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Evaluation of Pre-Procedural Phone Call Effectiveness Before a Colonoscopy

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Abstract

Problem: Colorectal cancer is the third most diagnosed cancer in the United States (Gu et al., 2019). A colonoscopy procedure is the best diagnostic tool to evaluate the colon for pre-cancerous and cancerous polyps (Dang et al., 2020). Inadequate bowel preparation decreases colon visualization where adenomatous colon lesions may be missed.

Methods: Using an observational, pre/post design, a chart review was conducted for this QI project. Quantitative data comparing Boston Bowel Preparation Scale (BBPS) scores was collected on patients who received nurse-led phone calls one month prior to a colonoscopy, and patients who received phone calls one week prior to a colonoscopy. 100 patients pre-implementation and 100 patients post-implementation were included. Additional data collected was completion of bowel preparation and adherence to clear liquids the day prior to procedure time as reported by patients.

Results: An independent samples t-test was conducted to compare BBPS scores for the pre and post groups. There was a significant difference in the score with the pre group results as (M=7.2, SD=1.2) and the post group results as (M=7.6, SD=.83); $t(198) = -2.66, p = .009$.

Implications for Practice: Pre-procedural phone calls made within one week of colonoscopy procedure in comparison with one month before procedure increases bowel preparation scores. Facilities providing colonoscopy services should implement this process into regular practice.

Keywords:

Colonoscopy, bowel preparation, BBPS score, nurse-led phone calls

Evaluation of Pre-Procedural Phone Call Effectiveness Before a Colonoscopy

Introduction

Background and Significance

Colonoscopy is the standard method for examining the entire mucosal lining of the colon (Saltzman et al., 2015) with the goal of identifying and removing adenomatous polyps. Gastroenterologists remove polyps during colonoscopies to enhance early detection of colorectal cancer. Inadequate bowel preparation reduces the rate of adenoma detection, increases the risk of complications, increases the time of procedure, and increases costs (Nam et al., 2020; Gimeno-García et al., 2017)). About 12-22% of extra colonoscopy costs are a result of inadequate bowel preparation (Park et al., 2016). Inadequate bowel preparation reduces the quality of the procedure, increases the difficulty of the procedure, increases the risks for perforation, creates the need for repeat examinations at earlier intervals, and is time-consuming (Park et al., 2016).

Colorectal cancer is the third most diagnosed cancer in the United States, which means adequate bowel preparation is important (Gu et al., 2019). In 2021, 104, 270 new cases of colon cancer and 45, 230 new cases of rectal cancer were diagnosed (American Cancer Society, 2021). A colonoscopy procedure is the best diagnostic tool to evaluate the colon for pre-cancerous polyps, cancerous polyps, and other irregularities in the colon (Dang et al., 2020). Without an adequate bowel prep, adenomatous colon lesions may be missed. Multiple different bowel cleansing preparations, such as GoLYTELY® (polyethylene glycol 3350, an osmotic laxative, and electrolytes), Miralax® (Polyethylene glycol 3350), and Suprep® (sodium sulfate, potassium sulfate, magnesium sulfate), are available for use worldwide. However, there is no consensus on which bowel

preparation produces the best result. Standardizing bowel preparation protocol will help increase the detection and removal of adenoma polyps during colonoscopy procedures and reduce the rate of colorectal cancer.

Patients undergoing a colonoscopy should understand the importance of quality bowel preparation. It is estimated 25% of patients are non-compliant with bowel preparation instructions, resulting in poor bowel preparation with potential for missing adenomatous polyps (Gimeno-García et al., 2017). Adequate colon cleansing is enhanced when patients understand and accurately following the bowel preparation instructions.

Currently, several guidelines recommend a split-dose regimen for bowel preparation as well as a low-residue or full-liquid diet a few days before the procedure (Nam et al., 2018). As of 2018, there are over ten different bowel preparations available to use for colonoscopies, each with different formulations, tolerability, and volume (Gu et al., 2019). Written instructions may appear complex and difficult to understand. Risk factors for having inadequate bowel preparation include non-adherence to instructions, male gender, afternoon procedure times, tricyclic antidepressant use, and history of chronic constipation, and poor bowel preparation in the past (Dang et al., 2020).

