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Factors Affecting Colorectal Cancer Screening Among African-Born Immigrants in the United States: A Cross-Sectional Study

Chidoziri Chibundu[1,*], Frazier Beatty[1], and Sampson Akwafuo[2]

[1]College of Health Sciences, Walden University, Minneapolis, USA
[2]College of Engineering and Computer Science, California State University, Fullerton, USA

***Corresponding author:** Chidoziri Chibundu, College of Health Sciences, Walden University, Minneapolis, USA, Email: ccchibundu@yahoo.com

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Abstract

Objectives: Early detection of colorectal cancer through periodic screening has proved to be effective in reducing the incidence rate and mortality from colorectal cancer. Available records indicate racial and ethnic disparities in colorectal cancer screening in the United States. In this paper, a retrospective cross-sectional study to examine how family income, health insurance status, language of interview, length of stay in the US, perceived health status, level of education, and having a usual place for medical care affect colorectal cancer screening among African-born immigrants in the United States is presented.

Methods: Secondary data collected in 2010, 2013, and 2015 through the National Health Interview Survey from 349 African-born immigrants, age 40 years and above were analyzed using logistic regression and chi-square test of independence. A stratified multistage sampling procedure was used to select the sample for the study. The immigrant health services utilization model provided the framework for the study.

Results: A significant association was found between colorectal cancer screening and health insurance status, length of stay in the United States, perceived health status, and having a usual place for medical care. However, no association was found between colorectal cancer screening and family income, education level, and interview language.

Conclusion: These findings may be used to impact positive social change and guide key policy decisions on colorectal cancer preventive interventions targeting African-born immigrants living in the United States.

Keywords: Cancer; Colorectal cancer; Health disparities; African-born immigrants; Health screening

Introduction

Globally, colorectal cancer is the third most common type of cancer. It ranks fourth among causes of cancer-related deaths, with an estimated increase of 2.2 million new cases and 1.1 million deaths from colorectal cancer by 2030 [1]. In 2008, 1.24 million new cases of colorectal cancer were diagnosed. This is about 9% of all new cases of cancer. In the same year, approximately 600,000 deaths resulting from colorectal cancer were recorded worldwide, with an estimated 70% occurring in low and middle-income countries [2,3]. The numbers of newly recorded cases increased to 1.36 million in 2012 with 55% of the cases occurring in more developed regions of the world, and 694,000 deaths from the disease were recorded the same year [4]. In 2017, an estimated 135,000 persons in the United States were diagnosed with colorectal cancer and approximately 50,260 individuals died from the disease in the same year [5]. Several studies have shown that early detection of colorectal cancer, followed by the removal of precancerous polyps is effective in decreasing both incidence and mortality rates from colorectal cancer [6]. Concerted public health efforts have led to increases in colorectal cancer screening rates. However, screening records indicate continued disparities among different races in the United States [7,8]. Racial minorities have lower colorectal cancer screening rates than non-Hispanic whites in the United States [5,9]. Immigrant populations (including individuals from Africa) have considerably lower screening rates compared to individuals born in the United States, and may be at a disadvantage in terms of early detection and removal of precancerous polyps [10-12]. African-born immigrants living in the United States emigrated from the African continent where colorectal cancer is considered a rarity, and routine colorectal cancer screening is not a common practice [13]. As African- born immigrants become acculturated, the adoption of a western lifestyle and dietary patterns associated with increased colorectal cancer risks creates the need for increased colorectal cancer screening. There is a low level of awareness of the disease among the populace [14]. Cancer prevention efforts by various national governments in Africa are deficient as there is no organized population-based colorectal cancer screening program in any country in Africa [13]. These circumstances may negatively impact African-born immigrants' perception of the need to get screened for colorectal cancer while living in the United States.

The remaining part of the paper is structured as follows: a review of the current literature on cancer, colorectal cancer, and discrepancies in screening is presented in section 2. Section 3 presents the problem definition of this study, including the hypotheses. Section 4 contains details of the methodologies used, statistical regression test, and stratified multistage sampling procedures employed. Section 5 presents the results and discussions of the outcomes while the conclusion is presented in section 6.

