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RESEARCH ARTICLE

Correlates of U.S. Adults Aged 50−75 Years Having Had a Colorectal Cancer Screening Test

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Introduction: Colorectal cancer is a leading cause of cancer death in the U.S. Until 2021, the U.S. Preventive Services Task Force recommended colorectal cancer screening for all adults aged 50−75 years. Using a nationally representative sample, we explored the associations between having colorectal cancer screening and key sociodemographic and health-related factors among U.S. adults aged 50−75 years.

Methods: We analyzed self-reported data from the National Cancer Institute's Health Information National Trends Survey 5 (Cycle 4) collected from February to June 2020. A multivariable weighted logistic regression model was conducted using all of the factors that were univariably significant with $p<0.10$. Using backward elimination, factors that were not significant with $p>0.05$ were removed one at a time until the remaining factors were all significant collectively with $p<0.05$.

Results: Complete data were available for 1,649 respondents: 1,384 (81.2% weighted) had a colorectal cancer screening test, and 265 (18.8% weighted) did not. Multivariably, the odds of having had a colorectal cancer screening test increased with age (OR=1.07) and were higher for participants who identified as Black/African American than for White participants (OR=2.4), participants who had a family member who ever had cancer (OR=1.7), participants who believed that being overweight and obese influences development of cancer a lot than those who believed not at all (OR=2.0), and participants who had friends or family to talk with about health (OR=2.3).

Conclusions: Age, race, family history, weight-related beliefs about the causes of cancer, and having someone to talk with about health were associated with having colorectal cancer screening test.
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INTRODUCTION

Colorectal cancer (CRC) is the third most commonly diagnosed cancer and the second most common cause of cancer death in the U.S.[1,2] In 2022, there were 106,180 new cases of colon cancer and 44,850 new cases of rectal cancer.[3] The lifetime risk of developing CRC is 1 in 23 (4.3%) for men and 1 in 25 (4%) for women.[3] Lifestyle factors associated with developing CRC include smoking, being overweight, lack of physical activity, an unhealthy diet, and high alcohol consumption.[4] In

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addition, night shift work, a personal or family history of CRC or adenomatous polyps, and racial/ethnic background have also been associated with CRC.[3,5] Certain segments of the population have the lowest CRC screening rates (e.g., Hispanic compared with White adults, those <200% of the federal poverty line compared with those ≥200% of the federal poverty line, and those with less than a high school education compared with those with greater educational attainment[6]); these disparities often translate to CRC being found at later stages.[7,8] Notably, Black men and women have the highest incidence and mortality rates of CRC than other racial/ethnic groups in the U.S.[9,10]

The U.S. Preventive Services Task Force (USPSTF) recommends CRC screening in all adults aged 50−75 years.[11] CRC screening tests include fecal occult blood tests, fecal immunochemical test DNA test (sometimes referred to as the stool DNA test), colonoscopy, virtual colonoscopy, and sigmoidoscopy.[12] Because the 5-year relative survival rate for CRC is more than 90% when the cancer is diagnosed when localized (i.e., at Stage 1),[13] early detection and access to appropriate screening tests are essential. Using a nationally representative sample of U.S. adults, we explored the associations between having had a CRC screening test in adults aged 50−75 years. This study is one of the first to simultaneously evaluate key attitudinal, sociodemographic, and health-related factors that may influence CRC screening using contemporary data collected within the last 3 years through the National Cancer Institute's Health Information National Trends Survey (HINTS). Findings from this research may inform future interventions designed to enhance CRC screening across subpopulations of U.S. adults.

METHODS

This study used publicly available, deidentified secondary data from HINTS 5 Cycle 4.[14] Accordingly, no formal IRB approval was required from the authors' home institution.

Study Sample

HINTS 5 Cycle 4 data were collected from non-institutionalized U.S. adults aged ≥18 years between February and June 2020. The sample in this study was restricted to respondents aged 50−75 years to be consistent with the USPSTF's recommendation for CRC screening in all U.S. adults aged 50−75 years before 2021. Of the 3,865 respondents in the full HINTS data set, 2,079 were within this specified age range. After removing 430 respondents due to missing data for one or more variables of interest, an unweighted sample size of 1,649 respondents was obtained.

