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Ashley N. Martell, Student

Richard Crosby, PhD, Committee Chair

Dr. William Pfeifle, Director of Graduate Studies

Association of HIV Testing, Educational Attainment, and Age among Black and Non-Black Men

Capstone Project Paper

A paper submitted in partial fulfillment of the

Requirements for the degree of

Master of Public Health

In the

University of Kentucky College of Public Health

By

Ashley N. Martell, B.S.

Pikeville, Kentucky

April 24, 2014

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Introduction

Human Immunodeficiency Virus (HIV) infection can lead to a chronic condition, Acquired Immunodeficiency Syndrome (AIDS), but can be well managed with a combination of medications, treatments, and remedies.¹ The emergence of HIV in the United States in 1981 created an atmosphere unlike any other at that time. Overtime, the science community has worked diligently to combat this disease through research, practice, and intervention. Although many efforts have been put forth over the past thirty years, millions of Americans still remain infected with HIV.² Among those who are infected with HIV/AIDS we see disproportionate rates among specific races and gender. Research shows that nearly 75% of all HIV/AIDS cases in the United States are among men, more specifically Black men who have sex with men (MSM).² Additionally, we see a disproportionate amount of Black and African American individuals becoming infected with HIV year after year.³ African Americans represent around 12% of the national population, but represent nearly 45% of all new HIV infections across the United States.³

In 2010, the U.S. government issued the first National Strategy for HIV/AIDS in the United States. Several approaches to the reduction of HIV are discussed in the strategic plan, including the recommendation of those at risk of infection to be tested annually and know their status.² The Centers for Disease Control and Prevention (CDC) recommends that everyone between the ages of 13 and 64 get tested at least once as part of a routine healthcare check up from their regular provider.⁴ Unfortunately, nearly one in five people in the United States who have HIV do not know they are infected. These people unknowingly contribute to the spread of HIV.⁴ Unfortunately, many issues still remain with HIV vaccine research.⁵ According to researchers, there are many biological

components to the virus that make it extremely difficult to vaccinate against HIV, but are hopeful that there will be a vaccine in the future.⁵ Since a vaccination for HIV is unlikely in the *near* future, HIV testing remains a critical part of preventative sexual health.^{2,4,5}

Education plays a significant role in the adherence to an overall healthy lifestyle. Researchers often take into account an individual's education level and how education impacts one's risk for contracting disease. Researchers have shown that low literacy has a strong tie to multiple adverse health outcomes.⁶ Applying this idea about health behavior outcomes and education level to HIV testing is more difficult, however. Increasing HIV testing in individuals remains a multi-factorial issue. Stigma, education, and age all play a part in increasing the rates of testing each year.^{2,4} The information from the U.S. National HIV/AIDS Strategy as well as the recommendations from the CDC allow us to assume that obtaining a test for HIV is a preventative and healthy choice.^{2,4} Applying this idea of education and health outcomes to HIV testing, one would anticipate that the higher level of education one has then the more likely one would be to obtain a test for HIV as well as other sexually transmitted diseases. The study attempted to answer if an individual's educational attainment and age impact the obtainment of HIV testing services. We hypothesized that individuals with higher education levels and age would be more likely to obtain HIV testing services.

Although there are multiple studies that have previously explored the association of HIV testing rates and general educational attainment among women, there is a lack of research in this specific area on men in the United States. Exploring the literature allows you to perceive an obvious gap in this area. Previous studies are limited to studying

women in foreign nations, but it is important to note that each study echoes the hypothesis for this study of men in the United States.

One study of a group of women in Kenya, Zambia and Zimbabwe revealed that there was an increase of HIV testing rates among women who had higher levels of education.⁷ An additional study, taking place in Northeast China, revealed that there was an increase in willingness to accept HIV testing, however, multiple factors influenced one's willingness—including age, location, and education.⁸

This study will explore the association of HIV testing, educational attainment, and age among Black and Non-Black men ages of 15 and 44 using nationally representative data from the National Survey of Family Growth between year 2006 and 2010 (Figure 1).

