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BARRIERS AND FACILITATORS OF COLON CANCER SCREENING AMONG PATIENTS AT FAITH-BASED NEIGHBORHOOD HEALTH CENTERS

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ABSTRACT: We determined the barriers to and facilitators of colorectal cancer (CRC) screening among two faith-based, inner city neighborhood health centers in Southwestern Pennsylvania. Data from a random sample of patients 50 years and older (n = 375) were used to estimate logistic regression equations to compare and contrast the predictors of four different CRC screening protocols: (1) fecal occult blood test (FOBT) ≤ 2 years ago, (2) colonoscopy ≤ 10 years ago, (3) lower endoscopy (colonoscopy or sigmoidoscopy) ≤ 10 years ago, and (4) any of these screening measures. Racial differences (between African Americans or Caucasians) in type of colon cancer screening were not found. Controlling for covariates, logistic regression equations showed that a physician's support of colon cancer screening was positively associated with the receipt of colonoscopy (OR: 19.47, 95% CI: 5.45–69.54), lower endoscopy (OR: 10.96, 95% CI: 3.77–31.88) and any colon cancer screening (OR: 10.12, 95% CI: 3.36–30.46). Patients who see their physicians more frequently were also more likely to be screened for CRC. Unlike other studies, the faith-based environment in which these patients are treated may explain the lack of racial disparity specific to our measures of CRC screening.

KEY WORDS: colorectal cancer; screening; spiritual care.

INTRODUCTION

Colorectal cancer (CRC) is the second leading cause of cancer-related death in the United States.[1] An individual's lifetime risk of devel-

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oping colorectal cancer in the United States is nearly 6%, with over 90% of cases occurring after the age of 50.[2] Over the last 20 years, while the incidence of CRC has decreased for Caucasians, it has remained constant for African Americans.[3] African Americans have the highest mortality from CRC of any racial or ethnic group in the United States.[4,5] From 1992–1998, the five year survival rates for CRC were 63% for Caucasians and 53% for African Americans.[6] Data from the Behavioral Risk Factor Surveillance Survey (BRFSS) indicate that CRC screening rates remain low nationwide. In 1999, only 20.6% of eligible patients had undergone a fecal occult blood test (FOBT) within the preceding year, and only 33.6% of eligible patients had undergone sigmoidoscopy and/or colonoscopy in the preceding 5 years.[7] Based on pooled BRFSS data from 1997–1999, rates in Pittsburgh, Pennsylvania were slightly higher for FOBT (21.8%) and sigmoidoscopy (33.9%).[8]

Many patient factors account for low CRC screening rates including low socioeconomic status, [9–11] race,[12] lack of knowledge about CRC,[13,14] confusion about which screening test is appropriate,[13] embarrassment or discomfort discussing tests with physicians,[13,15–17] pain and discomfort of testing, [15–19] concern about the ability to perform the test properly (e.g., FOBT),[13,20] fear of test results,[13,21] cost of screening,[13] and difficulty making an appointment for screening.[16] Health care providers can also be the cause of low screening rates. When physicians do not recommend or discuss screening, patients perceive it to be of low priority.[13,22] Furthermore, physicians in the inner-city cite that they have received little training in preventive medicine and lack staff capable of providing health education to patients.[23]

In Pittsburgh, Pennsylvania, many inner city neighborhood are served by faith-based health centers. These centers offer medical and spiritual care, regardless of ability to pay, as part of the office visit. The purpose of this study is to examine CRC screening among patients of two such faith-based health centers and determine what attitudes, social influences, perceived consequences, and facilitating conditions influence CRC screening and if there are racial differences in self-reported CRC screening rates.

