ORIGINAL RESEARCH

Barriers and Facilitators of Colorectal Cancer Screening in a Federally Qualified Health Center (FQHC)

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Introduction: Colorectal cancer is a leading cause of cancer-related mortality in the United States. Current screening recommendations for individuals aged 50 to 75 years include colonoscopy every 10 years, flexible sigmoidoscopy every 5 years, or annual stool-based testing. Stool-based testing, including fecal immunochemical tests (FITs), are cost effective, easy to perform at home, and noninvasive, yet many patients fail to return testing kits and go unscreened. The purpose of the study was to identify patient characteristics and perceived barriers and facilitators of FIT return.

Methods: Patients in a large, federally qualified health center who received a FIT kit order between January 1 and July 1, 2017 were identified. We compared sociodemographic and health characteristics between patients who returned and did not return FITs. We used telephone surveys to nonreturners to identify potential barriers (cost, knowledge, psychosocial factors) and facilitators (prepaid postage, outreach) of FIT kit return. An online survey of clinicians assessed perceived patient barriers and facilitators of colorectal cancer screening.

Results: Of the 875 patients who received a FIT order, 435 (49.7%) did not return the kit and 121 of the nonreturners completed a telephone survey. Current smokers had an increased risk of FIT nonreturn compared with never smokers (RR = 1.32; 95% CI, 1.13–1.54). Forgetfulness and lack of motivation were the most common FIT return barriers perceived by both patients and clinicians. Prepaid postage with return address on FIT return envelopes and live call reminders were the most commonly reported facilitators. Barriers and facilitators varied greatest between English- and Spanish-speaking patients.

Conclusion: In this study, the most common perceived barriers to return of screening fecal test kits were forgetfulness and lack of motivation. The most common perceived facilitators were live call reminders and postage-paid return envelopes. Understanding barriers and facilitators to FITs may be necessary to enhance cancer screening rates in underserved patient populations. (J Am Board Fam Med 2019;32:180–190.)

Keywords: Colonoscopy, Colorectal Cancer, Early Detection of Cancer, Motivation, Occult Blood, Primary Health Care, Sigmoidoscopy, Vulnerable Populations

Colorectal cancer is the second most common type of cancer-related death in men and the third most common in women; over 50,000 deaths a year in the United States are attributable to colorectal cancer.[1] Although substantial progress was made over the past 2 decades and colorectal cancer death rates

decreased by 34% among individuals ≥50 years,[1] gains have not been experienced equitably. Colorectal cancer deaths rates among non-Hispanic blacks are presently 40% higher than death rates among non-Hispanic whites, and Hispanics are the least likely race/ethnic group to be screened for colorectal cancer.[1,2]

The United States Preventive Services Task Force (USPSTF) recommends that healthy adults begin colorectal cancer screening at age 50 years and continue until at least age 75 years, at varying intervals depending on the screening test.[3] Screening methods can include direct visualization tests such as colonoscopy every 10 years or flexible sigmoidoscopy every 5 years, or more frequent stool-based tests such as annual guaiac fecal occult blood tests (gFOBTs) or annual fecal immunochemical tests (FITs).[3] Although USPSTF recommendations indicate no preference for colorectal cancer screening method,[3] physicians overwhelmingly prefer to recommend colonoscopies.[4–8] This is particularly problematic for underserved patients because the high cost, intensive time preparation, and invasive nature of colonoscopies are common barriers to participation.[9]

Recent estimates suggest that only 61% of adults age ≥50 years were up to date with colorectal cancer screening in 2015,[10] which falls short of the 70.5% goal of Healthy People 2020 national objectives.[11] Low-income patients, particularly those served by federally qualified health centers, have the lowest colorectal cancer screening rates in the nation. Nationally, only 38.3% of federally qualified health center patients are screened[12] and thus represent a priority population for colorectal cancer prevention. Stool-based tests, such as the FIT, are low cost, noninvasive, and simple, which may be more amenable for hard-to-reach patient populations. Recent work has shown that FIT participation is associated with older age, female sex, and higher socioeconomic status,[13] but considerably less is known about low-income patients. The purpose of the study was to identify patients at a federally qualified health center who received a FIT order, compare patient characteristics between those who returned and did not return the FIT, and describe barriers and potential facilitators of future FIT participation. The secondary purpose of the study was to identify clinician perceptions of patient barriers and facilitators and colorectal cancer screening recommendations.