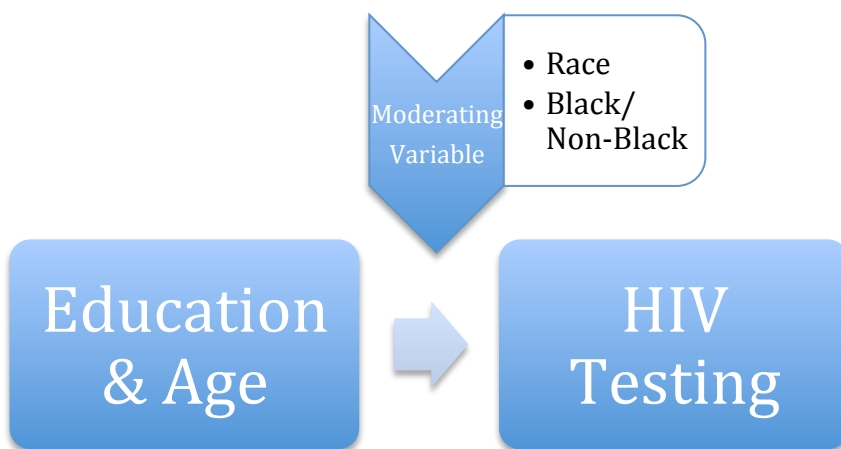


Figure 1. Conceptual Model

The correlation between HIV testing, age, and education level is very important in narrowing what populations (age and education level) to target for future health behavior interventions. Specifically, understanding how education level and age impact HIV testing rates is crucial in furthering HIV testing recommendations and HIV testing interventions. Data show that Black men have the highest rates of HIV in this country.³ Also, it is important to note that 25% of all new HIV infections in the United States are

among Youth (ages 13-24).² Furthermore, 60% of youth that are infected with HIV are unaware.² This study will attempt to define the association between education levels and testing for HIV and could possibly impact future HIV testing interventions.

Methods

The Institutional Review Board at the University of Kentucky waived review of this study because of the use of publically available, de-identified secondary data. Data was supplied from the National Survey of Family Growth (NSFG). NSFG gathers information on family life, marriage and divorce, pregnancy, infertility, use of contraception, and men's and women's health. The survey results are used by multiple agencies, including the U.S. Department of Health and Human Services, in order to perform statistical studies of fertility and health as well as plan health promotion programs across the United States.⁹ Since HIV rates in men are among the highest in the country this study exclusively focused on men and excluded all women from the sample. The men for this survey were recruited and selected using probability sampling methods. Clusters of addresses, known as primary sampling units, were located in large metropolitan areas and counties.⁹ The sample was representative of the U.S. population, as 121 primary sampling units were used to randomly select from. These sampling units were located in nearly every state across the United States.⁹

The inclusion criteria for participation in the survey required that one of the individuals living at the listed residence, including those away from home at college, were between the ages of 15-44. If there were multiple residents that fit the inclusion

criteria in an individual household, then one individual was randomly selected from the home.⁹

Over 22,000 interviews were collected over the duration of four years between 2006 and 2010—every 48 weeks of each year. Of the 22,000 interviews, over 10,000 interviews were conducted on men. Professionally trained females administered the interviews in person using a laptop, notebook or computer. The computer portion of the interview collected sensitive material—this type of collection is commonly referred to as CAPI, or computer-assisted personal interviewing. The interview process lasted for roughly 60 minutes for men and 80 minutes for women respondents. Incentives were provided for both men and women for their time involved with NSFG.⁹

Measures

Correlates

The correlate in this study was the current or highest level of education obtained by the respondent. Additionally, the study looked at the correlation between respondent's age and HIV testing. In Section A of the survey, the respondent's were asked to answer multiple questions including age at time of interview as well as his current or highest level of education. Respondents answered the question regarding age with a numerical value ranging from 15 to 44. This variable was dichotomized into two separate groups in order for a chi-square analysis to be performed. The two age groups were ages 15-29 and ages 30-44.

Furthermore, the respondent had to list the formal years of schooling they had obtained. The survey question specifically asked, "What is your current or highest level of education obtained?" The responses for this question included: 9th grade, 10th grade,

11th grade, 12th grade, 1 year of College or less, 2 years of College, 3 years of College, 4 years of college/graduate school, 5 years of college/graduate school, 6 years of college/graduate school, or 7 or more years of college/graduate school. The responses to the education question were ordinal—listing the answers from “no formal school” to “professional school/Graduate—7 or more years.”⁹ This variable was also dichotomized into two separate education groups—Lower Education (12th grade or below) and Higher Education (At least 1 Year of College).

