

## ORIGINAL PAPER

# African American Patients' Intent to Screen for Colorectal Cancer: Do Cultural Factors, Health Literacy, Knowledge, Age and Gender Matter?

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*Abstract:* African Americans have higher colorectal cancer (CRC) mortality rates compared with all racial/ethnic groups. Research suggests that CRC screening interventions for African Americans target cultural variables. Secondary analysis of data from 817 African-Americans who had not been screened for CRC was conducted to examine: 1) relationships among cultural variables (provider trust, cancer fatalism, health temporal orientation [HTO]), health literacy, and CRC knowledge; 2) age and gender differences; and 3) relationships among cultural variables, health literacy, CRC knowledge, and CRC screening intention. Provider trust, fatalism, HTO, health literacy, and CRC knowledge demonstrated significant relationships among study variables. Stool blood test intention model explained 43% of the variance, with age and gender being significant predictors. Colonoscopy intention model explained 41% of the variance with gender a significant predictor. Results suggest when developing CRC interventions for African Americans, addressing cultural variables is important, but particular attention should be given to age and gender.

*Key words:* Colorectal cancer screening, health care provider, trust, fatalism, health temporal orientation, health literacy, culture, colorectal cancer knowledge, African Americans.

Although largely preventable, colorectal cancer (CRC) remains the third leading cause of cancer death among African Americans.<sup>1-3</sup> Using the results of previous research, several interventions have been developed that incorporate cultural factors in order to promote CRC screening.<sup>4-6</sup> However, CRC incidence and mortality continue to affect African Americans at disproportionate rates.<sup>1,2</sup> The most common cultural factors that have been examined in relation to cancer screening are health care provider

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(HCP) trust and cancer fatalism.<sup>7</sup> In addition, health temporal orientation (HTO), a cultural factor that has been considered more recently, has been shown to influence CRC screening.<sup>6-9</sup>

Although it has been suggested that CRC screening interventions should be targeted on cultural dimensions,<sup>4,6,7</sup> few studies have examined how HCP trust, cancer fatalism, HTO, health literacy, and CRC knowledge influence CRC screening intention. In this paper, we will review these constructs and describe the results of a secondary analysis conducted to examine relationships among cultural factors (i.e., HCP trust, HTO, and cancer fatalism), CRC knowledge, health literacy, and CRC screening intention among urban African Americans who were not up to date with CRC screening. In addition, relationships among age, gender, and cultural variables will be examined. Additional knowledge about the relationships among these variables may inform the development of more effective CRC screening interventions for African Americans and decreased incidence and mortality from this often preventable disease. The following research questions guided the study:

- 1) What are the relationships among HCP trust, fatalism, HTO, health literacy, and CRC knowledge among African Americans seeking care in 11 primary care settings in the Midwest?
- 2) Are there age and gender differences in HCP trust, fatalism, HTO, health literacy, and CRC knowledge among African Americans seeking care in 11 primary care settings in the Midwest?
- 3) Do HCP trust, fatalism, HTO, health literacy, CRC knowledge, age, and gender predict CRC screening intention among African Americans seeking care in 11 primary care settings in the Midwest?

**Conceptual framework.** The Preventive Health Model (PHM)<sup>10</sup> was the theoretical framework that guided this secondary data analysis. The PHM proposes that internal and external factors influence preventive health-related actions (behaviors) that reflect a person's self-system.<sup>10</sup> The PHM proposes that when faced with a health decision or problem (e.g., disease risk) the person forms an intention to act (e.g., to be screened or not screened) based on the relationships among facets of the self-system.<sup>11</sup> For this secondary analysis, only a portion of the PHM was used: 1) self-system (i.e., HCP trust, fatalism, HTO, health literacy, CRC knowledge, age, and gender) and 2) intention to complete a CRC screening test (i.e., fecal occult blood test (FOBT) or colonoscopy). Figure 1 represents the concepts derived from the PHM used in this study. The other factors in the PHM (preference clarification, alternative selection, planning, and experience) were not used because they were not measured in the original study and screening completion data were not yet available.