METHODS

Site Descriptions

Health Center A consists of two sister sites in the same organization serving different neighborhoods and Health Center B is a single site. The health centers are similar in that they are located in low-income

urban neighborhoods, have similar missions, and have approximately the same patient demographic distribution. For example, Health Center A served a total of 5610 persons in 2002, of whom 48% were black, 25% were white, and 2% were Hispanic and other (25% were unreported). Health Center B served 3032 persons in 2001, of whom 45% were black, 30% were white, and 1% were Asian (24 % were unreported). The health centers differ somewhat in size, location and insurance coverage. Health Center A has six providers (FTE) with 12 medical support staff divided between two sites. One site is located in a primarily residential neighborhood and the other on a side street of a commercial district but within 1–2 blocks of public housing high-rise apartments. Health insurance coverage for patients at Health Center A is 22% uninsured, 33% Medicaid and 45% private/Medicare/other. Health Center B has three providers with two medical support staff, and is located in a mixed use commercial district on a busy thoroughfare. The insurance coverage of Health Center B patients is 17% uninsured, 29% Medicaid, and 54% private/Medicare/other.

Sample

Patients were sampled from both health centers to participate in a telephone survey to assess their CRC screening status and their attitudes and beliefs about CRC screening. From both health centers, we drew a simple random sample (based on billing records and age) of active patients in two age groups (50–64 or ≥65 years) as of October 1, 2000. This resulted in a sample of 707 patients of whom 59 were determined ineligible (by medical professionals at the centers) because they were deaf, homeless, had severe psychosis or dementia, resided in a nursing home or outside the Pittsburgh metropolitan area. Patients were not excluded if they were CRC patients. Of the remainder, 154 could not be reached and 119 refused, leaving 375 who completed the interview, for a response rate of 58% and a refusal rate of 18%.

Survey Questionnaire

The survey included questions about demographic characteristics, health behaviors and attitudes toward preventive health behaviors. The latter were based on the Triandis model for consumer decision-making from the Theory of Reasoned Action.[24] We chose to use the Triandis model because unlike the health belief model,[25] it measures the impact of social networks, affect and habits as well as physician influence on

patients. The model predicts a variety of behaviors well[26–29] including exercise[28] and birth control/fertility[27] behavior, has been used in different cultural and economic situations [27] and, as used for influenza immunization, has been shown to be internally consistent and externally valid (Cronbach's alpha 0.79 to 0.91).[26] The components of this model include attitudes (e.g., getting screened for CRC is wise); social influences (e.g., doctor or family member recommends screening); consequences of the activity (e.g., screening for CRC increases success of treatment);[26,29] and facilitating conditions (e.g., cost of CRC screening). The final questionnaire contained approximately 57 questions, depending upon skip pattern, including multiple choice items and Likert scale items, and covers immunizations and CRC screening. A personalized introductory letter and a letter from the sites endorsing the project and encouraging participation were sent to each of the sampled patients. An honorarium of $20 was offered to encourage participation.

Interviews were performed using Computer Assisted Telephone Interviewing (CATI). A recent study has shown that the CATI is reliable for collecting self-reported CRC screening behavior.[30] Trained interviewers conducted the telephone interviews between August and October 2002. Use of CATI allowed for direct data entry during the interviews, directed the sequence of questioning, prevented skipped questions through automated skip patterns, and blocked illogical or out of range values.

Dependent Variables

We initially used five dichotomous measures to assess CRC screening among persons aged ≥50 years: fecal occult blood test (FOBT), flexible sigmoidoscopy (FS), colonoscopy, lower endoscopy (either FS or colonoscopy), and any CRC screening. Receipt of FOBT was based on the percentage of patients who (1) answered ''yes'' to ''Have you ever received special cards from your doctor that you used at home to test for blood in your stool?''; and (2) reported receiving it either <1 year ago or 1–2 years ago when asked ''When was the last time you received those cards?'' We chose a more liberal guideline for FOBT instead of the annual one because patients who reported that they had received the screening 1–2 years ago could fall within the ''annual'' guideline. Receipt of FS was based on the percentage of patients who (1) answered ''yes'' to ''Have you ever had a test in which a tube is inserted into the rectum to look for colon cancer or other problems (these tests are called sigmoidoscopy or colonoscopy)?''; (2) indicated ''sigmoidoscopy'' when asked

''Which test did you have?''; and (3) reported receiving it within the past 5 years when asked ''When was the last time you had this test?'' Similarly, the receipt of colonoscopy was based on the percentage of patients who (1) answered ''yes'' to ''Have you ever had a test in which a tube is inserted into the rectum to look for colon cancer or other problems (these tests are called sigmoidoscopy or colonoscopy)?''; (2) indicated ''colonoscopy'' when asked ''Which test did you have?''; and (3) reported receiving it ≤10 years ago when asked ''When was the last time you had this test?'' The receipt of a lower endoscopy was determined by the percentage of patients who (1) answered ''yes'' to ''Have you ever had a test in which a tube is inserted into the rectum to look for colon or other problems (these tests are called sigmoidoscopy or colonoscopy)?''; and (2) reported receiving it ≤10 years ago.

