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Literacy Barriers to Colorectal Cancer Screening in Community Clinics

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Abstract

This article examines the relationship between literacy and colorectal cancer (CRC) screening knowledge, beliefs, and experiences, with a focus on fecal occult blood tests (FOBTs). Participants were 975 patients in 8 Louisiana federally qualified health centers. Participants were 50 years of age or older and not up to date with CRC screening; approximately half (52%) had low literacy (less than a 9th-grade level). Participants with low literacy were less likely than were those with adequate literacy to be aware of advertisements promoting CRC screening (58.7% vs. 76.3%, $p < .0001$) or to believe it was very helpful to find CRC early (74.5% vs. 91.9%, $p < .0001$). The majority of participants had positive beliefs about the benefits of CRC screening using FOBTs. Participants with low literacy had more perceived barriers to FOBT completion and were more likely to strongly agree or agree that FOBTs would be confusing, embarrassing, or a lot of trouble; however, none of these remained significant in multivariate analyses controlling for

relevant covariates. Confidence in being able to obtain an FOBT kit was high among those with low and adequate literacy (89.8% vs. 93.1%, respectively, $p = .20$); yet multivariate analyses revealed a significant difference in regard to literacy ($p = .04$) with low-literacy participants indicating less confidence. There was no significant difference by literacy in ever receiving a physician recommendation for CRC screening (38.4% low vs. 39.0% adequate, $p = .79$); however, multivariate analyses revealed significant differences in FOBT completion by literacy ($p = .036$). Overall, findings suggest that literacy is a factor in patients' CRC knowledge, beliefs, and confidence in obtaining a FOBT.

Colorectal cancer (CRC), the third most commonly occurring cancer in the United States and the second leading cause of cancer deaths, is preventable and highly curable when found in its early, localized stage (American Cancer Society, 2011). Despite the benefits of early detection, almost 40% of American adults are not up to date with CRC screening (Centers for Disease Control and Prevention, 2011a). Screening rates remain persistently low among low-income individuals, those with Medicaid or no health insurance, adults with fewer years of education, racial/ethnic minorities, and those living in rural areas (American Cancer Society, 2011; Centers for Disease Control and Prevention, 2011b). The 2011 National Health Disparities Report (Centers for Disease Control and Prevention, 2011) calls for urgent efforts to reduce disparities in cancer screening among these disadvantaged groups. To achieve this objective, CRC screening must be promoted in a culturally appropriate manner, taking into account the unique circumstances and barriers faced by vulnerable populations (Taplin et al., 2008).

Low health literacy may be a contributing factor to disparities in CRC screening and, ultimately, cancer-related outcomes. Unique health literacy challenges to CRC screening include patients' ability to adequately understand and independently act on multistep instructions to complete a fecal occult blood test (FOBT) or to prepare for colonoscopy. Current instructions for these tests are often unnecessarily complicated (Vernon & Meissner, 2008). Although the evidence is limited, a few CRC studies have linked low literacy to less knowledge, more negative attitudes and poorer understanding of screening benefits, and lower self-efficacy to completing cancer screening (Berkman et al., 2011; Cho, Lee, Arozullah, & Crittenden, 2008; Dolan et al., 2004; Guerra, Dominguez, & Shea, 2005; Miller, Brownlee, McCoy, & Pignone, 2007; Peterson, Dwyer, Mulvaney, Dietrich, & Rothman, 2007; White, Chen, & Atchison, 2008). Findings are mixed as to whether individuals with low literacy are less likely to complete CRC screening (Cho et al., 2008; Dolan et al., 2004; Peterson et al., 2007; White et al., 2008). Only a few studies (Dolan et al., 2004; Peterson et al., 2007; von Wagner, Semmler, Good, & Wardle, 2009) have looked specifically at literacy barriers to completion of FOBTs, which is the most feasible CRC screening method for vulnerable populations because of cost and health insurance concerns.

The purpose of this article was to examine the relationship between literacy and CRC screening knowledge, awareness, and experiences, as well as the relationship between literacy and FOBT beliefs, barriers, and self-efficacy, and to examine the relationship between literacy and CRC screening experiences among patients at federally qualified health centers (FQHCs). This study specifically targeted patients in inner-city and rural safety-net clinics because these individuals are less likely to complete CRC screening and are therefore more likely to be affected by colorectal cancer. Results may be used to help tailor interventions to improve CRC screening among disadvantaged populations.