Purpose and Problem Statement

The purpose of this project is to evaluate the impact that a pre-procedural phone call would have on the quality of bowel cleanliness for patients undergoing a routine, screening, colonoscopy at a GI Lab located at a Midwestern, medium-sized, urban hospital. Reviewing the bowel preparation procedure with patients one week prior to the procedure over the phone may enhance compliance with bowel prep instructions to ensure adequate colon visualization. The PICOT question for the study is: In routine

screening colonoscopy patients, does performing nurse-led pre-procedure phone calls with bowel preparation clarification one week before a colonoscopy, compared to a phone call one month before, lead to better visualization of the colon as measured by the Boston Bowel Preparation Scale?

The primary outcome measure of interest for this project is the quality of bowel preparation on patients who received pre-op phone calls within one week of their colonoscopy procedure, measured by the Boston Bowel Preparation Scale. Secondary outcome measures include the percentage of bowel prep completed and compliance with food restrictions before the procedure.

Literature Review

A literature search was conducted to explore the timing of pre-procedural phone calls and their impact on bowel preparation. PubMed, Medline (EBSCO), and Google Scholar databases were used for this search. Key search terms and phrases included *educational phone calls before colonoscopy*, *education AND phone calls or telephone calls AND colonoscopy screening*, and *endoscopy nurse educational telephone intervention*. Initially, 476 results were generated based on the original key searches. After inclusion and exclusion criteria were applied (Appendix A), 109 publications remained. Abstracts were reviewed for relevancy and ten publications were selected for critical appraisal. Of the ten articles, there was one systematic review, two meta-analyses, and seven randomized controlled studies.

Saltzman et al. (2015) published a guideline to assist endoscopists to determine appropriate colonoscopy bowel preparation. This guideline states bowel preparation should be individualized for the patient and education or verbal counseling from nurses

should be offered to each patient before starting their bowel preparation (Saltzman et al., 2015). Cost of bowel prep, patient age, comorbidities, tolerance of bowel prep, and safety are factors that should be included when providers select a bowel preparation regimen for patients.

Several studies have been done to determine which bowel preparation solution is superior in achieving adequate bowel cleansing. Currently, polyethylene glycol (PEG) split-dose solution is the standard for colonoscopy preparation (Dang et al., 2020). This split-dose preparation has various brand names such as GoLYTELY or CoLyte. Split-dose preparations require the patient to drink half of the bowel prep the night before their procedure and then finish the last of the prep the morning before their procedure.

Measurement tools are used to determine the quality of bowel preparation during each procedure. These measurement tools score the appearance of the prepped bowel using numerical values or phrases such as poor, good, or excellent prep. The Boston Bowel Preparation Scale, the Aronchick Scale, and the Ottawa Bowel Prep Scale are measurement tools used by endoscopists for colonoscopy procedures.

Patients typically receive oral and written instructions in their native language before colonoscopy procedures, however, up to 20% of patients fail to follow the recommendations (Hernandez et al., 2019) resulting in unsuccessful colonoscopy procedures (Galvez et al., 2017). Patients may not understand the instructions provided to them before their procedure or may forget important information explained to them in a pre-operative phone call if performed longer than 16 weeks before their procedure (Elvas et al., 2016). Instructions provided only by mail may not adequately explain the details of the bowel preparation (Chang et al., 2015). These common barriers need to be addressed

to increase compliance and rates of quality bowel preparation. Educational interventions which help patients comprehend the bowel preparation instructions should be performed to ensure compliance and adequate bowel cleansing.

Additional barriers affecting the quality of bowel preparation include sociodemographic features, such as elderly age, male sex, low education level, and relationship status as single are predictive factors for inadequate bowel preparation (Hernandez et al., 2019). Patients with a history of a previously failed bowel preparation attempt are most at risk for unsuccessful bowel preparation (Alvarez-Gonzalez et al., 2020).