Methods

Our study was conducted in a large, multi-site federally qualified health center located in central Texas. The Waco Family Health Center provides care for over 58,000 unique patients, or approximately 1 in every 5 county residents, over 90% of whom live at or below 200% of the federal poverty guidelines.[14] One quarter of patients are non-Hispanic black/African American, 40% are Hispanic/Latino, and 30% are non-Hispanic white.[14] Approximately 1 in 6 patients do not have health insurance and are afforded care through a sliding scale discounted fee program that expands coverage to approximately 1 quarter of self-pay patients.[14] In 2016, 165,784 primary medical care encounters were provided by 68 physicians (21 family physicians, 38 resident/fellow family physicians, 2 pediatricians, 3 internists, 4 obstetrician/gynecologists), 14 nurse practitioners, and 5 physician assistants.[14]

From January 1, 2017 to July 1, 2017, 8717 patients aged 50 to 75 years without a history of colon cancer had a clinic visit at the Waco Family Health Center. Of those, 2473 (28%) met USPSTF colorectal cancer screening recommendations by any screening method. The electronic health record system, Epic, was used to query all patient visits during which a FIT order was placed during this time period. The follow-up status of the FIT order was used to define screening adherence. Completed orders included FIT results from home-test kits that were returned for analysis; patients who returned the FIT were defined as screened and adherent to recommendations. Blank orders indicated that patients did not return the FIT kit; patients who had not returned the FIT were defined as nonadherent with USPSTF screening recommendations. In total, there were 1489 FIT orders between January 1 and July 1, 2017. After removing duplicates, patients younger than 50 years, and those with incomplete data, the final analytic sample included 875 nonduplicate patients aged ≥50 years.

In addition to FIT screening completion, patient sociodemographic variables were obtained from the health record. Age in years was categorized as 50 to 59 years, 60 to 69 years, and 70 years or older. Sex was defined as female or male. Race/ethnicity was defined as Hispanic or Latino, non-Hispanic white, non-Hispanic black, or non-His-

panic other. Patient insurance status was described as private insurance, public insurance, or self pay. Private insurance included commercial options (Blue Cross Blue Shield, Humana, United, etc.) and public insurance included Medicare and Medicaid. Self pay included patients without insurance and those covered by the sliding-scale discount fee program, nonprofit organizations, and other regional grant funding that provides subsidized care at the clinic. Body mass index (BMI) and smoking were also included as covariates because of documented associations with colorectal cancer screening.[15,16] BMI was calculated using weight in kilograms (kg) and height in meters (m) from the health record and categorized as underweight or normal (<25 kg/m^2), overweight (≥ 25 and <30 kg/m^2), or obese (≥ 30 kg/m^2). Smoking status was defined as never smoker, former smoker, or current smoker.

Patients who did not return the FIT were contacted via telephone and provided information about participation in a survey in English or in Spanish, based on their language preference. Interviewers followed a script to obtain verbal informed consent from patients, which was approved by the Baylor University Institutional Review Board (IRB Reference #1125461). As part of survey development, potential barriers and facilitators of colorectal cancer screening were identified using empirically supported barriers in the literature as well as those identified by administrators at our health center. Potential barriers included cost,[17] time,[18] poor/confusing instructional materials,[17] transportation to FIT return sites,[19] limited drop-off sites or return site hours of operation (recommended by local clinic administrators), fear of abnormal findings,[17,20] embarrassment,[21] lack of motivation,[21] and forgetfulness.[18] Potential facilitators included a prepaid postage with proper return address[22]; more drop-off sites (recommended by local clinic administrators); reminders by phone, email, text, or mail[19]; better test instructions[23]; additional colorectal cancer screening educational materials[17]; or more time spent with the clinician.[17] Patient participants were asked to respond with *yes*, *no*, or *prefer not to answer* to each barrier and facilitator. In addition, 2 open-ended questions accounted for unidentified barriers and facilitators (eg, *what about the FIT process was difficult for you?*, *what would help you return the FIT in the future?*). All responses were recorded in Microsoft Excel. Patients were called up to 6 times; of the 435 patients who did not return the FIT, 121 (28%) participated in the telephone survey.

