Research Article

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Culturally Targeted Patient Navigation for Increasing African Americans' Adherence to Screening Colonoscopy: A Randomized Clinical Trial

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Abstract

Background: Patient navigation has been an effective intervention to increase cancer screening rates. This study focuses on predicting outcomes of screening colonoscopy for colorectal cancer among African Americans using different patient navigation formats.

Methods: In a randomized clinical trial, patients more than 50 years of age without significant comorbidities were randomized into three navigation groups: peer-patient navigation ($n = 181$), pro-patient navigation ($n = 123$), and standard ($n = 46$). Pro-patient navigations were health care professionals who conducted culturally targeted navigation, whereas peer-patient navigations were community members trained in patient navigation who also discussed their personal experiences with screening colonoscopy. Two assessments gathered sociodemographic, medical, and intrapersonal information.

Results: Screening colonoscopy completion rate was 75.7% across all groups with no significant differences in completion between the three study arms. Annual income more than $10,000 was an independent predictor of screening colonoscopy adherence. Unexpectedly, low social influence also predicted screening colonoscopy completion.

Conclusions: In an urban African American population, patient navigation was effective in increasing screening colonoscopy rates to 15% above the national average, regardless of patient navigation type or content.

Impact: Because patient navigation successfully increases colonoscopy adherence, cultural targeting may not be necessary in some populations. *Cancer Epidemiol Biomarkers Prev; 22(9); 1577–87. ©2013 AACR.*

Introduction

Colorectal cancer is the third most commonly diagnosed cancer in African Americans and its incidence and mortality rates are higher than all other ethnic groups. One factor that may contribute to this trend is the lower rate of colorectal cancer screening participation, which is critical to the prevention and early detection of colorectal cancer. If precancerous polyps in the colon and rectum are identified (through colonoscopy or flexible sigmoidoscopy screening) and removed (through polypectomy), patients can live normally with no further treatment required. Current data indicate that the removal of precancerous polyps decreases colorectal cancer incidence by 75% to 90% (1). Although screening colonoscopy (one of several methods of screening normal risk adults ages 50 years or more) is recommended by the American Cancer Society, the U.S. Multisociety Task Force on Colorectal Cancer, and the American College of Radiology (2), colorectal cancer screening rates in general and colonoscopy specifically remain low especially among African Americans (3).

Patient navigation (Freeman and colleagues; ref. 4) involving a specifically trained person within the health care setting who helps the patient obtain medical care, has received considerable attention as a way to improve cancer care among minority patients. Most published patient navigation programs assist patients in obtaining follow-up of suspicious findings and treatment. Previous studies and national programs have reported that patient navigation for individuals with abnormal findings or cancer diagnoses is beneficial and results in more timely treatment and resolution (5, 6).

Recently, patient navigation has been expanded to assist with obtaining cancer screening. Studies, mainly focused on breast and cervical screening, report that patient navigation increases screening adherence (see review; ref. 7). Although a handful of recent studies have examined the effectiveness of patient navigation for colorectal cancer screening, few have focused solely on patient

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navigation for screening colonoscopy. Related studies (e.g., Lasser and colleagues; ref. 8 and Percac-Lima and colleagues; ref. 9) showed significantly higher rates of colonoscopy completion in navigated over nonnavigated groups; however completion rates for both groups were still below 40%. Our group was among the first to introduce patient navigation to facilitate colonoscopy completion among minority primary care patients, increasing adherence from 40% to 66% (10).

Peers as navigators

Research in public health and health education confirms the benefits of peer educators in healthcare interventions (11–13). In cancer education, peers increased smoking cessation and were more cost effective (14). For breast cancer, peer-led education programs increased mammography and self-examination among African Americans (15, 16). We hypothesize that racially matched peer navigators can model ways of coping with anxiety about colonoscopy screening, and successful engagement with mainstream health care. This hypothesis was informed by reference group-based social influence theory (17); an important element is informational social influence (the extent to which referents or peers from one's racial group, age group, or gender serve as a source of credible information). In the context of colorectal cancer screening, one source of information is a peer's own experience with colonoscopy. Through a peer navigator's self-disclosure about colonoscopy as a "similar other," the patient may obtain information relevant to his or her own screening expectations. The information provided by a peer navigator may serve to model attitudes and behaviors associated with successful adherence such as effective communication with healthcare providers and screening self-efficacy. Peer navigators can also model strategies to overcome barriers identified among African Americans such as limited colorectal cancer knowledge, low perceived colorectal cancer risk, colorectal cancer fatalism, and medical mistrust (18–24).