Literature Review

Cancer is a complex heterogeneous disease in which abnormal cells divide uncontrollably and invade other surrounding tissues [15]. According to the National Cancer Institute, NCI, cancerous cells appear when the normal process of cell division, growth, and function specializations are altered leading to the formation of abnormal cells that divide without control and may form tumors [16]. There are different kinds of colorectal cancer. About 95% of all colorectal cancer cases are adenocarcinomas, and they start as a growth of cells called polyp in the lining of the colon and rectum and then spread to other layers [16]. The tumor is called mucinous adenocarcinoma when it appears to be in a pool of mucus under the light microscope and makes up about 10 to 15 percent of all colon and rectal adenocarcinomas. However, it is called signet ring cell adenocarcinoma when the tumor cells have a signet shape under a light microscope and make up about less than 1percent of adenocarcinomas [17]. Other less prominent cancers of the colon and rectum include (a) primary colorectal lymphomas, which is a non-Hodgkin lymphoma that develops in the lymphocytes of the lymphatic system, and account for about 0.5 percent of all colorectal cancer cases; (b) gastrointestinal stromal tumor that forms an interstitial cell of Cajal found in the lining of the gastrointestinal tract, and develop mostly in the stomach; (c) leiomyosarcomas, which occurs in the three layers of the smooth muscles found in the colon and rectum that guide waste products through the digestive tract, and constitutes about 0.1 percent of colorectal cancer cases; and (e) melanomas that are commonly associated with skin cancer but occur anywhere else including the colon and rectum [2,16]. Several factors contribute or predispose individuals the risk for colorectal cancer. While some of these factors are modifiable and are related to behavior or lifestyle such as smoking, alcohol intake, physical inactivity, diet, and obesity, others are non-modifiable factors including age, heredity and family history, and medical history among others [18].

In the United States, colorectal cancer is the third most common cancer in both men and women [6,18]. About 145,000 new cases of and 55,000 deaths from colorectal cancer occur yearly in the United States. It is estimated that 1 out of 22 men (4.6%) and 1 out of 24 women (4.2%) will be diagnosed with colorectal cancer in their lifetime [18]. Though colorectal cancer incidence has been on the decline in the United States generally, the incidence in adult's younger than 50 years of age is on the upward trend, and the underlying factors are unknown. It has been suggested, though, that it could reflect increased sedentary lifestyle, higher prevalence of obesity, and unhealthy dietary patterns in children and young adults [19]. The slow course of growth from precancerous polyp to invasive cancer creates an opportunity for the prevention and early detection of colorectal cancer. Early detection of premalignant polyps through screening and removal of precancerous polyps is considered an important strategy aimed at reducing this invasive menace [6,18]. When detected at an early stage, the treatment of colorectal cancer usually results in a positive outcome [15]. Modeling studies have suggested that increasing colorectal cancer screening would greatly assist in reducing colorectal cancer mortality compared with the reduction of risk factors or increased treatment use [20,21]. The tests that can detect adenomatous polyps include (a) flexible sigmoidoscopy that is done every 5 years, (b) colonoscopy that is conducted every 10years, (c) double-contrast barium enema that is performed every 5 years, and (d) Computed Tomographic Colonography (CTC) that is done once in 5 years. In addition to the above, there are high sensitivity stool tests such as fecal occult blood test (FOBT) and stool DNA test used primarily for cancer detection even though they are also capable of detecting some precancerous polyp.

According to the Center for Disease Control and Prevention, CDC, the racial and ethnic disparity in colorectal cancer screening persists in the United States despite the national increases in colorectal cancer screening rates [22]. The colorectal cancer screening rate for racial minorities remains lower than that of the Whites [9,23]. Numerous studies have been done in an attempt to explain racial and ethnic disparities in colorectal cancer screening in the United States. Some of the factors that have been found to influence racial and ethnic disparities in colorectal cancer screening include socioeconomic status, socio-cultural factors, and the disparity in physician recommendation for colorectal cancer screening and access to care [24-27]. The existence of disparity in colorectal cancer screening between foreign-born and US-born citizens of the United States is established [22]. According to the American Cancer Society [18], foreign-born individuals living in the United States are among the subgroups of U.S. populations that are most likely to have low colorectal screening rates. The factors that drive the disparity in colorectal cancer screening between US-born and foreign-born US citizens have been examined in several studies and factors such as nativity, access to health insurance, limited English language proficiency, and cultural barriers have been suggested. These findings highlight the need to investigate how some of these factors affect colorectal cancer screening practices of immigrant populations in the United States.