Enhanced education on colonoscopy prep instructions eliminates misconceptions and can help change negative attitudes by helping patients address their concerns (Seoane et al., 2020). Enhanced instructions improve the quality of bowel preparation and increase patients' willingness to undergo a procedure again in the future (Guo et al., 2017). Lee et al. (2015) suggest that reinforcement of education via phone calls or text messages should be individualized to each patient, depending on resources available to endoscopy units.

In a randomized control study, Park et al. (2016) examined the effect of a simple educational video on the quality of bowel preparation. There was a significant difference in the quality of bowel prep between the video group and the non-video group.

In a randomized control study by Alvarez-Gonzalez et al. (2020) patients with a previously failed colonoscopy prep received a nurse-led phone call within 48 hours of their schedule procedure. The nurse reviewed diet, timing and dosing of bowel

preparation, and the importance of adherence to the prep. The rate of successful bowel preparations in this study was significantly higher in the telephone group than in the control group (83.5% vs. 72%) (Alvarez-Gonzalez et al., 2020).

Timing is important for educational phone calls before a procedure. Patients may forget instructions if the phone call is too far in advance of their procedure day. Lee et al. (2015) suggest a phone call or SMS text two days before a colonoscopy improves bowel preparation. In this study, there was a significantly higher rate of compliance with bowel preparation and lower rates of anxiety in patients who received an educational phone call two days prior to their procedure. Liu et al. (2013) and Galvez et al. (2017) both performed randomized controlled studies to examine if phone calls one day prior to procedure time help improve the quality of bowel preparation. Liu et al. (2013) found adequate preparation in 81.6% of patients who received a phone call the day before the procedure compared to 70.3% in those who did not. Galvez et al. (2017) performed a ten-minute phone call to 141 randomly selected patients the day before their procedure and found higher compliance in 97.16% of patients compared to 82.05%. Patients who received phone calls one day before their procedure stated they were more satisfied with the process and would repeat their colonoscopy in the future (Galvez et al., 2017). The timing of the pre-procedural phone calls is important because compliance with diet and laxative timing are important factors affecting bowel preparation quality (Alvarez-Gonzalez et al., 2020).

The articles explored in this literature review provide a persuasive argument for educational phone calls within one week of procedure time for a colonoscopy. Strengths of the literature include studies with large sample sizes. Weaknesses include both

physician and patient self-reporting bias. Gaps in the literature include lack of identifying standardized bowel prep assessment tools, reliability on the quality of preparation, and reliability of self-reported compliance.

Quality Improvement Framework

The Plan-Do-Study-Act (PDSA) cycle is the framework selected for this QI project. The PDSA cycle developed by Walter Shewhart and Edward Demings (Taylor et al., 2013) is used as a model implementing change. This four stage framework is used to evaluate if the proposed change will work in the actual environment, evaluate the cost of the change, decide which proposed change should be implemented, and increase the belief the change being made will make improvements (Institute for Healthcare Improvement [IHI], n.d.). For this project, the pre-procedural phone call will be tested in the real work setting to determine if pre-procedural phone calls within one week of procedure improves the quality of bowel prep prior to colonoscopy. Data will be analyzed and shared with the facility, with potential for practice change.

Methods

Design

This QI project used a descriptive, observational, pre vs post implementation design. A retrospective chart review of approximately 100 patients was used to collect baseline quantitative data regarding patient compliance with bowel preparation when receiving phone calls one month prior to procedure for the pre group. Next, nurse-led phone calls were moved from one month before the procedure to one week before the procedure. After implementation of moving phone calls closer to the procedure date, a

prospective chart review of approximately 100 patients was used to collect quantitative data regarding patient compliance with bowel preparation for the post group. The Boston Bowel Preparation scale (BBPS) was utilized to determine adequate bowel preparation (See Appendix B). Additional data collection included percentage of bowel preparation completed and adherence to food restrictions prior to procedure time as reported by patients.