Targeted interventions have been developed on the basis of demographic, behavioral, and psychosocial characteristics shared by members of subgroups (25). Our conceptualization of patient navigation for increasing screening colonoscopy adherence suggests the importance of determining intrapersonal barriers which affect understanding the consequences of adherence to screening colonoscopy (26), guided by cognitive-behavioral theory (27–29). Thus, patient navigation is a strategy to reduce the aversive consequences associated with screening behavior. Our patient navigation approach systematically addresses the consequences or "punishments" as represented by intrapersonal barriers, including colonoscopy-specific fear, worry, anxiety, and perceived disadvantages of colonoscopy (30–36).

Thus, combining patient navigation with culturally targeted messages (CTPN) to overcome system barriers and help people understand the importance of screening colonoscopy may have a greater impact than patient navigation alone. This study sought to examine the impact of three forms of patient navigation. The standard of care (STD) focused on the basic facts of screening and provided logistical assistance to patients (e.g., making an appointment, reminder calls). We investigated enhancing STD through cultural targeting including: (i) emphasis on the colorectal cancer problem among African Americans and the relevance of colonoscopy, (ii) discussion of culturally specific facts (for African Americans) and personal colonoscopy barriers, and (iii) modeling effective coping by a peer navigator (someone who has completed colonoscopy) to increase self-efficacy of a patient. In addition, we examined the effectiveness of a peer delivering the CTPN (peer-patient navigation) versus professional (health educator) navigation (pro-patient navigation). Thus, in this randomized clinical trial (RCT), we examined patient navigation, delivered in three ways (peer-patient navigation, pro-patient navigation, and STD), to address the low adherence to physician recommended screening colonoscopy by African American patients. We also examined the potential impact of sociodemographic, medical, and intrapersonal factors as predictors of screening completion.

Materials and Methods

Study setting and recruitment

In this Institutional Review Board-approved RCT, African American primary care patients referred for screening colonoscopy by their primary care physician (PCP) at a nonacute medical visit were recruited at Mount Sinai's primary care clinic between May 2008 and December 2011. PCPs and medical assistants referred their patients. Interested patients met with a research assistant to discuss the study and to sign informed consent. The baseline assessment was also conducted as an interview during this meeting.

African American patients more than 50 years of age without active gastrointestinal symptoms, significant comorbidities, or a history of inflammatory bowel disease or colorectal cancer were included. Patients must not have undergone colonoscopy within the past 5 years (on the basis of the clinical practice at our institution) or have been current with other forms of colorectal cancer screening (e.g., FOBT, flexible sigmoidoscopy). After recruitment, referrals were reviewed by the Division of Gastroenterology to confirm medical eligibility and evaluate any contraindications to colonoscopy or sedation.

We received 589 referrals to the study. Of these, 532 (90.3%) consented and were enrolled.

Nonnavigated participants

Of the 532 enrolled patients, 15 were ineligible (e.g., no working phone). Furthermore, during the medical clearance process, some patients were deemed ineligible for direct referral (e.g., uncontrolled diabetes, cardiac concerns) and were referred to our gastroenterology clinic and were not randomized ($N = 106$). Participants with medical clearance who were randomized to one of the study arms but were never reached for their scheduling

call, had their referral returned to their PCP (nonnavigated; $N = 61$) and were excluded from further analyses.

Navigated participants

Randomization and patient navigation assignments were made by the project coordinator using our statistician's randomization chart. All navigation services (and subsequent assessments) were conducted by telephone. There were two navigation call scripts. The first included a culturally targeted message designed to convey the importance of colorectal cancer prevention for African Americans and asked about patients' concerns. The second message was a STD script to simply schedule the procedure and answer any questions. The protocol also included being navigated by either a professional (pro-patient navigation) or community member (peer-patient navigation). Overall, 350 participants were navigated. On the basis of our preliminary data of the projected different screening colonoscopy completion rates for each group, we used *a priori* power calculations to determine that participants should be randomized in a ratio of 3:2:1 (peer-patient navigation, $N = 181$; pro-patient navigation, $N = 123$); and STD, $N = 46$) to best ensure statistical power for the anticipated effects. For STD, we assumed that screening uptake would be 40%, whereas pro-patient navigation would be 66% and peer-patient navigation would be 68%. With this size sample, power for the comparison of peer-patient navigation with STD would be 0.94 and pro-patient navigation to STD would be 0.87.