The immigrant health utilization model provides the basis for this study. It reveals the possible factors that could directly or indirectly influence health services utilization among immigrants. The model, therefore, serves as a valuable tool to identify relevant variables that could affect the use of health care services such as colorectal cancer screening among African-born immigrants living in the United States.

Problem Definition

Underlining factors affecting colorectal cancer screening among U.S. immigrant populations have been the subject of some studies that focused on Hispanics, Asian-Americans, Pacific Islanders, and other minorities [28,29]. However, we are not aware of any study that focuses on immigrants from African countries. African-born immigrants living in the United States are part of the African American population known to have lower screening rates and higher incidence and mortality rates from colorectal cancer relative to Whites [30]. To further examine factors contributing to these discrepancies, we designed some research questions, as highlighted below. Each of the Research Questions (RQ) is accompanied by a null and alternative hypothesis.

RQ 1: Is socioeconomic status, as measured by education level and family income associated with colorectal cancer screening among African-born immigrants living in the United States?

$H_0$1: There is no association between socioeconomic status and colorectal cancer screening among African-born immigrants living in the United States.

$H_\alpha 1$: There is an association between socioeconomic status and colorectal cancer screening among African-born immigrants living in the United States.

RQ 2: Is acculturation, as measured by the length of stay in the United States and interview language associated with colorectal cancer screening among African-born immigrants living in the United States?
H_0 2: There is no association between acculturation and colorectal cancer screening among African-born immigrants living in the United States.

$H_\alpha 2$: There is an association between acculturation and colorectal cancer screening among African-born immigrants living in the United States.

RQ 3: Is perceived health status associated with colorectal cancer screening among African-born immigrants living in the United States?

$H_0 3$: There is no association between perceived health status and colorectal cancer screening among African-born immigrants living in the United States.

$H_\alpha 3$: There is an association between perceived health status and colorectal cancer screening among African -born immigrants living in the United States.

RQ 4: Is access to health care, as measured by having a usual place for medical care and health insurance status associated with colorectal cancer screening among African-born immigrants living in the United States?

$H_0 4$: There is no association between access to health care and colorectal cancer screening among African-born immigrants living in the United States.

$H_\alpha 4$: There is an association between access to health care and colorectal cancer screening among African-born immigrants living in the United States.

Methodology

Secondary analysis of existing databases and studies were carried out. The theoretical framework for the study was the immigrant health services utilization model [31]. The major source of the research data is the NHIS survey. Responses from 2010, 2013 and 2015 surveys were used. The surveys were conducted on only African-born immigrants who were residents in the United States and were non-institutionalized at the time. African descendants born in the United States were excluded from the study.

The first stage involves geographically dividing the United States into 1700 primary sampling units (PSUs). The PSUs are then stratified in line with the social and demographic characteristics of the area. The probability of a PSU being selected is proportional to its population size within the strata. In the second stage of sampling, geographical area segments within each PSU are sampled, and the segments are divided into clusters that are made of about 4 to 9 housing units. The selected households are then assigned a quarter of the year, which is further distributed across 13 weeks within the quarter for the interview. The data analysis was done using IBM SPSS version 21. Responses from participants who satisfied the inclusion and exclusion criteria and completed the interview in 2010, 2013, and 2015 were used. All statistical tests were conducted using an α-level of 0.05, which is an indication of the significance level of acceptance or rejection of the null hypothesis [32]. The null hypothesis is retained, and the alternative hypothesis is rejected, if the p-value is greater than the α-level. On the other hand, the null hypothesis is rejected, and the alternate hypothesis retained if the p-value is less than or equal to the α-level. The total sample size for the initial study was 349 African-born immigrants, age 40 years and above living in the United States at the time of data collection. 40 years is the youngest age of participants while the oldest is 85 years, with a mean age of 51.98 years. The participants were grouped into four categories, using age range: 40-49 years, 50-59years, 60-69 years, and 70 years and above. 40-49 age range has the highest number of participants (n=158) representing 45.3% of total participants. Detailed descriptions of all age groups and other demographics of the participants are shown on table 1.