Setting

The project took place at an endoscopy center in a large, suburban medical center in a medium sized Midwestern metropolitan area. This department is part of a large healthcare organization with approximately 7,500 employees in the hospital. Patients come from all over this metropolitan area for procedures.

Sample

This project used a convenience sample of adult patients ages 18 years and older receiving screening colonoscopy procedures. To minimize the variable of different prep solutions dosage, timing, and instructions, only patients using the GoLYTELY bowel preparation protocol were included for data collection. A comparison in quality of bowel preparation was made between those who received phone calls one week prior to their procedure with those who did not. Patients younger than 18 years of age and inpatients were excluded. The desired sample was approximately 200 colonoscopy procedures total, 100 pre-implementation and 100 post-implementation.

Data Collection/Analysis

A retrospective record review containing quantitative data regarding quality of bowel preparation was collected. Patient's age and gender were recorded. The data was

collected in an excel sheet which was locked with a password and stored within the primary investigator's laptop. Data collected was the BBPS score, age, gender, pre or post group, percentage of bowel preparation completed, and adherence to food restrictions (See Appendix C). To assess the outcomes of pre-procedural phone calls, an independent t-test for comparison of the two groups was analyzed using IBM SPSS Statistics (Version 27).

Approval Processes

Formal, written approval was obtained from the participating site's Quality Improvement department. After site approval was obtained, approval for this project was obtained from the Doctor of Nursing Practice (DNP) candidate's (primary investigator) university's Institutional Review Board (IRB) prior to implementation. Benefits include increase in compliance with bowel preparation and higher quality procedures.

Procedure

This QI project on improving pre-procedural bowel preparation was led by the (DNP) candidate. To obtain stakeholder agreement in the facility, steps to complete this project included consultation with GI lab team leader to determine quality of current pre-procedure phone calls and discuss moving the phone calls closer to procedure date. The GI physicians performing the colonoscopies were educated on the quality improvement project prior to implementation. Next, the DNP candidate completed a meeting with the registered nurses responsible for making pre-procedural phone calls to discuss the project and conduct training on timing and content of the phone calls. Lastly, data retrieved retrospectively from the chart review was analyzed to determine whether pre-procedural phone calls within one week of procedure time improve the quality of bowel preparation

in comparison with phone calls one month before procedure for patients undergoing a screening colonoscopy.