Patient navigators

Five African American peer-patient navigators and four African American pro-patient navigators were recruited and trained (37). Peer-patient navigators (paid hourly) were eligible for the position if they were more than 50 years old and had recently undergone colonoscopy screening. All pro-patient navigators (salaried staff) held a Bachelor's degree, had research experience, and had worked with minority communities. Additional details about the training of the navigators, their characteristics, and payments have previously been published (see Shelton and colleagues; ref. 37).

Intervention protocols

Culturally targeted message. For the two culturally targeted groups (peer-patient navigation and pro-patient navigation), all navigators were African American to maintain racial concordance. Each call included information about how colorectal cancer specifically impacts African Americans (e.g., "black Americans are more likely to get colon cancer than people in other racial and ethnic groups") and asked participants about any concerns. The calls made by the peer-patient navigators also included their own story of completing their colonoscopy to model effective coping. In the STD group, there was no mention of culture or barriers. Everyone received information about the importance of colorectal cancer screening and specific instructions for colonoscopy preparation.

Telephone calls. The overall structure of each intervention group was the same. All participants received 3 scripted phone calls: a scheduling call, a call 2 weeks before their colonoscopy date, and a call 3 days before the procedure. Following the first call, written instructions for the bowel preparation were mailed. During the follow-up calls, patient navigators reminded participants of their appointments, confirmed receipt of mailed information, reviewed bowel preparation instructions, assessed transportation needs, and provided education and support. Peer-patient navigators also discussed their own colonoscopy experience. In the STD group, calls were conducted by the pro-patient navigators. That is, the same pro-patient navigators conducted the navigation for two groups. To minimize contamination, written scripts were used. In addition, throughout the study we listened to 10% of the audio-recorded calls for fidelity purposes to ensure compliance with each condition and different staff members completed the assessments.

Assessments

In addition to the three telephone calls, there were two assessments. Time 1 was completed at the time of consent (baseline), face-to-face as an interview. The time 2 assessment was completed over the phone 2 weeks before the scheduled colonoscopy, immediately following the reminder call. Each assessment took 20 to 30 minutes to complete and participants were paid $20 for each. There were 3 main categories of variables: (i) demographic characteristics, (ii) medical care and colorectal cancer knowledge and, (iii) intrapersonal factors that have been reported as potential barriers or facilitators for colorectal cancer screening. Table 1 shows the timing for each assessment.

Demographic characteristics

At time 1, participants completed a general sociodemographic questionnaire about age, race/ethnicity, employment status, income, and education.

Medical care and colorectal cancer knowledge

Participants answered questions about their health behaviors, knowledge of colorectal cancer, and relationship with health care providers.

Health behaviors. Participants answered questions about their health habits including postponing medical care, not following doctor's advice, and frequency of previous year medical care.

Interpersonal communication (with referring MD). An 8-item measure assessed participants' level of comfort and satisfaction in their communication with the doctor/provider who referred them for the colonoscopy. The measure was adapted from prior literature (38) to be specific to screening colonoscopy. Participants rated how strongly they agreed/disagreed on a 5-point Likert scale (1 = strongly disagree and 5 = strongly agree) with statements about physician communication (e.g., "I can easily talk about personal things with my doctor").

Table 1. Timing and content of assessments

Measure	α	Time 1 (baseline)	Time 2 (2 weeks before scheduled colonoscopy)
Demographic characteristics	n/a	X	
Health behaviors	n/a	X	
Intrapersonal communication with physician	0.868	X	X
History of cancer	n/a	X	
Colorectal cancer knowledge	0.420	X	X
Fear of colonoscopy	0.861	X	X
Fatalism	0.829	X	
Pros and cons	0.637	X	X
Multidimensional Inventory of Black Identity	0.641	X	
Group-based medical mistrust	0.855	X	
Collective self-esteem	0.559	X	
Self-efficacy	0.843	X	X
Social influence	0.895	X	
Cancer anxiety	0.444	X	X
Cancer worry	0.745	X	X
Perceived risk for colorectal cancer	0.526	X	X

NOTE: X indicates that the measure was included in the corresponding assessment.