Independent Variables

Based on the Triandis model, six questions were asked specific to attitudes, social influences, perceived consequences, and facilitating conditions of CRC screening. Measures of self-rated health, frequency of visits to a physician, time of last physical exam, frequency of smoking cigarettes, consumption of dietary supplements, and vaccination status for influenza and pneumonia were included. A series of questions on patient's comfort with their physician and their level of trust in the health information they received from different sources were also included. Finally, to identify personal and household characteristics that predispose patients to get screened for CRC, we included a series of variables representing various demographic characteristics.

Procedure

We calculated weights based on the achieved sample to account for different sampling fractions and stratification by age group and site. Chi-squared tests were weighted to compare participants who were and were not screened for CRC by independent variables. Frequency data are reported as weighted percentages only (i.e., reported sample sizes are unweighted). Multivariate logistic regression analyses are weighted and performed to adjust for confounders. All of the variables associated with outcomes in the bivariate analyses or hypothesized to be important were included in the logistic regression models. Sociodemographic characteristics did not vary by site except for race. Therefore, we controlled for site in all multivariate models to account for this difference. Interactions

between (1) race group and the Triandis factors (attitudes, social influences and facilitating conditions) and (2) site and the Triandis factors (attitudes, social influences and facilitating conditions) were tested. All statistical analyses were performed using SAS 8.2 statistical software (SAS Inc, Cary, North Carolina). Statistical significance was set at $p \leq 0.05$.

RESULTS

Descriptive characteristics of the sample

Descriptive characteristics of the sample are presented overall and by type of reported CRC screening in Table 1. Overall, patients are predominantly 50–64 years of age, female, and unemployed. A third (33%) of the sample report an annual household income of less than $10,000 and almost a third are married (31%). Only 13% underwent a FS, about a third reported an FOBT (32%) or colonoscopy (33%), almost half reported being screened by lower endoscopy (47%), and 60% report any form of CRC screening. Although Health Center A has a significantly higher proportion of African American respondents (57%) than Health Center B (34%; $p < 0.001$), there were no significant differences in type of CRC screening by race. Because the sample size for FS is small ($n = 42$), we excluded this outcome measure in further analyses.

Attitudes, Social Influences, Perceived Consequences and Facilitating Conditions

Table 2 shows that attitudes about whether CRC screening is wise or troublesome, the viewpoints held by a patient's physician or family/friends, and whether the patient has health insurance are factors significantly associated with reported CRC screenings. Examining these factors by race revealed differences specific to facilitating conditions alone. Overall, African American patients had more transportation problems getting to their medical appointments (17%) than Caucasian patients (10%, $p < 0.05$). Among patients screened by colonoscopy, endoscopy, or any CRC screening measure, more African Americans than Caucasians reported (1) choosing not to get screened for colon cancer because of cost (colonoscopy: 19% vs. 1%, $p < 0.01$; lower endoscopy: 19% vs. 1%, $p < 0.001$; any CRC screening: 38% vs. 21%, $p < 0.01$) and (2) having problems paying for medical treatments (colonoscopy: 37% vs. 19%, $p < 0.05$; lower endoscopy: 39% vs. 22%, $p < 0.05$; any CRC screening: 38% vs. 21%,

TABLE 1

Descriptive Characteristics of the Sample, Overall and by Self-Reported Type of CRC Screening (n = 375)

