]

	posttest - pretest
Z	-2.887[b]
Asymp. Sig. (2-tailed)	.004

a. Wilcoxon Signed Ranks Test

b. Based on negative ranks.

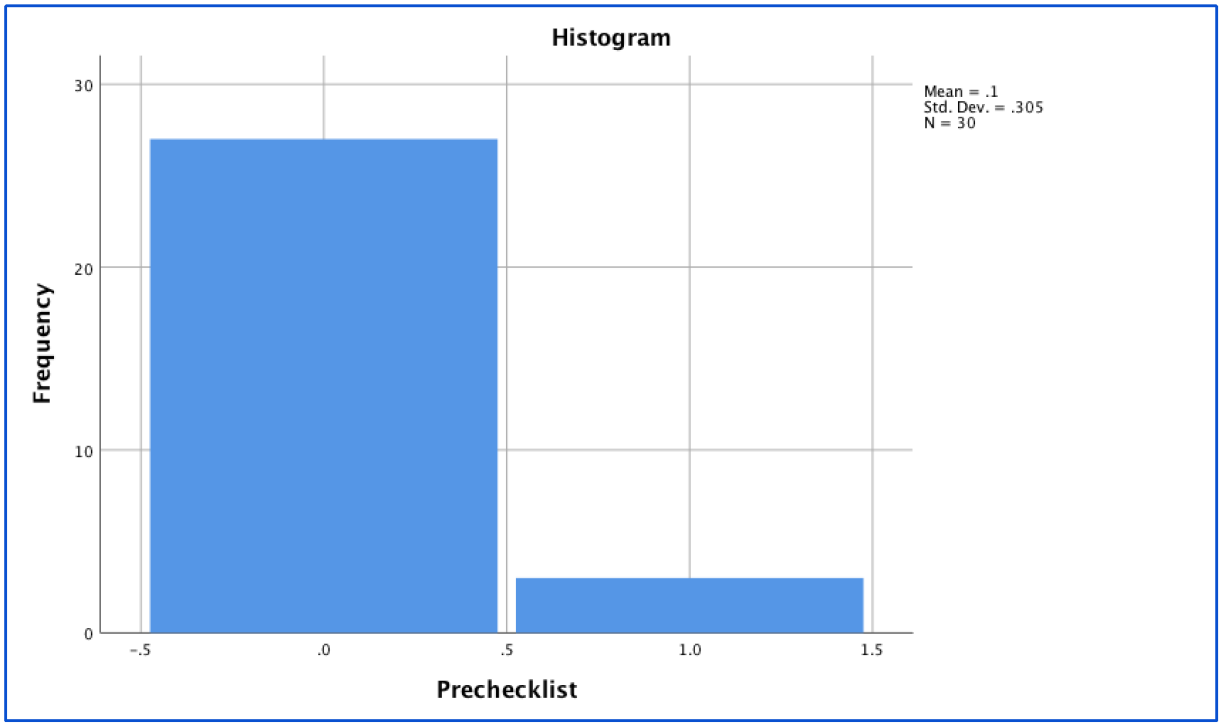
Appendix R: Pre-visit checklist data normality