Eighty-seven clinicians, including physicians, resident/fellow physicians, physician assistants, and nurse practitioners, were sent an online invitation by an administrator at our health center to complete a survey using Qualtrics software. The clinician survey evaluated perceptions of patient barriers and facilitators related to colorectal cancer screening and their preferred colorectal cancer screening test based on patient's insurance status (colonoscopy, flexible sigmoidoscopy, fecal occult blood tests [FOBT]/FIT, other), adapted from previous literature.[4,24–26] The clinician survey included the same FIT-related barriers and facilitators as the patient telephone survey. Provider preference for colorectal cancer screening test was measured by choosing 1 screening option for insured and 1 option for uninsured patients (colonoscopy, FIT, gFOBT, flexible sigmoidoscopy, patient preference, no preference, none of these). Thirty-one clinicians (36% of the 87 who were invited) participated in the survey.

Statistical analyses were performed using SAS v9.4 (SAS Institute Inc., Cary, NC). Descriptive statistics, including frequencies, means, and proportions, were generated for all study variables in the total sample. χ^2 statistics were used to compare patients who did and did not return FITs. Log-binomial regression was conducted using the GENMOD procedure to estimate risk ratios and corresponding 95% confidence intervals[27] for FIT nonreturn compared with FIT return. Bivariate models estimated the risk of FIT nonreturn for each patient characteristic separately and multivariate models included all covariates in a single model. Finally, frequencies and proportions were used to identify the most common barriers and facilitators to FIT return identified by patients and by clinicians. We compared patient-reported barriers by insurance status, race/ethnicity, and language preference using Fisher's exact test. Statistical significance was 2-sided and defined at the $\alpha = 0.05$ level.

Results

Patients age ≥ 50 years of age who received a FIT order between January 1, 2017 and July 1, 2017 are described in Table 1. Approximately two thirds

Table 1. Patient Characteristics of Total Sample and by FIT Return Status, n = 875

	Total (n = 875)	FIT Return (n = 440)	FIT Non-Return (n = 435)	P
Sex, n (%)				.33
Male	322 (36.8)	155 (35.2)	167 (38.4)	
Female	553 (63.2)	285 (64.8)	268 (61.6)	
Age, n (%)				.19
50 to 59 years	478 (54.6)	227 (51.6)	251 (57.7)	
60 to 69 years	327 (37.4)	176 (40.0)	151 (34.7)	
70 years and older	70 (8.0)	37 (8.4)	33 (7.6)	
Race/Ethnicity, n (%)				**.02**
Hispanic or Latino	392 (44.8)	213 (48.4)	179 (41.2)	
Non-Hispanic white	259 (29.6)	133 (30.2)	126 (29.0)	
Non-Hispanic black	213 (24.3)	91 (20.7)	122 (28.1)	
Non-Hispanic other	11 (1.3)	3 (0.7)	8 (1.8)	
Insurance Status, n (%)				.07
Private	246 (28.1)	131 (29.8)	115 (26.4)	
Public	214 (24.5)	93 (21.1)	121 (27.8)	
Self-pay	415 (47.4)	216 (49.1)	199 (45.8)	
Body mass index, n (%)				.74
Underweight or normal (<25 kg/m^2)	154 (17.6)	75 (17.1)	79 (18.2)	
Overweight (≥25 and <30kg/m^2)	239 (27.3)	125 (28.4)	114 (26.2)	
Obese (≥30 kg/m^2)	482 (55.1)	240 (54.6)	242 (55.6)	
Smoking status, n (%)				**.003**
Never	466 (53.3)	255 (58.0)	211 (48.5)	
Former	215 (24.6)	107 (24.3)	108 (24.8)	
Current	194 (22.2)	78 (17.7)	116 (26.7)	

FIT, fecal immunochemical test.

