

Factors Associated with HIV-Testing among African Americans: Analysis of the 2016 National Health Interview Survey

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ABSTRACT

African-Americans represent 12% of the total United States population, but account for more recent human immunodeficiency virus (HIV) diagnoses (44%), people estimated to be living with HIV disease (40%), and HIV-related deaths (44%) than any other racial/ethnic group in the United States. This paper examines the prevalence of HIV testing and its correlates among African Americans during the pre-exposure HIV prophylaxis era. Secondary analysis of the 2016 National Health Interview Survey (NHIS) data was carried out using descriptive and logistic regression analyses to determine the prevalence of recent HIV testing and factors associated with HIV testing. Of the 33,028 individuals included in the Sample Adult Core, 3,777 (11.43%) were African Americans, the sample for this study. Among them, an estimated 2,050 respondents (54.3%) reported to have ever tested for HIV. Respondents aged 25 to 34 years of age were more likely to have ever tested for HIV compared to individuals aged 25 years or younger (OR: 2.47, $P < 0.001$). Respondents who had a paid employment were more likely to have ever tested for HIV compared to those who were unemployed (OR: 1.74, $P < 0.05$). There was no difference in HIV testing among the marital status categories. Since HIV testing is critical to improve prevention efforts, more research is needed to understand the characteristics of individuals who get tested for HIV to inform the design of innovative interventions to motivate younger adults and individuals from different marital status categories to seek HIV testing.

Keywords: HIV, testing, African Americans, correlates, USA

BACKGROUND

Although African-Americans represent only 12% of the United States total population, they account for more recent human immunodeficiency virus (HIV) diagnoses (44%), people estimated to be living with HIV disease (40%), and HIV-related deaths (44%) than any other racial/ethnic group in the U.S (Prevention CfD, 2016-2017). Behavioral, economic, and contextual factors contribute to the deepening of this disparity over time. The high HIV prevalence in African-American communities puts its members at higher risk of infection with each sexual encounter. The high HIV prevalence persists even when individual risk behaviors, such as sex without condoms, multiple sexual partners, and increased number of concurrent relationships, are consistent with other racial groups (Aral et al., 2008; Control CfD, Prevention, 2015; Hallfors et al., 2007). However, higher prevalence of sexually transmitted diseases (STDs) in African-Americans compared to other racial/ethnic groups may contribute to the high transmission of HIV among African-Americans (Control CfD, Prevention, 2015). Additionally, social and structural factors including: poverty, limited educational opportunities and attainment, high rates of incarceration, unrelenting stress, lack of access to medical and dental care, and racism in its many forms, continue to fuel HIV transmission among African Americans (McCree, 2009). Furthermore, the prevalence of

stigma and homophobia in African-American communities push men who are ashamed of their sexuality to seek discrete sexual relations with other men while remaining involved in monogamous relationships with women. This phenomenon, known as “down low phenomenon” plays a critical role in the spread of HIV in the black communities (Stone, 2011).

It is estimated that nearly 40% of individuals living with HIV in the United States are unaware of their status (WHO | HIV/AIDS, 2017). Individuals who learn that they are HIV positive are much more likely to engage in protective behaviors to reduce the risk of transmission (No Author, 2017). HIV diagnosis is essential as the entry point for a lifelong continuum of care and treatment that benefits the health, quality of life, and life expectancy of the infected person and reduces the likelihood of HIV transmission to others (Marks et al., 2005; Cohen et al., 2011). Although HIV testing rates increased among adults from 40% between 2001 and 2006 to 45% in 2009 (Johnson et al., 2010), a large portion of the U.S. population has never been tested for HIV. National studies indicate that as many as 60–68% of African Americans have been tested for HIV at some point in their lifetime as compared to 42–49% of Whites (Johnson et al., 2010; Anderson et al., 2005). Despite increasing overall HIV testing rates, African Americans are more likely to have delayed HIV diagnosis and treatment, as compared to Whites (Marks et al., 2005; Hall et al., 2015). African Americans with HIV are also less likely to receive antiretroviral therapy than people of other races (Gebo et al., 2005). Low perceived risk, fear of testing positive, and stigma are the major deterrent to testing for HIV among African Americans (Adams et al., 2003; Kellerman et al., 2002; Nunn et al., 2011).