Methods

Study Design and Sites

We conducted a randomized clinical trial, sponsored by the National Cancer Institute (R01-CA115869), of 975 patients in FQHCs to test the effectiveness of three distinct strategies to improve initial and repeat CRC screening. FQHCs, also known as community health centers, are government-supported clinics that are required to provide services to patients regardless of insurance status. In North Louisiana, a large majority of the patients served by these FQHCs have no private health insurance, are from racial/ethnic minority groups, and are living at or below the poverty level. This article focuses on baseline data collected as part of this trial, before any intervention activities took place. Eight FQHCs across seven parishes in North Louisiana served as study sites. The FQHCs were invited to participate in the study because of their high patient volume.

Recruitment and Study Population

Participant enrollment took place between August 2008 and August 2011. To recruit participants, a nurse's aide at each clinic approached eligible participants to see if they would be willing to talk to a research assistant about participating in a cancer screening study. Participants who agreed were then screened for eligibility by the research assistant in a private room in the clinic. Participants were eligible if they (a) were 50 years of age or older, (b) were able to read and understand English, (c) were enrolled as a patient in a study clinic, (d) did not have a previous history of cancer other than melanoma or other skin cancer, (e) were not up to date with U.S. Preventive Services Task Force (U.S. Department of Health and Human Services, 2008) CRC screening recommendations (i.e., FOBT every year, flexible sigmoidoscopy every 5 years, or colonoscopy every 10 years), and (f) did not have any severe impairment or illness that precluded their participation. Eligible participants gave consent, signed a simplified consent form, and then were asked basic demographic questions and given a structured survey. Literacy was assessed using the Rapid Estimate of Adult Literacy in Medicine (Davis et al., 1993). Low health literacy was defined as having a literacy level of eighth grade or below (Rapid Estimate of Adult Literacy in Medicine score ≤ 60) and adequate literacy as having a literacy level of ninth grade or above (Rapid Estimate of Adult Literacy in Medicine score ≥ 61). Participants were given US \$10 to compensate for time taken to complete the survey. The Louisiana State University Health Sciences Center–Shreveport Institutional Review Board approved the study procedures.

Structured Survey

The baseline study interview included demographic and basic health status questions as well as 46 CRC and CRC screening related questions designed using the health belief model and social cognitive theory (Bandura, 2004; Rosenstock, Stretcher, & Becker, 1988). These questions came from validated questionnaires used in previous studies by the authors (Dolan et al., 2004; Wolf et al., 2005). Items assessed participants' CRC awareness, knowledge, beliefs about susceptibility of CRC, as well as benefits, perceived barriers, and self-efficacy for FOBT completion and whether participants had received CRC screening information, education or a recommendation from a physician or completed screening.

Statistical Analysis

Descriptive statistics were calculated for all variables, and differences by literacy level—low (<9th grade) or adequate (≥ 9 th grade)—were examined using the chi-square test for univariate analyses. In multivariate analyses, logistic regression (for dichotomous measures) or complementary log-log logistic regression for Likert scale measures were used to determine the relation between a measure and literacy level (low or adequate), adjusting for

age, gender, race, and location. For beliefs, self-efficacy and barrier measures, multivariate analyses combined the categories to be either very worried+somewhat worried, not worried +not worried at all, don't know, or strongly agree+agree, strongly disagree+disagree, don't know. Multivariate p values are reported only for variables where the multivariate analysis showed a significant difference between low and adequate literacy groups. Statistical significance was indicated when $p < .05$ and no adjustment for multiple testing was made, because actual p values are reported.

Results

We identified 1,008 participants as eligible to participate; of these, 33 refused (3.3%) and 975 were enrolled in the study, for a response rate of 96.7%. Subjects ranged in age from 50 to 89 years, with a median age of 57 years; 77% were female; 33% lacked a high school diploma; and 52% had low literacy. The majority of participants were African American (67%). Men were significantly more prevalent in the low literacy group compared with the adequate literacy group (28.6% vs. 16.4%, $p < .0001$) as were African Americans (82.5% vs. 51.0%, $p < .0001$), and participants living in urban areas (33.4% vs. 22.4%, $p < .0001$; see Table 1).

