Cultural, Economic, and Psychological Predictors of Colonoscopy in a National Sample

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BACKGROUND: Although colorectal cancer (CRC) is the second leading cause of cancer death among adults in the US and colonoscopy is efficacious in reducing morbidity and mortality from CRC, screening rates are sub-optimal. Understanding the socioeconomic, cultural, and health care context within which decisions about colonoscopy are made allows physicians to address patients' most salient beliefs and values and other constraints when making screening recommendations.

OBJECTIVE: To evaluate the direct and interactive effects of socioeconomic, health care variables, psychological characteristics, and cultural values on colonoscopy use.

DESIGN, SETTING, PARTICIPANTS: National survey completed between January-August 2009 in a random sample of African American, white, and Hispanic adults ages 50–75 without cancer (n=582).

MAIN MEASURE: Self-reported colonoscopy use.

KEY RESULTS: Only 59% of respondents reported having a colonoscopy. The likelihood of colonoscopy increased with having health insurance (OR=2.82, 95% CI=1.24, 6.43, p=0.004), and increasing age (OR=1.40, 95% CI=1.11, 1.77, p=0.001). In addition, respondents with greater self-efficacy were more likely to have a colonoscopy (OR=2.41, 95% CI=1.35, 4.29, p=0.003).

CONCLUSIONS: Programs that help patients to overcome access and psychological barriers to screening are needed.

KEY WORDS: colonoscopy; racial; economic; predictors; national survey.

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INTRODUCTION

Colorectal cancer (CRC) is the second leading cause of cancer death in the US;¹ most adults should start screening at age 50.^{2,3} Although colonoscopy is effective at reducing CRC mortality,^{4–6} screening rates are low. National surveys show that only about 63% of adults ages 50 and older have had endoscopic screening for CRC according to recommended guidelines.⁷ Limited health literacy, lack of health insurance, and lack of physician referral are associated with low rates of CRC screening.⁸ Self-efficacy, or the extent to which individuals are confident that they can obtain screening, and perceived risk of developing disease, were also important to screening in a national sample.⁹ However, socioeconomic, psychological beliefs, and health care variables are not the only determinants of CRC screening.

Cultural factors, which include values related to religion and spirituality and the extent to which it is important for patients to include family members in health care decisions,¹⁰ are associated with a wide range of cancer prevention and control (CPC) behaviors.¹¹ However, the relationship between cultural factors and CRC screening is not well-understood. There is evidence that social relationships are important to CRC screening,¹² but no study to date has evaluated how cultural factors interact with socioeconomic, psychological, and health care variables that are important to CRC screening. Recent reports have emphasized the importance of understanding how cultural factors work together with these variables so that providers will have a better understanding of the context within which health care decisions are made.¹³ Understanding cultural factors allows physicians to address patients' most salient beliefs and values and other constraints they may be facing when making screening recommendations.

This study presents results from a national sample assessing the effects of cultural, socioeconomic, psychological, and health care variables, and how they interact to influence CRC screening. While compliance with CRC screening guidelines has been evaluated in terms of receipt of any type of test, we focused specifically on colonoscopy because it would ultimately be indicated if other tests are abnormal¹ and this procedure provides a more comprehensive evaluation of the colon relative to other procedures.³ Colonoscopy is also

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estimated to reduce the risk of CRC by 76% to 90%^{14,15} and is the preferred screening modality among many primary care providers^{16,17} because of its diagnostic and therapeutic value over other tests and its coverage by Medicare and other insurers.¹⁸ Finally, individuals who have a negative result typically do not need to be screened again for 5–10 years and those at older ages, may not need screening again.¹⁹ Based on previous research,¹² we predicted that individuals with greater collectivist values (e.g., who valued the inclusion of family members in health care decisions and think about the impact of screening on relatives) would be most likely to report having a colonoscopy. We also hypothesized that individuals who believed in the importance of relying on their spiritual faith to protect their health and prevent cancer would be least likely to have screening.