Dependent Variable

During Section H of the survey, administered by CAPI, a series of questions regarding sensitive material about sexual transmitted diseases were asked. The dependent variable in this study, also known as the outcome variable, was whether or not the respondent had ever been tested for HIV (“Have you ever obtained a HIV test outside of blood donation?”). The responses for this variable included, “Yes, No, Don’t Know, and Refused.” Men who responded with “Don’t know” or “Refused” were filtered out of the data set.

Analytic Plan

This study examined the association of an individual’s educational attainment, age, and HIV testing. Incidence and prevalence rates of HIV are much higher among men in the United States, so this study explored only men from the national representative data set. Among the respondents, 56 men did not answer specific questions that were needed to perform the data analysis; therefore, they were filtered out of the data set.

To examine the correlation between educational attainment, age, and HIV testing, a bivariate analysis was performed using a chi-square statistical approach. Separate chi-

square analyses were run for the following categories: HIV testing rates and level of education among all individuals, HIV testing rates and level of education among Black individuals only, and HIV testing rates and level of education among Non-Black individuals. Another set of chi-square analyses were performed for the following categories to examine the association of age and HIV testing: Age at interview and level of education among all respondents, age at interview and level of education among Black respondents only, and age at interview and level of education among Non-Black respondents. A chi-square statistic, p-value, and effect size were calculated for each analysis. The bivariate data analysis was performed using SPSS Statistical Software (IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp).

Results

Descriptive Statistics

The sample for this study was relatively large (Table 1; N=10403), therefore an alpha of .01 was used to determine statistical significance to protect against Type I error. Less than half of respondents (Table 1; 48.4%) did not have a college education and 42.6% of participants reported ever being tested for HIV outside of blood donation. The majority of the respondents were Non-Black (Table 1; 73.8%) and 18.2% of participants identified as Black. The age range of participants was diverse; nearly half of respondents were less than 29 (Table 1; 56.9%) and 43.0% were between ages 30 and 44.

Education and HIV Testing

The first statistical test performed was a chi-square analysis between Current/Highest Education Level Obtained and HIV Test Outside of Blood Donation. There were 56 responses that were filtered out of the chi-square analysis due to missing

data. Results show that 36.0% of respondents with lower education levels (12th grade or below) had ever obtained a test for HIV outside of blood donation (Table 2; 36%).

Looking at participants with at least one year of college, half of these individuals had ever obtained a HIV test outside of blood donation (Table 2; 50.1%). When a difference is statistically significant, as we see in this particular case, it does not necessarily mean that it is important or helpful in decision-making. It simply means you can be confident that there is a difference. In order to see if the statistical significance is meaningful we used percent relative difference (PRD). PRD is a common metric used for measuring the magnitude of change across different measures and is good for interpreting the effect size in a study. The PRD for this association was 28.3 (Table 2) and the p-value was .001 ($p < .001$).

Education and HIV Testing: Non-Black Males

This statistical analysis allowed us to examine only the Non-Black respondents in the sample. Of the respondents with a high school education or below (12th grade or below), only 32.2% reported ever being tested for HIV outside of a blood donation (Table 3). Additionally, 46.9% of respondents who had at least year of college reported being tested for HIV outside of a blood donation. The p-value was significant at less than .001 ($p < .001$), however, the PRD was lower than the analysis of all respondents (Table 3; $PRD=27.7$).

Education and HIV Testing: Black Males

This analysis allowed us to examine statistical findings of the association of HIV testing and education level for Black respondents only (Table 4; N=1891). There were three responses that were filtered from the data due to refusal to answer. The results

showed that over half of black respondents had obtained a test for HIV outside of blood donation who had completed the 12th grade or less (Table 4; 51.3%). There was a significant amount of Black respondents with at least one year of college education who had received a HIV test outside of blood donation (Table 4; 70.9%). The calculated p-value was less than .001 ($p < .001$) and the PRD was 67.4 (Table 4; PRD=67.4).