Knowledge and Awareness

The majority of participants (96.2%) had heard of CRC (Table 2). Participants with low literacy were less likely than those with adequate literacy to have ever seen or heard advertisement that encouraged CRC screening (58.7% vs. 76.3%, $p < .0001$) or to think it was very helpful to find CRC early (74.5% vs. 91.9% $p < .0001$). They were also significantly less likely to report they knew someone who has had CRC (40.9% vs. 57.1%, $p < .0001$). Participants with low literacy were less likely to have heard of any tests to find CRC (46.9% vs. 66.2%, $p < .0001$). Of participants who could name a test, those with low literacy were more likely than were participants with adequate literacy to name an FOBT (50.9% vs. 34.2%, $p < .0001$) while participants with adequate literacy were more likely to name a colonoscopy (92.8% vs. 76.6%, $p < .0001$).

In multivariate analysis controlling for age, race, gender, and location (rural/ urban), differences between participants with low literacy and those with adequate literacy were significant in awareness of advertisements for CRC ($p < .0001$), knowing that it is very helpful to find CRC early ($p < .0001$) and for the type of CRC test named ($p = .0018$ for FOBT, $p = .0007$ for colonoscopy, and $p = .0035$ for sigmoidoscopy).

Beliefs

Overall, the majority of participants stated they would want to know whether they had CRC; however, those with low literacy were less likely to want to know (88.0% vs. 92.8%, $p = .022$, Table 3). Few participants felt strongly that they were susceptible to CRC, but more than one in four agreed that they would get CRC sometime in their life. In addition, 22% indicated that they were “very or somewhat worried” about finding out they had CRC if they were screened. In multivariate analysis adjusting for age, race, gender, and location, literacy differences were not significant for participants being more likely to want to know whether they had CRC, believing they would get CRC sometime in their life or for being more likely to report they were worried they might find out they had CRC.

The majority of participants had positive beliefs about the benefits of CRC screening using FOBT (Table 3). Participants with low literacy were less likely to strongly agree/agree that FOBT will help find colon and rectal problems early (93.5% vs. 98.1%, $p = .0027$). This remained significant in multivariate analysis. Participants with low literacy were also less

likely to strongly agree/agree that having an FOBT would decrease their chances of dying from CRC (77.1% vs. 83.7%, $p = .0156$). This difference remained significant in multivariate analysis after adjusting for age, race, gender, and location ($p = .015$).

Self-Efficacy

Overall self-efficacy in both groups was high (Table 4). There was no significant difference by literacy in confidence of being able to obtain an FOBT kit (89.8% low vs. 93.1% adequate, $p = .20$); however, multivariate analyses revealed significant differences in belief of ability to obtain a kit ($p = .04$) with participants with low literacy indicating less confidence.

Barriers

Although participants with low literacy were more likely to report barriers to completing FOBT than were their adequate literate counterparts, few individuals in either group anticipated barriers to screening (Table 5). Participants with low literacy had more perceived barriers to FOBT completion as they were more likely to strongly agree/agree that FOBTs would be confusing (12.0% vs. 5.3%, $p < .0001$), embarrassing (16.6% vs. 8.5%, $p < .0001$) or a lot of trouble (9.9% vs. 6.1%, $p = .0031$); however, none of these results remained significant in multivariate analyses controlling for relevant covariates.

Screening Experience

Physician recommendation for CRC screening was low overall with just over one third of participants having ever received a recommendation (Table 6). There was no significant difference by literacy with regard to having received a physician CRC screening recommendation. However, when those who stated they had received a recommendation were asked what specific test (or tests) their physician recommended, there was a significant difference by literacy. Compared with participants with adequate literacy, those with low literacy reported receiving a recommendation for an FOBT (52.2% vs. 30.0%) and less for a colonoscopy (28.3% vs. 44.7%, $p < .001$). There was no significant difference by literacy in regard to a physician having ever having given participants an FOBT kit or their ever having completed an FOBT. Education on FOBTs among all participants was also limited, with participants with low literacy being less likely to report having received FOBT information (16.2% vs. 22.4%, $p = .013$).

In multivariate analysis, adjusting for age, race, gender, and location, there was no significant difference between participants with low literacy and those with adequate literacy with regards to having been given an FOBT kit or to having received a physician recommendation. However, after controlling for relevant covariates, there was a significant difference for previous completion of a FOBT ($p = .036$), with participants with low literacy being less likely to report having completed the test.

