



HHS Public Access

Author manuscript

J Cancer Educ. Author manuscript; available in PMC 2024 December 01.

Published in final edited form as:

J Cancer Educ. 2023 December ; 38(6): 1816–1824. doi:10.1007/s13187-023-02337-1.

Association of preventive care attitudes and beliefs with colorectal cancer screening history among African American patients of community health centers

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Abstract

Colorectal cancer (CRC) is the third most common cancer and third leading cause of cancer-related death among African Americans in the United States. However, when detected early, CRC is treatable and survival rates are high. CRC health disparities for African Americans compared with other groups may be due in part to lower screening adherence and later stage diagnosis. The objective of this research phase was to test predictors of ever having received CRC screening (i.e., self-report of lifetime receipt of CRC screening) using survey measures in the domains of healthcare communication, trust in doctors, CRC perceived susceptibility, CRC worry, negative cancer beliefs, CRC screening self-efficacy, and cultural constructs for CRC screening in a sample of African American community health center patients. The study recruited 115 African American patients between the ages of 45 to 64 years old from community health centers in north Florida to complete the baseline survey. Our results show significant differences in CRC screening history by age, marital status, level of mistrust of healthcare providers, and level of empowerment toward cancer screening. To increase CRC screening in this population, the study findings suggest development of intervention programs that focus on priority populations of younger, unmarried African Americans, especially given the current trend of early onset CRC. Moreover, survival rates are lower for unmarried and younger African Americans relative to older and married individuals. Such interventions should also aim to increase trust in healthcare providers and increase empowerment for CRC screening decision making to increase screening participation.

Keywords

Colorectal cancer; Cancer screening; African Americans; Survey research

Introduction

Colorectal cancer (CRC) is the third most common cancer and third leading cause of cancer-related death among African Americans. African Americans had 40% higher mortality rates for men and 30% higher mortality rates for women compared to non-Hispanic whites (2014-18) for CRC [1]. Cancer health disparities in mortality for African Americans have been attributed to lower rates of screening and lower stage-specific survival rates [2]. CRC screening rates for African Americans are also lower than their white counterparts. The target for Healthy People 2030 is for 68.3% of the age-eligible population to receive CRC screening based on the most recent guidelines [3]. In Florida, 69.3% of whites compared to 53.1% of African Americans had received a colonoscopy in the past 10 years (2018), and 17.6% of whites compared to 26.4% of African Americans had received a stool-based test in

the last year (2020) [4]. These numbers for Florida suggest there may be greater barriers for access to colonoscopy that may explain the lower screening rates for African Americans for the most common screening test.

For CRC screening, an analysis of data from the National Health Interview Survey (NHIS) reported that between 2019 and 2021, CRC screening slightly decreased for men from 46.4% to 45.5% and slightly increased for women from 40.6% to 41.6% [5]. The past-year stool blood test rate increased from 7.0% to 10.3% but past-year colonoscopy use decreased from 15.5% to 13.8% [5]. The uptick in stool-based CRC screening is partly an artifact of screening trends during the Covid-19 pandemic, during which time there were fewer colonoscopy procedures [5]. Consequently, there has been a trend toward increased use of stool-based tests, which is a front-line test used in community health centers across the US [6]. Stool-based screening across community health centers (CHC) in the US averaged 44% in 2020, so there is potential for improvement [7]. Barriers for CHCs to improve CRC screening rates include lack of in-facility testing, knowledge and attitudes toward CRC screening, and barriers with implementing effective intervention strategies such as using patient navigators and leveraging electronic medical record systems more effectively [7].

When detected at an earlier stage of disease, CRC is treatable and survival rates are high. However, early detection is a function of CRC screening adherence. Average-risk persons in the US are adherent if they have received a colonoscopy within the last 10 years or a stool blood test within the last year [e.g., fecal immunochemical test (FIT) or a stool DNA test within the last 3 years]. A provider may recommend additional testing to look for cancer or polyps in the colon following a positive stool test. During a colonoscopy screening when the patient is sedated, precancerous polyps can be removed during the procedure to prevent CRC. An assessment of the magnitude of perceived net benefits issued by the US Preventive Services Task Force (USPSTF) provides a “B” recommendation for all average-risk persons to participate in CRC screening between the ages of 45 to 49 years, and an “A” recommendation for adults between the ages of 50 and 75 years [3].