Age and HIV Testing

An association between age and HIV testing was also performed to examine the differences between age and education level and how they individually impact one's history of HIV testing. Table 5 shows the results from the chi-square analysis of age and HIV testing among all valid responses (N=10349). There were 54 responses that were not factored into the data analysis due to lack of information. The results showed that only 31.4% of respondents ages 15-29 had ever been tested for HIV outside of blood donation, whereas those ages 30-44 were more likely to be tested (Table 5; 57.8%). The calculated p-value was less than .001 ($p < .001$) and the PRD was 62.3 (Table 5; PRD=62.3).

Age and HIV Testing: Non-Black Males

A chi-square analysis was performed among Non-Black respondents only where 40 responses were filtered out of the data due to missing information (Table 6; N=7636). The results are very similar to the data analysis of all respondents (Table 5; N=10349). In this analysis we see that there are similar percentages to 'all respondents,' but there is a much lower PRD (55.7). Only 28.2% of the Non-Black respondents ages 15-29 reported ever being tested for HIV outside of a blood donation, whereas the respondents ages 30-44 were more likely to be tested for HIV outside of blood donation (Table 6; 53.9%). The calculated p-value was less than .001 ($p < .001$) and the PRD=55.7.

Age and HIV Testing: Black Males

A chi-square analysis was performed among Black respondents only exploring the relationship between age and HIV testing. There were three responses that were filtered out of the data due to missing information (Table 7; N=1891). The results from this chi-square analysis were different from the two previous chi-square analyses. There were higher percentages of HIV testing rates in both age categories and a much higher PRD. Specifically, 46.8% of Black respondents ages 15-29 reported ever being tested and 77.3% of respondents ages were tested for HIV outside of blood donation. The calculated p-value was less than .001 ($p < .001$) and the PRD was 134.4 (Table 7; PRD=134.4).

Discussion

Main Findings

The purpose of this study was to determine the association between HIV testing, age, and education level among Black and Non-Black men between ages 15-44. The results demonstrate a consistent pattern among the three groups that were analyzed (All Respondents, Black Respondents, and Non-Black Respondents). There was statistical significance ($p < .001$) determined among all groups, however, the PRD varied from group to group. Generally, all men in this study were more likely at higher education levels and higher ages to obtain a test for HIV (Figure 2, Figure 3, Figure 4, Figure 5). More specifically, however, Black respondents have higher percentages than the Non-Black respondents for receiving a HIV test outside of blood donation. Additionally, the PRD is significantly higher among the Black responses than the Non-Black responses (PRD=67.4 and PRD=27.7).

The analysis of age and HIV testing showed similar trends (Figure 4 and Figure 5). Specifically, Black respondents ages 30-44 are much more likely to obtain a test for HIV than younger black respondents (Figure 5). In comparison to the Non-Black respondents, the Black respondents (all ages: 15-44) are more likely to receive a test for HIV (Figure 4, Figure 5). The PRD for Black respondents was 134.4 and only 57.7 for Non-Black respondents.

Although the hypothesis for this study was correct and indicates that at higher education levels Black and Non-Black men are more likely to obtain a test for HIV, there was an overwhelming difference between races. Because rates of HIV in the United States continue to affect Black individuals at disproportionate rates we expected a lower obtainment of HIV testing in Black respondents. The Black respondents in this study, however, were more likely at every age category and education category to be tested for HIV (Figure 2, Figure 3, Figure 4, Figure 5). The importance of this study is significant for future public health practitioners and researchers wishing to implement HIV testing interventions. As mentioned previously, 25% of HIV infections occur in youth, and we know from this study that they are less likely than older adults to be tested for HIV.² Research also reports that Black individuals have higher rates of HIV incidence and prevalence.³ The findings from this study are significant when looking at the Black population as well as the Non-Black. We now know that Black men are more likely when they are older and more educated to be tested for HIV.

Strengths and Limitations

The primary strength of this study is the large sample size from a diverse nationally representative sample. The percentage of Black individuals was around 18%

making this an accurate representation of the U.S. population. To my knowledge, there have been no studies specifically looking at general educational attainment (not HIV specific education) and HIV testing between Black and Non-Black males. One limitation, however, is that the survey was self-reported information. Self-reported information may result in skewed data due to recall bias and social desirable answers being reported by participants. Additionally, the question asked in this study did not ask how many times or how regularly participant's obtained HIV testing. As mentioned earlier, the national recommendation is to obtain a test at least once a year. Future research on this topical area should include questions that specifically ask if individuals are meeting the national recommendation.