**Background.** Trust is a central feature of the patient-provider relationship.<sup>12,13</sup> High levels of trust in one's health care provider (HCP) have been associated with greater use of recommended preventive services among African Americans.<sup>12-14</sup> However, the relationship between HCP trust and CRC screening behaviors among African Americans has been mixed. For example, in one study, higher levels of HCP trust was the most significant predictor of CRC screening adherence (OR 2.08, 95% CI 1.49-2.94).<sup>14</sup> However, another study found that HCP trust was not associated with FOBT comple-

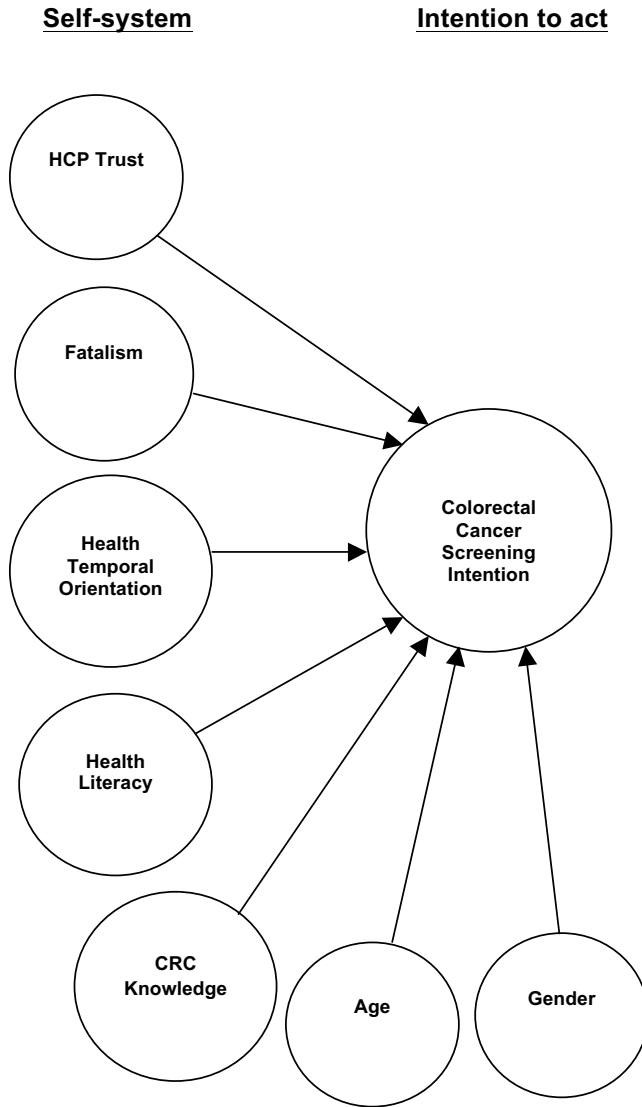


Figure 1. Conceptual framework: cultural factors that influence colorectal cancer screening intention among African Americans.

tion.<sup>13</sup> What has not often been considered is that the gender of African American patients may be important when examining the relationship between HCP trust and CRC screening. Thus, the current study seeks to clarify as well as contribute to what is known about the relationships among HCP trust and the other study variables.

Cancer fatalism is the belief that one will certainly die as a result of being diagnosed with cancer (i.e., “that death is inevitable when cancer is present”).<sup>15</sup> Cancer fatalism has been found to predict completion of CRC screening.<sup>5,16</sup> Indeed, among older African Americans, fatalism was a significant predictor of FOBT completion after controlling

for demographics such as age, education, and income. In addition, cancer fatalism has been found to mediate the relationship between socioeconomic status (SES) and CRC screening behavior.<sup>16</sup> Predictors of higher levels of cancer fatalism include older age, lower levels of education, lower income, lower levels of cancer knowledge, and lack of a provider recommendation for screening.<sup>15–18</sup> The current study seeks to add to the body of literature about cancer fatalism by examining relationships among cancer fatalism, CRC screening intention, and relevant cultural variables, which are variables that may be important among African Americans in relation to CRC screening.