The Test Up Now Education Program (TUNE-UP) study recruited research participants based on not being adherent with CRC screening, and adherence was determined as 9 years since last colonoscopy (10-year screening interval recommended) or 9 months since last stool blood test (1-year screening interval recommended for the FIT). The objective of this research phase was to test baseline predictors of ever having received CRC screening (i.e., self-report of lifetime receipt of any recommended CRC screening) using survey measures in the domains of healthcare communication, trust in doctors, CRC perceived susceptibility, CRC worry, negative cancer beliefs, CRC screening self-efficacy, and cultural constructs for CRC screening in a sample of African American community health center patients who met eligibility requirements to be enrolled in the study.

Methods

The TUNE-UP study is a two-group pretest/posttest pragmatic randomized behavioral clinical trial (Clinical trial registration: [NCT04304001](https://clinicaltrials.gov/ct2/show/study/NCT04304001)). The primary study aim is to test the effectiveness of a community health advisor intervention to increase stool-based testing

for CRC. The intervention and the study protocol for the trial have been published elsewhere [8, 9]. The study was approved by the Florida A&M University Institutional Review Board (IRB#1439452-2).

Data collection and study measures

The baseline survey questions were drawn from the Health Information National Trends Survey (HINTS) on demographics, body mass index (BMI), insurance coverage, having a regular healthcare provider, history of tobacco use, self-reported health status, current chronic health condition, feelings of depression or anxiety, family history of cancer, and beliefs and worry about getting cancer and seeking care [10]. In addition, there were validated scales or single items on health literacy [11], healthcare communication [10], trust in doctors [12], CRC perceived susceptibility [13], CRC worry [14], negative cancer beliefs [10], CRC screening self-efficacy [13], depression (PHQ-2) [15], generalized anxiety disorder (GAD-2) [16], and cultural factors related to cancer screening from the multi-construct African American Cultural Survey (MAACS) [17]. The binary dependent variable assessed whether participants had ever received CRC screening [14].

Participant recruitment and study eligibility

To be eligible for the study, study participants needed to satisfy specific inclusion criteria: (1) 45-64 years old, (2) African American, (3) working phone, (4) Florida resident, (5) not be up-to-date to screening (>9 months since stool test, >9 years since last colonoscopy, or >4 years since last flexible sigmoidoscopy), and (6) be a patient of one of two community health centers (CHC) in the study area in north Florida. Participants were excluded during the informed consent process if they had a previous history of CRC, precancerous polyps, or certain health conditions such as Lynch syndrome, Crohn's disease, or diseases of the bowels. With the assistance of the two CHC's, bimonthly text messages were sent to CHC patients with instructions to contact the project coordinator to determine study eligibility if they expressed interest. There was also a recruitment flyer with the project coordinator's contact information posted in the CHC waiting room areas as well as community events where the CHC was a partner. Participant recruitment began in April 2021 and lasted through March 2023. The project coordinator determined eligibility over the phone, administered the verbal informed consent, and met with the study participants to administer the baseline survey face-to-face. Participants received a copy of the consent form, completed the gift card receipt form, and received a \$20 retail store gift card as compensation for their participation. They also received a tailored educational brochure titled, *What Black Men and Women need to know about Colorectal Cancer Screening* [18].

Data management

Participants were all assigned a unique identification number. The paper surveys were double entered into the REDCap research management software platform by two research assistants to ensure accuracy. REDCap is a secure web application hosted on a local server to facilitate the management of survey data and enable export to statistical packages for analysis [19].

Statistical analysis

All statistical analyses were conducted using SAS v. 9.4. First, descriptive statistics were generated for all variables. Next, bivariate analyses were performed for key variables to compare differences on the dichotomous variable, “ever received CRC screening.” Categorical variables were compared using chi-square tests, and continuous variables, including scale variables, were compared using two-sample t-tests. The predictors that were found to be related to CRC screening history (1=yes; 2=no) in the bivariate analysis ($p < 0.10$) were then entered into a multivariate logistic regression model.

