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FOBT Completion in FQHCs: Impact of Physician Recommendation, FOBT Information, or Receipt of the FOBT Kit

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Abstract

Purpose—To determine the effect of common components of primary care-based colorectal cancer (CRC) screening interventions on fecal occult blood test (FOBT) completion *within* rural and urban community clinics, including: (1) physician’s spoken recommendation, (2) providing information or education about FOBTs, and (3) physician providing the FOBT kit; to determine the relative effect of these interventions; and to compare the effect of each intervention between rural and urban clinics.

Methods—We conducted structured interviews with patients aged 50 years and over receiving care at community clinics that were noncompliant with CRC screening. Self-report of ever receiving a physician’s recommendation for screening, FOBT information or education, physician providing an FOBT kit, and FOBT completion were collected.

Findings—Participants included 849 screening-eligible adults; 77% were female and 68% were African American. The median age was 57; 33% lacked a high school diploma and 51% had low literacy. In multivariable analysis, all services were predictive of rural participants completing screening (physician recommendation: $P = .002$; FOBT education: $P = .001$; physician giving FOBT kit: $P < .0001$). In urban clinics, only physician giving the kit predicted FOBT completion ($P < .0001$). Compared to urban patients, rural patients showed a stronger relationship between FOBT completion and receiving a physician recommendation (risk ratio [RR]: 5.3 vs 2.1; $P = .0001$), receiving information or education on FOBTs (RR: 3.8 vs 1.9; $P = .0002$), or receiving an FOBT kit from their physician (RR: 22.3 vs 10.1; $P = .035$).

Conclusions—Participants who receive an FOBT kit from their physician are more likely to complete screening.

Keywords

colorectal cancer screening; fecal occult blood test; Federally Qualified Health Centers; low-income patients; physician recommendation

Between a third and one half of eligible adults in the United States have not received recommended colorectal cancer (CRC) screening services, with socioeconomically disadvantaged, racial/ethnic minority, and rural individuals at greatest risk for not being screened.¹⁻⁶ Barriers have been extensively studied and include patient (eg, knowledge and awareness of screening, motivation, transportation, health insurance coverage),^{4,7-11} health system (physician shortages, insurance), and provider (rates of screening recommendation) factors.¹²⁻¹⁷

Previous research has found that low-income, medically underserved patients, despite provider perceptions, are aware of CRC, want to know if they have cancer, and have positive beliefs about fecal occult blood test (FOBT).^{7,9,16} This suggests that cost-effective interventions centered around annual occult blood testing can be a convenient method of screening and detecting CRC for safety net clinics such as Federally Qualified Health Centers (FQHCs) whose patients disproportionately face cost and access barriers to colonoscopy.^{7,18}

Identifying effective, efficient, and sustainable practices that can improve CRC screening among less educated (and lower literate), lower-income adults could dramatically advance public health preventive practices and reduce known disparities. To date, a diverse set of interventions has been tried with variable success and intensity. These interventions range from public health strategies that usually involve mailed reminders or test kits to primary care-based education using decision aids, multimedia tools, or targeted provider education to promote recommendation and organizational change such as nurses giving FOBT cards, instructions, and reminders.^{7,11,12,19} To our knowledge, no research investigation has currently deconstructed the value of core elements that have been perceived as requisite components to primary care screening strategies to best understand exactly which activities are necessary to engage patients in screening. In this study, our purpose was to determine the effect of common components of primary care-based CRC screening interventions on FOBT completion *within* rural and urban community clinics, including: (1) a physician's spoken recommendation, (2) providing information or education about FOBTs, and (3) a physician providing the FOBT kit. Each of these components may appear simple and easily administered, although each can be challenging to deliver and sustain in safety net environments. Therefore, a second purpose was to determine the relative effect of these interventions within rural and urban FQHCs. Finally, comparison of the effect of each intervention between rural and urban clinics was investigated to provide tailored guidance to support the development and implementation of CRC screening promotions for both low-income urban and rural patients in order to best achieve health care equity.

Methods

Adults aged 50 and over who received care at 1 of 8 FQHCs in 7 parishes (counties) in north Louisiana were given a structured interview to assess prior receipt of CRC screening recommendation and promotional services.^{20,21} FQHCs are government-supported clinics that are required to provide services to patients regardless of insurance status. They are strategically located in areas designated as medically underserved by the Department of Health and Human Services (DHHS). Patients were recruited for a National Cancer Institute (NCI) study (R01CA115869) that was designed as a randomized controlled trial to test the

effectiveness of a health literacy intervention designed to improve initial and repeat use of CRC screening. The trial had a baseline survey with 2 follow-up measurements to determine whether CRC screening occurred. This paper used baseline pre-intervention data from the NCI study. Even though the NCI study evaluated a health literacy intervention, this paper does not analyze literacy level other than to characterize the sample.