P values compare participants who returned and did not return FIT. P values were generated from χ^2 tests for categorical variables and bold font indicates statistical significance at the two-sided α = 0.05 level.

(63.2%) were female and the mean [SD] age was 59 [7.11] years. Most patients (n = 392; 44.8%) were Hispanic/Latino, one quarter (n = 213; 24.3%) were non-Hispanic black, and almost one third (n = 259; 29.5%) were non-Hispanic white. Most patients were self payers (n = 415; 47.4%). Mean [SD] BMI was 30.90 [7.76] kg/m^2 and over half (n = 482; 55.1%) were defined as obese. Approximately one quarter were current smokers (n = 194; 22.2%). Patients who returned the FIT (n = 440) were comparable to patients who did not return the FIT (n = 435) in terms of sex, insurance status, and BMI, but nonreturners were more likely to identify as non-Hispanic black and more likely to be current smokers. See Table 1 for more detail.

Patients who identified as non-Hispanic black had a marginally increased risk of FIT nonreturn (RR = 1.18 [95% CI, 0.99, 1.40]) and patients who identified as non-Hispanic other had an increased risk of FIT nonreturn (RR = 1.49 [95% CI, 1.02–2.19]) compared with non-Hispanic white patients.

Patients with public insurance were at increased risk of FIT nonreturn compared with patients with private insurance (RR = 1.21 [95% CI, 1.01–1.44]). Self-payers, including those who paid a discounted fee based on a sliding scale, had a lower risk of FIT nonreturn compared with patients with private insurance (RR = 0.85 [95% CI, 0.73–0.99]). Current smokers were at increased risk of FIT nonreturn compared with never smokers (RR = 1.32 [95% CI, 1.13–1.54]). After adjusting for all patient characteristics in multivariate models, current smokers remained at increased risk for FIT nonreturn (Table 2).

Among patients who did not return the FIT (n = 435), 121 patients participated in a telephone survey. The 121 patients who participated in the survey were less likely to identify as non-Hispanic black but were otherwise similar to patients who did not participate in terms of age, sex, insurance status, BMI, and smoking status (results not shown). The most common barriers to FIT return

Table 2. Bivariate and Multivariate Risk Ratios (RR [95% CI]) to Evaluate the Association Between Patient Characteristics and FIT Non-Return, n = 875

	Bivariate			Multivariate		
	RR	95% CI	*P*	RR	95% CI	*P*
Sex						
Male (Ref)	1.00	—		1.00	—	
Female	0.93	0.82, 1.07	.33	0.95	0.82, 1.09	.43
Age, years						
50 to 59 years	1.11	0.86, 1.45	.42	1.09	0.83, 1.43	.52
60 to 69 years	0.98	0.74, 1.29	.88	0.96	0.73, 1.27	.79
70 years and older (Ref)	1.00	—		1.00	—	
Race/ethnicity						
Hispanic or Latino	0.94	0.80, 1.11	.45	1.01	0.84, 1.20	.94
Non-Hispanic white (Ref)	1.00	—		1.00	—	
Non-Hispanic black	1.18	0.99, 1.40	.06	1.16	0.98, 1.38	.08
Non-Hispanic other	1.49	1.02, 2.19	**.04**	1.23	0.85, 1.80	.26
Insurance status						
Private (Ref)	1.00	—		1.00	—	
Public	1.21	1.01, 1.44	**.04**	1.01	0.85, 1.19	.95
Self-pay	0.85	0.73, 0.99	**.04**	1.13	0.94, 1.35	.18
Body mass index						
Underweight or normal (Ref)	1.00	—		1.00	—	
Overweight	0.93	0.76, 1.14	.48	0.97	0.79, 1.19	.79
Obese	0.98	0.82, 1.17	.81	1.03	0.86, 1.24	.71
Smoking						
Never (Ref)	1.00	—		1.00	—	
Former	1.11	0.94, 1.31	.22	1.06	0.89, 1.26	.50
Current	1.32	1.13, 1.54	**<.001**	1.26	1.07, 1.48	**.01**