Results

Over the two-year recruitment period for the TUNE-UP clinical trial, 115 participants completed the baseline survey. Over half of the participants (55%) were female and less than half (45%) were male. Close to two-thirds of participants (64%) had a regular health care provider, and 76% of participants reported that this provider was their medical home. Over half of participants (60%) had some form of health insurance such as Medicaid (21%), an individual plan (e.g., ACA Marketplace), (16%), or an employer-based health insurance plan (5%). One-third of participants (33%) were employed. Survey participants had a mean age of 54.7 years (standard deviation = 5.4) and 23% were married or living with a partner. In response to the question if a doctor had discussed different CRC screening tests, 57% of participants responded “yes.” Over one-third of participants (37%) reported fair or poor health status; however, the vast majority (95%) reported some type of chronic health condition (e.g., diabetes or high blood pressure). In response to the question of whether participants had ever received CRC screening, 32% responded “yes.” For those who responded “no,” reasons included “I am going to discuss with my doctor,” “I am planning to be screened next year,” and “never heard of the tests.” Table 1 provides additional details on the results of the chi-square tests organized by the dependent variable, “ever completed CRC screening.”

Bivariate analysis of scale measures for cancer-related beliefs and attitudes were also conducted to test for differences. For participants who had never been screened, there were more overall negative responses to having had positive healthcare communication with their providers, indicated by a higher mean score on the 7-item scale, but it did not reach statistical significance ($p = .08$). For participants who had never been screened, there was a higher level of disagreement regarding having trust in their physician ($p = .04$). For participants who had never received CRC screening there was a lower level of CRC worry, but it was not statistically significant ($p = .06$). For the other scale measures, there were no statistically significant differences between the groups based on the dependent variable of screening receipt, except for the MAACS subscale on empowerment which indicated higher scores for those in category of ever being screened, indicating greater empowerment around personal agency and cancer screening on the 6-item subscale ($p = .03$). Table 2 provides additional details on the results of the t-tests with values organized by the dependent variable, “ever completed CRC screening.”

Table 3 presents odds ratios and their 95% confidence intervals from a multivariate logistic regression model predicting ever having received CRC screening. Three sets of predictors

were included in the model: Socio-demographic (gender, age, marital status, education, and employment), Communication/Trust scales (healthcare communication, trust in doctors, and CRC worry), and seven MAACS subscales. The likelihood ratio chi-squared value (35.4, $df=15$, $p < 0.01$) showed the logistic model presented fit the data well. From the socio-economic factors considered, age and marital status were significant predictors of CRC screening history. Study participants in the 55-64 age-group were about seven times more likely (OR = 6.58, 95% CI 1.75-24.77) to ever being screened compared to participants in the 45-54 age-group. Participants who were married or living with a partner were about ten times more likely (OR = 10.56, 95% CI 1.73-64.41) to ever being screened relative to those who were single (also included separated, widowed, or divorced individuals). Study participants who had higher levels of education were close to five times more likely (OR = 4.66, 95% CI 1.21-17.91) to ever being screened compared to those with lower levels of education. From the MAACS measures, only mistrust and empowerment were significantly associated with ever having received CRC screening. Higher values on the MAACS mistrust subscale (i.e., greater trust) were positively associated with ever being screened (OR = 1.26, 95% CI 1.01-1.56). In addition, higher values on the MAACS empowerment scale (i.e., more empowerment) were also positively associated with ever being screened (OR = 1.29, 95% CI 1.03-1.61).

Discussion

The study findings indicate significant differences in CRC screening history by age, marital status, mistrust of healthcare providers, and empowerment toward cancer screening. To increase CRC screening in this African American patient population of CHCs, the results point to the importance of intervention programs to consider priority populations such as younger and single African Americans, especially given the current trend of early onset CRC [20]. This study included individuals in the 45–49-year-old category, a population that should be prioritized for CRC screening, and in this case, utilized stool-based tests in the context of being a patient of a CHC. A separate study with 817 African American patients also identified age as a significant predictor of intention to receive a stool blood test [21]. Moreover, while younger individuals tend to underutilize CRC screening, married individuals have higher rates of adherence. A study using US national survey data reported 69% of married participants completed CRC screening compared to 53% of never married individuals [22]. Our study adds to the literature on the effect of marital status on screening to show that among an African American patient population with a low level of CRC screening, there was a 13-percentage point difference by marital status.