Measures

HINTS participants were given brief descriptions of a colonoscopy, sigmoidoscopy, and stool blood test and then asked whether they had ever had one of these tests to check for colon cancer. Only respondents with complete data for the following variables of interest were included in the analyses: having had a CRC screening test, age, birth gender, race/ethnicity, education, feelings about one's household income, self-rated general health, history of medical conditions, ever had cancer, BMI, family history of cancer, belief that knowing that one is genetically at high risk for developing cancer changes behavior, beliefs about what causes cancer, talking with friends about health, and caregiving responsibilities.

Statistical Analysis

Data analysis using SAS, Version 9.4, SAS/STAT 14.1 took place in November 2022. ORs (95% CIs) and p-values were calculated using SAS proc survey logistic with jackknife weighting, including the overall weight and 50 replicate weights, and the Newton−Raphson algorithm.[15] A multivariable weighted logistic regression model was conducted using all of the factors that were univariably significant with $p<0.10$. Using backward elimination, factors that were not significant with $p>0.05$ were removed one at a time until the remaining factors were all significant collectively with $p<0.05$. ORs with CIs that do not include the value 1 are considered significant.

RESULTS

Complete data were available for 1,649 respondents, of whom 1,384 (weighted 81.2%) had a CRC screening test and 265 (18.8%) did not. Univariable results are presented in Table 1. Univariably, the odds of having a CRC screening test increased with age, race/ethnicity, history of various medical conditions (e.g., high blood pressure, lung disease, and depression), having a family member with cancer, believing that being overweight and obese influenced cancer a lot, and having family or friends to discuss health. In the multivariable analysis (Table 2), the odds of having had a CRC screening test increased with age (OR=1.07), Black race compared with White race (OR=2.4), having a family member who ever had cancer (OR=1.7), believing that overweight and obesity influence cancer development a lot compared with believing not at all (OR=2.0), and having friends or family to talk with about health (OR=2.3).

Table 1. Univariable Associations With Having Had a Test for Colon Cancer Among Respondents Aged 50–75 Years

Correlates	Have you ever had one of these tests to check for colon cancer?			
	Yes	**No**		
Number of respondents (weighted % of all respondents)	**1,384 (81.2%)**	**265 (18.8%)**		
	% of row (SE)	**% of row (SE)**	**OR for having a colon cancer test (95% CI)**	***p*-value**
Age, mean years (SE)	61.1 (0.3)	57.8 (0.6)	1.08 (1.04, 1.11)	<0.001
Sex assigned at birth				
Female	81.7% (2.5%)	18.3% (2.5%)	1.1 (0.7, 1.6)	0.75
Male	80.8% (1.9%)	19.3% (1.9%)	ref	—
Race/ethnicity				overall *p*<0.001
Non-Hispanic White	81.2% (1.7%)	18.8% (1.7%)	ref	—
Non-Hispanic Black or African American	91.0% (1.9%)	9.0% (1.9%)	2.3 (1.5, 3.7)	0.001
Hispanic	66.0% (5.2%)	34.0% (5.2%)	0.5 (0.3, 0.8)	0.004
Non-Hispanic Asian	89.3% (6.5%)	10.7% (6.5%)	1.9 (0.6, 6.7)	0.29
Non-Hispanic other	89.6% (5.7%)	10.4% (5.7%)	2.0 (0.5, 7.7)	0.31
Education				
College graduate	84.2% (2.3%)	15.8% (2.3%)	1.3 (0.9, 2.0)	0.14
Not college graduate	79.9% (1.8%)	20.1% (1.8%)	ref	—
Income feelings				overall *p*=0.25
Living comfortably on present income	84.8% (2.7%)	15.2% (2.7%)	1.7 (0.9, 3.4)	0.12
Getting by	79.9% (2.1%)	20.1% (2.1%)	1.2 (0.7, 2.2)	0.50
Finding it difficult or very difficult	76.5% (4.4%)	23.5% (4.4%)	ref	—
General health				overall *p*=0.48
Excellent or very good	82.9% (1.9%)	17.1% (1.9%)	1.0 (0.4, 2.2)	0.93
Good	78.3% (3.0%)	21.7% (3.0%)	0.7 (0.3, 1.7)	0.44
Fair or poor	83.4% (4.9%)	16.6% (4.9%)	ref	—
Diabetes				
Yes	86.2% (2.7%)	13.8% (2.7%)	1.6 (1.0, 2.6)	0.06
No	79.6% (1.7%)	20.4% (1.7%)	ref	—
High blood pressure				
Yes	85.6% (1.9%)	14.4% (1.9%)	1.8 (1.1, 2.8)	0.02
No	77.0% (2.7%)	23.0% (2.7%)	ref	—
Heart condition				
Yes	84.7% (4.7%)	15.3% (4.7%)	1.3 (0.6, 2.8)	0.47
No	80.7% (1.5%)	19.3% (1.5%)	ref	—
Lung disease				
Yes	89.8% (2.8%)	10.2% (2.8%)	2.2 (1.2, 4.0)	0.01
No	79.9% (1.6%)	20.1% (1.6)	ref	—
Depression				
Yes	86.9% (2.5%)	13.1% (2.5%)	1.7 (1.0, 2.8)	0.04
No	79.7% (1.8%)	20.3% (1.8%)	ref	—
Ever had cancer				
Yes	85.1% (4.0%)	14.9% (4.0%)	1.4 (0.7, 2.6)	0.33
No	80.6% (1.5%)	19.4% (1.5%)	ref	—
BMI, kg/m^2				overall *p*=0.32
Underweight or normal (<25)	80.9% (2.4%)	19.1% (2.4%)	ref	—
Overweight (25 to <30)	84.1% (2.7%)	15.9% (2.7%)	1.3 (0.7, 2.1)	0.39
Obese (≥30)	78.7% (2.6%)	21.3% (2.6%)	0.9 (0.5, 1.4)	0.58