Results

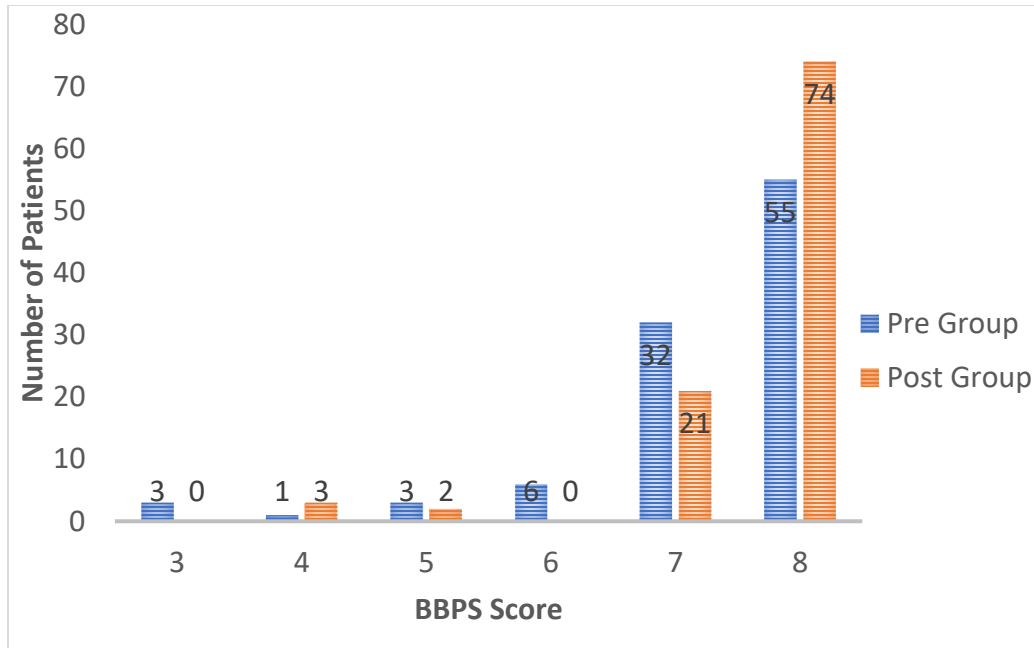
Demographics

The sample included 200 patients receiving screening colonoscopy procedures as outpatients in the hospital (100 pre and 100 post). The sample included 105 men and 95 women. The mean BBPS score for males was 7.49 and 7.56 for females. The ages of the patients ranged from 35 to 87 years old with an average of 75. The pre group was from November 1st, 2021-December 1st, 2021 and the post group was from December 1st, 2021-January 1st 2022. Only patients who received GoLYTELY for routine screening colonoscopies were used in data collection.

BBPS Scores

Only one physician was used for consistency in BBPS scoring. A t-test for comparison of means between the two groups was performed in IBM SPSS (Version 27) to determine whether pre-procedural phone calls made a statistical difference in BBPS scores for screening colonoscopy procedures. An independent samples t-test was conducted to compare BBPS scores before and after implementation. There was a significant difference in the score with the pre group results as (M=7.2, SD=1.2) and the post group results as (M=7.6, SD=.83); $t(198) = -2.66$, $p = .009$. The mean scores were 7.2 vs 7.6 which shows a clinical difference in BBPS scores and proves implementation of this project would increase BBPS scores.

Table 1

BBPS Score Comparison of Means

For the secondary measures obtained, when separated into the two groups, 8% of people who received a phone call within one week failed to complete all their bowel preparation and 10% of this group were non-compliant with the food restrictions. The results for those who did not receive a phone call within one week were 10% failed to drink all their bowel preparation and 11% were not compliant with food restrictions the day prior to the procedure.

Discussion

The outcomes of this QI project suggest that pre-procedural phone calls made one week prior to procedures do lead to better visualization of the colon as measured by the Boston Bowel Preparation Scale. The data proves to be statistically significant.

These results support a practice change that nurse-led phone calls should occur closer to patient procedure date to ensure accurate results. Recommendations to

implement this practice change include moving the current standard of nurse-led phone calls up to one week prior to the procedure date.

Limitations of this QI project includes a small window of time for implementation and data collection. Collecting data over a longer period would allow for a more accurate representation of BBPS scores. Another limitation not addressed in this project was provider inter-rater reliability using the BBPS scale. Each physician may differ slightly on how they score each colonoscopy. Additionally, those who came to their procedure time who were cancelled for reasons such as not being NPO, not finishing enough of the bowel preparation, or eating three meals the day prior, were not included in this study because they were taken off the schedule and did not receive BBPS scores.

Recommendations for further endeavors on this topic would be to use a larger sample size over a longer period and to find a way to include how many patients are cancelled for not following preparation instructions. Further study comparing types of bowel preparation solution and dosing protocol on BBPS scores is also warranted.

Conclusion

Pre-procedural phone calls made within one week of the procedure date for a colonoscopy did improve bowel preparation compliance and improve BBPS scores. Pre-procedural phone calls made within one week of colonoscopy procedure should be implemented regularly at this facility.