CI, confidence interval; FIT, fecal immunochemical test; RR, risk ratio.
Bivariate and multivariate log-binomial regression models the risk of FIT non-return. Multivariate model includes all variables in the table. Risk ratios greater than one indicate the patient characteristic is a risk factor for failing to return the FIT and risk ratios less than one indicate a beneficial characteristic for FIT return. Bold font indicates statistical significance at the two-sided $\alpha = 0.05$ level.

reported by patients were forgetfulness (61%), lack of motivation (51%), and fear of embarrassment (31%). Clinicians perceived the most common patient barriers to FIT return were lack of motivation (81%), forgetfulness (61%), fear of embarrassment (55%), and FIT instructions (55%). Patients reported that prepaid postage with return address on FIT return envelopes (77%), live call reminders (73%), and reminders by text message (60%) would be helpful to FIT return. Clinicians reported that prepaid postage envelopes with return address (71%), live call reminders (52%), and better FIT instructions (45%) would be helpful to increase patient FIT return (Table 3).

We compared FIT barriers and facilitators by insurance status, race/ethnicity, and language preference. Patients who participated in the telephone survey (n = 121) were privately insured (n = 30;

25%), publicly insured (n = 26; 21%), or self payers (n = 65; 54%). There were no statistically significant differences in barriers and facilitators between insurance groups, with the exception of live call reminders to facilitate FIT return: 23 patients with private insurance (77% of the 30 patients with private insurance), 13 patients with public insurance (50% of the 26 patients with public insurance), and 52 self payers (80% of the 65 self-pay patients; *P* = .03 across groups) preferred live call reminders. Patients who participated in the telephone survey were Hispanic/Latino (n = 48; 40% of the 121 telephone participants), non-Hispanic black (n = 28; 23% of the 121 telephone participants), and non-Hispanic white (n = 45; 37% of the 121 telephone participants); there were 94 (78% of the 121 telephone participants) English speakers and 27 (22% of the 121 telephone partic-

Table 3. Barriers and Facilitators of FIT Return for Patients and Clinicians

	Patients, n (%) (n = 121)	Clinicians, n (%) (n = 31)
Barriers		
Cost of test	22 (18)	3 (10)
Poor/confusing test instructions	33 (27)	17 (55)
Transportation to return site	23 (19)	13 (42)
Time to complete test	26 (21)	1 (3)
Limited return sites	13 (11)	0 (0)
Return site hours of operation	3 (2)	2 (6)
Fear of abnormal findings	24 (20)	7 (23)
Fear of embarrassment	38 (31)	17 (55)
Lack of motivation	62 (51)	25 (81)
Forgetfulness	74 (61)	19 (61)
Facilitators		
Pre-paid postage w/ return address	93 (77)	22 (71)
More drop-off sites	63 (52)	6 (19)
Live call reminders	88 (73)	16 (52)
Text message reminders	72 (60)	8 (26)
Email reminders	34 (28)	11 (35)
Mailed reminders	51 (42)	4 (13)
Better test instructions	33 (27)	14 (45)
More educational materials	64 (53)	4 (13)
More time with clinician	61 (50)	9 (29)
Automatic messaging by EPIC	n/a	4 (13)

FIT, fecal immunochemical test.
Patients self-reported barriers and facilitators by telephone survey and clinicians reported perceived patient barriers and facilitators by online survey. Both patients and clinicians could select as many barriers and facilitators as they deemed appropriate.

ipants) Spanish speakers. Race/ethnicity and language preference demonstrated similar patterns of FIT return barriers and facilitators (Tables 4 and 5). Of note, Hispanic/Latino patients and Spanish-speaking patients were more likely to report test instructions as a barrier to the FIT, and more likely to report better test instructions, more educational materials, and more time with their clinician as FIT facilitators (Table 4 and Table 5).