METHODS

Study Population

We conducted a national, random digit dialing telephone survey of African American, white, and Hispanic adults in the US. To be eligible for the survey, individuals had to be at least 18 years of age and self-identify as belonging to one of the racial and ethnic groups described above. We created a three-level variable for race (non-Hispanic Black, non-Hispanic white, and Hispanic, regardless of race) because most Hispanics did not specify a separate racial group. The study was designed to enroll 2133 respondents with baseline data, of whom we anticipated approximately 600 would be within the age range for CRC screening. This sample size provided approximately 80% power to detect race-adjusted odds ratios for screening, comparing respondents with a 1 SD difference in MCVAT scores, of between 1.3 and 1.7, depending on the screening prevalence and the strength of the association between race and screening and MCVAT scores. Data on study measures were collected as part of a prospective longitudinal study on health beliefs and behaviors. We used data from the baseline telephone interview in this study and only included respondents who were ages 50–75 in the analysis because colonoscopy is recommended in this age range for average-risk screening. We also excluded respondents who reported a personal history of any type of cancer.

Procedures

This study was approved by the Institutional Review Board at the University of Pennsylvania. Baseline data were collected by telephone between January and August 2009 by a professional survey firm. To identify households and respondents for the survey, a sample of telephone exchanges was randomly selected by a computer from a complete list of more than 69,000 active residential exchanges across the country. The exchanges were chosen to ensure that each region of the country was represented in proportion to its population. Within each exchange, random digits were added to form a complete telephone number, thus permitting access to both listed and unlisted numbers. In each household that was

reached, one adult was randomly selected to be the respondent for the survey using a standardized procedure after obtaining verbal informed consent. To enhance participation, individuals who completed the baseline were entered into a \$2000 sweepstakes and each respondent was given a \$20 incentive after completing the interview. The American Association for Public Opinion Research response rate was 53% and the cooperation rate was 65.3%, using the second formulas to calculate each disposition.²⁰ Study data were weighted for each race using population targets for education, age, and gender using estimates from March 2009 Current Population Survey.

Study Measures

We obtained race and socioeconomic by self-report. Health care variables included insurance status and whether or not respondents had a usual source of medical care. We used items from the Health Information National Trends Survey (HINTS)²¹ to evaluate psychological factors related to CRC screening. To evaluate perceived risk of developing disease, respondents were asked how likely it is that they would develop colon cancer in the future. Self-efficacy to obtain screening was evaluated using an item that asked respondents, “How confident are you that you can obtain screening for colon cancer?” To develop our self-efficacy measure, we adapted a HINTS question that asked how confident respondents were in their ability to take good care of their health.²¹ Our measure was similar to other measures that have been administered in other national samples.⁹ Perceived risk and self-efficacy items were re-coded into binary variables based on the distribution of responses and conceptual relevance (e.g., confident versus not confident to obtain CRC screening and at risk versus not at risk for developing disease). Self-efficacy was defined as “confident” for responses of “completely confident” or “very confident”. Perceived risk was defined as “high” for responses of “very high” or “somewhat high”.

We administered the Multi-Dimensional Cultural Values Assessment Tool (MCVAT), a 19-item Likert-style scale that evaluates cultural values for CPC. The MCVAT was developed through qualitative research with African American, white, and Hispanic adults in which participants identified cultural values related to CPC. Items were generated based on the values elicited from these groups and were validated through a hospital-based survey to establish the MCVAT's psychometric properties. The MCVAT includes three sub-scales that evaluate religious and spiritual (e.g., it is important for me to pray before making a decisions about cancer screening), collectivist (e.g., I should talk to my family members about whether or not I should have cancer screening tests, it is important to me that my family supports my decisions about cancer screening), and individualistic (e.g., it is important for me to learn on my own about which cancer screening tests are needed) values for CPC. We focused on the effects of religious and collectivist values in this study because prior research has shown that religious beliefs are important to decisions related cancer care¹¹ and social ties are important to CRC screening.¹² Both sub-scales had good internal consistency (Cronbach's alpha = 0.92 for religious and 0.80 for collectivist values).

Colonoscopy use was evaluated by self-report using one item from the HINTS that asked respondents if they had ever

had a colonoscopy. To enhance the validity of responses,²² colonoscopy procedures were described (see Table 1) and respondents were asked to provide the month and year of their last test. Respondents who reported that they had a colonoscopy were categorized as screening users and those who reported that they had never had a test or if they did not know (n=3) were categorized as non-users.

