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Impact of a literacy-sensitive intervention on CRC screening knowledge, attitudes, and intention to screen

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Abstract

Background—Colorectal cancer (CRC) screening rates remain low, especially among low-income populations.

Objective—To determine if a CRC screening intervention (video, brochure) improves knowledge about CRC and CRC screening, attitudes toward screening, and intention to complete CRC screening among average-risk adults with different health literacy skills, seeking medical care at a Federally Qualified Health Center (FQHC).

Methods—Average-risk adults (50 years or older) who were not within CRC screening guidelines completed face-to-face pre-and post-intervention interviews that focused on knowledge about CRC and CRC screening, attitudes toward CRC screening, and intention to complete CRC screening.

Results—Of the 270 participants, 64% were women, 72% were black/African American, 86% were not married, 79% had an annual household income of <$20,000, and 57% did not have health insurance. Reading levels by Rapid Estimate of Adult Literacy in Medicine health literacy test were: 3rd grade or lower, 17 participants (6.3%); 4th-6th grade, 27 (10.0%); 7th-8th grade, 101 (37.4 %); and high school, 125 (46.3%). CRC screening knowledge mean score improved, and perceived CRC susceptibility and self-efficacy to complete screening significantly increased, irrespective of health literacy (all $P < .01$). There were no significant changes in other attitudes or intention to complete screening.

Limitations—The study was conducted in a single FQHC, so the results may not be generalizable to other health centers or populations of low-income and minority patients.

Conclusion—A CRC screening intervention improved CRC screening knowledge and attitudes across levels of health literacy and may be an important strategy for improving CRC screening in the primary care setting.

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Colorectal cancer (CRC) is the second most common type of cancer and the second leading cause of cancer death in both men and women in the United States.[1] The cost of care for CRC in the US was $14.14 billion in 2010 and is estimated to increase to $17.41 billion by 2020.[2] There are disparities in CRC rates, and reasons for the disparities are complex and occur at different levels (patient, health care provider, health systems, societal).[1,5]Improving CRC screening rates is one strategy to reduce CRC disparities and has been shown to be cost effective.[3,4] Although CRC screening is recommended for average-risk adults beginning at age 50 years, certain population groups have significantly lower CRC screening rates. CRC screening disparities exist by race/ethnicity, education level, socio-economic status, geographic location, and health insurance status.[1,5]

Complex factors at the individual and community levels influence an individual's health behaviors and health outcomes and may also have an impact on cancer disparities.[6,7] An individual's health literacy has been suggested as one factor that might affect health outcomes.[8] Limited health literacy has been associated with more barriers to CRC screening (eg, not understanding how to complete a fecal occult blood test [FOBT] or how to complete the bowel prep for a colonoscopy), more negative attitudes about screening, less knowledge about CRC screening, and lower CRC screening rates within guidelines.[9–13] To address limited health literacy, some study findings have demonstrated that educational videos and/or decision aids are important for providing CRC screening information in an understandable format.[14–23] These types of interventions may be especially beneficial among patients with lower levels of education and/or with inadequate health literacy.

The current study focuses on process data obtained in a randomized, controlled trial of a patient-level intervention (CRC screening information plus communication skills training [intervention arm] vs CRC screening information only [control arm]) to improve CRC screening rates.[24,25] The CRC screening educational video used in the study was developed for individuals with inadequate health literacy (reading ability below 12th grade level) to improve their understanding of the importance of completing CRC screening.[18] The purpose of the study was to examine the relationship between health literacy and the impact of an educational intervention on changing participants' knowledge of and attitudes toward CRC screening, and their intention to complete screening. We thought that participants, irrespective of their health literacy, would report increased knowledge of CRC screening, more positive attitudes toward screening, and intention to complete CRC screening after the intervention, compared with baseline. Data from baseline and immediate post-intervention face-to-face interviews offer important insights into the value of providing cancer screening messages through interventions designed for individuals with inadequate health literacy skills.