Participants

Participants were eligible if they were not up-to-date with screening according to US Preventive Service Guidelines (CRC screening: FOBT every year, or flexible sigmoidoscopy every 5 years, or colonoscopy every 10 years for adults aged 50 and over)²² and did not have a previous history of cancer or a family history requiring screening at earlier ages according to American Cancer Society guidelines.²³ Additional eligibility criteria included being English-speaking and being enrolled as a patient in the study clinic. Exclusion criteria included having severe visual or hearing impairments and being too ill to participate.

Outcomes

The primary outcomes under study were patient self-report of ever receiving a physician verbal recommendation for FOBT, ever receiving FOBT information or education, receiving an FOBT kit from a physician, and completion of an FOBT. Clinics were defined as rural or urban based on the Index of Relative Rurality (IRR), which uses dimensions such as population density, extent of urbanization, and distance to nearest metro area to categorize counties on a 0–1 scale.^{24–26} According to the 2010 US Census Bureau American FactFinder, the 6 rural clinics were located in towns with populations ranging from 450 to 13,000; the 2 urban clinics were in cities with populations of 63,000 and 199,000 (<http://factfinder2.census.gov>).

Our Institutional Review Board approved the study and all participants signed a simplified informed consent document prior to participation. Patient enrollment took place between August 2008 and February 2011. In all, 882 participants were identified as eligible to participate of which 33 participants refused (3.4%) and 849 were enrolled in the study.

Procedure

A nurse's aide asked eligible participants, who had a scheduled appointment and were waiting to see their physician, if they would be willing to talk to a research assistant (RA) about participating in a cancer screening study. Patients who agreed to participate were pre-screened for eligibility by the clinic RA. If patients were eligible, they participated in the consent process and were given a structured survey which included questions that assessed whether they had ever received a CRC screening recommendation from a physician; been given information or education on FOBTs (ie, pamphlet, video, discussion, or information at health fairs); been given an FOBT kit by a physician; or completed an FOBT. As in other studies, participants were shown 2 kinds of FOBT kits as a visual aid to help ensure they were clear about FOBT questions.⁷ In addition, participants were asked basic demographic questions and given the Rapid Estimate of Adult Literacy in Medicine (REALM).²¹ Participants were paid \$10 for their time to complete the survey at enrollment.

Statistical Analysis

We sought to determine the degree to which individual or a combination of services (physician recommendation, receipt of information or education, receipt of FOBT test) was associated with FOBT screening completion. Fisher's exact test was used to examine bivariate associations between these variables, and risk ratios and 95% CI were calculated

where the risk ratio (RR) was defined as the proportion of patients who received the service who had an FOBT completed, divided by the proportion of patients who did not receive the service yet who had an FOBT completed. Separate analyses were done for rural and urban subgroups. Multiple logistic regression adjusting for age, race, and literacy level assessed the significance of the services in a multivariable model. Logistic regression was also used to determine whether the RR for a specific service differed between rural and urban groups. All analyses are based on 849 patients who had complete data on the questions related to the receipt of services and completion of FOBT.

Results

The demographic characteristics of the sample, stratified by urban and rural sites, are presented in Table 1. Subjects ranged in age from 50 to 89, with a median age of 57. The majority of patients were female (77%) and African American (68%); one-third lacked a high school diploma; and half of participants had low literacy (less than a ninth grade reading level). There were 598 participants from the rural FQHCs, and 251 participants from the urban FQHCs.

In looking at how receipt of these preventive services was related to FOBT completion (Table 2), 42.7% of participants in rural clinics who reported ever receiving a physician recommendation for CRC screening had completed at least 1 FOBT vs 8.0% of those who had never received a recommendation (RR 5.3; 95% CI: 3.7–7.7; $P < .001$). Among urban participants, 64.6% of those who reported ever having received a physician recommendation for CRC screening had ever completed an FOBT vs 30.4% who had never received a physician recommendation (RR 2.1; 95% CI: 1.6–2.8; $P < .001$). Among participants in rural clinics who had received information or education on FOBTs, 57.3% had completed an FOBT compared to 14.9% who had not received education (RR 3.8; 95% CI: 2.9–5.1; $P < .001$). Two-thirds of urban participants had received information or education and had completed an FOBT compared to 35.9% who had not received information (RR 1.9; 95% CI: 1.4–2.4; $P < .001$).