Data Analysis

First, descriptive statistics were generated to characterize respondents in terms of socioeconomic, health care variables, and colonoscopy use. Next, we used chi square tests and univariate logistic regression analysis to evaluate the associations between colonoscopy and dichotomous and continuous

variables, respectively. We then generated a multivariate logistic regression model based on weighted data to identify factors having significant independent associations with colonoscopy. Variables that had a $p < 0.10$ association with colonoscopy were included in the model. To determine if the association between colonoscopy and socioeconomic, health care, and psychological variables was influenced by cultural values, we also tested the interactions between cultural factors and variables that had a significant association with colonoscopy in the model. Due to concerns about overfitting the model, we only tested interactions between cultural values and socioeconomic, health care, and psychological factors that had a significant association with colonoscopy. We centered the cultural values scores to minimize the potential for multicollinearity between variables included in the interaction terms.²³ Data were analyzed using STATA version 11.

Table 1. Bivariate Analysis of Colonoscopy

Variable	Level	% Screened (95% CI)	p-value
Sociodemographic Factors			
Gender	Male	64% (56, 71)	0.13
	Female	55% (48, 63)	
Race	Non-Hispanic Black	59% (52, 66)	0.34
	Non-Hispanic White	60% (53, 67)	
	Hispanic	52% (43, 61)	
Marital status	Married	62% (55, 68)	0.27
	Not married	55% (46, 64)	
Education level	>High school	63% (55, 70)	0.18
	≤High school	55% (46, 64)	
Employment status	Employed	57% (49, 65)	0.44
	Not employed	61% (54, 68)	
Income level	>\$50,000	63% (55, 71)	0.22
	≤\$50,000	56% (49, 64)	
Health insurance	Yes	62% (57, 68)	0.001
	No	32% (18, 50)	
Usual source of medical care	Yes	60% (55, 66)	0.14
	No	46% (30, 64)	
Age (Mean, SD) [CI]	Screened	61.8 (6.6)	0.01
		[60.9, 62.8]	
		Not screened	
		[58.7, 60.9]	
Psychological Factors			
Self-efficacy [§]	Confident	64% (58, 70)	0.0007
	Not confident	41% (30, 53)	
Perceived risk ^{†§§}	High	73% (49, 89)	0.22
	Not high	59% (53, 64)	
Cultural Values			
Religious (Mean, SD)	Screened	19.1 (6.1)	0.03
		[18.3, 20.1]	
	Not screened	20.8 (6.1)	
		[19.6, 21.9]	
Family (Mean, SD)	Screened	24.0 (4.7)	0.28
		[23.3, 24.6]	
	Not screened	24.6 (5.4)	
		[23.6, 25.6]	

The colonoscopy question was as follows: A colonoscopy is a test that examines the bowel by inserting a tube in the rectum. You may feel sleepy and need someone to drive you home. Have you ever had a colonoscopy?

[§]Self-efficacy: Confident=Completely confident, very confident; Not confident=somewhat confident, a little confident, not confident at all

[†]30 subjects were missing data for perceived risk

^{§§}Perceived risk: high=somewhat high, very high; Not high=very low, somewhat low, moderate

RESULTS

Table 2 shows the characteristics of our study sample (n=582) for the unweighted and weighted data. According to the unweighted data, most respondents were women, married, were at least high school graduates, employed, and had an annual household income that was less than or equal to \$50,000. Thirty-nine percent of respondents were non-Hispanic Black, 37% were non-Hispanic white, and 24% were Hispanic. Most respondents had health insurance and a usual source of medical care. With the exception of race, the percentages for each variable were comparable using the weighted data.

Overall, 59% (95% CI=53.8, 64.7) of respondents reported having a colonoscopy. As shown in Table 2, respondents who had health insurance were significantly more likely to report having had a colonoscopy, as were older respondents. In addition, respondents who were completely or very confident in their ability to get screening were significantly more likely to have a colonoscopy compared to those with lower self-efficacy. Religious values were significantly lower among respondents who had screening compared to those who had not had a colonoscopy. There were no differences in colonoscopy according to gender, marital status, education level, employment, usual source of care, perceived risk, or collectivist values for CPC. Racial differences in colonoscopy were also not significant.