Methods

The CRC screening intervention study (November 2007-May 2010) was conducted at a single Federally Qualified Health Center (FQHC) in Columbus, Ohio. Patients were eligible

if they were aged 50 years or older, at average risk for CRC, not within American Cancer Society CRC screening guidelines (FOBT in the past year, flexible sigmoidoscopy in the previous 5 years, or colonoscopy in the previous 10 years), were able to speak English, had a working telephone, had a scheduled appointment with a primary care provider for a non-acute medical issue, and could arrive at the health center 1 hour before their appointment. A brief description of the intervention follows, however details about the intervention, study design, and primary outcome have been published.[18,24,25] Study protocols and informed consent procedures were approved by the Institutional Review Board of The Ohio State University.

All participants completed a baseline in-person interview with a trained research assistant, who was blinded to the randomization. A second research assistant showed the participants in both arms of the study the CRC screening educational video and provided each participant with a CRC prevention brochure (the information in the brochure was presented in the video). Immediately after watching the video and receiving the brochure, and before the medical visit, participants completed a post-intervention interview with the first research assistant. The video was 10 minutes long and focused on completion of the FOBT because it was the most common CRC screening test recommended by providers at the FQHC at the time of the study. The video was guided by the Protection Motivation Theory (PMT)[26] and addressed CRC risk, seriousness of CRC, response efficacy (screening reduces developing or dying from CRC), response cost (screening barriers), fear of cancer, and reasons to complete CRC screening. The video was narrated and included: graphics showing the location of the colon; scenes with a patient interacting with a physician; a physician discussing CRC risk, explaining the seriousness of CRC, the importance of completing the FOBT, and follow-up testing if needed; instructions on how to complete a FOBT including footage of the test being completed; and CRC screening barriers (eg, fear of cancer, embarrassment), which were addressed by patient testimonials.

Participants who had been randomized to the intervention arm also watched an additional 2-minute communication skills training section in the video and received a second brochure on how to communicate with a provider (the information in this brochure was also included in the video segment). These additional intervention components were guided by the PACE communication system (Presenting information [eg, patients mention CRC screening to their provider], Asking questions [eg, patient asks questions about CRC screening], Checking for understanding [eg, patient checks how to complete the CRC screening test], Expressing concerns [eg, about completing the test, fear of cancer])[27,28] and were designed to prompt patients to ask their provider for a CRC screening test. The communication skills training section of the video included 2 men talking about a friend who had been diagnosed with CRC. One man explains the PACE communication system to his friend and encourages that friend to use the system to ask his provider for a CRC screening test during his annual physical examination.

The study process (obtaining patient consent, conducting the interviews, and administering the intervention) was completed, on average, in 45 minutes. Participants received a $25 gift card in appreciation of their time. This analysis includes all participants (N = 270), regardless of randomization assignment, because both groups watched the CRC screening

educational video and received the CRC prevention brochure, and health literacy was not a significant variable in the primary outcome of the intervention.[24]

Measures

Baseline and post-intervention interviews included demographics, health literacy, knowledge about CRC and CRC screening, attitudes and barriers to CRC screening, and screening intentions.

Demographics

Information obtained included age, gender, race (black, white, Asian, American Indian/ Alaska Native, Native Hawaiian/Pacific Islander), ethnicity (Hispanic/ non-His-panic), marital status (single, married/living as married, divorced/separated, widowed), highest grade of formal education, annual household income, and health insurance status (uninsured, public, private).

Health literacy

The Rapid Estimate of Adult Literacy in Medicine (REALM) instrument was used to document health literacy.[29] ‘e REALM has good face validity (.88) and high test-retest reliability (0.97).[29] Each word (66 words) pronounced correctly was given 1 point; REALM scores could range from 0–66, and the score was used to categorize participants into the recommended 4 reading grades:

- REALM 1 (score, 0–18): reading level equivalent of 3rd grade or lower; defined as not being able to read most educational materials and will need verbal instructions.
- REALM 2 (19–44): 4th-6th grade reading level; defined as not being able to read low literacy materials independently (ie, may need accompanying verbal instructions).
- REALM 3 (45–60): 7th-8th grade reading level; a person may struggle with understanding educational materials.
- REALM 4 (61–66): high-school education; a person who is able to read most educational materials.