Variable	*Overall* % (n)	*FOBT*[a] *≤2 years* % (n)	*Colonoscopy ≤10 years* % (n)	*Lower Endoscopy ≤10 years* % (n)	*Any Screening*[b] % (n)
Age					
50–64 years	64 (185)	31 (57)	32 (56)	48 (88)	60 (112)
65+ years	36 (190)	35 (67)	35 (62)	46 (84)	60 (115)
Gender					
Female	63 (241)	32 (78)	35 (77)	48 (110)	59 (143)
Male	37 (134)	33 (46)	29 (41)	47 (62)	61 (84)
Race[c]					
African American	47 (172)	36 (61)	30 (52)	43 (73)	59 (103)
Caucasian	53 (187)	29 (57)	34 (60)	52 (93)	61 (114)
Marital status					
Married	31 (114)	34 (41)	36 (41)	57 (64)	67 (78)
Single	14 (46)	25 (11)	30 (13)	36 (16)	51 (23)
Widowed	26 (113)	33 (38)	35 (35)	46 (49)	61 (69)
Separated/divorced	30 (100)	33 (34)	29 (29)	45 (43)	57 (57)
Education level					
Elementary/some H.S.[d] (grades 1 to< 12)	22 (93)	26 (24)	38 (31)	59 (42)	55 (50)
H.S. graduate/vocational or technical school	39 (144)	30 (46)	35 (48)	47 (66)	58 (85)
Some college/college graduate	27 (95)	39 (38)	28 (27)	42 (40)	58 (58)
Graduate/professional school	12 (42)	38 (16)	30 (12)	57 (24)	80 (34)*

TABLE 1 (*Continued*)

Variable	*Overall %* (n)	*FOBT*[a] *≤2 years % (n)*	*Colonoscopy ≤10 years % (n)*	*Lower* Endoscopy *≤10 years % (n)*	*Any Screening*[b] *% (n)*
Annual household income					
<$10,000	33 (117)	33 (39)	30 (34)	42 (47)	55 (64)
$10,000–$19,999	30 (104)	25 (28)	37 (36)	48 (47)	54 (58)
$20,000–$39,999	18 (59)	35 (22)	40 (23)	56 (34)	70 (43)
$40,000 or more	19 (62)	46 (28)	17 (17)	51 (31)	71 (45)*
Employment status					
Unemployment	61 (252)	29 (76)	37 (88)	50 (122)	59 (150)
Employed part-time or full-time	39 (121)	38 (48)	27 (30)	44 (50)	63 (77)
Self-rated health					
Excellent	15 (54)	29 (16)	28 (18)	42 (24)	54 (30)
Very good	23 (89)	33 (30)	29 (25)	42 (37)	57 (52)
Good	31 (120)	39 (47)	38 (42)	51 (58)	67 (80)
Fair/poor	31 (110)	26 (31)	32 (33)	50 (53)	59 (65)
Frequency of visit to physician					
Every 1–2 months	25 (96)	27 (24)	44 (37)	60 (51)	62 (58)
3–4 times per year	36 (137)	44 (62)	30 (42)	46 (64)	67 (94)
Less than 2 times per year	39 (139)	26 (38)*	30 (39)	42 (57)*	54 (75)
Time of last physical exam					
Less than 1 year ago	73 (273)	36 (101)	33 (86)	50 (130)	65 (177)
1–2 years ago	16 (59)	26 (15)	27 (17)	36 (22)	47 (28)
More than 2 years ago	11 (36)	17 (6)*	37 (13)	49 (17)	50 (18)*
Frequency of cigarette smoking					
Current smoker	27 (93)	24 (24)	24 (20)	40 (35)	48 (45)
Never a smoker	31 (119)	39 (47)	34 (39)	51 (56)	64 (75)
Once a smoker, but quit	42 (163)	32 (53)	37 (59)	49 (81)	64 (107)*