Persons unaware of their human immunodeficiency virus (HIV) infection contribute nearly one third of ongoing transmission in the United States (Marks et al., 2005). To advance the goals of the National HIV/AIDS Strategy (i.e., reducing new HIV infections, improving health outcomes among persons living with HIV, and reducing HIV-related disparities), CDC and its partners have been pursuing a prevention approach to maximize the impact of current HIV testing efforts (Hall et al., 2015).

Several prevention strategies ranging from raising awareness about modes of HIV transmission to promoting pre-exposure HIV prophylaxis (PrEP) have been developed to curb the spread of HIV infection (Hayman and Callister, 2006; Smith et al., 2012). Recent data indicate some encouraging trends, including a decline in new HIV diagnoses among African-Americans overall, especially among women, and a leveling off of new diagnoses among Black homosexual and bisexual men (Control CfD, Prevention, 2013). However, given the epidemic’s continued impact among African-Americans, an ongoing assessment of HIV transmission in this community is paramount to controlling the epidemics in the United States. Randomized clinical trials of a daily oral regimen of antiretrovirals used as pre-exposure prophylaxis (PrEP) for the prevention of HIV-1 acquisition have demonstrated efficacy in women and men from diverse settings (Grant et al., 2010; Baeten et al., 2012). PrEP can help prevent HIV infection in people who don’t have HIV, but who are at high risk of becoming infected with HIV. The health benefit of PrEP can motivate people who are at high risk for HIV to seek testing to take advantage of this new preventive technology. The purpose of this study is to examine the prevalence of HIV testing and its correlates among African Americans during the PrEP era.

METHODS

Data Source

This study is the secondary analysis of data derived from the 2016 National Health Interview Survey (NHIS) public use file. The NHIS is an ongoing annual health survey conducted by the National Center for Health Statistics (NCHS), Centers for Disease Control and Prevention (CDC). NHIS is a nationally representative health survey of the civilian, noninstitutionalized population aged 18 years and older and serves as one of the most comprehensive resources on health in the United States. The NHIS sampling and data collection methods have been described elsewhere (Parsons et al., 2014). The NHIS has four main modules: The Household Composition Section, Family Core, Sample Adult Core, and Sample Child Core. The Household Composition Section collects basic demographic and relationship information about all persons in the household. The Family Core questionnaire collects information on sociodemographic characteristics, basic indicators of health status, health insurance coverage, and access to and utilization of health care services from all persons in each family in the household. From each participating family, one sample child (if there are any children aged 17 years and under) and one sample adult aged 18 years and over are randomly selected. Information on each is collected with the Sample Child and Sample Adult questionnaires, respectively. The Sample Adult Core interview collects additional data on health status and conditions, health behaviors, functioning and disability, and access to and utilization of health care services.

Data were collected by trained interviewers with the U.S. Census Bureau using computer-assisted personal interviewing (CAPI), a data collection method in which an interviewer meets with respondents face-to-face to ask

Table 1. Socio-demographic characteristics of the study sample

Characteristics	Male N=1431 (%)		Female N=2346 (%)		Total N=3777	Chi-Square	P
Age	≤ 25	153	38.5	244	61.5	7.04	0.13
	25-34	225	34.5	428	65.5		
	35-44	224	38.4	360	61.6		
	45-54	266	41.5	375	58.5		
	≥ 55	563	37.5	939	62.5		
Marital status	Married	582	51.1	558	48.9	124.4	0.00
	Separated	360	38.5	821	69.5		
	Single	481	33.3	963	66.7		
Region	Northeast	178	37.9	291	62.0	6.34	0.07
	Midwest	224	40.8	325	59.2		
	South	901	36.6	1560	63.4		
	West	128	42.9	170	57.0		
Employment	Not working	624	35.5	1134	64.5	8.06	0.005
	Working	807	39.9	1211	60.1		
Ever tested for HIV	No	665	38.5	1062	61.5	0.54	0.47
	Yes	766	37.4	1284	62.6		

questions and enter the answers into a laptop computer. When necessary, interviewers completed missing portions of the interview over the telephone. In 2016, NHIS interviews were conducted in 33,676 households with the response rate of 67.9%.

Study Sample

Our study sample was drawn from the Sample Adult Core. Respondents who reported being black or African American were included in this analysis. Those who reported more than one race were excluded. Of the 33,028 individuals included in the Sample Adult Core, 3,777 (11.43%) were African Americans. Respondents 18 years or older were asked, "Have you ever tested for HIV?" We classified respondents as ever tested for HIV (54.3%) and never tested for HIV (45.72%). Having ever tested for HIV was our outcome of interest or our dependent variable.