Tests of Normality

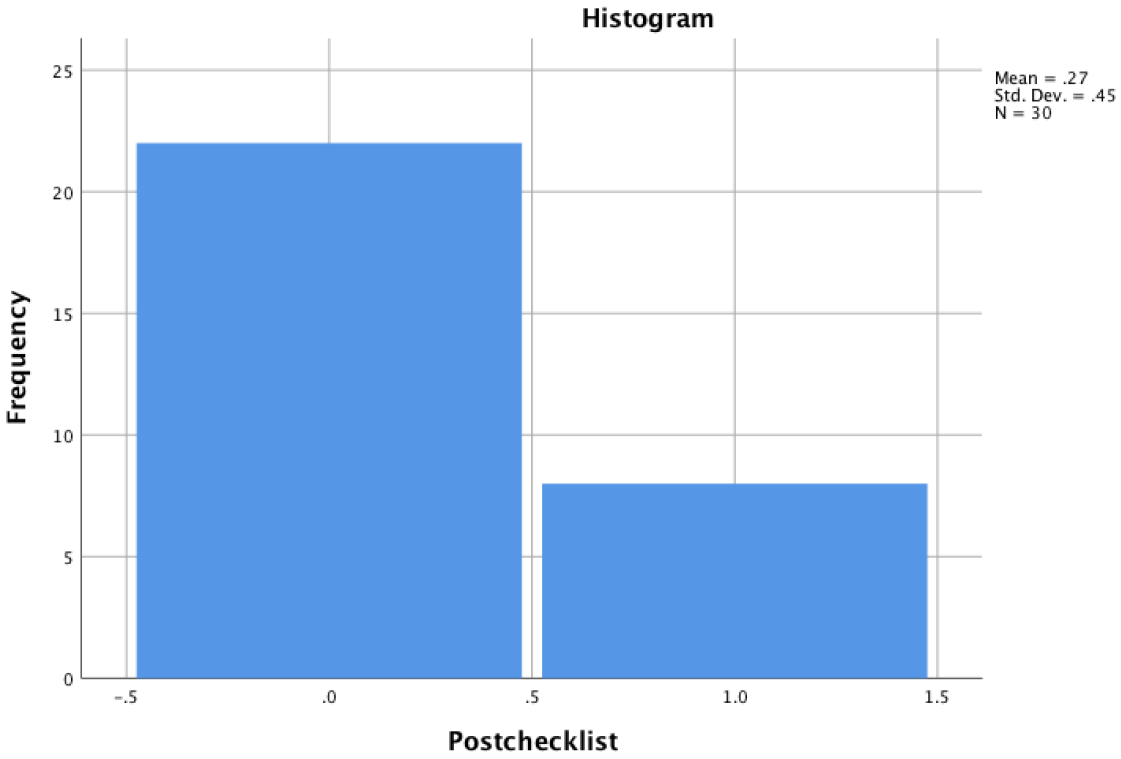
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Prechecklist	.528	30	.000	.347	30	.000
Postchecklist	.457	30	.000	.554	30	.000

