



Appointment-keeping behaviors and procedure day are associated with colonoscopy attendance in a patient navigator population



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ABSTRACT

Background. Patient navigator programs (PNP) have been shown to improve colonoscopy completion with demonstrated cost-effectiveness. Despite additional resources available to these patients, many still do not attend their colonoscopies. The aim of this study was to determine factors associated with colonoscopy attendance amongst patients in whom logistical barriers to attendance have been minimized through enrollment in a PNP.

Methods. Retrospective case-control study of patients enrolled in a PNP for colonoscopy performed at a tertiary endoscopy center from 2009 to 2014. Cases were defined as patients who did not attend their first scheduled colonoscopy after PNP enrollment. Age- and gender-matched controls completed their first scheduled colonoscopy after PNP enrollment.

Results. 514 subjects (257 cases, mean age 57.1 years, 36.6% males) were included. Patients who attended their colonoscopy were less likely to be Spanish-speaking (64.6% vs 78.2%, $p = 0.0003$) and uninsured (0.4% vs 3.9%, $p = 0.006$). Attendance rates were significantly lower for screening colonoscopies compared to an indication of surveillance or diagnostic (45.5% vs 65.3%, $p < 0.0001$). Fewer patients attended colonoscopies scheduled on Monday (39.2% vs 52.1%, $p = 0.04$) and in December (10.7% vs 52.3%, $p < 0.0001$). On multivariate analysis, poor appointment-keeping behaviors, including a prior missed colonoscopy (OR 0.20, 95% CI 0.10–0.39) or missed office visit (OR 0.44, 95% CI 0.26–0.73) and procedures scheduled on Mondays (OR 0.51, 95% CI 0.27–0.94) were negatively associated with attendance.

Conclusions. Appointment-keeping behaviors, in addition to insurance-status, language-barriers and medical comorbidities, influence colonoscopy attendance in a PNP population. Patients scheduled for colonoscopies on Mondays or in December may require more resources to ensure attendance.

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1. Introduction

Colon cancer is the third leading cause of cancer-related death in the United States (American Cancer Society, 2014). Colonoscopy, considered the gold standard in colon cancer screening, has been shown to decrease colon cancer-related mortality and to be cost effective (Adams et al., 2004; Winawer et al., 1993; Zauber et al., 2012). Despite these benefits, rates of non-attendance for colonoscopy vary from 4.1% to 67% depending on the population evaluated (Adams et al., 2004; Turner et al., 2004; Gurudu et al., 2006; Sola-vera et al., 2008; Kazarian et al., 2008; Day et al., 2013; Nash et al., 2006). Previously identified factors associated with colonoscopy non-attendance include patient-related

characteristics, such as young age, insurance type and Hispanic ethnicity, as well as procedural factors, such as Monday procedures and prolonged time on a wait list (Adams et al., 2004; Sola-vera et al., 2008; Kazarian et al., 2008; *Morb. Mortal. Wkly Rep.*, 2012). Colonoscopy requires a colon cleansing regimen and sedation during the procedure, which presents unique logistical barriers to completion compared to other cancer screening procedures. These logistical barriers, coupled with transportation barriers and personal fears related to the exam, may disproportionately affect certain populations, such as those with lower socioeconomic status or educational background, and non-native English speakers, and may result in decreased compliance rate for colon cancer screening in these groups (*Morb. Mortal. Wkly Rep.*, 2012; Swan et al., 2003).

Removing logistical barriers to attendance may help improve colonoscopy completion, particularly among at-risk groups. Patient navigator programs (PNP) are designed to eliminate these barriers by providing patients a personal guide to schedule appointments, answer questions about doctors' recommendations, and resolve potential

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difficulties that may prevent successful procedure completion. PNP have been shown to improve colonoscopy attendance and to be cost effective (Nash et al., 2006; Jandorf et al., 2005; Elkin et al., 2012; Ladabaum et al., 2015). The PNP at our institution was designed to increase the rate of colon cancer screening by targeting patients in two licensed community health centers, many of whom are uninsured, Hispanic and anticipated to have difficulties scheduling and attending colonoscopy appointments. In spite of this intensive approach, a sizable number of patients in PNP do not attend their colonoscopy appointments. A better understanding of this group of patients and factors associated with non-attendance despite intensive intervention will facilitate improvements in colonoscopy completion rates and maximize allocation of resources. In this study, we aimed to assess patient and procedural characteristics associated with colonoscopy attendance amongst patients in whom logistical barriers have been minimized through enrollment in a PNP.

2. Methods

This was a retrospective case-control study of patients enrolled in a PNP for colonoscopy performed at a tertiary endoscopy center from two licensed community health centers between February 2009 and March 2014.