Measures

Independent variables for this analysis included the demographic and socioeconomic variables: age (<25 years, 25-34, 35-44, 45-54, and 55 years and older), sex, educational attainment (<high school, high school, and ≥some college), marital status (living in union, separated/divorced/widow), employment status during the last 12 months, and the region of the United States where they live (Northeast, Midwest, South or West) and sexual orientation.

Data Analysis

Descriptive analysis was performed to compare demographic and socioeconomic variables between men and women as well as between respondents who ever tested and those who never tested for HIV. Student t test was used for quantitative measures and chi-square was used to test for statistically significant differences in categorical variables. Multivariate regression was performed to estimate bivariate association between independent variables and HIV testing. Logistic regression was also used to calculate multivariate-adjusted odds ratios (OR) and their 95% confidence intervals (CI) while adjusting for potential confounding. Collinear variables were excluded from the analyses. Statistical analyses were performed using Stata/SE 13.0 (StataCorp, 2013: Stata Statistical Software, Release 13.0, College Station, TX: StataCorp LP) and a p-value of less than 0.05 was considered significant unless otherwise specified.

RESULTS

Participant Characteristics

Table 1 shows the sociodemographic characteristics of the participants. Among the 3,777 African-Americans who participated in the 2016 NHIS, 62.2% were women. The age ranged from 18 to 85 years, with a mean age of 48.7 years (SD: 17.3 years) for men compared to 48.7 years (SD: 18.4 years) for women. Most participants (n=1502) were 55 years old or more.

Regarding their marital status, 1,140 (30.2%) participants lived in union (married or living with a partner). More men lived in union (51.1%) than women (48.9%). A high proportion of women were single (66.7%) compared to men (33.3%). The South accounted for most participants (65.1%), followed by Midwest with 14.5%. During the 12 months preceding the interview, 53.4% of participants held a paid position. More women (60.1%) reported working than men (39.9%). Furthermore, women were asked if they were pregnant at the time of the interview.

Table 2. Factors associated with HIV testing among African-Americans in 2016

Characteristics		Never tested for HIV n = 1727 (%)		Ever tested for HIV n = 2050 (%)		Unadjusted Odds Ratio	95% CI	P
Sex	Male	665	38.5	766	37.4	1		
	Female	1062	61.5	1284	62.6	1.04	0.83 - 1.19	0.51
Age groups	≤ 25	211	12.2	186	9.1	1		
	25-34	205	11.9	448	21.9	2.47	1.91 – 3.20	0.00***
	35-44	156	9.0	428	20.9	3.11	2.51 – 4.07	0.00***
	45-54	263	15.2	378	18.4	1.63	1.26 – 2.09	0.00***
	≥ 55	892	51.6	610	29.7	0.77	0.62 – 0.96	0.02*
Marital status	Living in union	510	26.9	630	30.8	1		
	Separated	590	34.3	591	28.9	0.81	0.68 – 0.95	0.01**
	Single	618	35.9	826	40.4	1.08	0.92 – 1.26	0.32
Region	Northeast	207	11.9	262	12.8	1		
	Midwest	258	14.9	291	14.2	0.89	0.69 – 1.14	0.36
	South	1138	65.9	1323	64.5	0.91	0.75 – 1.12	0.40
	West	124	7.2	174	8.5	1.10	0.82 – 1.48	0.49
Employment	Not working	993	54.1	825	40.2	1		
	Working	793	45.9	1225	59.8	1.74	1.53 – 1.98	0.00***

* p < 0.05 ** p < 0.01 *** p < 0.001

Table 3. Factors associated with HIV testing among African-Americans in 2016

Characteristics		Adjusted OR	95% CI	P
Sex	Male	1		
	Female	1.03	0.90 - 1.19	0.60
Age groups	≤ 25	1		
	25-34	2.39	1.83 – 3.10	0.00***
	35-44	2.94	2.22 – 3.89	0.00***
	45-54	1.55	1.18 – 2.03	0.00***
	≥ 55	0.75	0.58 – 0.97	0.03*
Marital status	Living in Union	1		
	Separated	1.15	0.96 – 1.37	0.11
	Single	1.00	0.84 – 1.19	0.01
Employment	Not working	1		
	Working	1.17	1.01 – 1.35	0.03*

† Odds ratios for these variables reflect the expected change in odds of recent testing for a one standard deviation increase in the variable.