Frequency of seatbelt use					
Always	67 (253)	34 (88)	34 (81)	51 (123)	64 (163)
Sometimes	23 (83)	31 (26)	29 (24)	38 (31)	52 (44)
Never	10 (34)	27 (9)	39 (12)	49 (16)	53 (18)
Consume dietary supplements					
Yes	63 (236)	36 (87)	33 (74)	49 (113)	65 (155)
No	37 (139)	26 (37)*	33 (44)	45 (59)	51 (72)*
Vaccinated against influenza in 2001					
Yes	53 (210)	39 (83)	37 (75)	52 (107)	67 (144)
No	47 (161)	25 (40)*	28 (42)	41 (61)*	51 (79)*
Ever vaccinated against pneumonia					
Yes	45 (183)	35 (66)	38 (67)	50 (91)	62 (119)
No	55 (179)	31 (54)	29 (49)	46 (78)	59 (102)
Can freely ask physician questions					
Yes	98 (362)	33 (120)	33 (115)	48 (169)	61 (221)
No	2 (9)	41 (4)	42 (3)	36 (3)	64 (6)
Site					
Health center A	48 (200)	47 (87)	32 (62)	47 (92)	66 (133)
Health center B	52 (175)	19 (37)*	33 (56)	48 (80)	54 (94)*

Notes: All percentages are weighted and obtained using SAS; n's are unweighted; percentages may not add to 100% due to rounding error.
[a] Fecal Occult Blood Test
[b] FOBT ≤2 years ago or Colonoscopy or Sigmoidoscopy ≤10 years ago.
[c] 14 patients defined their race as ''other'' and 2 did not define themselves by race.
[d] High school.
* $p \leq 0.05$.

TABLE 2

Attitudes, Social Influences, Perceived Consequences and Facilitating Conditions by Self-Reported Type of CRC Screening (n = 375)

Variable	*FOBT*[a] ≤2 years % (n)	*Colonoscopy* ≤10 years % (n)	*Lower Endoscopy* ≤10 *years* %(n)	*Any Screening*[b] % (n)
Attitudes				
I believe getting a colon cancer test is a wise thing to do.				
Agree/Maybe/Sometimes	34 (116)	35 (116)	51 (169)	63 (216)
Disagree	24 (5)	9 (2)*	9 (2)*	31 (7)*
I believe getting a colon cancer test is more trouble than it's worth.				
Agree/Maybe/Sometimes	20 (8)	18 (6)	24 (9)	41 (16)
Disagree	35 (109)	37 (110)*	53 (159)*	65 (203)*
Social influences				
My doctor thinks I should get checked for colon cancer.				
Agree/Maybe/Sometimes	37 (88)	46 (103)	62 (142)	74 (171)
Disagree	25 (25)*	8 (8)*	19 (18)*	34 (35)*
My family/friends think I should get checked for colon cancer.				
Agree/Maybe/Sometimes	41 (58)	45 (59)	61 (81)	74 (102)
Disagree	29 (44)*	20 (31)*	35 (50)*	49 (73)*

Perceived consequences				
Getting regular colon cancer screening will help identify and treat.				
Agree/Maybe/Sometimes	33 (120)	34 (116)	48 (169)	61 (221)
Disagree	18 (2)	8 (1)	26 (2)	36 (3)
Facilitating conditions				
I don't get screened for colon cancer because of cost.				
Yes	22 (7)	37 (9)	48 (12)	56 (15)
No	34 (115)	33 (109)	50 (160)	61 (210)
I have problems paying for my medical treatments.				
Yes	28 (30)	30 (27)	46 (43)	58 (59)
No	34 (94)	34 (91)	48 (129)	61 (168)
I have health insurance.				
Yes	34 (115)	34 (109)	50 (159)	62 (209)
No	23 (9)	23 (9)	33 (13)*	45 (18)*
I have transportation problems getting to my medical appointments.				
Yes	25 (11)	32 (12)	47 (19)	57 (24)
No	33 (113)	33 (106)	48 (153)	60 (203)

Notes: All percentages are weighted and obtained using SAS; n's are unweighted; *p*-value obtained by chi-squared test of screening type by Triandis factor.

*$p \leq 0.05$

$p < 0.01$). Among those who reported being screened by any CRC screening measure, 94% of Caucasians had health insurance compared to 85% of African Americans ($p < 0.05$).