Implications for Research and Practice

As mentioned previously, data shows that 75% of all cases of HIV are among men.² More specifically, 44% of all new cases are among Black individuals and 25% of cases are in youth.^{3,4} The results from this study allow us to develop HIV testing interventions that are targeted at specific age groups and education levels. These findings can aid in the formulation of specific interventions that reflect the 2011-2015 HIV/AIDS Strategic Plan issued by the Department for Health and Human Services. In this HIV/AIDS Plan there are multiple strategies working towards very specific goals—goals that are hopefully attained by 2015. One of those goals is the reduction of HIV/AIDS and health disparities.¹⁰

There are several implications for the future of public health and HIV testing. First, there needs to be specific interventions for younger men and those who have lower levels of education, as we see that these are the men in the study that have the lowest

levels of obtaining a test for HIV. The results from the study showed that higher educated men are more likely to be tested for HIV, but it is not a simple task to motivate men into higher education. This intervention strategy would be extremely difficult and unlikely to work as a form of HIV testing uptake. If accessibility is the issue for these young men, then bringing testing centers and temporarily setting them up in high schools across the United States could have an impact on increasing HIV testing rates in these individuals. According to the most recent statistics from the state legislatures, only twenty states in the U.S. are implementing HIV/AIDS specific education into the sexual health education curriculum.¹¹ There are, however, 33 states that teach about HIV/AIDS, but do not use this as part of the sexual education course.¹¹ Future interventions should expand on HIV/AIDS education in the school system and bring the testing centers to high schools. We know that 25% of all HIV/AIDS cases are among Youth (13-24) and about 60% of infected Youth are unaware that they have HIV.² Interventions should be targeting this age group to create a society where testing for HIV is a social norm. Coupling education of HIV/AIDS in high schools with easy access to testing centers could impact the rates of testing and possibly help testing become more of a social norm in the United States.

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Table 1. Descriptive Statistics for All Respondents—National Survey of Family Growth 2006-2010 (N=10403)

VARIABLES	N (%)
SEX	
Males	10403 (100%)
LEVEL OF EDUCATION	
12 th Grade or Less	5373 (51.7%)
At least 1 Year of College or Beyond (Graduate or Professional School)	5027 (48.3%)
HIV TEST	
(HIV Test Outside of Blood Donation)	
Yes	4427 (42.6%)
No	5922 (56.9%)
Missing (filtered out of data)	54 (.5%)
RACE	
<i>Black</i>	1894 (18.2%)
<i>Non-Black</i>	7676 (73.8%)
White	6081 (58.5%)
Hispanic	1595 (15.3%)
AGE	
15-29	5925 (56.9%)
20-44	4478 (43.0%)

Table 2. Association of HIV Testing with Respondent Education Level for All Valid Responses (N=10347)

Current or Highest Education Level Obtained	% Ever Been Tested For HIV Test Outside of Blood Donation		Chi-Square Statistic	P-value	PRD ¹
	Yes	No			
<i>12th Grade or Below</i>	36.0%	64.0%	X ² = 210.978	P<.001	28.3
<i>At least 1 Year of College</i>	50.1%	49.9%			

1. Percent Relative Difference

Table 3. Association of HIV Testing and Education Level of Valid Non-Black Responses (N=7634)

Current or Highest Education Level Obtained	% Ever Been Tested For HIV Test Outside of Blood Donation		Chi-Square Statistic	P-value	PRD ¹
	Yes	No			
<i>12th Grade or Below (High School Degree)</i>	32.2%	67.8%	X ² = 171.857	P<.001	27.7
<i>At least 1 Year of College</i>	46.9%	53.1%			

1. Percent Relative Difference

Table 4. Association of HIV Testing and Education Level of Valid Black Respondents (N=1891)

Current or Highest Education Level Obtained	% Ever Been Tested For HIV Test Outside of Blood Donation		Chi-Square Statistic	P-value	PRD ¹
	Yes	No			
<i>12th Grade or Below</i>	51.3%	48.7%	X ² = 73.091	P<.001	67.4
<i>At least 1 Year of College</i>	70.9%	29.1%			