Discussion

In our study of FQHC patients who were not up to date with CRC screening, almost all had heard of CRC. The majority reported positive beliefs about CRC screening and had a desire to know if they had CRC. Despite participants' receptivity to CRC screening, only about one third had ever received a physician recommendation and this did not vary by literacy. Participants with low literacy were less likely to report barriers to FOBT completion, yet after controlling for relevant covariates in multivariate analyses, there was no significant difference in perceived barriers. Despite this, multivariate analyses revealed that participants with low literacy still were significantly less likely to have completed an FOBT.

Basic knowledge about CRC and screening was significantly lower among participants with low literacy. Our finding that participants with low literacy were significantly less likely to be able to name tests to find CRC, believe it was helpful to find CRC early, and to have ever seen or heard advertisement encouraging CRC screening is consistent with other studies (Dolan et al., 2004; Miller et al., 2007; Peterson et al., 2007). However, unlike Guerra and colleagues (2005), literacy remained a significant predictor of knowledge in our multivariate analyses controlling for relevant covariates.

More than a quarter of our participants thought they would develop CRC in their lifetime, which is consistent with rates reported by Dolan and colleagues (2004). However, our finding that literacy is not an independent predictor of safety-net patients' belief they are susceptible to CRC is supported and contradicted in the literature. In studying community clinic patients, Guerra (2005) and Peterson (2007) found literacy did not predict patients' beliefs about susceptibility to CRC. However, other studies in community clinics and national surveys (Cho et al., 2008; Dolan et al., 2004; Miller et al., 2007; von Wagner et al., 2009; White et al., 2008) found lower literacy was linked to heightened belief in CRC susceptibility. Further examination of this issue and how it relates to health literacy and screening rates is warranted.

In our study, participants' beliefs about completing FOBT varied by literacy. Those with lower literacy were less likely to believe an FOBT will help find CRC or decrease their chance of dying from CRC. Although it is not known why participants with lower literacy have less positive beliefs about FOBTs, it may be related to the fact that they are less likely to recall being given information about FOBTs. As in previous studies (Dolan et al., 2004; Peterson et al., 2007; von Wagner et al., 2009), we found safety-net clinic patients with lower literacy were more likely to report barriers to understanding FOBT instructions on completing a FOBT kit. However, in multivariate analyses after controlling for relevant covariates only the ability to obtain a FOBT kit remained significant as a barrier.

Only slightly over a third of all participants in this study reported ever receiving a physician recommendation for CRC screening and fewer recalled being given an FOBT kit. These services did not vary by literacy. Our findings of limited physician recommendation and education for FOBTs are consistent with previous studies (Holmes-Rovner et al., 2002; Lasser et al., 2008; O'Malley, Beaton, Yabroff, Abramson, & Mandelblatt, 2004). Lack of information and access to FOBTs is particularly concerning with FQHC patients who are likely to lack insurance or income to pay for other CRC screening methods. In another report from the present study, we found our FQHC patients who reported ever receiving a recommendation for CRC screening, education on FOBTs or being given an FOBT kit by a physician significantly more likely to have ever completed an FOBT. However, the service that had the greatest effect on FOBT completion was the physician actually giving the FOBT kit to the patient (Davis et al., 2012).

In our study, literacy was a significant, independent predictor of completing CRC screening in multivariate analyses. This is consistent with White and colleagues' (2008) results, which used the National Health Literacy Survey Database and found that adults older than 65 years of age with basic and below literacy were less likely to report being screened for CRC. Dolan and colleagues (2004) and Cho and colleagues (2008) also found that safety-net clinic patients with low literacy were less likely to report completing CRC screening. However, Peterson and colleagues' (2007) study in a community clinic did not find literacy to be a factor. Our findings and the mixed results in the literature do not provide a clear indication that patients' literacy is a factor in CRC screening completion. It is possible the data may be confounded by patients with low literacy not being as reliable in self-report of screening.

This study has several limitations. The majority of participants were female and African American; however, this is representative of FQHC populations. FQHCs in this study were located in one state, and all patients spoke English. Therefore, results may not be generalized to FQHCs serving other language speaking and minority patients in other states. Data on previous CRC education, physician recommendation, and FOBT completion were self-reported and not confirmed with chart review. However, most CRC studies use self-report data for CRC screening (Cho et al., 2008; Dolan et al., 2004; Peterson et al., 2007; von Wagner et al., 2009; White et al., 2008).