Table 3 shows the results of the final regression model of colonoscopy. Since there were no racial differences in colonoscopy, we did not conduct stratified regression analyses. Respondents who were most likely to have a colonoscopy included those who had health insurance and greater self-efficacy. In addition, increasing age was associated with a greater likelihood of having a colonoscopy. In this adjusted model, religious values were no longer significantly associated with colonoscopy use. None of the interactions between religious values and socioeconomic, health care, and psychological variables were significant.

DISCUSSION

To our knowledge, this is the first study to evaluate the direct and interactive effects of socioeconomic, health care vari-

Table 2. Sample Characteristics (n=582)

Variable	Level	n (%) Unweighted Frequencies	n (%) Weighted Frequencies
Sociodemographics			
Gender	Male	276 (47%)	251.1 (46%)
	Female	306 (53%)	290.4 (54%)
Race	Non-Hispanic Black	227 (39%)	61.6 (12%)
	Non-Hispanic White	218 (37%)	424.4 (78%)
	Hispanic	137 (24%)	55.5 (10%)
Marital status	Married	359 (62%)	357.2 (66%)
	Not married	223 (38%)	184.3 (34%)
Education level	>High school	328 (56%)	295.9 (55%)
	≤High school	254 (44%)	245.7 (45%)
Employment status	Employed	272 (47%)	241.9 (45%)
	Not employed	310 (53%)	299.7 (55%)
Income level	>\$50,000	224 (38%)	227.8 (42%)
	≤\$50,000	358 (62%)	313.7 (58%)
Health insurance	Yes	511 (88%)	484.1 (89%)
	No	71 (12%)	57.4 (11%)
Usual source of medical care	Yes	534 (92%)	496.9 (92%)
	No	48 (8%)	44.6 (8%)
Age in Years	Mean, SD	60.6, 6.5	61.0, 6.2
	Range	51-75	51-75
Psychological Variables			
Self-efficacy for screening	Completely confident	252 (43%)	228.6 (42%)
	Very confident	208 (36%)	199.9 (37%)
	Somewhat confident	87 (15%)	87.6 (16%)
	A little confident	27 (5%)	21.3 (4%)
	Not at all confident	8 (1%)	4.1 (1%)
Perceived risk of colon cancer	Very low	275 (50%)	225.1 (43%)
	Somewhat low	137 (25%)	153.1 (29%)
	Moderate	110 (20%)	107 (20%)
	Somewhat high	25 (4%)	29.2 (6%)
	Very High	5 (1%)	5.2 (1%)
Cultural Factors			
Collectivist	Mean, SD	24.5, 5.1	24.2, 5.0
	Range	7-35	7-35
Religious	Mean, SD	21.1, 5.9	19.8, 6.3
	Range	6-30	6-30

ables, psychological factors, and cultural values on colonoscopy in a national sample of African Americans, whites, and Hispanics. Consistent with the 2008 Behavioral Risk Factor Surveillance Survey (BRFSS),²⁴ we found that colonoscopy use was sub-optimal; only 59% of respondents reported ever having had a colonoscopy. In contrast with other reports, racial differences in colonoscopy were not significant in this study.²⁵⁻²⁷ This could be because we asked specifically about colonoscopy, whereas other reports measured use of sigmoidoscopy or colonoscopy or receipt of any type of CRC screening. Another possible explanation is that our sample was more limited in size; the small differences we observed may not have

been statistically significant for this reason. We did find that having health insurance was associated with an increased likelihood of having screening; respondents who had health insurance were about twice as likely to have a colonoscopy compared to those without coverage. Recently, a national program was established by the CDC to increase access to CRC screening among uninsured and under-insured men and women ages 50-64.²⁸ Our findings underscore the importance of these types of programs, but also suggest that they may be insufficient by themselves to increase screening rates. We found that self-efficacy, or one's level of confidence in their ability to obtain CRC screening, had a significant association with colonoscopy use. Similar to the association with health insurance, respondents with greater self-efficacy were about twice as likely to have a colonoscopy compared to those with less confidence.