Colorectal cancer knowledge. Our own measure for assessing colorectal cancer knowledge (39) was used and included ten true–false statements (e.g., "a person could have colorectal cancer without having any symptoms").

Colonoscopy completion was assessed via medical record review.

Intrapersonal factors

Fear of colonoscopy. Participants' fear of colorectal cancer screening was assessed using a 6-item measure developed by Manne and colleagues (40). On the basis of a 5-point Likert scale (1 = not at all fearful and 5 = extremely fearful), participants were asked to indicate how fearful they felt about the preparation, procedure, and results.

Fatalism. The Powe Fatalism Inventory (41) was adapted to measure colorectal cancer fatalism. The inventory consisted of five yes/no items about the implications of colorectal cancer diagnosis (e.g., "I believe that if someone gets colorectal cancer, his/her time to die is near").

Pros and cons about colonoscopy screening. A 17-item measure, adapted from prior research (35), asked, on a 5-point Likert scale, how strongly participants agreed/disagreed (1 = strongly disagree and 5 = strongly agree) about the pros or cons of getting a colonoscopy (e.g., "it would be inconvenient to have a colonoscopy at this time").

Ethnic identity. The 8-item centrality subscale of the Multidimensional Inventory of Black Identity was used to measure participants' ethnic identity, how they feel about it, and how much their behavior is affected by it (42). Participants indicated on a 5-point Likert scale how strongly they agreed/disagreed (1 = strongly disagree and 5 = strongly agree) with statements about their identity and role in the Black community (e.g., "in general, being Black is an important part of my self-image.").

Medical mistrust. The 6-item suspicion subscale of the group-based medical mistrust scale was used to measure assessed participants' beliefs about the care they and people of their racial and ethnic group receive from the health care system (43) and asked participants to indicate on a 5-point Likert scale how strongly they agreed/disagreed (1 = strongly disagree and 5 = strongly agree) with statements about trust or suspicion of health care staff (e.g., "people of my ethnic group should be suspicious of information from doctors and health care professionals").

Collective self-esteem. Collective self-esteem was assessed using an 8-item measure drawn from previous literature (44). Participants indicated on a 5-point Likert scale how strongly they agreed/disagreed (1 = strongly disagree and 5 = strongly agree) with statements about the importance of gender and age to their self-image (e.g., "my gender is an important reflection of who I am").

Self-efficacy. A 10-item measure, adapted from previous literature (45), assessed participants' confidence in their ability to complete a colonoscopy. Participants indicated on a 5-point Likert scale how strongly they agreed/disagreed (1 = strongly disagree and 5 = strongly agree) with statements about carrying out specific tasks related to getting a screening colonoscopy (e.g., "I can get a colonoscopy even if I don't know what to expect").

Social influence. A 4-item measure (36) evaluated social influence on participants' medical decisions, rating

how strongly they agreed/disagreed with statements about the influence of their families and close friends (e.g., "my close friends think I should have a colonoscopy") on a 4-point Likert scale (1 = strongly disagree and 4 = strongly agree).

Cancer anxiety. Two questions, adapted from previous research (46), assessed colorectal cancer anxiety. For example, "Is thinking about colorectal cancer emotionally stressful?" on a 3-point scale (1 = not at all and 3 = very much).

Cancer worry. Vernon and colleagues' (36) 3-item scale assessed colonoscopy worry. Participants indicated on a 4-point Likert scale how strongly they agreed/disagreed (1 = strongly disagree and 4 = strongly agree) with statements about screening consequences (e.g., "I am afraid of having an abnormal colonoscopy result").

Perceived risk of colorectal cancer. Participants were asked three questions adapted from the 2005 Health Information National Trends Survey (47) about their perceived risk for getting colorectal cancer. For example, "compared with the average (man/woman) your age, would you say you are…?" with three answer choices rating the relative likeliness of getting colorectal cancer. Responses were averaged to generate mean scores for each medical factor and intrapersonal variable.