Screening interventions should also aim to increase trust in healthcare providers and increase empowerment for CRC screening decision making. The 6-item empowerment subscale and 9-item mistrust/discrimination subscale from the MAACS were significant predictors of CRC screening history. A prior systematic review reported that medical mistrust is a factor which may partially explain CRC screening disparities in African Americans [23]. This study identifies mistrust/discrimination, which included items regarding preference for an African American doctor, trust in doctors, and racial discrimination in the doctor's office, as associated with CRC screening history. Like the Thompson et al. study, among the sociocultural variables considered from the MAACS, in our study, empowerment also

had the strongest association with CRC screening, and consequently, this cultural construct should be considered when designing intervention programs [17]. Our study adds additional evidence for the importance of empowerment (i.e., strong belief in individual's ability to affect cancer outcomes) related to CRC screening; however, unlike the Thompson et al. study, our study did not find evidence that participants who held strong privacy beliefs were less likely to have participated in CRC screening [17]. To bolster empowerment, intervention materials should reinforce the belief that having regular screening tests will prolong a person's life, help to support the family, and avoid future medical problems.

Another study with African Americans examined discussions with providers for CRC screening and reported that 48% of 103 African American male participants did not receive a recommendation from their provider for CRC screening [24]. A clinical trial of a computer-based intervention to increase CRC screening identified patient-provider discussions as a mediator for completing a stool blood test [25]. In our study, 57% of participants had discussed CRC screening with their doctor, but only 32% reported ever receiving CRC screening. Provider recommendation for cancer screening is an effective strategy for increasing cancer screening adherence. Thus, providers and the healthcare team have a vital role to play to help inculcate the behavior of regular CRC screening to boost screening rates.

Limitations

There were some limitations to this study. The first limitation is that screening history was based on self-report. Confirmation of CRC screening was not objectively verified by medical record review at baseline. Per study eligibility, all participants were determined not to be up to date with screening based on self-report. Further, the sample size was not large, but it was sufficient to predict screening history based on a limited set of variables selected for the analysis. The study relied on CHC text messaging for recruitment of participants by asking them to contact the study coordinator. Another major challenge in recruiting participants consisted of the fact that 202 potential participants who showed interest in participating were either up to date with CRC screening or were not enrolled because of other exclusion criteria.

Conclusion

Cancer health disparities persist for African Americans, especially in the US South where health insurance rates are lower, partly because many of the southern states have declined to participate in Medicaid expansion under the Affordable Care Act [26]. Consequently, additional studies are needed to examine the individual and structural factors related to CRC screening in African Americans to inform intervention programs. The scales and individual items used in the survey collected reliable data to measure beliefs and attitudes toward CRC screening among African American CHC patients. This study identified key cultural barriers (mistrust/discrimination) and facilitators (empowerment) to CRC screening that merit consideration when designing intervention programs to increase screening. Results of the current study were similar to past research findings that older and married individuals were more likely to have ever received CRC screening. Subsequent study activities include

completing the 12-month follow-up surveys with participants and electronic medical record verification of CRC screening to test the effectiveness of the community health advisor educational intervention to increase stool-based screening. The goal of our research program is to decrease CRC screening disparities for African Americans by delivering culturally appropriate intervention and outreach programs.

Acknowledgements

We sincerely appreciate the invaluable assistance of the U54 RCMI Community Engagement Core headed by Dr. Sandra Suther and our community partners from Bond Community Health Center (Dr. Temple O. Robinson, MD, and Ms. Bessie Duncan) and Neighborhood Medical Center (Ms. Jeanne' S. Freeman, Mr. Mark Leonard, and Ms. Yolanda Gibson) for providing critical assistance with recruiting participants and organizing team meetings. Finally, we acknowledge support of the U54 RCMI Center Office – Ms. Leola Hubert-Randolph and Ms. Gloria O. James–Academic Support Services, Florida A&M University College of Pharmacy and Pharmaceutical Sciences, Institute of Public Health and U54 RCMI Principal Investigator, Dr. Karam F. Soliman.

Funding

This article was supported by funding from the National Institute on Minority Health and Health Disparities of the National Institutes of Health under Award Number U54 MD007582. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

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Table 1.