Six participants were not able to read, and another 5 reported not having their eyeglasses. Participants were offered the REALM large print version for individuals with 20/200 vision (legal blindness), however they did not complete the instrument. These eleven participants were assigned a score of zero and were categorized in REALM 1. The REALM score was also considered as a continuous variable in the analyses.

Knowledge of CRC and CRC screening

Participants’ knowledge of CRC and CRC screening was assessed with 10 True/False questions. A response of *Do not know* (12.5% of baseline responses, 3.4% of post-intervention responses) was coded as incorrect. Total knowledge score (number of correct answers) could range from 0–10.

CRC screening attitudes, barriers, intention

A validated CRC screening instrument from a previous study was used to assess CRC attitudes, barriers, and screening intention.[30,31] Items focused on salience and coherence ([CRC screening] *Is important for me to do*, *Makes sense for me*), self-efficacy (belief in one's ability to complete CRC screening), perceived susceptibility (perceived risk of CRC), worries (barriers about CRC screening), and intention (plans to complete CRC screening), which are all predictors of CRC screening. Responses were rated on a 4-point Likert scale, ranging from *Strongly agree* to *Strongly disagree*. Among attitude questions, 1.3% of data were missing overall. A response of *I don't know* was reported on 5.7% of baseline responses and 4.5% of postintervention responses. For attitude questions, responses were scaled over the available data for missing items.[30]

Analysis

Descriptive statistics were used to characterize the baseline characteristics of the participants. Differences in demographics by REALM score category were assessed with an analysis of variance (ANOVA) for age, and the Fisher exact test for categorical variables.

Change scores in knowledge, attitudes, and intention between the baseline and post-intervention interviews were calculated. Differences in these change scores across REALM levels were evaluated by ANOVA and linear regression. For CRC screening knowledge only, differences in pretest scores, by REALM score necessitated an alternative approach. For this outcome, the dependent variable was post-test score and the analysis was adjusted for the baseline score to control for confounding (ANCOVA model). All statistical analyses were conducted using SPSS (version 19.0, IBM SPSS Statistics) and STATA (version 12.0, StataCorp).

Results

Participants

Information about exclusion criteria and participants included in the study has been reported.[24] Participants' demographic characteristics by REALM category are listed in Table 1. Most participants were women (64%), black/African American (72%), not married (86%), had an annual household income less than $20,000 (79%), and did not have health insurance (57%). ‘e mean age of the participants was 56.0 years (SD, 5.9).

Health literacy

Among participants, 17 (6.3%) were categorized in REALM 1, 27 (10.0%) in REALM 2, 101 (37.4 %) in REALM 3, and 125 (46.3%) in REALM 4. Participants categorized in REALM 1 and REALM 2 were slightly older than were participants categorized in REALM 3 or REALM 4. In addition, there were fewer women categorized in REALM 1; more African Americans categorized in REALM 1, compared with REALM 4; and more participants with less than a high school education categorized in REALM 1 and REALM 2, compared with participants categorized in REALM 3 or REALM 4.

Knowledge of CRC and CRC screening by health literacy

Among the participants, the mean score for knowledge of CRC and CRC screening at baseline was 6.76 out of 10 and it improved to 8.59 after the intervention, a statistically significant increase in knowledge ($P < .01$). Participants with higher health literacy levels had greater baseline knowledge scores compared with participants with lower health literacy levels (Table 2). However, mean change in knowledge scores from baseline to post-intervention were similar across REALM categories (Table 2). Participants categorized in REALM 2 had the largest change in score (2.63 points), followed by REALM 1 (1.94 points), REALM 3 (1.80 points), and REALM 4 (1.65 points). After adjustment for baseline score, post-intervention scores were not statistically different by REALM category ($P = .15$). Results were similar when treating REALM score as a continuous variable; after adjusting for baseline knowledge, mean post-intervention scores were only 0.06 points higher per 10-unit increase in REALM literacy score ($P = .27$).