A physician giving an FOBT kit was the most powerful predictor of participants completing screening. In rural clinics, 84.4% of participants whose physician had given them an FOBT kit completed the test compared to 3.8% who had not been given a kit (RR 22.3; 95% CI: 14.1–35.3; $P < .001$). In urban clinics, 86.0% who had been given a kit by a physician completed it compared to 8.5% who had not been given a kit (RR 10.1; 95% CI: 5.7–18.0; $P < .001$). Only 75 participants reported receiving all 3 services—28 in rural clinics and 47 in urban clinics. The majority (78.6%) of rural participants who received all 3 services completed the FOBT compared to 17.4% who did not receive all services (RR 4.5; 95% CI: 3.5–5.9; $P < .001$). In urban clinics, 83% who reported receiving all 3 services completed an FOBT compared to 37.3% who did not report receiving all services (RR 2.2; 95% CI: 1.8–2.8; $P < .001$).

In multivariable analyses controlling for age, race, and literacy, all services were predictive of participants completing screening in rural areas (physician recommendation: RR 3.2, 95% CI: 1.5–6.7, $P = .002$; FOBT education: RR 4.2, 95% CI: 1.8–10.0, $P = .001$; and physician giving FOBT kit: RR 95.5, 95% CI: 44.1–206.9, $P < .0001$). In urban areas, only physicians giving participants an FOBT kit predicted their ever completing an FOBT (RR 68.9; 95% CI: 26.6–178.4; $P < .0001$).

There were significant differences in risk ratios between rural and urban participants for all 3 services. For participants who reported ever receiving a physician recommendation for CRC screening, the rural RR of 5.3 significantly differed from the urban RR of 2.1 ($P = .$

0001). For participants who had received information or education on FOBTs, the rural RR of 3.8 significantly differed from the urban RR of 1.9 ($P = .0002$). Finally, for physicians giving an FOBT kit, the rural RR of 22.3 significantly differed from the urban RR of 10.1 ($P = .035$). For receiving all 3 services, the rural RR of 4.5 differed from the urban RR of 2.2 ($P < .0001$).

Discussion

To date, the majority of studies in the United States addressing CRC screening have been situated in primary care, with fundamental similarities in how CRC and screening options are introduced, explained, and recommended. This study is the first to deconstruct, in a very precise way, these common elements of recommendation, information, or education, providing the test itself to determine what is most salient for encouraging patient CRC screening behavior. In general, participants who reported receiving any of the individual services were significantly more likely to complete FOBT screening than those who did not receive the service. The service that had the greatest impact on CRC screening in these resource-poor FQHCs was the physician actually giving the FOBT kit to the patient. This alone had the most profound impact compared to the receipt of a recommendation or education. In fact, rates of completion were not improved with the addition of those services among those who received the FOBT kit.

This study's findings, like those of other studies, indicate physician recommendation is clearly important.^{5,7,8,10,11,13,14,19,27} Previous studies have also indicated that low-income and minority patients and those with low literacy may lack sufficient knowledge of CRC screening and its benefits, and desire more information.^{9,13,14,28,29} Therefore, the literature recommends CRC screening education, information, and counseling.^{5,9,11,28} If possible, these services need to be provided. However, the literature has noted the challenges of improving and sustaining CRC physician recommendations, particularly among safety net primary care providers focused on the acute medical and social needs of their patients.^{7,16,19} This study's finding that the physician providing the FOBT kit was the strongest predictor of screening completion has important implications and suggestions for further studies. Over 80% of participants who reported ever being given an FOBT kit by a physician reported that they had completed at least 1 FOBT. The act of giving the patient the test may reduce any access barriers to obtaining the kit (ie, knowing where to get an FOBT, cost, degree of interest). Also, a physician giving the kit is a concrete and powerful recommendation, especially for low-income patients at greater risk for limited education and literacy skills.

While it may be a seemingly simple aspect of screening promotion, our findings provide clear guidance for subtly redesigning the delivery of preventive services in primary care. When considering other proposed strategies, improving recommendation rates and providing FOBTs are relatively low-intensity strategies with a greater likelihood for adoption. O'Malley suggested the possibility of organizational change where nurses deliver the FOBT cards, instructions, and reminders to promote screening.⁷ Future studies are needed to determine if the physician needs to give patients the kit or if it can be given by a nurse or other clinic staff.⁷ In a recent study where a nurse gave the kit, there was an increase in screening in community clinics in San Francisco. During an 18-week influenza vaccination campaign, patients in the intervention group were given FOBT kits by nurses during primary care visits, and FOBT completion rates went from 33% to 46% vs from 31% to 36% in the control group where nurses provided FOBT only when ordered by the primary care physician.³⁰ Another approach that does not rely on the physician to give the kit was found to be effective in Scotland. In this study, patients aged 50–69 enrolled in the National Health Service were mailed an FOBT kit with a letter inviting them to be screened. The kits were mailed from a single screening center and participants sent back a specially designed

envelope to a central laboratory.³¹ The initial return rate was 55%; with subsequent mailings, the initial return rate increased to 63%.