Patients' Trust

Participants were also asked to rate their level of trust in health information they receive from various sources. Those screened by FOBT (66% vs. 52%, $p < 0.05$), colonoscopy (64% vs. 53%, $p < 0.05$), lower endoscopy (62% vs. 51%, $p < 0.05$) or any CRC screening (63% vs. 46%, $p < 0.01$) more frequently trusted ''mostly or some'' health information from the government than unscreened patients. Furthermore, patients who where screened by FOBT (68% vs. 55%, $p < 0.05$), lower endoscopy (65% vs. 54%, $p = 0.05$), or any method of screening (65% vs. 51%, $p < 0.01$) more frequently trusted ''mostly or some'' information from the television or radio than the unscreened. For each of the four screening measures, screened and unscreened patients trust information from their personal physician, friends or family, local church or religious leaders, and newspapers or magazines with almost equal frequency.

Logistic Regression Analyses

Logistic regression models specific to self-reported FOBT, colonoscopy, lower endoscopy, and any CRC screening are presented in Table 3. Controlling for other covariates, the social influence of a physician's support of CRC screening was positively associated with reported colonoscopy, lower endoscopy and any CRC screening. Patients who believed that their ''doctor thinks [they] should get checked for colon cancer'' were 19 times more likely to report a colonoscopy and 10 times more likely to report a lower endoscopy or any CRC screening, compared to patients without this belief. In addition, patients who reported visiting their physicians more frequently were more likely to report a CRC screening than those who visit less frequently. In contrast, patients who believed that ''getting a colon cancer test is more trouble than it's worth'' were 78% less likely to report a lower endoscopy than those who disagreed with this belief. Health behaviors such as never smoking cigarettes and taking dietary supplements were also positively associated with CRC screening. Also of note are differences in gender and trust in health information from the television/radio. Compared to males, females were 54% less likely report an FOBT although they were 3 times more likely to report a colonoscopy. Patients who ''mostly or somewhat'' trusted the

TABLE 3

Variables Associated with Self-Reported Type of CRC Screening in Logistic Regression Analyses (n = 375)

Variable	*FOBT*[a] *OR*[b] *(95% CI*[c]*)*	*Colonoscopy OR (95% CI)*	*Lower Endoscopy OR (95% CI)*	*Any Screening*[d] *OR (95% CI)*
Health Center A (referent, Center B)	0.20 (0.10–0.42)*	0.85 (0.41–1.77)	1.08 (0.52–2.20)	0.46 (0.21–0.99)*
Attitudes				
I believe getting a colon cancer test is a wise thing to do	–	–	–	0.43 (0.07–2.79)
I believe getting a colon cancer test is more trouble than it's worth	0.26 (0.05–1.31)	0.56 (0.12–2.57)	0.22 (0.05–1.02)*	0.30 (0.07–1.32)
Social Influences				
My doctor thinks I should get checked	1.65 (0.61–4.50)	19.47 (5.45–69.54)*	10.96 (3.77–31.88)*	10.12 (3.36–30.46)*
My family/friends think I should get checked	1.32 (0.55–3.18)	1.49 (0.64–3.45)	1.56 (0.70–3.49)	1.48 (0.61–3.59)
Facilitating Conditions				
I have health insurance	0.70 (0.21–2.37)	0.56 (0.18–1.78)	0.66 (0.22–1.98)	0.70 (0.23–2.12)
Health Care Utilization				
Frequency of visit to physician <2 times per year)				
Every 1–2 months	2.48 (1.02–6.02)*	2.95 (0.97–9.01)*	4.82 (1.63–14.23)*	3.31 (1.06–10.35)*
3–4 times per year	1.41 (0.47–4.20)	1.05 (0.43–2.52)	1.25 (1.63–14.26)	1.48 (0.59–3.71)

TABLE 3 (*Continued*)