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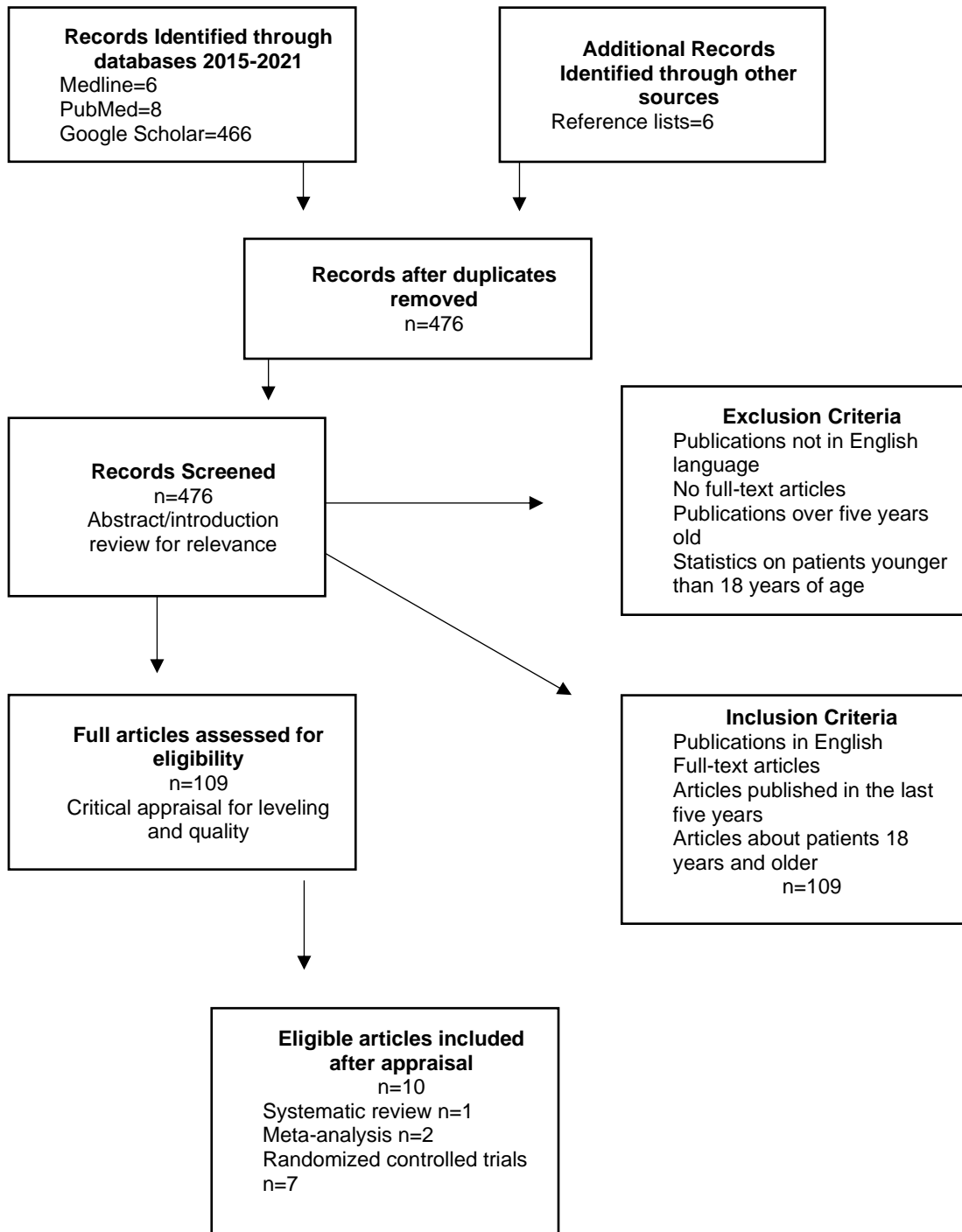
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Appendix A

Prisma Chart of Literature Review



Appendix B

Boston Bowel Preparation Scale

Score	Description
0	Unprepared colon segment with mucosa not seen due to solid stool that cannot be cleared
1	Portion of mucosa of the colon segment seen, but other areas of the colon segment not well seen due to staining, residual stool, and/or opaque liquid
2	Minor amount of residual staining, small fragments of stool and/or opaque liquid but mucosa of the colon segment seen well
3	Entire mucosa of the colon segment seen well with no residual staining, small fragments of stool, or opaque liquid