Statistical analyses

All analyses were conducted using SPSS Statistics V19. The univariable analysis described participant characteristics, medical care, colorectal cancer knowledge, and intrapersonal factors. χ^2 compared equality of proportions for demographic variables. One-way ANOVA tested equality of means.

On the basis of the univariable results, a binary logistic regression model was developed to examine the association between screening colonoscopy completion and significant predictor variables, after adjusting for participant characteristics, medical care, colorectal cancer knowledge, and intrapersonal factors. Variables that were significant at the 0.2 level in the bivariable analyses were considered for the multivariable model. Variables were retained in the multivariable model if they were significant at the 0.1 level (to indicate trend) or if they exhibited a confounding effect. The statistical significance in the final multivariable model was set at 0.05. All statistical tests were two-sided.

Results

Of the 589 patients recruited for this study, there were no significant age or gender differences between those who consented ($N = 532$) and those who refused to participate ($N = 57$). There were also no significant differences in age or gender between eligible, randomized participants who were navigated ($N = 350$) and those who were unable to be reached for navigation ($N = 61$).

Colonoscopy completion rates

There were no significant differences in colonoscopy completion rates among the three study arms [$N = 350$; peer-patient navigation (74.0%), pro-patient navigation (76.4%), and standard (80.4%)], suggesting that all forms of patient navigation are highly effective. Thus, the focus of this report is on potential predictors of colonoscopy completion, regardless of study arm.

Sociodemographic characteristics of completers and noncompleters

Comparative analyses of sociodemographic features of colonoscopy completers versus noncompleters are shown in Table 2. Unemployed patients were significantly less likely to complete the screening colonoscopy than employed patients [$P = 0.022$; OR = 0.524; 95% confidence interval (CI) = 0.300–0.918]. Participants with annual income less than $10,000 were significantly less likely to get a colonoscopy than those who earned more than $10,000 annually ($P = 0.017$; OR = 0.536; 95% CI = 0.319–0.899). Insurance status was also related to colonoscopy completion. Patients insured through Medicare or Medicaid were significantly less likely to get their screening than patients with private or self-pay insurance ($P = 0.019$; OR = 0.466; 95% CI = 0.244–0.892). There were no notable differences in gender, age, marital status, or education level between those who completed versus noncompleters.

Medical history and health behaviors of completers and noncompleters

Table 2 also displays comparative results related to medical history and health behaviors of colonoscopy completers versus noncompleters. Participants who indicated that they had put off or did not seek care for a medical problem in the previous 12 months were significantly less likely to get colonoscopy screening compared with participants who had not postponed treatment or were not sure ($P = 0.005$; OR = 2.11; 95% CI = 1.25–3.57). Patients who reported incidents of not following doctors' advice in the previous year were significantly less likely to complete their screening colonoscopy ($P = 0.039$; OR = 1.75; 95% CI = 1.02–3.00).

Intrapersonal characteristics

Table 3 shows the comparative results of intrapersonal variables of colonoscopy completers versus noncompleters. Data from the time 1 (baseline) assessment reveal that participants who indicated lower levels of self-efficacy were less likely to complete the screening procedure ($P = 0.036$). Participants who did not get screened had significantly higher levels of fear about the colonoscopy ($P = 0.012$) and more cancer worry ($P = 0.027$). In addition, participants who more strongly identified with their ethnicity were more likely to complete ($P = 0.34$). There were no significant differences in any of the intrapersonal factors at the time 2 (2 weeks before the scheduled colonoscopy appointment) assessment between participants who completed their screening and those who did not complete.