1. Percent Relative Difference

Table 5. Association of HIV Testing with Respondent Age for All Valid Responses (N=10349)

Respondent Age	% Ever Been Tested For HIV Test Outside of Blood Donation		Chi-Square Statistic	P-value	PRD ¹
	Yes	No			
15-29	31.4%	68.5%	X ² = 717.889	P<.001	62.3
30-44	57.8%	42.2%			

1. Percent Relative Difference

Table 6. Association of HIV Testing with Respondent Age for Non-Black Respondents (N=7636)

Respondent Age	% Ever Been Tested For HIV Test Outside of Blood Donation		Chi-Square Statistic	P-value	PRD ¹
	<i>Yes</i>	<i>No</i>			
15-29	28.2%	71.8%	X ² = 518.641	P<.001	55.7
30-44	53.9%	46.1%			

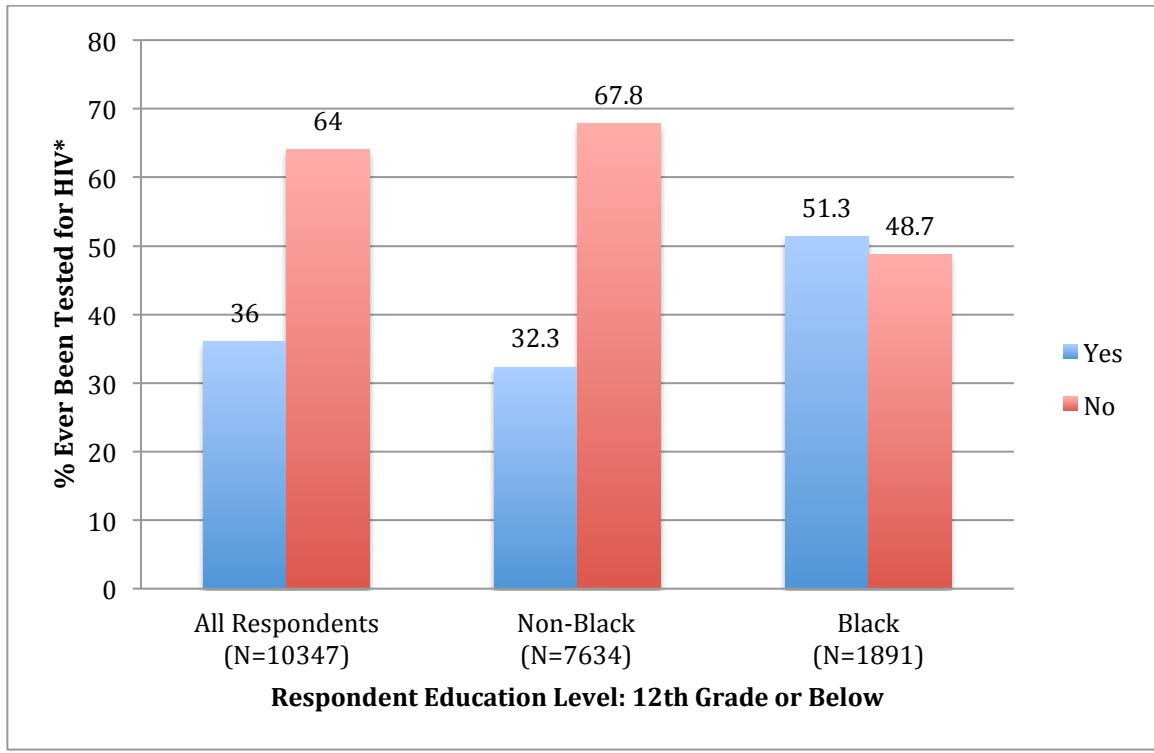
1. Percent Relative Difference

Table 7. Association of HIV Testing and Respondent Age for Black Respondents (N=1891)

Respondent Age	% Ever Been Tested For HIV Test Outside of Blood Donation		Chi-Square Statistic	P-value	PRD ¹
	Yes	No			
15-29	46.8%	53.2%	X ² = 177.106	P<.001	134.4
30-44	77.3%	22.7%			