Table 1. Univariable Associations With Having Had a Test for Colon Cancer Among Respondents Aged 50−75 Years (*continued*)

Correlates	Have you ever had one of these tests to check for colon cancer?			
	Yes	No		
Number of respondents (weighted % of all respondents)	1,384 (81.2%)	265 (18.8%)		
	% of row (SE)	% of row (SE)	OR for having a colon cancer test (95% CI)	*p*-value
Family member ever had cancer				
Yes	83.2% (1.8%)	16.8% (1.8%)	1.7 (1.0, 2.8)	0.05
No/not sure	74.5% (4.1%)	25.5% (4.1%)	ref	—
High-risk change behavior[a]				overall *p*=0.69
Strongly agree	82.8% (2.2%)	17.2% (2.2%)	1.0 (0.4, 2.6)	0.94
Somewhat agree	79.8% (2.7%)	20.2% (2.7%)	0.8 (0.3, 2.0)	0.61
Somewhat disagree	76.5% (6.5%)	23.5% (6.5%)	0.7 (0.2, 2.0)	0.44
Strongly disagree	83.3% (6.0%)	16.7% (6.0%)	ref	—
Overweight or obesity influences cancer				overall *p*=0.03
A lot	85.2% (2.1%)	14.8% (2.1%)	2.2 (1.2, 4.1)	0.01
A little	78.3% (2.9%)	21.7% (2.9%)	1.4 (0.6, 3.0)	0.42
Not at all	72.5% (6.4%)	27.5% (6.4%)	ref	—
Do not know	83.9% (2.7%)	16.1% (2.7%)	2.0 (0.9, 4.4)	0.08
Gaining weight in adult life influences cancer				overall *p*=0.77
A lot	82.6% (2.8%)	17.4% (2.8%)	1.4 (0.7, 2.8)	0.33
A little	80.9% (2.0%)	19.1% (2.0%)	1.2 (0.6, 2.6)	0.55
Not at all	77.2% (5.5%)	22.8% (5.5%)	ref	—
Do not know	82.2% (2.8%)	17.8% (2.8%)	1.4 (0.6, 2.9)	0.43
Eating too much red meat influences cancer				overall *p*=0.14
A lot	86.3% (2.5%)	13.7% (2.5%)	1.7 (1.0, 3.0)	0.04
A little	81.5% (2.4%)	18.5% (2.4%)	1.2 (0.7, 2.2)	0.49
Not at all	78.3% (3.6%)	21.7% (3.6%)	ref	—
Do not know	77.8% (3.3%)	22.2% (3.3%)	1.0 (0.5, 1.8)	0.92
Have friends or family to talk about your health				
Yes	84.1% (1.6%)	15.9% (1.6%)	2.4 (1.7, 3.6)	<0.001
No	68.5% (3.5%)	31.5% (3.5%)	ref	—
Caregiving to someone with health condition[b]				
Yes	83.4% (4.2%)	16.6% (4.2%)	1.2 (0.6, 2.3)	0.57
No	80.7% (1.6%)	19.3% (1.6%)	ref	—