Health temporal orientation (HTO) refers to the time perspective with which one makes health decisions (i.e., present time orientation vs. future time orientation).<sup>7,19</sup> Future time orientation has been associated with a number of preventive health behaviors including intending to receive the HPV vaccine, use sunscreen, and undergo health screenings.<sup>8,20–22</sup> In general, African Americans have been found to be more likely to be present-oriented compared with Whites.<sup>23</sup> Among African Americans, present time orientation has been negatively associated with mammography as well as with CRC screening intention and adherence.<sup>3,8,9,22,23</sup> Although the relationship between HTO and CRC screening has been examined in prior research,<sup>8,9</sup> few studies have considered the influence of HTO on CRC screening intention while controlling for other constructs such as fatalism, CRC knowledge, and HCP trust among African Americans.

According to Ratzan and Parker, health literacy can be defined as “the degree which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.”<sup>24</sup>[p.vi] It is widely known that health literacy affects the use of preventive health services. Studies have found that low health literacy is associated with low CRC screening knowledge.<sup>25–28</sup> However, another study found that perceived high-quality HCP communication mediated the association between low health literacy and low CRC screening knowledge.<sup>25</sup> In order to improve CRC screening utilization, it is important to understand the relationships among health literacy, cultural factors such as HCP trust, CRC knowledge, and CRC screening adherence.

Knowledge of CRC screening consistently has been found to be associated with CRC screening intention and adherence.<sup>3,29–35</sup> Previous studies have found that lack of knowledge about CRC screening was a significant barrier to completing CRC screening.<sup>13,34,35</sup> For example, one study found that older African Americans lacked knowledge of CRC and CRC screening, and had difficulty listing CRC screening tests.<sup>35</sup> The current study will add to what is known about cultural factors (HCP trust, HTO, and cancer fatalism) associated with CRC knowledge among African Americans.

## Methods

Data were collected at baseline from 817 African Americans primary care patients who were enrolled in a randomized, controlled CRC screening intervention trial. The details of the parent study have been published elsewhere.<sup>36,37</sup> Briefly, the intervention study aimed to compare the efficacy of two CRC screening interventions—a computer-delivered, tailored intervention and a non-tailored brochure.<sup>36,37</sup> Participants were enrolled in Indianapolis, Indiana and Louisville, Kentucky from 11 urban primary care

clinics.<sup>36,37</sup> Eligible participants self-identified as Black or African American, were 51 to 80 years old, and were currently non-adherent to CRC screening guidelines (i.e., had not had a fecal occult blood test [FOBT] in the past 12 months, a sigmoidoscopy in the past five years, or a colonoscopy in the past 10 years).<sup>36,37</sup> Individuals were considered ineligible if they were adherent to CRC screening guidelines; had a personal history of CRC; a medical illness that precluded CRC screening; had a cognitive, speech, or hearing impairment; or did not speak English.<sup>36,37</sup> Potential eligible individuals were identified through primary care clinic databases.<sup>36,37</sup> Following approval from their primary care provider, individuals were sent an introductory study brochure, informed consent documents, and a brochure explaining the study prior to an upcoming primary care clinic visit.<sup>36,37</sup> Those individuals who did not wish to be contacted could call a toll-free number to opt-out of the study.<sup>36,37</sup> Within one week of the mailing, individuals were contacted by trained research staff that explained the study, assessed eligibility, and obtained consent.<sup>36,37</sup> Data for the current study (demographics, HCP trust, health temporal orientation, cancer fatalism, CRC knowledge, FOBT intention, colonoscopy intention ) were collected at baseline via a computer-assisted telephone interview system. At six months and after receiving the intervention, health literacy was assessed in person.<sup>36,37</sup> The current study analyzed data from 817 participants who completed study interviews at baseline and at six months.