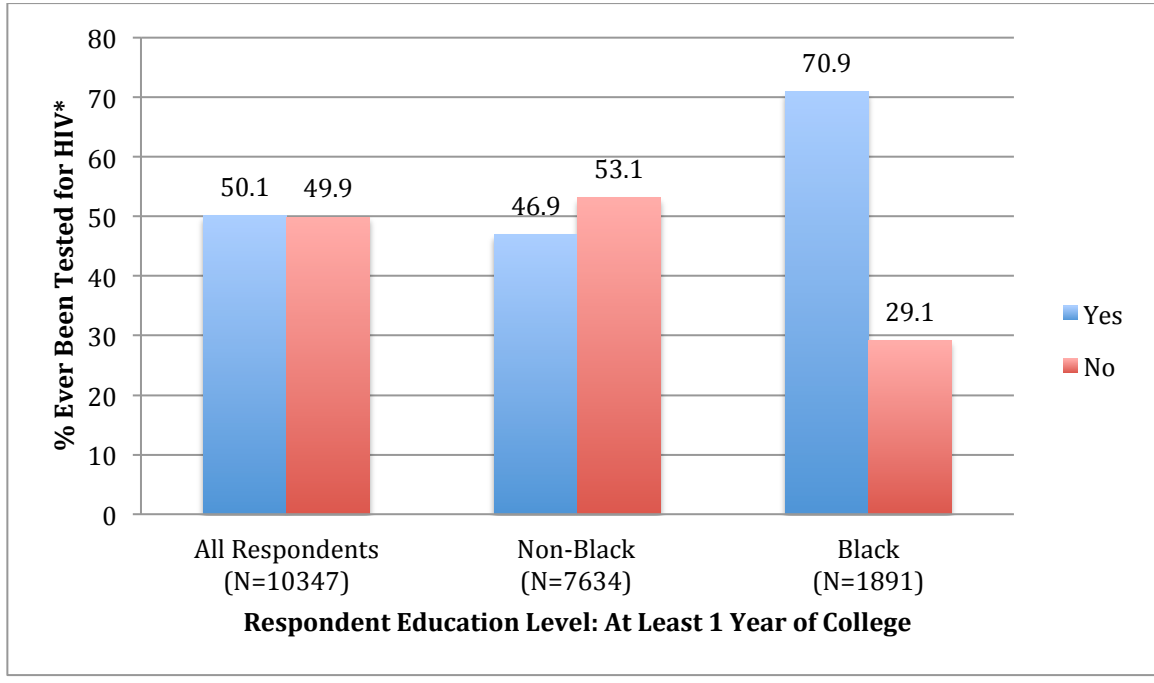
1. Percent Relative Difference

Figure 2. Association of HIV Testing with Lower Education Levels



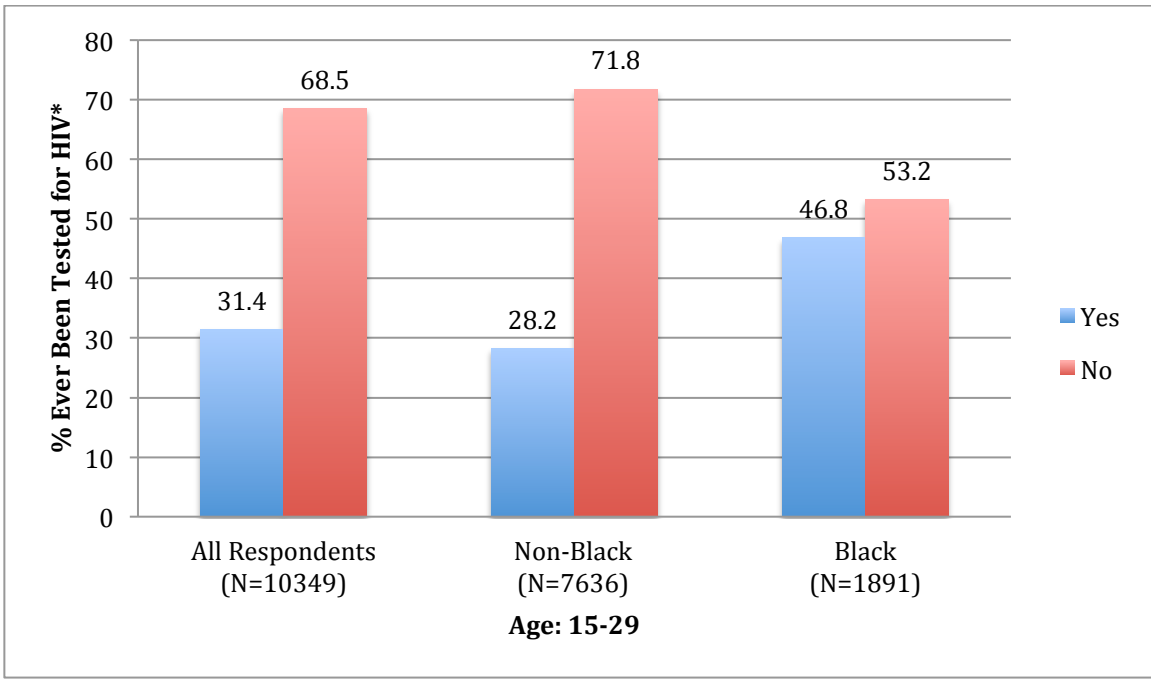
*Percent of respondents who have ever been tested for HIV outside of blood donation