Although the majority of participants in our study had heard about CRC and had positive beliefs about the benefit of CRC screening, basic knowledge about CRC and screening, as well as self-efficacy in obtaining an FOBT kit and actually completing a FOBT was significantly lower among participants with low literacy. This may be due in part to the unique health literacy challenges to CRC screening, which include patients' ability to adequately understand and independently act on FOBT instructions that are unnecessarily complicated. These findings indicate a need for simplified, illustrated step-by-step FOBT instructions, as well as literacy and culturally appropriate education on CRC in safety-net clinics. Plain language and easy to follow instructions may enhance patients' knowledge, self-efficacy and ability to independently use FOBT kits at home. Brief counseling by clinic staff using health literacy techniques such as teach back and demonstrating use of the kit, as well as giving patients an FOBT kit, may further encourage patients to complete screening. More research is needed to identify practical, low cost, health literacy interventions to promote CRC screening in community clinics that provide primary care for low-income uninsured individuals who are least likely to be screened and subsequently bear greater disease burden.

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Table 1

Demographics, by literacy level

Variable	Low literacy (n = 506)	Adequate literacy (n = 469)	Total (n = 975)
Gender ($p < .0001$)			
Female	359 (71.4%)	392 (83.6%)	751 (77.1%)
Male	144 (28.6%)	77 (16.4%)	221 (22.9%)
Race ($p < .0001$)			
African American	415 (82.5%)	239 (51.0%)	654 (67.3%)
White	86 (17.1%)	229 (48.8%)	315 (32.4%)
Hispanic	2 (0.4%)	1 (0.2%)	3 (0.3%)
Age ($p < .0001$)			
50–59 years	297 (58.7%)	323 (68.9%)	620 (63.6%)
60–69 years	144 (28.5%)	123 (26.2%)	267 (27.3%)
70+ years	65 (13.0%)	23 (4.9%)	88 (9.1%)
Marital status ($p < .0001$)			
Single	166 (33.0%)	116 (24.7%)	282 (29.1%)
Married	140 (27.8%)	193 (41.2%)	333 (34.3%)
Separated	34 (6.8%)	32 (6.8%)	66 (6.7%)
Divorced	81 (16.1%)	76 (16.2%)	157 (16.1%)
Widowed	82 (16.3%)	52 (11.1%)	134 (13.8%)
Last grade completed ($p < .0001$)			
Less than high school	226 (45.0%)	92 (19.6%)	318 (32.7%)
High school graduate	210 (41.8%)	229 (48.8%)	439 (45.3%)
Some college	52 (10.7%)	107 (22.8%)	161 (16.4%)
College grad and above	13 (2.6%)	41 (8.7%)	54 (5.6%)
Location ($p < .0001$)			
Rural	337 (66.6%)	364 (77.6%)	701 (72.0%)
Urban	169 (33.4%)	105 (22.4%)	274 (28.0%)

Note. Univariate ps in parentheses were obtained using a chi-square test.