2.1. Study participants

We collected information on patients who were enrolled in a PNP from February 2009 to March 2014. Follow-up data was collected through July 2014. Two protocols were used to enroll patients in the PNP. Patients who were expected to have difficulty scheduling a colonoscopy were enrolled to the PNP at the discretion of their primary care doctor. Additionally, the patient navigator reviewed all colonoscopy orders entered by primary care physicians in each of the two community health centers. Any patient who did not schedule their colonoscopy within one month of an order being placed was contacted by the patient navigator and enrolled in the PNP.

Once a patient was enrolled in the PNP, the navigator facilitated appointment scheduling, answered questions about the colonoscopy procedure and preparation and assisted in organizing transportation. The navigator also addressed other barriers including individual concerns about the colonoscopy exam and copay assistance when needed. During the study period there was a single navigator for all referred patients. Appointments for colonoscopy were scheduled at one of two endoscopy centers based on availability of appointment and patient preference.

Patients who did not attend their first colonoscopy after enrollment in the PNP were defined as “no show” cases. Controls were defined as those attending their first colonoscopy after enrollment in the PNP and were termed “attended”. Controls were matched to cases by gender and age by five-year ranges (i.e. 20–25, 26–30, etc.) in a 1:1 ratio.

2.2. Data abstraction

Procedural data collected included date, time and indication for colonoscopy. Clinical data collected included medical history (including history of hypertension, diabetes mellitus, chronic pain and psychiatric illness and/or substance abuse), smoking history (ever versus never smoker), prior fecal occult blood testing, colonoscopies completed or missed prior to enrollment in the PNP, prior gastroenterology clinic visit, missed office visits, family history of colon cancer in a first degree relative and history of mammography for breast cancer screening in women. Collected demographic information included employment status, highest level of education, insurance status, language and race. Distance to endoscopy center was calculated based on distance between the patient's home zip code and endoscopy center zip code. This project was undertaken as a Quality Improvement Initiative at Brigham and

Women's Hospital, and as such was not formally supervised by the Institutional Review Board per their policies.

2.3. Statistical analysis

All categorical and binary variables were analyzed by a Chi-square Test or Fisher's Exact Test and reported as proportions. The continuous variable age was analyzed by Kruskal-Wallis and was reported as mean with standard deviation. Logistic regression was used to identify factors associated with colonoscopy attendance. We looked for any interaction between day of the week of the procedure (Monday procedure versus other), month of the procedure (December procedure versus other), time of day of procedure (morning versus afternoon), location of colonoscopy, indication for colonoscopy, prior colonoscopy completed, prior colonoscopy missed, missed office visit, medical history (including diabetes mellitus, chronic pain and psychiatric illness), prior fecal occult blood sample obtained, site of referral, smoking status, family history of colon cancer, educational level (high school or greater), insurance-status, English speaking and distance to endoscopy location. Employment status and race were excluded from the model as these were thought to be co-linear with educational level and language, respectively.

A two-sided p-value of <0.05 was considered statistically significant. All statistical analyses were performed using SAS version 9.3 (SAS Institute Inc.).

3. Results

3.1. Study population

During the study period, 1252 patients were enrolled in the PNP and 995 patients attended their first scheduled colonoscopy for a completion rate of 79.5%. We identified 257 cases who did not show for their scheduled colonoscopy and randomly selected 257 age- and gender-matched controls for inclusion. The subjects were 36.6% male with a mean age of 57.1 years. Of the 257 cases, 103 (40%) eventually attended and 154 (60%) never attended a colonoscopy during the follow-up period after the initial no-show. Table 1 shows the demographic characteristics of subjects.

The attended (control) group had similar race distribution, educational level and employment status compared to the no show group. However, the attended group had significantly fewer Spanish-speaking (64.6% vs 78.2%, $p = 0.0003$) and fewer uninsured (0.4% vs 3.9%, $p = 0.006$) subjects. We dichotomized these variables into Spanish versus non-Spanish speaking and insured versus uninsured. We did not evaluate for significant differences between other languages or insurance types. Subjects who attended their colonoscopy lived significantly farther from the procedure location (4.16 miles vs 3.74 miles, $p = 0.04$). There was no significant difference in attendance based on site of referral (site 1: 53.3% vs site 2: 46.7%, $p = 0.91$).

3.2. Characteristics of attendance groups

Medical history of the subjects and indication for colonoscopy referral is shown in Table 2.

There were significantly fewer patients with diabetes mellitus in the attended group compared to the no show group (24.9% versus 33.9%, $p = 0.03$), but the groups did not differ in history of hypertension, chronic pain, psychiatric illness and/or substance abuse, smoking or family history of colon cancer. The percentage of subjects who underwent colon cancer screening with fecal occult blood testing at any time prior to referral for colonoscopy did not differ between the groups (25.9% vs 18.7%, $p = 0.11$). Patients undergoing colonoscopy for an indication of screening were significantly less likely to attend compared to an indication of surveillance or diagnostic (45.5% vs 65.3%, $p < 0.0001$).

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