Our study sheds new light on the effects that cultural values have on CRC screening. Increasing levels of religious values were not significantly associated with the likelihood of having a colonoscopy in the final regression model. This finding raises questions about the central premise of culturally tailored strategies that have been recommended to increase utilization of cancer screening tests; a key assumption of this approach is that adherence to screening guidelines can be enhanced if health messages and recommendations are tailored to cultural beliefs and values.¹⁰ This presumes that cultural values have a positive association with screening; consistent with this, studies have evaluated the ways in which supportive aspects of culturally-based beliefs may encourage screening.²⁹ But, cultural values, and beliefs based on these values, exist along a continuum; some patients may rely completely on their spiritual and religious faith to prevent or control disease while others use a more collaborative approach in which they use these beliefs and values along with biomedical information to make health care decisions.³⁰ Our findings emphasize the importance of determining the alternate ways in which cultural values influence utilization of health care services and developing health promotion efforts that are consistent with these different views.

In considering the results of this study, some limitations should be noted. We used single items to evaluate self-efficacy for CRC screening and perceived risk of disease and the instrument we used to evaluate cultural values for CPC was newly developed. However, the item we used to evaluate perceived risk came from a national survey on psychosocial constructs for CPC and our self-efficacy measure had acceptable face validity. The cross-sectional nature of our study does not allow us to determine causality with respect to self-efficacy and colonoscopy. Additional limitations may be that we did not ask respondents about their family history of cancer or if their colonoscopy was for screening, diagnosis, or surveillance. This may be important because a colonoscopy that is prompted by experiencing a sign or symptom of disease or a positive FOBT may be motivated by different factors in comparison to having this test for routine screening. However, national data show that most adults have colonoscopies as part of a routine exam²¹ and we excluded respondents who had a personal history of cancer, which reduces the possibility that colonoscopies were performed as part of diagnosis or surveillance. Since lack of physician recommendation is an established barrier to colonoscopy, we did not ask about respondents if they had been advised to have this type of screening.

Table 3. Final Multivariate Regression Analysis of Colonoscopy

Variable	Level	OR	95% CI	p-value
Age in Years	[Continuous] ^a	1.40	1.11, 1.77	0.004
Health insurance	Yes	2.82	1.24, 6.43	0.01
	No			
Self-efficacy	Confident	2.41	1.35, 4.29	0.003
	Not confident			
Religious values	[Continuous] ^a	0.79	0.61, 1.02	0.07

^aORs for continuous variable reflect the OR for a 1-unit change in the covariate

Nevertheless, future studies should evaluate if cultural, health care, psychological, and socioeconomic factors have different effects on colonoscopy use depending on if the test is for screening, diagnosis, or surveillance and if providers have recommended screening or not. In addition, providing a financial incentive for completing the interview may introduce some bias into our results. Also, while our study is based on a national sample of adults from the three largest ethnic and racial groups in the US and is the first to evaluate the effects of cultural values on colonoscopy in this type of sample, we did not include other populations. Finally, relative to other national samples, we had a smaller number of respondents. Future studies should explore the relationships between socioeconomic, health care variables, psychological factors, and cultural values on CRC screening in larger samples that include all racial and ethnic groups.

Primary care providers play an important role in CRC screening; several studies have shown that lack of physician referral is a significant barrier to colonoscopy.^{8,31} Our findings suggest that while provider referral and recommendation are clearly necessary for CRC screening, they are not sufficient for individuals to actually use screening tests. We found that whether or not individuals feel confident in their ability to obtain CRC screening was just as important as health insurance coverage. Further, general recommendations to have a colonoscopy because early detection saves lives may be challenged by patients' religious and spiritual values. In part to address these concerns, patient navigators have been used with some success to help individuals obtain health services.³² Navigators provide guidance on obtaining health care services and also provide assistance with specific barriers; clinic- and community-based navigators could potentially increase access to and utilization of CRC screening by helping patients without health insurance obtain free or reduced cost screening through national programs. For those with low self-efficacy, patient navigators could also provide education about screening so that patients understand the advantages and disadvantages of different screening modalities and working with these individuals to address specific barriers. This may include developing an action plan for obtaining screening that includes specific and achievable goals, providing assistance with scheduling screening appointments, and helping patients to identify someone to take them home after the procedure.³³ These actions could also be performed by physicians, but may be better suited for patient navigators because of the limited amount of time that is available for medical visits. As part of future studies of these approaches, it may be useful to evaluate patients' cultural values using instruments such as the MCVAT so that culturally-based beliefs can be identified and addressed as part of patient navigation programs and other strategies that are used to increase screening.

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