Sociodemographic Characteristics and Cancer Perceptions of African Americans by Ever Screened Status for Colorectal Cancer

Characteristics	Total (n) ^a	CRC Screening Ever (yes), %	CRC Screening Ever (no), %	p values
Overall	115	32.2	67.8	<.001
Age group (years)				
45-54	54	31.4	59.7	.006
55-64	53	68.6	40.3	
Gender				
Male	52	38.5	61.5	.190
Female	63	27.0	73.0	
Marital status				
Single/separated/widowed/divorced	89	29.2	70.8	.209
Married/living with a partner	26	42.3	57.7	
Education				
<11 years	16	31.3	68.8	.207
12 years or high school	37	21.6	78.4	
Some college, technical, or higher	59	39.0	61.0	
Employed				
Yes	38	23.7	76.3	.171
No	77	36.4	63.6	
BMI				
Normal weight, 18.5-24.9	15	26.7	73.3	.402
Overweight, 20.0-29.9	28	25.0	75.0	
Obese, 30.0	63	38.1	61.9	
Health insurance coverage				
Yes	46	33.3	66.7	.744
No	69	30.4	69.6	
Have a regular provider				
Yes	74	33.8	66.2	.620
No	41	29.3	70.7	
History of smoking cigarettes				
Yes	53	34.0	66.0	.749
No	61	31.1	68.9	
Self-reported health status				
Excellent/very good	29	48.3	51.7	.123
Good	42	26.2	73.9	
Fair/poor	41	29.3	70.7	
Current chronic health condition ^b				

Characteristics	Total (n) ^a	CRC Screening Ever (yes), %	CRC Screening Ever (no), %	p values
Yes	96	32.3	67.7	.661
No	5	40.0	60.0	
Depression or anxiety				
Yes	39	38.5	28.6	.289
No	70	61.5	71.4	
Family history of cancer				
Yes	73	30.1	69.9	.425
No	40	37.5	62.5	
Chances of getting cancer				
Very unlikely/unlikely	30	36.7	63.3	.634
Neither unlikely nor likely	46	28.3	71.7	
Very likely/likely	35	37.1	62.9	
Worry about cancer				
Not at all/slightly	48	41.7	58.3	.084
Somewhat	25	16.0	84.0	
Moderately/extremely	41	31.7	68.3	
If you were diagnosed with cancer, obtaining follow-up care would be difficult				
Yes	28	28.6	71.4	.724
No	84	32.1	67.9	

^aTotal may not sum to 115 for some questions because of missing data.

^bDerived variable from five different types of chronic conditions, including diabetes, high blood pressure, heart conditions, chronic lung disease (or asthma, emphysema, chronic bronchitis), and arthritis or rheumatism.

Table 2.

Responses for Cancer-Related Beliefs and Attitudes by Ever Screened Status for Colorectal Cancer

Characteristics	CRC Screening Ever (yes) (M ± SD)	CRC Screening Ever (no) (M ± SD)	p values
<i>Health Literacy Screener^a</i>			
How often do you have difficulty learning about your health or medical condition due to not understanding what is written?	1.62 ± 0.68	1.59 ± 0.63	.806
<i>Healthcare Communication Scale^b</i>	9.59 ± 4.90	11.63 ± 5.40	.075
How often did they give you the chance to ask all the health-related questions you had?			
How often did they give you the attention you needed to your feelings and emotions?			
How often did they involve you in decisions about your health care as much as you wanted?			
How often did they make sure you understood the things you needed to do to take care of your health?			
How often did they explain things in a way you could understand?			
How often did they spend enough time with you?			
How often did they help you deal with feelings of uncertainty about your health or health care?			
<i>Trust in Doctors Scale^c</i>	19.41 ± 6.33	22.22 ± 7.16	.044 *
Your doctor does whatever it takes to get you the care you need			
Sometimes your doctor cares more about convenience than your health care			
Your doctor's medical skills are not as good as they should be			
Your doctor is extremely thorough and careful			
You completely trust your doctor's decisions about what's best for you			
Your doctor is totally honest about all treatment options available to you			
Your doctor only thinks about what is best for you			
Sometimes your doctor doesn't pay full attention to what you're telling them			
You have no worries about putting your life in your doctor's hands			
You completely trust your doctor			
<i>CRC perceived susceptibility^d</i>	8.78 ± 1.89	9.03 ± 2.23	.570
I believe the chance I might develop CRC is high			
I think it is very likely I will develop CRC or polyps			
I believe the chance I will develop colorectal polyps is high			
<i>CRC worry^d</i>	6.41 ± 1.28	5.85 ± 1.53	.057
I am afraid of having an abnormal screening result			
I am worried that screening will show that I have CRC or polyps			
<i>Negative cancer beliefs^d</i>	10.68 ± 2.03	10.44 ± 2.56	.618
It seems like everything causes cancer			
There's not much you can do to lower your chances of getting cancer			
It's so hard to know which cancer prevention recommendations to follow			