Table 2. Sociodemographic and medical factors of completers versus noncompleters of screening colonoscopy

N = 350	Completers *N* (%)[a]	Noncompleters *N* (%)[a]	Total *N* (%)[b]	*P*[c]
Sociodemographic factors				
Gender				
Female	175 (73.5)	63 (26.5)	238 (68.0)	0.165
Male	90 (80.4)	22 (19.6)	112 (32.0)	
Age, y				
49—64	199 (74.0)	70 (26.0)	269 (76.9)	0.167
65+	66 (81.5)	15 (18.5)	81 (23.1)	
Marital status				
Married	49 (80.3)	12 (19.7)	61 (17.5)	0.348
Not married	215 (74.7)	73 (25.3)	288 (82.5)	
Employment status				
Employed	98 (83.1)	20 (16.9)	118 (33.7)	0.022
Unemployed	167 (72.0)	65 (28.0)	232 (66.3)	
Education level				
≥Grade 13	95 (77.9)	27 (22.1)	122 (35.0)	0.478
≤Grade 12	169 (74.4)	58 (25.6)	227 (65.0)	
Income				
≤10,000	90 (68.2)	42 (31.8)	132 (42.3)	0.017
>10,000	144 (80.0)	36 (20.0)	180 (57.7)	
Insurance status				
Medicare/Medicaid	191 (72.6)	72 (27.4)	263 (75.1)	0.019
Private/self pay	74 (85.1)	13 (14.9)	87 (24.9)	
Insurance status				
Medicare	76 (78.4)	21 (21.6)	97 (27.7)	0.037
Medicaid	115 (69.3)	51 (30.7)	166 (47.4)	
Private	71 (85.5)	12 (14.5)	83 (23.7)	
Self pay	3 (75.0)	1 (25.0)	4 (1.1)	
Study arm				
Peer	134 (74.0)	47 (26.0)	181 (51.7)	0.648
Pro	94 (76.4)	29 (23.6)	123 (35.1)	
Std	37 (80.4)	9 (19.6)	46 (13.1)	
Medical factors				
Regular doctor				
Yes	244 (76.0)	77 (24.0)	321 (91.7)	0.665
No	21 (72.4)	8 (27.6)	29 (8.3)	
Since when regular doctor				
Before 2008	88 (75.2)	29 (24.8)	117 (40.5)	0.765
2008+	132 (76.7)	40 (23.3)	172 (59.5)	
First year at clinic				
Before 2001	68 (73.9)	24 (26.1)	92 (32.1)	0.788
2001+	147 (75.4)	48 (24.6)	195 (67.9)	
Number of doctor visits				
0	14 (93.3)	1 (6.7)	15 (4.3)	0.104
1+	251 (74.9)	84 (25.1)	335 (95.7)	
Put off medical problem				
No/not sure	206 (79.5)	53 (20.5)	259 (74.0)	0.005
Yes	59 (64.8)	32 (35.2)	91 (26.0)	

(Continued on the following page)

Table 2. Sociodemographic and medical factors of completers versus noncompleters of screening colonoscopy (Cont'd)

N = 350	Completers *N* (%)[a]	Noncompleters *N* (%)[a]	Total *N* (%)[b]	*P*[c]
Did not follow doctor's advice				
Yes	58 (67.4)	28 (32.6)	86 (24.6)	0.039
No or not sure	207 (78.4)	57 (21.6)	264 (75.4)	
Trust doctor				
Agree	252 (76.8)	76 (23.2)	328 (95.3)	0.189
Disagree/not sure	10 (62.5)	6 (37.5)	16 (4.7)	
Doctor satisfaction				
Satisfied	248 (76.1)	78 (23.9)	326 (95.3)	0.922
Dissatisfied/neither	12 (75.0)	4 (25.0)	16 (4.7)	

[a]Row percent.
[b]Column percent.
[c]*P* value obtained from χ^2 test.

Multivariable regression

A 5-variable model was created to predict colonoscopy completion (Table 4). Income was the strongest unique predictor of colonoscopy completion (OR, 2.835). Participants with annual income more than $10,000 were two and a half times more likely to complete than those who made less than $10,000 annually. Higher self-efficacy was the second predictor of colonoscopy completion

Table 3. Intrapersonal factors of completers versus noncompleters of screening colonoscopy