Table 2

Knowledge and awareness, by literacy level

Variable	Low literacy, <i>n</i> (%)	Adequate literacy, <i>n</i> (%)
Have you ever heard of CRC? (<i>p</i> = .49)		
Yes	462 (95.7%)	443 (96.5%)
No	21 (4.4%)	16 (3.5%)
Do you know anyone who has had CRC? (<i>p</i> < .0001, multivariate <i>p</i> < .0001)		
Yes	197 (40.9%)	262 (57.1%)
No	275 (57.1%)	194 (42.3%)
Don't know	10 (1.9%)	3 (0.7%)
Have you ever heard of any tests to find CRC? (<i>p</i> < .0001, multivariate <i>p</i> = .0016)		
Yes	226 (46.9%)	304 (66.2%)
No	245 (50.8%)	148 (32.2%)
Don't know	11 (2.3%)	7 (1.5%)
If yes, which tests (name all that you have heard of)?		
FOBT (<i>p</i> < .0001, multivariate <i>p</i> = .0018)	115 (50.9%)	104 (34.2%)
Colonoscopy (<i>p</i> < .0001, multivariate <i>p</i> = .0007)	173 (76.6%)	282 (92.8%)
Sigmoidoscopy (<i>p</i> = .0003, multivariate <i>p</i> = .0035)	3 (1.3%)	26 (8.6%)
Have you ever seen one of these FOBTs? [stool and tissue tests are shown] (<i>p</i> = .051, multivariate <i>p</i> = .039)		
Yes	185 (38.4%)	192 (41.8%)
No	289 (60.0%)	266 (58.0%)
Don't know	8 (1.7%)	1 (0.2%)
Have you ever seen or heard an advertisement that encouraged you to get tested for CRC? (<i>p</i> < .0001, multivariate <i>p</i> < .0001)		
Yes	283 (58.7%)	350 (76.3%)
No	187 (38.8%)	106 (23.1%)
Don't know	12 (2.5%)	3 (0.7%)
How helpful do you think it is to find CRC early? (<i>p</i> < .0001, multivariate <i>p</i> < .0001)		
Very helpful	359 (74.5%)	422 (91.9%)
Helpful	92 (19.1%)	33 (7.2%)
Not very helpful	2 (0.4%)	0 (0.0%)
Not helpful at all	4 (0.8%)	0 (0.0%)
Don't know	25 (5.2%)	4 (0.9%)

Note. Univariate *ps* were obtained using a chi-square test; multivariate *ps* were obtained using a logistic regression and were adjusted for age, gender, race, and location. CRC = colorectal cancer; FOBT = fecal occult blood test.

Table 3

Beliefs, by literacy level

Variable	Low literacy, <i>n</i> (%)	Adequate literacy, <i>n</i> (%)
If you had CRC, would you want to know about it? (<i>p</i> = .022)		
Yes	424 (88.0%)	426 (92.8%)
No	39 (8.1%)	18 (3.9%)
Don't know	19 (4.0%)	15 (3.3%)
How worried are you that you might find out you have CRC? (<i>p</i> = .36)		
Very worried	21 (4.4%)	23 (5.0%)
Somewhat worried	80 (16.6%)	91 (19.8%)
Not worried	185 (38.4%)	170 (37.0%)
Not worried at all	182 (37.8%)	163 (35.5%)
Don't know	14 (2.9%)	12 (2.6%)
I feel I will get CRC sometime during my life (<i>p</i> = .013)		
Strongly agree	8 (1.7%)	6 (1.3%)
Agree	138 (28.6%)	112 (24.4%)
Disagree	194 (40.3%)	215 (46.8%)
Strongly disagree	44 (9.1%)	55 (12.0%)
Don't know	98 (20.3%)	71 (15.5%)
Having an FOBT will help me find colon and rectal problems early (<i>p</i> = .0027, multivariate <i>p</i> = .0003)		
Strongly agree	72 (14.9%)	121 (26.4%)
Agree	379 (78.6%)	329 (71.7%)
Disagree	5 (1.0%)	3 (0.7%)
Strongly disagree	2 (0.4%)	0 (0.0%)
Don't know	24 (4.6%)	6 (1.3%)
Having an FOBT will decrease my chances of dying from CRC (<i>p</i> = .0156, multivariate <i>p</i> = .015)		
Strongly agree	45 (9.3%)	88 (19.2%)
Agree	327 (67.8%)	296 (64.5%)
Disagree	54 (11.2%)	44 (9.6%)
Strongly disagree	6 (1.2%)	5 (1.1%)
Don't know	50 (10.4%)	26 (5.7%)
I am afraid to do an FOBT because I am afraid of finding out that something is wrong (<i>p</i> = .49)		
Strongly agree	10 (2.1%)	16 (3.5%)
Agree	79 (16.4%)	56 (12.2%)
Disagree	315 (65.4%)	266 (58.0%)
Strongly disagree	65 (13.5%)	110 (24.0%)
Don't know	13 (2.7%)	11 (2.4%)

Note. Univariate *ps* were obtained using a chi-square test; multivariate *ps* were obtained using logistic regression and were adjusted for age, gender, race, and location. CRC = colorectal cancer; FOBT = fecal occult blood test.