Variable	*FOBT*[a] *OR*[b] *(95% CI*[c]*)*	*Colonoscopy OR (95% CI)*	*Lower Endoscopy OR (95% CI)*	*Any Screening*[d] *OR (95% CI)*
Last time completed physical exam (referent, >2 years ago)				
1 year ago	2.51 (0.66–9.47)	1.09 (0.35–3.38)	1.34 (0.43–4.12)	2.09 (0.66–6.67)
1–2 years ago	2.05 (0.42–10.11)	1.08 (0.26–4.46)	0.67 (0.16–2.71)	1.01 (0.25–4.14)
Health Behaviors				
Smoking behavior (referent, current smoker)				
Never a smoker	1.88 (0.64–5.46)	5.03 (1.63–15.48)*	3.72 (1.25–11.11)*	4.92 (1.57–15.37)*
Once a smoker, but quit	1.39 (0.54–3.58)	2.33 (0.89–6.11)	1.11 (0.44–2.78)	1.77 (0.70–4.51)
Take dietary supplements	2.40 (1.13–5.10)*	0.73 (0.34–1.54)	0.88 (0.42–1.82)	1.72 (0.78–3.80)
Received influenza vaccine in 2001	1.27 (0.60–2.72)	1.05 (0.49–2.26)	1.31 (0.61–2.81)	1.42 (0.62–3.24)
Trust				
Trust health information from television/radio	1.64 (0.76–3.58)	1.25 (0.55–2.84)	1.98 (0.90–4.31)	2.23 (1.00–4.98)*
Trust health information from the government	1.83 (0.83–4.07)	1.13 (0.50–2.58)	1.21 (0.56–2.61)	1.81 (0.80–4.07)
Demographics				
Age 65+ years (referent, 50–64 years)	0.69 (0.31–1.56)	0.65 (0.28–1.52)	0.82 (0.36–1.89)	0.81 (0.33–1.97)
Female (referent, male)	0.46 (0.21–1.00)*	3.04 (1.36–6.83)*	1.79 (0.83–3.87)	0.87 (0.39–1.94)
African American (referent, Caucasian)	1.28 (0.58–2.80)	0.55 (0.23–1.29)	0.53 (0.24–1.18)	0.76 (0.33–1.76)
Education level completed (referent, graduate/professional)				
Elementary/some H.S.[e] (grades 1 to < 12)	3.44 (0.77–15.32)	2.31 (0.56–9.62)	0.74 (0.17–3.22)	0.51 (0.09–3.08)

H. S. graduate/vocational or technical school	2.73 (0.70–10.70)	2.59 (0.70–9.57)	0.74 (0.19–2.89)	0.71 (0.13–3.98)
Some college/college graduate	3.29 (0.91–11.86)	0.59 (0.18–1.94)	0.24 (0.07–0.83)*	0.29 (0.06–1.46)
Annual household income (referent, ≥$40,000)				
<$10,000	1.00 (0.29–3.48)	0.50 (0.14–1.80)	0.51 (0.15–1.76)	0.60 (0.17–2.18)
$10,000–$19,999	0.79 (0.25–2.46)	0.91 (0.29–2.87)	1.12 (0.36–3.46)	1.02 (0.32–3.32)
$20,000–$39,999	1.58 (0.48–5.19)	1.67 (0.52–5.32)	2.73 (0.81–9.26)	3.89 (0.93–16.29)

Notes: All percentages are weighted and obtained using SAS; n's are unweighted.
[a] Fecal Occult Blood Test.
[b] Odds Ratio.
[c] Confidence Interval.
[d] FOBT ≤2 years ago or Colonoscopy or Sigmoidoscopy ≤10 years ago.
[e] High School.
*$p \leq 0.05$.

health information from the television/radio were more than 2 times as likely to report any CRC screening than those who trusted ''little or none'' of this information.

Although interactions between race group and the Triandis factors specific to attitudes and social influences were not significant, the interaction between race group and having health insurance significantly predicted reported FOBT alone. Compared to Caucasians with health insurance, African Americans without health insurance were 6 times more likely to report an FOBT (OR: 6.7, 95% CI: 1.3–35.2). Possible differences by site were also tested by interacting site with Triandis factors in the models (i.e., attitudes, social influences and facilitating conditions), of which none were significant.