Note: SE is the weighted SE. Ref is the reference category of the independent variable.
[a]The question is stated as follows: *How much do you agree or disagree: If I found out from a genetic test that I was at high risk of cancer, I would change my behaviors such as diet, exercise and getting routine medical tests.*
[b]Participants who are currently caring for or making healthcare decisions for someone with a medical, behavioral, disability, or other condition.

DISCUSSION

Our finding that the odds of receiving a CRC screening test increased with age is consistent with published data.[1,2,16,17] In addition, Black respondents had higher odds of CRC screening than White respondents. Although much discussion has been given to higher incidence and death rates of CRC in Black adults,[18,19] it is possible that local and national CRC screening initiatives designed to raise awareness about CRC screening in the Black community are helping to improve screening rates.[20−22] In addition, significant associations with undergoing CRC screening included having a family member who had cancer and believing that being overweight and obese influences the development of cancer. These findings are consistent with established genetic risk factors and the well-documented influence of obesity on cancer risk.[3,23,24] Novel findings in this study include the relationship between having friends or family to talk with about health, which might be explained by the fact that individuals who have friends or family to discuss health matters may be more likely to have someone who can accompany them to screening colonoscopy

Table 2. Multivariable Model of Factors Associated with CRC Screening

Correlates	OR for having had a colorectal cancer screening test (95% CI), adjusting for other factors in the model
Age (per 1 year increase)	1.07 (1.04, 1.11)
Race/ethnicity	
Non-Hispanic White	ref
Non-Hispanic Black or African American	2.4 (1.4, 4.1)
Hispanic	0.6 (0.3, 1.0)
Non-Hispanic Asian	2.1 (0.4, 10.7)
Non-Hispanic other	2.7 (0.7, 11.0)
Family member ever had cancer	
Yes	1.7 (1.0, 2.9)
No/not sure	ref
Overweight or obesity influences cancer	
A lot	2.0 (1.0, 3.8)
A little	1.3 (0.6, 2.8)
Not at all	ref
Do not know	2.1 (0.9, 5.0)
Have friends or family to talk about your health	
Yes	2.3 (1.6, 3.4)
No	ref

CRC, colorectal cancer.

appointments and help with CRC-specific health information seeking,[25] both of which may lead to higher screening rates.

Our study found a relatively high CRC screening rate among HINTS participants (81.2% weighted) compared with the national average (71.6%).[1] In the entire HINTS data set, the unweighted rate of having CRC screening was 63%. Race was the variable that caused the largest number of responses to be eliminated from our analyses. However, rates of having CRC screening were not appreciably different between those missing race and those with race data.

Limitations

Our study lacks information on the specific type of CRC screening test used by HINTS participants, which might shed light on preferences and concerns regarding different aspects of CRC screening decision making (e.g., time and financial costs, invasiveness of test).[26,27] We limited our sample to individuals aged 50−75 years per USPSTF recommendations before 2021. However, the recommended age range for CRC screening has evolved over time to include ages 45−49 years.[11] Finally, we cannot differentiate between screening and diagnostic tests owing to the wording of the HINTS survey.

CONCLUSIONS

Age, race/ethnicity, family history of cancer, weight-related beliefs about the causes of cancer, and having someone to talk with about health were associated with having had a CRC screening test. Interventions that promote discussions of family medical history, address beliefs about the causes of cancer, and support personal communication networks may be helpful for increasing CRC screening rates.

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CREDIT AUTHOR STATEMENT

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