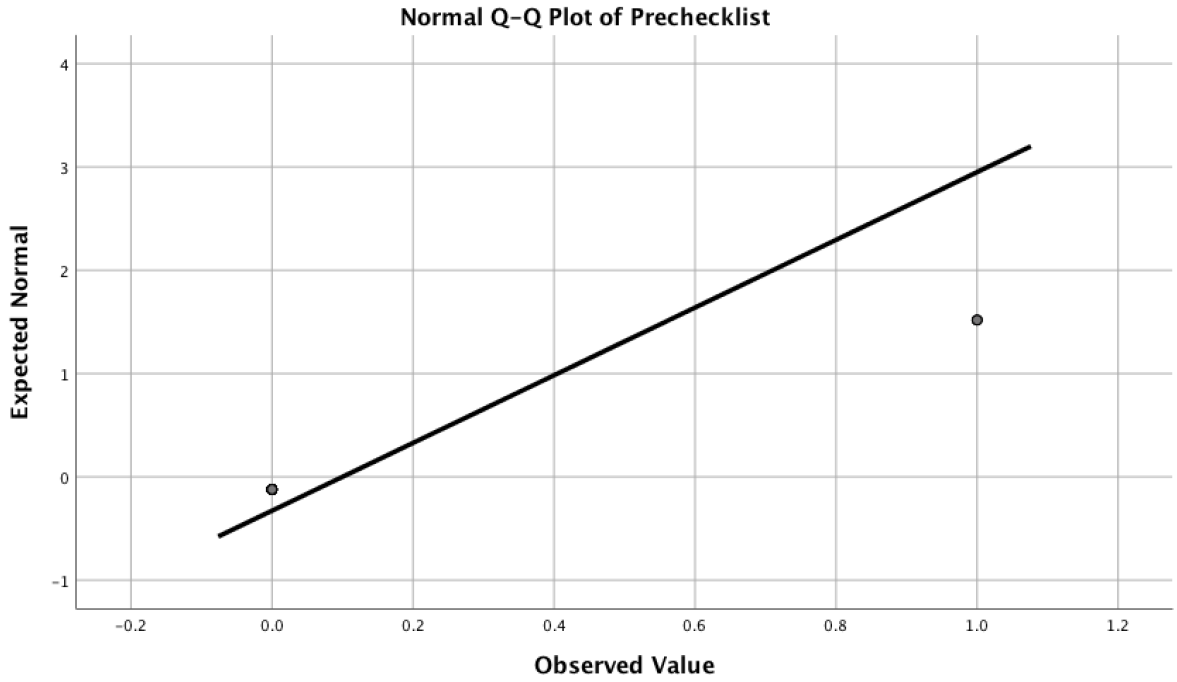
a. Lilliefors Significance Correction

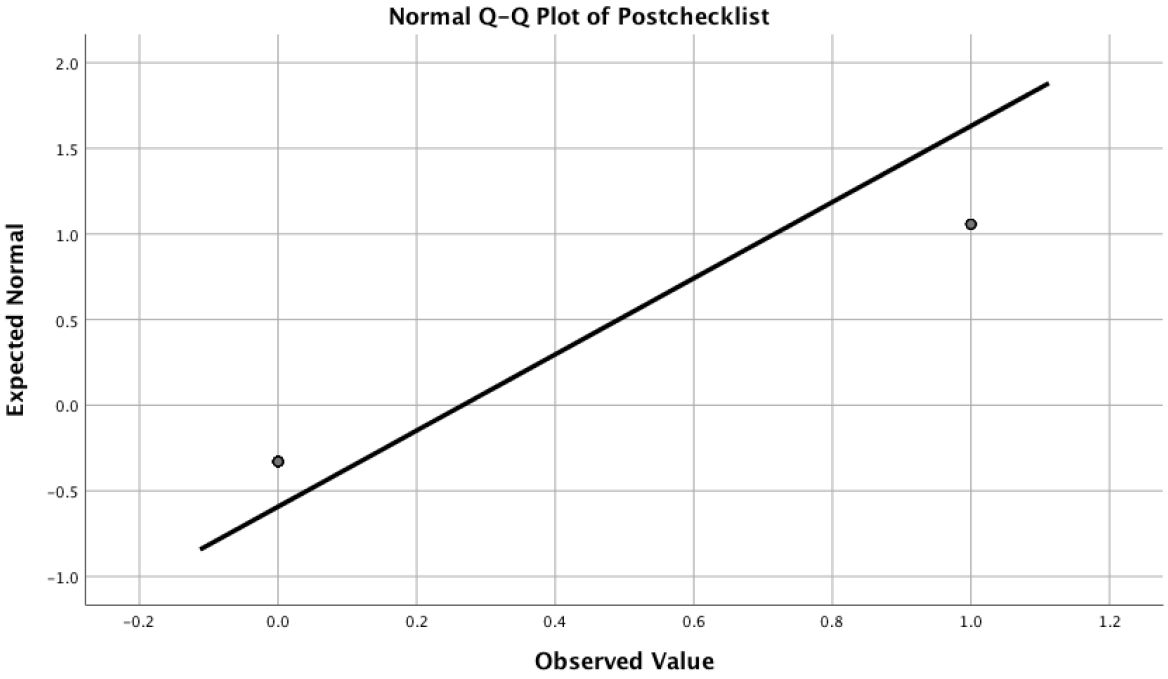
Prechecklist



Postchecklist




Normal Q-Q Plot of Prechecklist
Expected Normal
Observed Value
4
3
2
1
0
-1
-0.2
0.0
0.2
0.4
0.6
0.8
1.0
1.2


Normal Q-Q Plot of Postchecklist
Expected Normal
Observed Value
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-0.2
0.0
0.2
0.4
0.6
0.8
1.0
1.2

Descriptives

			Statistic	Std. Error
Prechecklist	Mean		.10	.056
	95% Confidence Interval for Mean	Lower Bound	-.01	
		Upper Bound	.21	
	5% Trimmed Mean		.06	
	Median		.00	
	Variance		.093	
	Std. Deviation		.305	
	Minimum		0	
	Maximum		1	
	Range		1	
	Interquartile Range		0	
	Skewness		2.809	.427
	Kurtosis		6.308	.833
Postchecklist	Mean		.27	.082
	95% Confidence Interval for Mean	Lower Bound	.10	
		Upper Bound	.43	
	5% Trimmed Mean		.24	
	Median		.00	
	Variance		.202	
	Std. Deviation		.450	
	Minimum		0	
	Maximum		1	
	Range		1	
	Interquartile Range		1	
	Skewness		1.112	.427
	Kurtosis		-.824	.833

Mann Whitney U test

Test Statistics[a]

	Referral
Mann-Whitney U	375.000
Wilcoxon W	840.000
Z	-1.654
Asymp. Sig. (2-tailed)	.098

a. Grouping Variable: Period