Intrapersonal factors - time 1	Completers Mean (σ)	Noncompleters Mean (σ)	*P*[a]	*N*
Fear of colonoscopy	1.9387 (.96335)	2.2482 (1.03214)	0.012	349
Fatalism	0.1253 (.24884)	0.0934 (.23862)	0.304	345
Pros and cons	2.5396 (.43089)	2.5882 (.35736)	0.348	350
Multidimensional Inventory of Black Identity	3.2501 (.65990)	3.0669 (.75519)	0.034	344
Group-based medical mistrust	1.9417 (.66328)	1.9010 (.62899)	0.661	272
Collective self-esteem	3.2003 (.60311)	3.2229 (.73137)	0.822	272
Self-efficacy	4.1952 (.51065)	4.0746 (.43981)	0.036	350
Social influence	2.8620 (.75538)	3.0242 (.65814)	0.130	260
Cancer anxiety	1.6154 (.69585)	1.7923 (.73364)	0.078	273
Cancer worry	2.2268 (.68199)	2.4444 (.72166)	0.027	274
Perceived risk for colorectal cancer	1.6869 (.58101)	1.5882 (.59904)	0.178	349
Intrapersonal factors - time 2				
	Mean (σ)	**Mean (σ)**	***P***	***N***
Fear of colonoscopy	1.9339 (.86265)	1.9927 (.86761)	0.688	272
Pros and cons	2.6110 (.46880)	2.5305 (.34911)	0.295	270
Self-efficacy	4.0474 (.48159)	4.0798 (.50918)	0.694	272
Cancer anxiety	1.6609 (.72325)	1.7162 (.81258)	0.680	211
Cancer worry	2.3257 (.67903)	2.4054 (.75415)	0.525	211
Perceived risk for colorectal cancer	1.7879 (.57545)	1.7764 (.66834)	0.909	272

σ = SD
[a]*P* value obtained from independent samples *t*-test.

Table 4. Logistic regression predicting odds of colonoscopy completion

	P	OR (95% CI)
Income		
≤10,000		1.00 (1.00–1.00)
>10,000	0.002	2.835 (1.469–5.472)
Self-efficacy	0.022	2.396 (1.136–5.057)
Social influence	0.023	0.514 (0.289–0.913)
Multidimensional Inventory of Black Identity	0.021	1.656 (1.046–2.622)
Fear of colonoscopy	0.029	0.699 (0.507–0.964)

($P = 0.022$; OR, 2.396) whereby higher self-efficacy increased completion. Social influence also predicted screening colonoscopy adherence (OR, 0.514). For each single unit increase in participants' social influence score, the odds of getting a screening colonoscopy decreased by about 50%. In addition, greater identification with one's ethnic group increased screening colonoscopy adherence ($P = 0.031$; OR, 1.656) by more than 60%. Finally, participants with increased fear of the colonoscopy procedure were less likely to complete by about 70% ($P = 0.029$; OR, 0.699).

Discussion

This study of 350 African Americans randomized to one of three patient navigation groups assessed adherence to screening colonoscopy. Although results from studies of patient navigation programs showed improvement in adherence rates of colorectal cancer screening among minorities (8–10, 48–51), more knowledge about different types of patient navigation programs and their respective influence on promoting colonoscopy completion among African Americans can provide significant guidance for future patient navigation protocols.

The current study investigated a peer-patient navigator who provided a culturally targeted approach and additional insight into one's experience of undergoing a colonoscopy versus a pro-patient navigator who only applied a culturally targeted approach versus a standard-patient navigator who provided basic information and logistical preparations for colonoscopy. Contrary to our hypothesis that using a peer-patient navigator with a culturally targeted approach would be more advantageous in promoting adherence to colonoscopy than other types of patient navigation, our results revealed no significant differences among the three patient navigation interventions. Thus, the use of reference group-based social influence theory to support the inclusion of peer navigators was not borne out to the extent that they were selected on the basis of age and personal history of colonoscopy. However, it is important to note that all navigators were racially concordant with participants and it is possible that race alone as a reference group shared by navigator and patient is important to the navigation experience. In addition, Black identity was predictive of screening completion. Nonetheless, the use of a patient navigation intervention was helpful in promoting adherence to screening colonoscopy as the rate of completion across the three groups was 75.7%, approximately 15% above the national average (52), suggesting that patient navigation is beneficial overall, and suggesting that cognitive-behavioral theory is useful in the conceptualization of colorectal cancer screening navigation programs for African Americans.