Finally, we identified clinician-preferred colorectal cancer screening methods. Almost all (n = 30; 97% of the 31 participating) clinicians reported they would recommend a colonoscopy for insured patients, and 21 (68% of the 31 participating) clinicians would recommend stool-based tests (FITs and gFOBTs) for uninsured patients.

Discussion

Multiple studies have identified the importance of a physician recommendation for colorectal cancer screening.[28,29] The purpose of our study was to compare, subsequent to a clinician recommenda-

tion, patients at a federally qualified health center who did and did not participate in FIT for colorectal cancer screening. In our 6-month study of a large, racially/ethnically diverse clinic population, 875 patients received orders for FITs and the return rate was approximately 50%. Patients who were current smokers were at increased risk for failure to return the FIT, but there were no differences between returners and nonreturners in terms of sex, race/ethnicity, insurance status, and BMI. Our findings regarding poor screening adherence among current smokers is consistent with other work.[16,30] A growing body of evidence suggests that cancer screening settings may be a "teachable moment" for multiple lifestyle interventions, including increasing physical activity and healthy diet, alcohol consumption reduction, and smoking cessation.[31,32] Our findings regarding smoking may be particularly useful for primary care providers to identify and maximize person-centered clinical care opportunities and use strategies such as motivational interviewing to support patients with dual

Table 4. Reported Barriers and Facilitators of FIT Return by Patient Race/Ethnicity

	Hispanic or Latino, n (%) (n = 48)	Non-Hispanic Black, n (%) (n = 28)	Non-Hispanic White, n (%) (n = 45)	P
Barriers				
Cost of test	6 (13)	6 (21)	10 (22)	.39
Poor/confusing test instructions	26 (54)	4 (14)	3 (7)	**<.001**
Transportation to return site	12 (25)	4 (14)	7 (16)	.42
Time to complete test	11 (23)	6 (21)	9 (20)	.96
Limited return sites	3 (6)	2 (7)	8 (18)	.18
Return site hours of operation	1 (2)	0 (0)	2 (4)	.61
Fear of abnormal findings	10 (21)	7 (25)	7 (16)	.56
Fear of embarrassment	27 (56)	5 (18)	6 (13)	**<.001**
Lack of motivation	32 (67)	14 (50)	16 (36)	**.03**
Forgetfulness	35 (73)	19 (68)	20 (44)	**.02**
Facilitators				
Pre-paid postage w/ return address	40 (83)	16 (57)	37 (82)	**.05**
More drop-off sites	31 (65)	16 (57)	16 (36)	**.02**
Live call reminders	40 (83)	19 (68)	29 (64)	.13
Text message reminders	29 (60)	17 (61)	26 (58)	.84
Email reminders	12 (25)	9 (32)	13 (29)	.57
Mailed reminders	23 (48)	12 (43)	16 (36)	.49
Better test instructions	26 (54)	4 (14)	3 (7)	**<.001**
More educational materials	36 (75)	14 (50)	14 (31)	**<.001**
More time with clinician	34 (71)	13 (46)	14 (31)	**<.001**

FIT, fecal immunochemical test.
P values generated from χ^2 tests. Bold font indicates statistical significance at the two-sided α = 0.05 level.

lifestyle changes regarding smoking and cancer screening.