**Measures.** *Independent variables.* Demographic data were collected at baseline. Demographic data collected were age (in years), gender (male or female), highest grade completed (in years), health insurance (yes or no; if yes: type of insurance), employment (yes or no; if yes: full-time or part-time), and income (less than \$15,000/\$15,000–\$30,000/more than \$30,000) as these variables are known to be significantly associated with CRC screening intention.<sup>9</sup>

Health care provider (HCP) trust was measured using a five-item scale developed by Dugan and colleagues.<sup>38</sup> Participants were asked to identify with statements such as “You completely trust your doctor’s decisions about medical treatments best for you.” and “All in all, you have complete trust in your doctor.” Participants responded to items using a Likert-type scale ranging from 4=strongly agree to 1=strongly disagree ( $\alpha = 0.71$ ). Higher scores on the HCP trust scale indicated greater levels of trust in one’s HCP.

Cancer fatalism was measured using an 11-item scale modified from Powe’s original scale using items such as “If someone gets cancer, it was meant to be.” and “If someone gets cancer, his or her time to die is near.”<sup>39</sup> The Cronbach’s alpha obtained with this sample was 0.86. Higher scores on the cancer fatalism scale indicated more fatalistic views of cancer.

Health temporal orientation (HTO) was measured using a nine-item scale with items such as “Being healthy is important to your future” and “It makes sense to take care of your health now so you can be healthy in the future,” with response ranges from 4=strongly agree to 1=strongly disagree.<sup>40</sup> The Cronbach’s alpha obtained with this sample was 0.80. Higher scores on the HTO scale indicated a greater present-time orientation.

Health literacy was assessed using the brief version of the Rapid Estimate of Adult Literacy in Medicine (REALM).<sup>41</sup> REALM is an in person administered test of word recognition and pronunciation of common patient direction and education materials

terms and is the most commonly used measure of health literacy. While the REALM test does not measure comprehension or numeracy skills, REALM has been successfully used to help clinicians identify patients at greatest risk of having limited health literacy skills and is an easy to administer and reliable measure of health literacy in a clinical setting.<sup>42</sup> The number of words read correctly is recorded and this number is categorized as one of four grade-level literacy estimates.

Colorectal cancer (CRC) knowledge was assessed with an 11-item measure developed by the researchers in the parent study ( $\alpha = 0.63$ ) with items such as, "Can colon cancer ever be prevented?" and "Which of these is the most effective way for people to lower their chances of dying from colon cancer?" Higher scores on the measure indicated greater knowledge of CRC, risk factors and screening.

*Dependent variables.* Fecal occult blood test (FOBT) and colonoscopy intention were assessed by two separate dichotomous items that asked whether participants were planning to complete each of these tests in the next six months; response options were yes, no, and don't know. To make FOBT and colonoscopy intention dichotomous variables, 10 "don't know" responses were recoded as missing.

**Data analysis.** Data were analyzed using SPSS 21.0 (Released 2012 IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.). To address the first two research questions, Pearson's correlations, t-tests, and chi-square analyses were run. In the case of continuous variables, t-tests were performed. In the case of categorical variables, chi-square tests were performed. To address the third research question, binary logistic regression models were run. All variables that were found to be statistically significant in the Pearson's correlation were included in the models. P-values of .05 or less were considered to be significant.

## Results

**Sample.** Of the 817 participants included in this secondary data analysis, all participants identified themselves as African American or Black and 90% were not of Hispanic or Latino origin. The majority of the sample was women (53%); the age of the participants ranged from 51–80 years of age and the mean age of the participants was 57 years old. Many of the participants reported that the highest grade they completed was the 12th grade (40%) and 28% did not complete high school. Of the sample, 80% had some form of insurance ranging from Veteran's Administration benefits, Medicaid, Medicare, or private insurance. A majority of the sample was not employed and had low income (Table 1).

**Research question 1: What are the relationships among HCP trust, fatalism, HTO, health literacy, and CRC knowledge, and age among African Americans seeking care in 11 primary care settings in the Midwest?** Relationships among study variables were mixed (Table 2). Health care provider (HCP) trust was positively associated with health temporal orientation ( $r = .31, p \leq .01$ ) but not significantly associated with health literacy, fatalism, or colorectal cancer (CRC) knowledge. Health literacy was negatively associated with fatalism ( $r = -.23, p \leq .01$ ) and positively associated with CRC knowledge ( $r = .27, p \leq .01$ ). CRC knowledge was negatively associated with fatalism ( $r = -.30, p \leq .01$ ).