Although no statistically significant differences among the three types of navigation were detected, our findings did distinguish participants who completed a colonoscopy versus those who did not. 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 (32, 53). Assessment of intrapersonal factors revealed that statistically significant differences between the completers and noncompleters existed at baseline (time 1) about fear of colonoscopy, ethnic identity, self-efficacy, and cancer worry. However, the clinical relevance of these differences is not known. By time 2, no significant group differences in intrapersonal factors remained. We speculate that the lack of differences in intrapersonal factors between the two groups may be attributable to the patient navigators effectively addressing the participants' questions about colonoscopies and concerns about cancer, thus, removing any intrapersonal factors which could have undermined screening colonoscopy adherence for all of the participants, regardless of patient navigation type.

Logistic regression revealed that higher income was a significant predictor of screening adherence. Income has often been associated with other variables representative of socioeconomic status such as employment, education level, and insurance status. In this sample, more than 60% were unemployed and had less than a high school education. Low income could be related to poor adherence to screening through poor healthcare coverage and access. However, all patients had insurance coverage. Furthermore, approximately 92% had a regular physician. Therefore, the relation of poor income to poor health care coverage and access does not exist in our study. Our findings show that low income may be independently associated with poorer colorectal cancer screening rates by colonoscopy, at least in this urban sample.

Self-efficacy was the second strongest predictor of colonoscopy completion, suggesting that participants with inherent confidence in their ability to get the procedure were more likely to follow through with screening. This is an important finding for future implementation of patient navigation. If patients' degree of self-efficacy can be identified early in the process, patient navigation interventions can focus on increasing low levels of self-efficacy and

patient navigation resources can be appropriately reallocated in cases of inherent high self-efficacy.

Logistic regression unexpectedly revealed that colonoscopy noncompleters were more likely to have had social influence from family or close friends who encouraged colonoscopy. Although controversial, the finding provides potential insight on reasons for not completing. Perhaps those with strong social influence received conflicting information about colonoscopies from close friends and family even though they were supportive of colonoscopies. Another hypothesis could be discrepancy between intrinsic and extrinsic support of colonoscopies among the subjects' family and friends. Perhaps the subjects' family and friends never adhered to colonoscopies but supported them for others. Further investigation of social influence is merited in future studies.

Stronger identification with one's ethnicity was found to independently predict colonoscopy completion. One aspect of the Multidimensional Inventory of Black Identity assessed participants' regard for other African Americans. Our finding may be the result of participants' positive regard and connection to their navigators, as all navigators were racially concordant with participants, suggesting that matching patient navigations to patients by ethnicity may add trust and aid in increasing screening colonoscopy adherence.

Fear of the colonoscopy procedure was also identified by logistic regression as a unique predictor of screening colonoscopy adherence. This finding presents another opportunity for targeted future patient navigation interventions to address this barrier and help patients overcome fear, thus hopefully increasing screening rates.

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. Additional limitations include our entry criteria of a 5-year interval for previous colonoscopy screening (which is the practice in our clinical setting) and relatively low α coefficients (Cronbach's $\alpha < 0.7$) of several assessments of intrapersonal factors. Although a low α coefficient could be caused by heterogeneous dimensionality of the test, a short-length test could also reduce α values and underestimate reliability (54, 55). Our two lowest α coefficients (0.420 for colorectal cancer knowledge, 0.444 for cancer anxiety) had the fewest number of items per test. Future evaluations of similar intrapersonal values are recommended to add more items to test the same concept.

In summary, a large RCT was conducted using three different patient navigation arms to assess potentially different colonoscopy completion outcomes and revealed no differences among the three types of patient navigation. Because the completion rate was more than the average rate of endoscopic screening among African Americans (75.7% vs. 53%; refs. 56), integration of patient navigation services into primary care settings may be useful in promoting screening colonoscopy adherence. Our finding is consistent with results of a systematic review of intervention studies aimed to improve colorectal cancer screening rates: any patient navigation protocol was effective in increasing rates of colorectal cancer screening by 15% (52). The fact that peers can be trained to be effective navigators may have financially beneficial implications to screening programs. As the current study assesses patient navigation protocols among African Americans in an urban community, our findings provide new insight that any type of patient navigation service may be beneficial in facilitating screening colonoscopy adherence in a population overburdened by colorectal cancer mortality.

Disclosure of Potential Conflicts of Interest

S.H. Itzkowitz has commercial research support from Exact Sciences Corporation and is a consultant/advisory board member of the same. No potential conflicts of interest were disclosed by the other authors.

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