The Health Belief Model is a commonly used framework to explain cancer screening behavior and posits that education and knowledge may modify the pathway between individual perceptions (eg, perceived susceptibility of the disease) and behavior.[33] The clinician plays a key role in patient behavior through advising, communicating, and educating the patient. Clinician-patient interactions regarding preventive services should follow the 5A's: assess, advise, agree, assist, and arrange.[34] In our study, most clinicians reported they would advise insured patients to receive a colonoscopy and uninsured patients to receive stool-based screening tests. Physician preferences for colonoscopies have been noted throughout the literature,[4–8] but the USPSTF equally endorses multiple colorectal cancer screening options. Education for the patient on the benefits, harms, and alternatives for each colorectal cancer screening modality may engage patients in the shared decision making process and increase screening adherence, particularly for race/ethnic minority patients.[33]

Recent evidence suggests that colorectal cancer mortality has increased since 2005 among those aged 40 to 54 years,[35] and in May 2018, the American Cancer Society expanded its colorectal cancer screening recommendations to begin screening at 45 years of age.[36] In our study of patients aged ≥50 years, younger individuals appeared to be at a marginally increased risk of FIT return failure, and although results were not statistically significant, this is consistent with other recent work[13] and troubling in light of trend data. In our study, we did not observe differences in patient-reported barriers or facilitators of FIT return between age strata (results not shown). More work is needed to understand why younger individuals in the United States are less likely to be screened and to develop strategies to increase motivation to be screened, which we noted as a common barrier to colorectal cancer screening in all ages. Large-scale education efforts at the societal level may be needed to educate the public to increase colorectal cancer screening motivation among midlife adults in their fifth (40 to 49 years) and sixth (50 to 59 years) decades of life.

Table 5. Reported Barriers and Facilitators of FIT Return by Patient Language

	Spanish, n (%) (n = 27)	English, n (%) (n = 94)	P
Barriers			
Cost of test	4 (15)	18 (19)	.78
Poor/confusing test instructions	22 (81)	11 (12)	**<.001**
Transportation to return site	8 (30)	15 (16)	.16
Time to complete test	9 (33)	17 (18)	.12
Limited return sites	1 (4)	12 (13)	.29
Return site hours of operation	0 (0)	3 (3)	.99
Fear of abnormal findings	5 (19)	19 (20)	.79
Fear of embarrassment	22 (81)	16 (17)	**<.001**
Lack of motivation	26 (96)	36 (38)	**<.001**
Forgetfulness	26 (96)	48 (51)	**<.001**
Facilitators, n (%)			
Pre-paid postage w/ return address	26 (96)	67 (71)	**<.001**
More drop-off sites	23 (85)	40 (43)	**<.001**
Live call reminders	26 (96)	62 (66)	**<.001**
Text message reminders	17 (63)	55 (59)	.82
Email reminders	3 (11)	31 (33)	.06
Mailed reminders	11 (41)	40 (43)	.99
Better test instructions	22 (81)	11 (12)	**<.001**
More educational materials	26 (96)	38 (40)	**<.001**
More time with clinician	23 (85)	38 (40)	**<.001**

FIT, fecal immunochemical test.
P values generated from χ^2 tests. Bold font indicates statistical significance at the two-sided $\alpha = 0.05$ level.

Among those who did not return the FIT, patients reported that prepaid postage with return addresses on the FIT kit return envelope and live call reminders would facilitate FIT kit return. These facilitators were similar for all race/ethnic groups. Hispanic/Latino patients, and Spanish speakers in particular, were more likely to indicate that better test instructions, more educational materials, and more time with the clinician during their clinic visit would facilitate FIT return. In our study, although there were no race/ethnic differences in FIT return in the multivariate models, Hispanic/Latino patients were significantly more likely to report poor/confusing test instructions and fear of embarrassment as barriers to FIT screening. This is concordant with recent qualitative work among Hispanic/Latino patients by Leal et al,[37] who noted beliefs about illness and health, and reactions to illness such as embarrassment and fear, were major themes that limited the early detection and treatment of colorectal cancer among lower-income, minority patients. Several studies have also noted the use of bilingual community health workers, or *promotoras de salud*, in colorectal cancer screening interventions.[38] *Promotoras* are generally trained community members that connect community members to research or formal institutions through culturally targeted interventions.[39] The large disparities we noted in our study between English-speaking patients and Spanish-speaking patients may represent an opportunity to tailor patient care with bilingual community health workers or patient navigators in the future.