Statistical test for research hypothesis

On the RQ 1, the outcome variable 'ever had colonoscopy' and the predictor variable, the education level and family income are categorical. Chi-square test of independence was therefore used to test the association between ever had a colonoscopy and socioeconomic factors. The significance of the Pearson chi-square statistic was determined by alpha level. Because the outcome variable was dichotomous, simple logistic regression was used to assess the relationship between ever had a colonoscopy and each of the socioeconomic factors. The odds ratio, which indicates the change in odds resulting from a unit change in the predictor variable and its 95% Confidence Interval (CI) were presented in section 5. Logistic regression analysis was used to examine the effect of each variable of interest in this study on the probability of getting a colonoscopy when all the variables are in the model. For RQ 2, ever had colonoscopy and 'the length of stay in the United States and language of interview' were categorical. Therefore, a chi-square test of independence was used to test for the association between 'ever had colonoscopy and each of the predictor variables. The significance of the Pearson chi-square statistic was determined by the α-level, and this further determines whether the null hypothesis is rejected or accepted. Because the outcome variable was categorical and dichotomous, simple logistic regression was used to assess the relationship between ever had colonoscopy and each of the predictor variables. On RQ 3, the outcome variable (ever had colonoscopy) and the predictor (perceived health status), were both categorical. Chi-square test of independence was used to test for the association between ever had colonoscopy and perceived health status, followed by the use of simple logistic regression. The same applies to RQ 4: having a usual place for medical care and health insurance status. Descriptive statistics were used to show the summary of the demographics and the relationships between variable outcomes and predictor. Predictions from the data were done using inferential statistics. Other predictor variables that were assessed against 'ever had colonoscopy' include: length of stay in the United States, health insurance status, the language of interview, having a usual place for medical care, family income, education level, and perceived health status. Logistic regression has been used in related studies to examine factors that affect colorectal, breast, and cervical cancer screening in several specific population [28]. Hence, the logistic regression analysis is appropriate for assessing the relationship between the variables.

Results and Discussions

The distribution and demographics of the study participants are as shown in table 1. 9(5.6%) of the 158 participants in the age group 40-49 years had a colonoscopy in the past, while 41(33.3%) of the 123 participants in the age group 50-59 years has a colonoscopy. For age group 60-69 years, 33(66%) of 50 participants has a colonoscopy, whereas in the age group 70 years and above, 7(38.8%) of 18 participants has a colonoscopy. Analysis of the educational level of the participants shows that 162(46.4%) has at least four years of college,

99(28.4%) has high school education or less, and 88(25.2%) has some college education. Of the 349 participants, 321(92%) has stayed 5 years or more in the United States and they were labeled established immigrants in the study; 28(8%) participants have lived less than 5 years in the United States. Other details can be seen in table 1.