Table 4

Self-efficacy, by literacy level

Variable	Low literacy, <i>n</i> (%)	Adequate literacy, <i>n</i> (%)
I know for sure I can get an FOBT kit ($p = .20$, multivariate $p = .04$)		
Strongly agree	30 (6.2%)	81 (17.7%)
Agree	403 (83.6%)	346 (75.4%)
Disagree	16 (3.3%)	9 (2.0%)
Strongly disagree	0 (0.0%)	3 (0.7%)
Don't know	33 (6.9%)	20 (4.4%)
I know for sure I can find out how to correctly complete an FOBT kit at home ($p = .081$)		
Strongly agree	30 (6.2%)	87 (19.0%)
Agree	424 (88.0%)	359 (78.2%)
Disagree	8 (1.7%)	4 (0.9%)
Strongly disagree	0 (0.0%)	0 (0.0%)
Don't know	20 (4.2%)	9 (2.0%)
I know for sure I will mail the card with the results on it back to the clinic ($p = .59$)		
Strongly agree	46 (9.5%)	129 (28.1%)
Agree	429 (89.0%)	324 (70.6%)
Disagree	3 (0.6%)	1 (0.2%)
Strongly disagree	0 (0.0%)	0 (0.0%)
Don't know	4 (0.8%)	5 (1.1%)

Note. Univariate p s were obtained using a chi-square test; multivariate p s were obtained using logistic regression and were adjusted for age, gender, race, and location. FOBT = fecal occult blood test.

Table 5

Barriers, by literacy level

Variable	Low literacy, <i>n</i> (%)	Adequate literacy, <i>n</i> (%)
I am afraid the FOBT instructions will be confusing ($p < .0001$)		
Strongly agree	2 (0.4%)	1 (0.2%)
Agree	56 (11.6%)	22 (4.8%)
Disagree	366 (75.9%)	341 (74.3%)
Strongly disagree	19 (3.9%)	75 (16.3%)
Don't know	39 (8.1%)	20 (4.4%)
Doing FOBT is embarrassing ($p < .0001$)		
Strongly agree	3 (0.6%)	2 (0.4%)
Agree	77 (16.0%)	37 (8.1%)
Disagree	357 (74.1%)	345 (75.2%)
Strongly disagree	23 (4.8%)	65 (14.2%)
Don't know	22 (4.6%)	10 (2.2%)
Doing an FOBT is a lot of trouble ($p = .0031$)		
Strongly agree	3 (0.6%)	1 (0.2%)
Agree	45 (9.3%)	27 (5.9%)
Disagree	359 (74.5%)	340 (74.1%)
Strongly disagree	26 (5.4%)	64 (13.9%)
Don't know	49 (10.3%)	27 (5.9%)
Doing an FOBT is messy ($p = .013$)		
Strongly agree	5 (1.0%)	5 (1.1%)
Agree	107 (22.2%)	79 (17.2%)
Disagree	278 (57.7%)	272 (59.3%)
Strongly disagree	15 (3.1%)	49 (10.7%)
Don't know	77 (16.0%)	54 (11.8%)

Note. Univariate p s were obtained using a chi-square test; multivariate p s were obtained using logistic regression and were adjusted for age, gender, race, and location. FOBT = fecal occult blood test.

Table 6

Recommendation and behavior, by literacy level

	Low literacy, <i>n</i> (%)	Adequate literacy, <i>n</i> (%)
Has a doctor ever recommended that you get tested/screened for colon cancer? (<i>p</i> = .79)		
Yes	185 (38.4%)	179 (39.0%)
No	291 (60.4%)	272 (59.3%)
Don't know	6 (1.2%)	8 (1.7%)
Have you ever been given information or education on either of the FOBT tests? (<i>p</i> = .013)		
Yes	78 (16.2%)	103 (22.4%)
No	391 (81.1%)	351 (76.5%)
Don't know	13 (2.7%)	5 (1.1%)
Has a doctor ever given you one of the FOBT kits or stool tests? (<i>p</i> = .17)		
Yes	152 (31.5%)	125 (27.2%)
No	322 (66.7%)	330 (71.9%)
Don't know	8 (1.7%)	4 (0.9%)
Have you ever done an FOBT kit or stool test? (<i>p</i> = .073, multivariate <i>p</i> = .036)		
Yes	134 (27.8%)	133 (29.0%)
No	340 (70.5%)	325 (70.8%)
Don't know	8 (1.7%)	1 (0.2%)

Univariate *ps* were obtained using a chi-square test; multivariate *ps* were obtained using logistic regression and were adjusted for age, gender, race, and location. FOBT = fecal occult blood test.