There are several limitations of our study. Approximately one quarter of patients (n = 121; 28% of the 435 nonreturners) who did not return the FIT participated in a telephone interview. In our patient population, many patients had inaccurate or out of service telephone numbers in their medical records, despite clinic protocol focused on updating this information at every clinical encounter. Although our response rate was lower than desired, the Pew Research Center has reported that response rates for telephone surveys have plateaued at approximately 9%, roughly 25 percentage points less than in 1997.[40] Selection bias may have occurred, such that survey participants may have differed from nonparticipants. Indeed, patient partic-

ipants who completed the telephone survey in our study were less likely to be non-Hispanic black, but nonreturners who participated in the telephone survey were otherwise similar to nonreturners who did not participate in the telephone survey in terms of age, sex, insurance status, BMI, and smoking status. Future work should consider multiple survey modalities to increase participation. Although the telephone survey was confidential, some patients may have felt uncomfortable with the personal nature of the questions and thus underreported or misreported true barriers. For example, we did not have any patients report disgust by the idea of handling stool, but another study reported that approximately 20% of 82 patients who did not complete FIT testing reported disgust.[21] In addition, we did not collect information about possible clinical presentations that may have initiated a FIT or other colorectal examination. Although we excluded patients younger than 50 years of age to mitigate FIT workups for reasons other than general screening, it is possible that some patients may have presented with clinically relevant signs or have been ineligible for other screening methods. Finally, during the telephone survey, several patients whose medical records showed a FIT order stated that they did not receive a kit to take home, which may have slightly underestimated the FIT return rate in our clinic.

Nevertheless, findings from this research study benefited patient care in our clinic by identifying procedural glitches that were easily addressed and increased the overall screening rate from 28% to 35% within 6 months. For example, some clinicians were unaware that patients could return FIT kits via mail, so we created a brief physician training to increase clinician awareness and improve the assist/arrange phase of preventive care decision making between health care providers and patients. In addition, a review of clinic procedure following this study found that many providers relied on Spanish-speaking staff to orally dictate FIT instructions at the clinic visit, which may be the reason that that many Hispanic/Latino patients did not feel informed about test instructions. While Spanish-language test instructions have been available, many clinicians and nurses were unsure of where to locate them. Currently, we are working with our information technology team to auto-populate Spanish language instructions in the electronic medical record check-out paperwork whenever the patient's primary language is marked as Spanish. Strategies such as leveraging health information technology, optimizing team work, education to both patients and clinicians, use of patient navigators, and interactive workshops for clinician training have been shown to increase colorectal cancer screening in other primary care settings.[41]

Conclusion

The prevention of colorectal cancer in low-income, minority patient populations is multifaceted. Racial/ethnic minorities and Spanish speakers experience significant barriers to FIT return compared with their English-speaking, non-Hispanic white counterparts. Tailored interventions may maximize FIT return and increase colorectal cancer screening rates in resource-limited community health centers across the nation. Understanding patient and clinician perspectives for colorectal cancer screening may be an important step to increase screening rates and thereby identify early-stage cancer. Bilingual community health workers may increase screening rates by serving as patient navigators, providing live call reminders to patients, and mitigating psychosocial factors such as fear and embarrassment with culturally appropriate interventions. Disseminating accurate information to clinicians may increase awareness about colorectal cancer screening modalities and clinic-specific screening workflow processes. Given recent data about colorectal cancer incidence and mortality for race/ethnic minority groups and adults aged 40 to 54 years, these tailored education and intervention efforts for both clinicians and patients may increase cancer screening adherence among adults across the life course.

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