Socioeconomic status and colorectal cancer screening

The results of chi-square test of independence to examine whether socioeconomic status measured by the level of education and total family income is associated with colorectal cancer screening shows negative association. For some college education category, 22 participants were expected to get a colonoscopy and the same got it, and 65 participants were expected not to get a colonoscopy but 66 returned positive. For the 4 years of college and above category, while 41 participants were expected to get a colonoscopy, result indicated a slightly. But 45 participants got a colonoscopy. While 120 participants for the negative colonoscopy category, 117 was obtained out of the expected 120. Based on the result of the Pearson chi-square test of independence {χ^2=.702, df=2, p=.704 (p >.05)}, there is no statistically significant association between level of education and colorectal cancer screening, as shown on table 2. Simple logistic regression was carried out to assess the association between colorectal cancer screening and socioeconomic status. The result of the simple logistic regression between colorectal cancer screening and education level, is as shown in table 3 below. Education level did not significantly predict whether a participant would get a colonoscopy or not. (Wald statistics=.70, df=2, p=.705 {p >.05}). Based on the result of the chi-square test of independent and simple logistic regression, the null hypothesis is retained. This implies that there is no statistically significant association between colorectal cancer screening and education level. Further, using the participants who had 4 years of college or more as the reference group, the B coefficient, which represented the logit of the outcome variable (natural logarithm of the odds of the outcome occurring) associated with a one-unit change in the predictor variable, and the Exp (B), which represented the odds ratio indicated that though there was no statistically significant association between colorectal cancer screening and education level, participants in high school education or less category had lower odds of getting colorectal cancer screening than the participants with 4 years of college education or more {B=-.24, Exp (B)=.79, 95% CI (0.441, 1.405)}. In the same vein, compared to the

Table 1: Distribution of respondents' demographics.

Characteristics	Frequency	Percentage (%)
Age		
40-49	158	45.3
50-59	123	35.2
60-69	50	14.3
70-85	18	5.2
Education		
High school education or less	99	28.4
Some college education	88	25.2
4 years of education or more	162	46.4
Health Insurance Status		
Have health insurance	265	75.9
Does not have health insurance	84	24.1
Total Family Income		
$0-$34,999	165	47.3
$35,000-$74,999	97	27.8
$35,000-$74,999	87	24.9
Perception of Health Status		
Good	307	88.0
Poor	42	12.0
Having a Usual Place for Medical Care		
Yes	288	82.5
No	61	17.5
Number of Years Stayed in United States		
5 years or more (established immigrants)	321	92.0
Less than 5 years (recent immigrants)	28	8.0
Language of Interview		
English Language	340	97.4
Other language	9	2.6

Table 2: Chi-Square test of independence of the dependent and independent variables.

Number of participants N=349	Ever had colonoscopy		P-value
	Yes	No	
Number of participants	90	259	
Level of education			
High school education or less	23(25.6%)	76(29.3%)	0.704
Some college education	22(24.4%)	66(25.5%)	
4 years of education or more	45(50.0%)	117(45.2%)	
Health Insurance Status			
Have health insurance	83(92.2%)	182(70.3%)	0.00
Does not have health insurance	7(7.8%)	77(29.7%)	
Total Family Income			
$0-$34,999	34(37.8%)	131(50.6%)	0.063
$35,000-$74,999	27(30.0%)	70(27.0%)	
$35,000-$74,999	29(32.2%)	58(22.4%)	
Perceived health status			
Good	72(80.0%)	235(90.7%)	0.007
Poor	18(20.0%)	24(9.3%)	
Having a Usual Place for Medical Care			
Yes	89(98.9%)	199(76.8%)	0.00
No	1(1.1%)	60(23.2%)	
Years Stayed in United States			
5 years or more (established immigrants)	1(1.1%)	27(10.4%)	0.005
Less than 5 years (recent immigrants)	89(98.9%)	232(89.6%)	
Language of Interview			
English Language	88(97.8%)	252(97.3%)	1.00
Other language	2(2.2%)	7(2.7%)	

participants with 4 years of college education and above, the participants with some college degree had lower odds of getting colonoscopy {B=-.14, Exp (B)=.867, 95% CI (0.479, 1.567)}. Therefore, there is no statistically significant association between education level and colorectal cancer screening. To test for association between colorectal cancer screening and total family income, three categories: $0-34,999 (low income), $35,000-$74,999 (middle income), and $75,000 or more (high income). 42 participants were expected to get a colonoscopy, but 34 participants got a colonoscopy, and while 122 participants were expected not to get a colonoscopy, 131 participants did not. For participants in the middle-income category, 25 persons were expected to get a colonoscopy but the testing returned 27 participants, and while 72 participants were not expected to get a colonoscopy, 70 participants did not get a colonoscopy. For participants in the high-income category, 22 participants were expected to get a colonoscopy but 29 participants got a one, and while 64 participants were not expected to get a colonoscopy, 58 participants did not get a colonoscopy. Based on the result of the Pearson chi-square test of independence (χ^2=5.116, df=2, p=.077 {p >.05}), there is no statistically significant association between colorectal cancer screening and total family income.