CRC screening attitudes by health literacy

CRC screening attitudes (Table 3) were divided into 5 categories: perceived susceptibility, salience and coherence, self-efficacy, intention, and worries. fie mean baseline susceptibility score across groups was 2.77 (SD, .50). There was some suggestion of a trend, with higher REALM groups having higher baseline susceptibility scores (indicating less feelings of susceptibility to CRC), but this trend did not reach statistical significance ($P = .08$). Participants' susceptibility scores decreased by an average of 0.24 ($P < .01$) following the intervention, indicating a greater feeling of susceptibility to CRC. These changes were similar across REALM categories ($P = .77$) and when considering the REALM score as a linear continuous variable ($P = .46$).

The mean baseline self-efficacy score of participants was 2.15 (SD, 0.48). Across REALM groups, self-efficacy scores decreased by an average of 0.09 ($P < .01$) post-intervention, indicating that individuals reported slightly greater self-efficacy with regard to CRC screening. These changes were not significantly different across REALM categories ($P = .18$) and when REALM score was considered as a linear continuous variable ($P = .97$). No statistically significant changes were documented when comparing mean baseline and post-intervention scores for salience and coherence, intention, or worries, nor were there differences by REALM score.

Discussion

There are disparities in CRC incidence and mortality rates among minority and underserved populations, partly because of lower CRC screening rates. A lower level of education or inadequate health literacy could contribute to those lower rates of screening. In the current study, even though 73.0% of participants reported having at least a high-school education, only 46.3% scored in REALM 4 category (high school reading level). The strength of this study was that the impact of the developed patient-level CRC screening intervention was evaluated by participants' health literacy. We found that, irrespective of health literacy, a video-based intervention significantly improved CRC screening knowledge and attitudes (susceptibility and self-efficacy) among participants. These results demonstrate the

importance of developing non-print interventions for individuals, with inadequate health literacy, and that literacy-sensitive interventions can improve knowledge and attitudes among individuals with different health literacy skills.

It is important to note, however, that there was no significant change in CRC screening intention after the educational intervention. This finding might reflect the fact that participants often remarked that they needed to talk to their primary care provider before deciding whether they intended to complete a CRC screening test suggesting the importance of a patient-provider discussion about CRC screening and a physician recommendation for screening. Furthermore, although there was a significant improvement in CRC screening knowledge and positive CRC screening attitudes, using this patient level intervention, 28.5% of patients (77 of 270) had a CRC screening test ordered (FOBT, 65; colonoscopy, 12) and 14.8% of patients (40) completed a CRC screening test (FOBT, 35; colonoscopy, 5).[24] The implication of this finding suggests that provider and clinic level strategies or policies (ie, teach-back methodology, chart reminders, incentive plans, patient navigators), in addition to patient level interventions, need to be implemented to reduce CRC screening disparities.

The current study's findings are consistent with studies that used educational strategies other than print material to improve CRC screening knowledge and/or screening rates targeted to patients with limited health literacy.[14,15,17–23,32] The use of videos or narrated computer programs has important implications (reach, cost) for the development of cancer prevention and screening interventions in the future. Providing CRC screening information in an understandable format, with communication skills training to activate patients to ask for a CRC screening test, could be an important step to initiating patient-provider CRC screening discussions. However, because improvement in knowledge, attitudes, and intentions does not always translate into positive behavior changes, the current study's findings also support the need for multilevel interventions aimed at patients, providers, and systems to reduce missed opportunities to improve screening rates.[33,34] An example of a comprehensive approach to reduce CRC screening disparities, including coverage for screening and treatment, patient navigation for screening and care, and case management, has recently been shown to reduce CRC disparities in the state of Delaware.[35]

Study limitations include that the study was conducted in a single FQHC, thus the results may not be generalizable to other health centers or populations of low-income and minority patients. Although participants were categorized in all REALM categories, only 44 participants were in REALM categories 1 and 2, defined as having the most limited literacy skills. In addition, the REALM test is limited to word recognition and pronunciation (ie, no measurement of health numeracy). Further evaluation of educational videos as a strategy to improve CRC screening knowledge, attitudes, and intention should be conducted in larger samples of individuals with inadequate health literacy.

Despite these limitations, this study's findings have important implications for future practice and research. It is important that interventions developed for patients to improve CRC screening knowledge and attitudes consider delivery systems (ie, videos, narrated computer programs) that minimize the reading burden. Including patient-level strategies that are sensitive to individuals with limited literacy will be important to include in the

development of multilevel efforts to improve CRC screening rates and ultimately reduce CRC disparities.