For FOBTs to be an effective means of CRC screening, they must be done annually. Studies are needed to determine if clinics handing out annual FOBTs or mailing them to patients would be effective year after year. In the UK study, the results of year 2 mailings were disappointing; only 15% of patients returned their FOBTs to the clinic.

Our study has limitations: the findings may not be generalizable to all patient populations, as the majority of patients were female and African American. However, this is representative of FQHC populations, particularly in the southern area of the United States. Half of the sample had low literacy, which is more common in older, lower-income populations. FQHCs in the study were in 1 state and all patients were English-speaking; therefore, results may not be generalized to FQHCs serving Hispanic and other minority patients in other states. Data on previous physician recommendation, FOBT education, physician giving an FOBT, and FOBT completion were self-reported. However, the majority of CRC studies use self-reported data for screening completion. While the questions on receipt of services and completion of the FOBT did not provide greater detail such as the type of CRC screening test(s) the physician recommended or the extent of FOBT education/information received, the answers as provided portray the overall relationship between service provided and patient action.

This investigation of factors that influenced FOBT completion in low-income individuals who were not up-to-date with CRC screening indicated that a physician giving rural and inner city safety net clinic patients the FOBT kit was the strongest predictor of their completing screening. These findings have implications for clinical medicine and public health. Identifying practices that have the strongest impact on completion of CRC screening (in inner city and rural clinics that serve low-income patients and those who lack insurance) has the potential to dramatically reduce CRC deaths among groups that are disproportionately affected.³¹

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Table 1

Demographic Characteristics of Sample by Location

	Rural: N = 598 (%)	Urban: N = 251 (%)	Total: N = 849 (%)	P Value
Gender				.35
Female	468(78.3)	189(75.3)	657(77.4)	
Male	130(21.7)	62(24.7)	192(22.6)	
Race				<.0001
African American	357(59.7)	222(88.5)	579(68.2)	
White	238(39.8)	29(11.6)	267(31.5)	
Hispanic	3(0.5)	0(0.0)	3(0.4)	
Age				.16
50–59	395(66.1)	149(59.4)	544(64.1)	
60–69	156(26.1)	76(30.3)	232(27.3)	
70+	47(7.9)	26(10.4)	73(8.6)	
Marital status				<.0001
Single	155(25.9)	98(39.0)	253(29.8)	
Married	234(39.1)	48(19.1)	282(33.2)	
Separated	36(6.0)	23(9.2)	59(7.0)	
Divorced	91(15.2)	46(18.3)	137(16.1)	
Widowed	82(13.7)	36(14.3)	118(13.9)	
Last grade completed				.56
Less than high school	206(34.4)	74(29.5)	280(33.0)	
High school graduate	264(44.1)	121(48.2)	385(45.4)	
Some college	94(15.7)	42(16.7)	136(16.0)	
College graduate and above	34(5.7)	14(5.6)	48(5.7)	
Literacy level				.0003
<Ninth grade	280(47.1)	152(60.8)	432(51.1)	
Ninth grade and above	315(52.9)	98(39.2)	413(48.9)	
Completion of FOBT kit				
Yes	121(20.2)	115(45.8)	236(27.8)	
No	477(79.8)	136(54.2)	613(72.2)	

Table 2

Completion of FOBT Kit by Type of Service Received

	Rural (n = 598)	Urban (n = 251)
Ever been given written information or education on FOBTs		
Number of participants receiving information/education	75	81
Number (%) completing FOBT	43 (57.3%)	54 (66.7%)
Number of participants <i>not</i> receiving information/education	523	170
Number (%) completing FOBT	78 (14.9%)	61 (35.9%)
Risk ratio	3.8	1.9
<i>P</i> value	<.0001	<.0001
Physician ever given you an FOBT kit		
Number of participants receiving FOBT kit	122	121
Number (%) completing FOBT	103 (84.4%)	104 (86.0%)
Number of participants <i>not</i> receiving FOBT kit	476	130
Number (%) completing FOBT	18 (3.8%)	11 (8.5%)
Risk ratio	22.3	10.1
<i>P</i> value	<.0001	<.0001
All of the above		
Number of participants receiving all	28	47
Number (%) completing FOBT	22 (78.6%)	39 (83.0%)
Number of participants <i>not</i> receiving all	570	204
Number (%) completing FOBT	99 (17.4%)	76 (37.3%)
Risk ratio	4.5	2.2
<i>P</i> value	<.0001	<.0001