Acculturation and colorectal cancer screening

To determine the association between colorectal cancer screening and the number of years lived in the United States, the participants were categorized into two groups: recent immigrants (lived less than 5 years in the United States) and established immigrants (lived in the United States for 5 years or more). Among established immigrants, 82 participants were expected to have a colonoscopy but 89 participants did get a colonoscopy, and while 238 participants were expected not to get a colonoscopy, 232 participants got a colonoscopy. Results of other tests are as shown in table 3. There is an indication that language of interview did not significantly predict whether a participant would get a colonoscopy or not (Wald statistics=.06, p=0.805 {p >.05}). The null hypothesis is retained. This infers that there is and there is no statistically significant association between the language of interview and colorectal cancer screening. Furthermore, using the participants who interviewed in other languages as a reference group, though there was no significant association between colorectal cancer screening and interview language, the B coefficient, which represented the logit of the outcome occurring associated with a one-unit change in the predictor variable, and the Exp (B), representing the odds ratio.

Table 3: Results of simple logistic regression analysis of independent variables and colorectal cancer testing.

Variable	B	S.E	Wald	df	Sig.	ExpB	95% CI for ExpB	
							Lower	Upper
Usual care place	-3.29	1.01	10.47	1	0.01	0.3	0.05	0.27
Insurance status	1.61	0.41	15.00	1	0.00	5.01	2.21	11.34
Stay in U.S	2.33	1.02	5.19	1	0.23	10.35	1.38	77.36
Interview language	0.20	0.81	0.06	1	0.80	1.22	0.24	5.99
Health status	0.89	0.34	6.94	1	0.008	0.40	0.21	0.79
Education level (1)	0.24	0.29	0.66	1	0.417	0.79	0.44	1.40
Education level (2)	1.43	0.30	0.22	1	0.636	0.87	0.49	1.56
Income total (1)	0.66	0.29	4.84	1	0.028	0.52	0.29	0.93
Income total (2)	0.26	0.32	0.65	1	0.419	0.77	0.41	1.45

Perception of health status and colorectal cancer screening

For research question 3, the participants were categorized into two groups: good health status and poor health status. The chi-square test of independence shows that among the participants that have good health status, 79 participants were expected to get a colonoscopy but 72 participants got a colonoscopy, and while 227 participants were expected not to have had a colonoscopy, 235 participants did not get a colonoscopy. Among the participants that have poor health status, 10 participants were expected to get a colonoscopy, 18participants got a colonoscopy, and 31 participants were expected not to get a colonoscopy, 24 participants did not get a colonoscopy. Based on the result of the chi-square test of independence (χ^2=7.269, df=1, p=.007 {p <.05}), there is a statistically significant association between colorectal cancer screening and perceived health status. Logistic regression to assess the association between the two variables was also carried out. The result is as shown in table 3. The null hypothesis is rejected and the alternate hypothesis is retained. Furthermore, using the participants in poor health status as a reference group, the B coefficient, representing the logit of the outcome variable (natural logarithm of the odds of the outcome occurring) is evaluated, indicating that the participants who have good health status are less likely to get colonoscopy (B= -.89, Exp (B)=.41, 95% CI {.210, .795}).

Access to health care and colorectal cancer screening

Participants were also categorized into two groups for research question 4: participants who have health insurance and those without health insurance. 68 participants who have health insurance coverage were expected to get a colonoscopy, 83 participants got a colonoscopy, and 196 participants were expected not to get a colonoscopy, but only 182 did not get a colonoscopy. In the category with no health insurance coverage, 21 participants were expected to get a colonoscopy, 7 participants got a colonoscopy, and 62 participants were not expected to get a colonoscopy, 77 participants did not get a colonoscopy. Based on the result of the chi-square test of independence (χ^2=17.61, df=1, p=.000 {p <.05}), there is a statistically significant association between health insurance status and colorectal cancer screening. Furthermore, a logistic regression test was carried out to assess the association between colorectal cancer screening and access to health care measured by having a usual place for medical care. The participants who do not have a usual place for medical care are less likely to get a colonoscopy {B=-3.2, Exp (B) =.04, 95% CI (.005, .273)}.