References

1. American Cancer Society. Cancer Facts & Figures 2015. Atlanta, GA: American Cancer Society.
2. Mariotto AB, Yabroff KR, Shao Y, Feuer EJ, Brown ML. Projections of the cost of cancer care in the United States: 2010–2020. J Natl Cancer Inst. 2011;103(2):117–128. [PubMed: 21228314]
3. Maciosek MV, Solberg LI, Co[f_f_i]eld AB, Edwards NM, Goodman MJ. Colorectal cancer screening: health impact and cost effectiveness. Am J Prev Med. 2006;31(1):80–89. [PubMed: 16777546]
4. Winawer S, Fletcher R, Rex D, et al. Gastrointestinal Consortium Panel. Colorectal cancer screening and surveillance: clinical guidelines and rationale-update based on new evidence. Gastroenterol. 2003;124(2):544–560.
5. American Cancer Society. Colorectal Cancer, Facts & Figures, 2014–2016, 2014; Atlanta, GA: American Cancer Society.
6. Sorensen G, Emmons K, Hunt MK, et al. Model for incorporating social context in health behavior interventions: applications for cancer prevention for working-class, multiethnic populations. Prev Med. 2003;37(3):188–197. [PubMed: 12914824]
7. Emmons KM, Barbeau EM, Gutheil C, Stryker JE, Stoddard AM. Social influences, social context, and health behaviors among working-class, multi-ethnic adults. Health Educ Behav. 2007;34(2): 315–334. [PubMed: 16740510]
8. Berkman ND, Sheridan SL, Donahue KE, Halpern DJ, Crotty K. Low health literacy and health outcomes: an updated systematic review. Ann Inter Med. 2011;155(2):97–107.
9. Davis TC, Dolan NC, Ferreira MR, et al. The role of inadequate health literacy skills in colorectal cancer screening. Cancer Invest. 2001;19(2):193–200. [PubMed: 11296623]
10. Dolan NC, Ferreira MR, Davis TC, et al. Colorectal cancer screening knowledge, attitudes, and beliefs among veterans: does literacy make a difference? J Clin Oncol. 2004;22(13):2617–2622. [PubMed: 15226329]
11. Miller DP,Jr, Brownlee CD, McCoy TP, Pignone MP. The effect of health literacy on knowledge and receipt of colorectal cancer screening: a survey study. BMC Fam Pract. 2007;8:16. [PubMed: 17394668]
12. Peterson NB, Dwyer KA, Mulvaney SA, Dietrich MS, Rothman RL. The influence of health literacy on colorectal cancer screening knowledge, beliefs and behavior. J Natl Med Assoc. 2007;99(10):1105–1112. [PubMed: 17987913]
13. Arnold CL, Rademaker A, Bailey SC, et al. Literacy barriers to colorectal cancer screening in community clinics. J Health Commun. 2012;17:252–264. [PubMed: 23030574]
14. Aragones A, Schwartz MD, Shah NR, Gany FM. A randomized controlled trial of a multilevel intervention to increase colorectal cancer screening among Latino immigrants in a primary care facility. J Gen Intern Med. 2010;25(6):564–567. [PubMed: 20213208]
15. Campbell MK, James A, Hudson MA, et al. Improving multiple behaviors for colorectal cancer prevention among African American church members. Health Psychol. 2004;23(5):492–502. [PubMed: 15367069]
16. Davis T, Arnold C, Rademaker A, et al. Improving colon cancer screening in community clinics. Cancer. 2013;119:3879–3886. [PubMed: 24037721]
17. Gimeno-Garcia AZ, Quintero E, Nicolas-Perez D, Parra-Blanco A, Jimenez-Sosa A. Impact of an educational video-based strategy on the behavior process associated with colorectal cancer screening: a randomized controlled study. Cancer Epidemiol. 2009;33(3–4):216–222. [PubMed: 19747893]
18. Katz ML, Heaner S, Reiter P, et al. Development of an educational video to improve patient knowledge and communication with their healthcare providers about colorectal cancer screening. Am J Health Educ. 2009;40(4):220–228. [PubMed: 20209024]