**Table 1.**  
**SAMPLE CHARACTERISTICS**

Characteristics	n	% <sup>a</sup>
Gender (N = 817)		
Male	384	47
Female	433	53
Health Insurance (N = 816)		
Yes	727	89
No	89	10.9
Employed (N = 817)		
Yes	174	21.3
No	643	78.7
Income (N = 785)		
Less than \$15,000	462	56.5
\$15,000–\$30,000	231	28.3
Greater than \$30,000	92	11.2
Age: Mean (SD)	57.3	6.2
Education: Mean (SD)	12.19	1.9

<sup>a</sup> Columns may not total to 100% due to missing data.

**Table 2.**  
**PEARSON CORRELATIONS AMONG STUDY VARIABLES**

Variable	1	2	3	4	5	6
1. Healthcare Provider Trust	—					
2. Fatalism	.002	—				
3. Health Temporal Orientation	.31 <sup>a</sup>	.03	—			
4. Health literacy	-.02	-.23 <sup>a</sup>	-.04	—		
5. CRC knowledge	-.01	-.30 <sup>a</sup>	.01	.27 <sup>a</sup>	—	
6. Age	.02	.08 <sup>b</sup>	-.03	.01	-.07 <sup>b</sup>	—

<sup>a</sup>correlation significant at  $p < .01$  level (2-tailed).

<sup>b</sup>correlation significant at  $p < .05$  level (2-tailed).

Table 2 shows that age was positively associated with fatalism ( $r = .08$ ,  $p \leq .05$ ) indicating that older participants had higher cancer fatalism scores. Age was negatively associated with CRC knowledge ( $r = -.07$ ,  $p \leq .05$ ) indicating that older participants had less knowledge of CRC, risk factors and screening. Age was not significantly related to the remaining study variables.

**Research Question 2: Are there gender differences in HCP trust, fatalism, HTO,**

**health literacy, and CRC knowledge among African Americans seeking care in 11 primary care settings in the Midwest?** Table 3 shows results of t-tests which indicated that men and women differed on health literacy scores ( $p \leq .01$ ) and CRC knowledge ( $p \leq .05$ ). There was a significant difference in the health literacy scores for men ( $M = 3.13$ ;  $SD = 0.9$ ) and women ( $M = 3.40$ ;  $SD = 0.7$ ) [ $t(462) = -4.48, p \leq .01$ ]. Among the study participants, there was a significant difference in the CRC knowledge scores for men ( $M = 3.37$ ;  $SD = 2.06$ ) and women ( $M = 3.83$ ;  $SD = 2.40$ ) [ $t(396) = -2.18, p \leq .05$ ]. The remaining study variables did not demonstrate significant differences between men and women.

Chi-square analyses were conducted to examine the differences in HCP trust, fatalism, HTO, health literacy, CRC knowledge, FOBT intention, and colonoscopy intention by gender. However, a greater proportion of men (62%) indicated that they intend to have a FOBT in the next six months than women (38%), [ $\chi^2(1) = 50.4, p \leq .01$ ]. In addition, a greater proportion of participants who had 9th grade literacy levels or higher reported not intending to have a FOBT in the next six months (54%) compared to all other literacy levels (46%) [ $\chi^2(3) = 7.1, p \leq .05$ ]. The remaining variables (i.e., HCP trust, fatalism, HTO, and CRC knowledge) were not related to FOBT intention. The proportion of men (52%) intending to have a colonoscopy in the next six months was greater than that of the women (48%) [ $\chi^2(1) = 9.7, p \leq .01$ ]. The remaining variables (i.e., HCP trust, fatalism, HTO, and health literacy) were not related to colonoscopy intention.