Multinomial logistic regression

A multiple logistic regression analysis was conducted to show the odds of predicting colorectal cancer screening when all the predictor variables are in the model. These variables include having a usual place for medical care, health insurance status; total family income, level of education, number of years lived in the United States, language of interview, and perceived health status. The result of the analysis is as shown in table 4 above. The result indicates that the model is a good fit (Omnibus tests of model coefficients, χ^2=57.62, df=9, p=.000 {p <.05}). The model correctly predicted 75.1% of the times whether a participant would get colonoscopy or not. It is also shown in table 4 above that four of the predictor variables, including having a usual place for medical care {Wald statistics=7.61, df=1, p=0.006 (p <0.05)}, insurance status{Wald statistics=6.06, df=1, p=.014 (p <.05)}, length of stay in the United States {Wald statistics=3.96, df=1, p=.046 (p

Table 4: Results of multiple logistic regression analysis of independent variables and colorectal cancer testing.

Variable	B	S.E	Wald	df	Sig.	ExpB	95% CI for ExpB	
							Lower	Upper
Step 1[a] Usual care place	-2.84	1.03	7.61	1	0.006	0.06	0.01	0.44
Insurance status	1.11	0.45	6.06	1	0.014	3.04	1.25	7.36
Stay in U.S	2.10	1.06	3.96	1	0.046	8.17	1.03	64.67
Interview language	0.07	0.93	0.01	1	0.940	1.07	0.17	6.61
Health status	-1.15	0.39	8.48	1	0.004	0.32	0.15	0.69
Education			0.06	2	0.920			
Education level (1)	-0.06	0.37	0.02	1	0.876	0.94	0.46	1.94
Education level (2)	0.10	0.35	0.07	1	0.788	1.10	0.55	2.19
Income Total			0.01	1	0.940			
Income total (1)	-0.43	0.38	1.31	1	0.252	0.65	0.31	1.36
Income total (2)	-0.11	0.36	0.09	1	0.764	0.89	0.44	1.81
Constant	-2.67	1.53	3.06	1	0.080	0.07		

<.05)}, and perceived health status {Wald statistics=8.48, df=1, p=.004 (p <.05)} significantly predicted whether a participant would get colorectal cancer screening or not. However, three of the predictor variables including interview language {Wald statistics=0.01, df=1, p=.940 (p >.05)}, education level {Wald statistics=0.16, df=2, p=0.920 (p >0.05)}, and total family income {Wald statistics =.01, df=1, p=.940 (p >.05)} did not significantly predict whether a participant would get colorectal cancer screening or not.

Conclusion

This paper presents the results of a quantitative cross-sectional study examining factors that affect colorectal cancer screening among African-born immigrants living in the United States. Data from the NHIS interview survey of 2010, 2013, and 2015 were analyzed. As shown above, education level, family income, health insurance status, having a usual place for medical care, the number of years lived in the United States, interview language, and perception of health status influenced the receipt of colorectal cancer screening among African-born immigrants in United States. Chi-square test of independence and logistic regression analysis reveals that insurance status, having a usual place for medical care, number of years lived in the United States, and perception of health status have a significant association with colorectal cancer screening among African-born immigrants in the United States. However, no statistically significant association was found between colorectal cancer and family income, education level, and language of interview among the study population. Multiple regression analysis shows that insurance status, having a usual place for medical care, number of years lived in the United States, and perception of health status significantly predicted the receipt of colorectal cancer screening among African-born immigrants. However, family income, education level, and language of the interview did not predict whether people would get screened for colorectal cancer among the study population. Findings from this study may aid better understanding of colorectal cancer practices and associated factors among African-born immigrants in the United States, which is invariably needed for efficient public health programs formulation and implementation. The study, however, considered only immigrants of age 40 years and above, who identified Africa as their region of birth.

Conflict of Interest

None.

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