19. Miller DP Jr, Spangler JG, Case LD, Goff DC Jr, Singh S, Pignone M. P. Effectiveness of a web-based colorectal cancer screening patient decision aid: a randomized controlled trial in a mixed-literacy population. Am J Prev Med. 2011;40(6):608–615. [PubMed: 21565651]
20. Pignone M, Harris R, Kinsinger L. Videotape-based decision aid for colon cancer screening. A randomized, controlled trial. Ann Intern Med. 2000;133(10):761–769. [PubMed: 11085838]
21. Rawl SM, Skinner CS, Perkins SM, et al. Computer-delivered tailored intervention improves colon cancer screening knowledge and health beliefs of African-Americans. Health Educ Res. 2012;27(5):868–885. [PubMed: 22926008]
22. Schroy PC 3rd, Emmons K, Peters E, et al. The impact of a novel computer-based decision aid on shared decision making for colorectal cancer screening: a randomized trial. Med Decis Making. 2011;31(1):93–107. [PubMed: 20484090]
23. Zapka JG, Lemon SC, Puleo E, Estabrook B, Luckmann R, Erban S. Patient education for colon cancer screening: a randomized trial of a video mailed before a physical examination. Ann Intern Med. 2004;141(9);683–692. [PubMed: 15520425]
24. Katz ML, Fisher JL, Fleming K, Paskett ED. Patient activation increases colorectal cancer screening rates: a randomized trial among low-income minority patients. Cancer Epidemiol Biomarkers Prev. 2012;21(1):45–52. [PubMed: 22068288]
25. Katz ML, Broder-Oldach B, Fisher JL, et al. Patient-provider discussions about colorectal cancer screening: who initiates elements of informed decision making? J Gen Intern Med. 2012;27(9): 1135–1141. [PubMed: 22476985]
26. Rogers RW, Prentice-Dunn S. Protection motivation theory In Gochman D (ed), Handbook of health behavior research: Vol. 1. Determinants of health behavior: personal and social . New York: Plenum, 1997; pp.113–132.
27. Cegala DJ, McClure L, Marinelli TM, Post DM. The effects of communication skills training on patients' participation during medical interviews. Patient Educ Couns. 2000;41(2):209–222. [PubMed: 12024545]
28. Cegala DJ, Post DM, McClure L. The effects of patient communication skills training on the discourse of older patients during a primary care interview. J Am Geriatr Soc. 2001;49(11):1505–1511. [PubMed: 11890590]
29. Davis TC, Crouch MA, Long SW, et al. Rapid assessment of literacy levels of adult primary care patients. Fam Med. 1991;23(6):433–435. [PubMed: 1936717]
30. Vernon SW, Myers RE, Tilley BC. Development and validation of an instrument to measure factors related to colorectal cancer screening adherence. Cancer Epidemiol Biomarkers Prev. 1997;6(10): 825–832. [PubMed: 9332766]
31. Tiro JA, Vernon SW, Hyslop T, Myers RE. Factorial validity and invariance of a survey measuring psychosocial correlates of colorectal cancer screening among African Americans and Caucasians. Cancer Epidemiol Biomarkers Prev. 2005;14:2855–2861. [PubMed: 16365000]
32. Meade CD, McKinney WP, Barnas GP. Educating patients with limited literacy skills: the effectiveness of printed and videotaped materials about colon cancer. Am J Public Health. 1994;84(1):119–121. [PubMed: 8279598]
33. Klabunde CN, Lanier D, Breslau ES, et al. Improving colorectal cancer screening in primary care practice: innovative strategies and future directions. J Gen Inter Med. 2007;22(8):1195–1205.
34. Taplin SH, Anhang Price R, Edwards HM, et al. Introduction: understanding and inžuencing multilevel factors across the cancer care continuum. J Natl Cancer Inst Monogr. 2012;(44):2–10. [PubMed: 22623590]
35. Grubbs SS, Polite BN, Carney J Jr, et al. Eliminating racial disparities in colorectal cancer in the real world: it took a village. J Clin Oncol. 2013;31(16):1928–1930. [PubMed: 23589553]