DISCUSSION

This analysis focuses on the predictors of four different self-reported CRC screening protocols among patients 50 years of age and older who frequent one of two faith-based health centers in Pittsburgh, Pennsylvania. When we compare our findings with data from the Behavioral Risk Factor Surveillance System (BRFSS) specific to the Pittsburgh metropolitan area,[8] we report higher rates for FOBT (32% vs. 22%) but lower rates for FS (13% vs. 34%). The higher rate for FOBT most likely reflects our more liberal definition of the FOBT guideline. Furthermore, when we compare our rates to others[31] who used similar guidelines for patients at primary care academic medical centers, we report lower rates for FOBT and FS, but higher rates for colonoscopy, lower endoscopy, or any colon cancer screening. This discrepancy may result from setting, regional or sample size differences.

Unlike other studies[4–6,12,32] racial disparities in self-reported CRC screening were not found in this study. Furthermore, racial differences specific to attitudes, social influences or perceived consequences of CRC screening were also absent. This lack of racial disparity could be due to the faith-based environment of the health centers these patients visit. The idea that an environment may influence screening rates has been discussed by Beeker et al.[33] who propose that culturally based clinics can promote screening rates. Health centers that integrate the delivery of health services with spiritual components (such as prayer) may reduce previously observed racial disparities in health promotion behaviors, such as CRC screening. This idea is worthy of further investigation and may

result in furthering the development of public health centers targeted at reducing disease specific mortality rates among minority populations.

The strongest single predictor of self-reported CRC screening in our analyses was the support of CRC screening by the patient's physician. Patients who believe their physician supports CRC screening were more likely to self-report colonoscopy, lower endoscopy, or any of three screening protocols (FOBT, colonoscopy, FS). Thus, our findings support that of others[10,13,15,34–40] which show that physician encouragement or recommendation is strongly related to participation in CRC screening. Furthermore, our finding that African Americans without health insurance were almost 7 times more likely to report an FOBT than Caucasians with health insurance may reflect the cost generally associated with CRC screening. Although Medicare now insures beneficiaries aged 50 and older for a colonoscopy every 10 years, an FOBT remains the least expensive and least invasive procedure. This may be particularly true among those 50–64 years of age, a number of whom lack insurance (whereas almost all persons ≥65 years of age have Medicare).

Secondary prevention strategies are key to reducing mortality of CRC. Health education programs targeted at African Americans are especially important given their higher CRC mortality rates. Our finding that patients who practice positive health behaviors (i.e., taking dietary supplements and not smoking) were more likely to report CRC screening could support the development of health education programs that integrate the importance of a variety of health promotion strategies such as CRC screenings, mammography, smoking cessation, weight management or diet. Furthermore, integrated health education programs may facilitate the discussion of this topic in a broader context and thereby help to reduce the discomfort associated with discussing CRC screening.

A potential limitation of this study is our reliance on cross-sectional data which limits our ability to draw causal inferences. As such, the direction of the association between attitudes, social influences, facilitating conditions and screening behavior cannot be discerned, though it is likely bidirectional. For instance, believing that ones physician ''thinks they should get checked'' for CRC could motivate adherence to screening guidelines. Alternatively, being screened may lead to the belief that screening can prevent CRC due to information shared by the physician. Another limitation of our study pertains to our sample. Unfortunately, we were unable to determine whether surveyed patients were also CRC patients. Patients with current or past CRC might more strongly adhere to screening guidelines than those without CRC. Furthermore, patients with CRC may have different attitudes or beliefs about screening than non-CRC patients.

Finally, as this study included only two racial groups (African Americans and Caucasians) results cannot be generalized to other racial or ethnic groups.

Strengths of this study include the use of computer-assisted telephone interviewing and responses from a racially diverse population that ordinarily are more difficult to reach, than socioeconomically advantaged groups. Future prospective studies should further explore the cultural environment in which patients and physicians interact. Whether and how spiritual care in a clinical setting ultimately influences screening behavior may help us target at-risk populations. Finally, intervention studies should measure the extent to which attitudes, social influences, and facilitating conditions can influence screening behavior over time.

CONCLUSION

Among patients at two faith-based health centers, this investigation examined the characteristics associated with four self-reported measures of CRC screening. An understanding of the predictors associated with different CRC screenings is of growing importance if we seek to reduce mortality due to CRC. We conclude that among African Americans, the cultural environment in which patients interact with their physicians (i.e., faith-based health centers) may influence CRC screening rates such that racial disparities are eradicated.

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