**Table 3.**

**UNIVARIATE ANALYSIS OF GENDER DIFFERENCES AMONG STUDY VARIABLES**

Variable	Gender		<i>t</i> <sup>b</sup>	<i>df</i>	p-value	Chi-square <sup>c</sup>		
	Males <sup>a</sup>	Females <sup>a</sup>				<i>df</i>	p-value	
HCP trust	17.46 (3.02)	17.02 (3.11)	1.49	462	.14			
Fatalism	22.60 (7.99)	22.07 (7.20)	0.74	462	.46			
HTO	33.05 (3.41)	32.88 (3.32)	0.55	462	.58			
Health literacy	3.13 (0.9)	3.40 (0.7)	-4.48	462	.00			
CRC knowledge	3.37 (2.06)	3.83 (2.4)	-2.18	396	.03			
FOBT intention						50.40	1	< .001
yes:	206 (62%)	126 (38%)						
no:	176 (37%)	303 (63%)						
Colonoscopy intention						9.67	1	< .002
yes:	239 (52%)	223 (48%)						
no:	143 (41%)	208 (60%)						

<sup>a</sup>Standard deviations appear in parentheses below means.

<sup>b</sup>T-tests performed for continuous variables.

<sup>c</sup>Chi-square tests performed for categorical variables.



**Table 4.****LOGISTIC REGRESSION TO PREDICT CRC SCREENING INTENTION**

Variable	FOBT intention <sup>a</sup>					Colonoscopy intention <sup>b</sup>				
	OR	95% CI	Wald test	df	p	OR	95% CI	Wald test	df	p
HCP trust	1.0	.92–1.06	.10	1	.75	1.02	.96–1.09	.39	1	.53
Fatalism	1.02	.99–1.05	2.06	1	.15	1.00	.98–1.03	.17	1	.67
HTO	1.0	.93–1.05	.21	1	.65	.98	.92–1.04	.60	1	.44
Health literacy	1.14	.87–1.50	.92	1	.34	1.25	.97–1.62	2.92	1	.09
CRC knowledge	1.01	.92–1.11	.06	1	.80	.97	.89–1.05	.57	1	.45
Age	1.0	.93–.99	5.37	1	.02*	1.01	.98–1.05	.85	1	.36
Gender	1.70	1.12–2.51	6.25	1	.01*	1.73	1.16–2.57	7.37	1	.01*

<sup>a</sup>For FOBT intention, the overall model explained 43% of the variance ( $p=.04$ ).

<sup>b</sup>For colonoscopy intention, the overall model explained 41% of the variance ( $p=.04$ ).

**Research Question 3: Do HCP trust, fatalism, HTO, health literacy, CRC knowledge, age, and gender predict screening intention among African Americans seeking care in 11 primary care settings in the Midwest?** Variables found to be significant at  $p .20$  in the univariate analyses results were included in the FOBT intention and colonoscopy intention models. Variables not included because they were not significant in the univariate analyses were: education, health insurance, employment, and income.

Separate binary logistic regression models were run to examine whether HCP trust, fatalism, HTO, health literacy, CRC knowledge, age, and gender predicted FOBT intention and colonoscopy intention. The FOBT intention logistic regression model was statistically significant [ $\chi^2(7) = 14.77, p \leq .05$ ], explaining 43% of the variation in FOBT intention. The only statistically significant predictors of FOBT intention were age ( $p = .02$ ) and gender ( $p = .01$ ). fecal occult blood test (FOBT) intention increased by .1 for each year of age and men were 1.7 times more likely than women to report they intended to have a FOBT in the next six months. The colonoscopy intention regression model was statistically significant [ $\chi^2(7) = 14.50, p \leq .05$ ] with 41% of the variance in colonoscopy intention explained. Gender ( $p = .01$ ) was the only statistically significant predictor of colonoscopy intention with men 1.7 times more likely than women to report they intended to have a colonoscopy in the next six months.