TABLE 1

Demographic characteristics of participants by REALM health literacy category[a]

	Health literacy category, n (%)				
Characteristic	**REALM 1 (n= 17)**	**REALM 2 (n = 27)**	**REALM 3 (n = 101)**	**REALM 4 (n= 125)**	**Total (N = 270)**
Mean age, y (SD) **	59.3 (11.1)	58.2 (5.6)	55.1 (5.2)	55.8 (5.3)	56.0 (5.9)
Gender (female) *	6 (35)	14 (52)	67 (66)	85 (68)	172 (64)
Race (black/African American) *	15 (88)	21 (78)	79 (78)	80 (64)	195 (72)
Marital status (married/living as married)	0 (0)	6 (22)	15 (15)	17 (14)	38 (14)
Education (<high school) **	11 (64)	17 (63)	29 (29)	17 (14)	74 (27)
Annual household income (<$20,000)[b]	8 (89)	16 (84)	65 (83)	75 (74)	164 (79)
Health insurance (none)[c]	10 (59)	13 (48)	58 (59)	71 (57)	152 (57)

[a] REALM (Rapid Estimate of Adult Literacy in Medicine): REALM 1, 3rd grade or lower reading level; REALM 2, 4th-6th grade; REALM 3, 7th-8th grade; REALM 4, highschool graduate.

[b] Missing data so numbers do not equal total: REALM 1, n = 8; REALM 2, n = 8; REALM 3, n = 23; REALM 4, n = 24.

[c] Missing data so numbers do not equal total: REALM 3, n = 2; REALM 4, n=1.

* $P < .05$

** $P < .01$

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TABLE 2

Colorectal cancer screening knowledge (mean score) preand post-intervention by REALM[a] health literacy category

	Mean score[b] by health literacy category				Total
	REALM 1	REALM 2	REALM 3	REALM 4	
Pre-intervention	5.65	6.15	6.58	7.19	6.76
Post-intervention	7.59	8.78	8.39	8.84	8.59
Difference from baseline to post intervention	1.94	2.63	1.80	1.65	1.82 *
95% confidence interval	(0.99, 2.89)	(2.02, 3.24)	(1.42, 2.18)	(1.38, 1.92)	(1.62, 2.03)

[a]REALM (Rapid Estimate of Adult Literacy in Medicine): REALM 1, 3rd grade or lower reading level; REALM 2, 4th-6th grade; REALM 3, 7th-8th grade; REALM 4, highschool graduate.

[b]Range, 0–10.

*$P < .05$

TABLE 3

Colorectal cancer screening mean attitude scores[a] preand post-intervention difference by REALM[b] health literacy category

Attitude	n (N = 270)	Health literacy category				F	*P* value
		REALM 1	REALM 2	REALM 3	REALM 4		
Pre-intervention/baseline							
Perceived susceptibility	241	2.56	2.63	2.75	2.83	2.25	0.08
Salience and coherence	270	1.94	1.81	1.78	1.69	2.36	0.07
Self-efficacy	267	2.20	2.16	2.19	2.11	0.60	0.61
Intention	232	1.97	2.00	2.01	1.89	0.95	0.42
Worries	249	2.40	2.32	2.31	2.26	0.42	0.74
Post-intervention difference from baseline							
Perceived susceptibility	228	−0.12	−0.27	−0.26	−0.23	0.38	0.77
Salience and coherence	264	0.03	−0.03	−0.01	0.07	1.20	0.31
Self-efficacy	265	−0.05	−0.10	−0.15	−0.05	1.62	0.18
Intention	216	0.07	0.05	−0.10	0.03	2.13	0.10
Worries	232	0.07	0.00	−0.04	−0.01	0.27	0.85

[a]Attitude scale: 1 = strongly agree; 2 = agree; 3 = disagree; 4 = strongly disagree.

[b]REALM (Rapid Estimate of Adult Literacy in Medicine): REALM 1, 3rd grade or lower reading level; REALM 2, 4th-6th grade; REALM 3, 7th-8th grade; REALM 4, high-school graduate.