Figure 3. Association of HIV Testing with Higher Education Levels



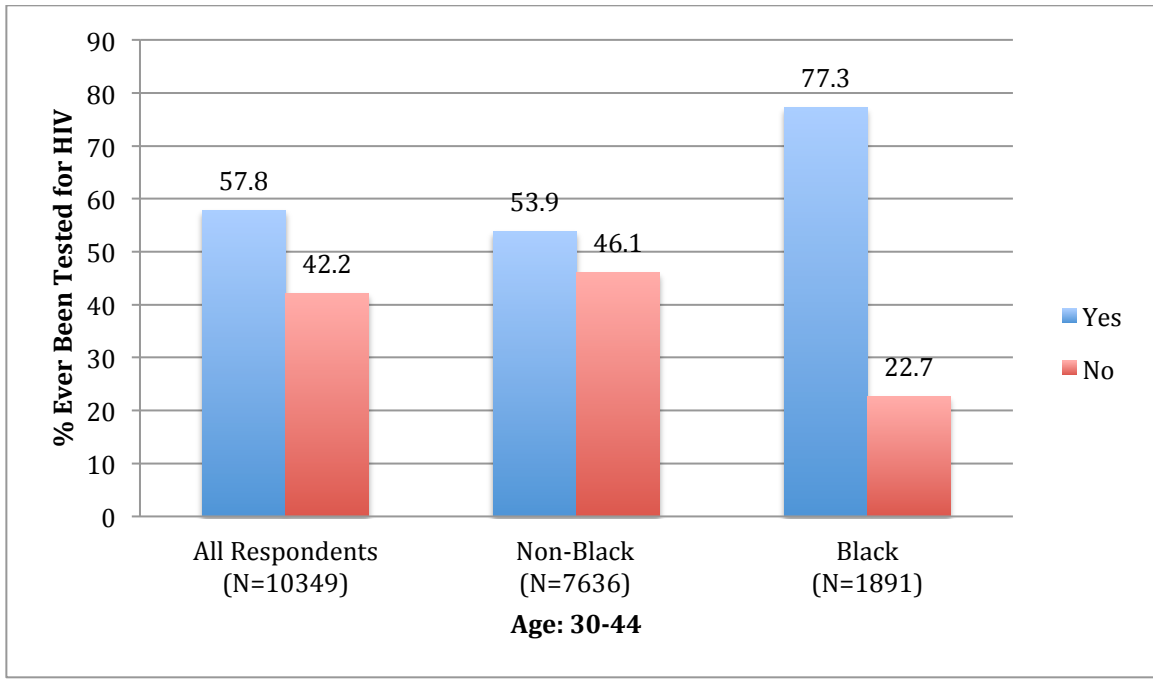
*Percent of respondents who have ever been tested for HIV outside of blood donation

Figure 4. Association of HIV Testing with Respondent Ages 15-29



*Percent of respondents who have ever been tested for HIV outside of blood donation

Figure 5. Association of HIV Testing with Respondent Ages 30-44



*Percent of respondents who have ever been tested for HIV outside of blood donation