## Discussion

The current study sought to examine the relationships among cultural variables (i.e., HCP trust, fatalism, and HTO), health literacy, and CRC knowledge and to explore potential age and gender differences in these variables. In addition, relationships among the aforementioned variables and intention to complete FOBT and colonoscopy were

examined. Although many of these variables have been featured in prior studies of CRC screening, to the authors' knowledge, no study has fully considered the relationships among the study variables and in relation to CRC intention among African Americans accessing primary care services who are currently non-adherent to CRC screening guidelines.

In the current study, HCP trust was not related to fatalism, CRC knowledge, FOBT intention, or colonoscopy intention. These findings support previous research that found that HCP trust does not affect a patient's fatalistic views of CRC screening or CRC knowledge.<sup>13</sup> Unfortunately, few studies have examined HCP trust and intention to receive either FOBT and/or colonoscopy which makes it difficult to compare the results to previous research.

Supporting the findings of previous research, the results of the current study showed that cancer fatalism was negatively associated with health literacy and CRC knowledge.<sup>17-21</sup> Previous research has found that people with fatalistic views about cancer were more likely to have lower health literacy scores and lower CRC knowledge.<sup>18,43</sup> However, in the current study, fatalism was not a significant predictor of FOBT or colonoscopy intention. It is possible when other variables such as gender and age are added to a model that includes CRC knowledge and health literacy, that fatalism no longer has a prominent role in predicting FOBT or colonoscopy intention. Another possible explanation for this finding is that the average age of the sample population was 57 years old, and perhaps this younger CRC screening-eligible population has less fatalistic views about CRC, thus making fatalism, CRC knowledge, and health literacy, non-predictive in the model used in the current study.

In this study, having a future-time orientation was related to HCP trust but did not predict either FOBT intention or colonoscopy intention. As in previous research, HTO was significantly positively associated with HCP trust. That is, individuals who trust their health care providers are more likely to have a future time orientation. Indeed, in their discussion of trust in one's health care provider, Hall and colleagues referred to trust as a construct relating to future orientation.<sup>44</sup> The finding that HTO did not predict FOBT or colonoscopy intention is similar to past research where HTO did not predict FOBT or colonoscopy intention or adherence.<sup>3,9</sup> However, on the other hand, the result of HTO not predicting CRC screening intention contradicts previous research on HTO in relation to many other preventive health behaviors.<sup>7,25-30</sup> This could be because prior studies examined HTO in the context of health behaviors common among younger people. However, previous studies included participants dissimilar to those in the current study; in prior research, participants were younger and the majority were not African American.<sup>20-22</sup> It is important to consider that CRC screening may represent a unique health behavior. In addition, it may be important to examine potential differential relationships between HTO and various health behaviors based upon a number of demographic factors.

The current study indicates that low health literacy is related to low CRC knowledge. This result supports previous studies that found that African Americans with low health literacy also had low knowledge concerning CRC and CRC screening.<sup>27,28</sup> Health literacy may be especially important to consider in the context of CRC screening because 1) many CRC screening interventions incorporate pamphlets or other

materials that must be read, and 2) written instructions accompany the screening test procedures themselves.

In the current study, age was positively related to fatalism and negatively related to CRC knowledge and FOBT intention; older study participants had higher fatalism scores and lower CRC knowledge and lower FOBT intention. The relationships between variables was small but significant. Note again that the mean participant age was 57 years of age: a stronger and significant relationship might have been found if the mean age was older. Despite having a younger study population, these results are similar to previous research results that found that older African Americans were more likely to have fatalistic views about cancer; such views in turn were related to lower CRC knowledge and lower cancer screening intention and adherence.<sup>17-21,43,45</sup> This finding may reflect the work needed to reduce cancer fatalism and increase CRC knowledge and increase FOBT intention among older African Americans.

The results reported here reveal that more men than women intended to receive either CRC screening test in the subsequent six months. This result is similar to past research in which men were more likely to have CRC screening and maintain CRC screening when compared to women.<sup>46,47</sup> This finding may suggest that the CRC screening messages and CRC screening interventions require further modification and target women to effectively reach women and encourage them to plan for CRC screening.