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Characteristics	CRC Screening Ever (yes) ($M \pm SD$)	CRC Screening Ever (no) ($M \pm SD$)	<i>p</i> values
In adults, cancer is more common than heart disease			
<i>CRC screening self-efficacy</i> ^d	7.59 ± 2.14	7.92 ± 2.21	.453
Arranging my schedule for CRC screening is easy			
Finding time for CRC screening would be difficult			
Going through CRC screening would be difficult			
Going through CRC screening would be easy			
<i>Patient Health Questionnaire 2-item (PHQ-2)</i> ^e	1.89 ± 1.88	1.88 ± 1.85	.988
Over the past 2 weeks how often have you been bothered by having little interest in doing things?			
Feeling down/depressed/hopeless?			
<i>Generalized Anxiety Disorder 2-item (GAD-2)</i> ^e	1.81 ± 2.07	1.62 ± 1.92	.643
Feeling nervous/anxious/on edge?			
Not able to stop/control worrying?			
<i>MAACS Measures and Subscales</i> ^f			
<i>MAACS Religiosity (6 items)</i>	24.35 ± 3.56	24.40 ± 4.66	.958
<i>MAACS Mistrust/Discrimination (9 items)</i>	25.97 ± 4.94	25.19 ± 4.42	.396
<i>MAACS Privacy (6 items)</i>	14.11 ± 5.41	14.94 ± 4.39	.383
<i>MAACS Ethnic Identity (7 items)</i>	24.58 ± 5.37	24.01 ± 4.38	.557
<i>MAACS Collectivism (5 items)</i>	18.65 ± 3.85	17.38 ± 4.21	.125
<i>MAACS Empowerment (6 items)</i>	24.95 ± 3.52	23.13 ± 4.40	.030*
<i>MAACS Male Role (4 items)</i>	14.38 ± 3.51	15.05 ± 3.41	.330

Note: Values in bold represent summary scale scores.

^aResponse categories for this item is the following: 1 = never; 2 = sometimes; 3 = always.

^bOnly participants who had a regular provider answered these questions. Response categories for these items are the following: 1 = *always*; 2 = *usually*; 3 = *sometimes*; 4 = *never*.

^cResponse categories for these items are the following: 1 = *strongly agree*; 2 = *agree*; 3 = *neutral*; 4 = *disagree*; 5 = *strongly disagree*.

^dResponse categories for these items are the following: 1 = *strongly agree*; 2 = *agree*; 3 = *disagree*; 4 = *strongly disagree*.

^eResponse categories for these items are the following: 0 = *not at all*; 1 = *several days*; 2 = *more than half the days*; 3 = *nearly every day*.

^fResponse categories for these items are the following: 1 = *strongly disagree*; 2 = *disagree*; 3 = *neutral*; 4 = *agree*; 5 = *strongly agree*.

* $p < 0.05$

Table 3.Multivariate Logistic Regression Predicting Ever Having Received CRC Screening ($N= 115$)

<i>Socio-demographic Variables</i>	OR	95% CI	<i>p</i> values
Gender			
Female	REF		
Male	2.28	0.62-8.39	.213
Age Group (years)			
45-54	REF		
55-64	6.58	1.75-24.77	.005*
Marital status			
Single/separated/widowed/divorced	REF		
Married/living with a partner	10.56	1.73-64.41	.011*
Education			
<12 years or high school	REF		
Some college, technical, or higher	4.66	1.21-17.91	.025*
Employed			
Employed	REF		
Not employed	4.42	0.86-22.75	.076
<i>Communication and Trust</i>			
Health Care Communication Scale	0.88	0.73-1.06	.172
Trust in Doctors Scale	1.01	0.88-1.16	.851
CRC Worry	1.60	0.98-2.63	.062
<i>MAACS^a Measures and Subscales</i>			
MAACS Religiosity	0.86	0.72-1.03	.103
MAACS Mistrust/Discrimination	1.26	1.01-1.56	.038*
MAACS Privacy	1.06	0.90-1.26	.496
MAACS Ethnic Identity	0.97	0.84-1.12	.701
MAACS Collectivism	0.88	0.69-1.12	.298
MAACS Empowerment	1.29	1.03-1.61	.028*
MAACS Male Role	0.87	0.72-1.05	.141

^aMulti-construct African American Cultural Survey* $p < 0.05$