When the variables of this study were analyzed as part of the binary logistic regression analyses, the results indicated that the separate models predicting FOBT and colonoscopy were significant. An interesting finding is that only age and gender were significant predictors of FOBT intention in the FOBT model, and only gender was a significant predictor of colonoscopy intention in the colonoscopy model. These findings contradict the results of other CRC screening studies that have shown that cultural factors such as cancer fatalism predicted CRC screening.<sup>5,16</sup> A possible explanation for cancer fatalism not being a significant predictor of FOBT and colonoscopy intention could be that the study participants were younger than participants in other studies of CRC screening and fatalism whose mean age was and the belief that CRC is fatal is not as prevalent among some adult African Americans. The other cultural variable examined, HTO, was not a significant predictor of FOBT and colonoscopy intention is consistent with previous research. The fact that data on cultural variables were collected at baseline is not expected to have made a difference in the results of the regression analyses. Although cultural variables did not predict CRC screening intention at baseline, future research will examine the relationship between cultural variables, cancer fatalism and HTO, and actual CRC screening behavior at 18 months post-intervention to further examine how the variables impact CRC screening behavior. The finding that age is a significant predictor of FOBT intention is consistent with previous research. In previous studies, age was found to be a significant predictor of FOBT screening completion. In fact, men and women 65 years and older have higher rates of CRC screening completion compared to people 50 to 64 years.<sup>48</sup> The results that gender was a significant predictor of FOBT intention and colonoscopy intention are consistent with previous research.<sup>9,48</sup> Research examining gender differences is mixed in that some studies report that men are more likely to report being up to date with CRC screening, while other studies have found that women are more likely to

report being up to date for screening.<sup>9,48</sup> However, previous research indicates that a possible explanation for gender differences is an association between a usual source of care, perceived good patient-provider communication, and having insurance.<sup>9,38,48,49</sup>

This study has limitations. First, the data used for this study were part of a larger study which tested two CRC screening interventions. Thus, it is possible that individuals who consented for the study are different from those who did not consent to the larger study. Second, this study of cultural factors and their relationship to CRC screening among African Americans was limited to men and women living in an urban area in the Midwest who had access to primary care. Region and having access to primary care have important influences on the variables of this study. In addition, the cultural factors utilized in the current study were measured only once: at baseline. However, it is possible that these factors may change over time, especially given that the interventions of the larger study aimed to increase CRC screening knowledge. Researchers designing future intervention studies which encourage CRC screening receipt should consider measuring these cultural variables at multiple time points.

Despite these limitations, these results can inform the development of CRC interventions targeting CRC behaviors among African Americans. Age and gender remain important factors in CRC screening intention as the results of this study indicate. Interventions delivered to patients that are tailored based upon these demographic variables may be useful in promoting CRC screening. In addition, interventions that educate providers on methods of discussing CRC screening options and assist providers with assessing patient CRC screening preferences among African American men and women may also promote improved CRC screening intention among non-adherent individuals.

Health literacy remains to be an important factor when developing CRC screening interventions as the results of the current study indicate that low levels health literacy continue to be associated with high levels of fatalism and low CRC knowledge despite health literacy not being a significant predictor in the models of FOBT intention and colonoscopy intention. Improved health literacy may reduce the CRC health disparities experienced by African Americans. CRC screening interventions should incorporate research-based strategies that improve health literacy, such as making sure the most important information about CRC screening is presented first, present only information about each screening individually, present the information about the test, preparation, and results in lay language and when possible use pictures and videos as supportive elements.<sup>50</sup> Health care providers should also check for understanding when using written and verbal information about CRC screening.<sup>50</sup> An additional strategy for CRC screening may be to present the information about each cancer screening more than once to ensure comprehension and increase CRC screening intention.<sup>51</sup> In addition, a nurse navigator may be useful in helping individuals with low health literacy to better understand the steps required for CRC screening completion.

The results of this study indicate that more research is needed to improve our understanding of the relationships between health literacy and newer cultural variables, such as health temporal orientation, and well-established variables, such as cancer fatalism and CRC knowledge. Expanding what is known may help to strengthen targeted intervention strategies designed to increase CRC screening rates among African Americans.

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