* p < 0.05 ** p < 0.01 *** p < 0.001

Among the 1,203 women responded to the question, 38 (3.16%) were pregnant. Of all the adult participants interviewed, 54.3% had ever been tested for HIV.

Variables associated with HIV testing

Table 2 shows the results of the bivariate associations between ever testing for HIV and selected independent variables (Unadjusted results). Older age 25-34 years (OR: 2.47); 35 – 44 years (OR: 3.11), and 45-54 years (OR: 1.63); being employed (OR: 1.74) were positively associated with having been tested for HIV. However, being 55 years or older (OR: 0.77) and being divorced/separated or widow (OR: 0.81) were negatively associated with having been tested for HIV.

Table 3 shows adjusted associations between the outcome of interest (ever tested for HIV) and the independent variables. Variables found to be associated with the outcome in the bivariate analysis (except the variable sex) were entered in the regression model. Although women (OR: 1.01, p > 0.05) were slightly more likely than men to report ever testing for HIV, the association was not statistically significant. Participants ages 25-34 years (OR: 2.39, p < 0.001); 35 – 44 years (OR: 2.94, p < 0.001); or 45-54 years (OR: 1.55, p < 0.001) were significantly more likely to have ever tested for HIV than those younger than 25 years. However, individuals aged 55 years or more (OR: 0.75, p < 0.05) were significantly less likely than those younger than 25 years old to have ever tested for HIV.

After adjusting for other variables, being separated/divorced/widow (OR: 1.15, p > 0.05) was no longer significantly associated with having ever tested for HIV. Participants who reported having a paid employment in the last 12 months were more likely than those who did not to have ever tested for HIV (OR: 1.17, p < 0.05).

DISCUSSION

The results of this analysis showed a significant association between older age and ever being tested for HIV. Respondents aged 25 to 34 years were more likely to have ever tested for HIV compared to those younger than 25 years (OR: 2.47, $p < 0.001$). Our results support previous findings by Benavides-Torres, Wall, Rocha, Rodríguez, Hopson (Benavides-Torres et al., 2012). According to the Centers for Disease Control and Prevention (CDC), 61% of the persons diagnosed with HIV in the United States in 2015 were between the ages of 20 to 39 years (HIV in the United States, 2017). It is alleviating to know that individuals in this age group (25 to 34 years), known to be at high risk for HIV, were also likely to seek HIV testing. However, individuals who tested positive at age 20 must have been infected at a younger age. African American adolescents tend to engage in sexual intercourse at a younger age and are at greater risk for STI and HIV than other racial/ethnic groups in the U.S (Hallfors et al., 2007; Biello et al, 2013; Browning et al., 2004). More efforts are needed to motivate African American adolescents to get tested early.

The second finding of this study is the lack of difference in HIV testing among the different categories of marital status. This finding raised concerns considering the strong association between marital status and HIV death. In the literature, divorced and separated individuals were more likely to have tested for HIV than married individuals (Benavides-Torres et al., 2012; Inungu et al., 2011). Divorced and separated individuals were over 4 times more likely to die of HIV/AIDS than married individuals. Single or never married persons were 13 times more likely to die of HIV/AIDS as their married counterparts (Kposowa, 2013a; Kposowa, 2013b). Because of their wider sexual network, single/never married persons and the divorced/separated are at high risk of acquiring HIV/AIDS and subsequently dying from it (Klovdahl et al., 1994). Marriage seems to confer a form of social control (Kposowa, 2000; Harawa et al., 2003), which in effect works to limit the number of sexual partners that a spouse in the union may legally have. To get individuals at high risk (single and divorced) to seek HIV testing, behavior change communications should target these individuals to get them to seek HIV testing, the cornerstone for HIV prevention.

The association between HIV testing and employment has never been consistent in the literature. While our results showed that African Americans who were employed were more likely than not to have tested for HIV (OR: 1.17, $p < 0.05$), other reports indicated no difference in HIV testing by employment status (Benavides-Torres et al., 2012). Since the vast majority of HIV testing is conducted in doctor's offices, people who are unemployed may be less likely to have been tested due to their lack of employer provided healthcare coverage (Petroll et al., 2009; Simmons et al., 2005). Even where HIV testing is free such as in public health clinics, people who are unemployed lack the means of transportation to reach these clinics. In some industries, such as the healthcare, arm forces etc., HIV testing may be part of the employment process. The hiring agencies often time pay for the cost of medical exams and tests. Understandably, people are often reluctant to test because the discovery of a positive HIV test result may lead to the loss of employment and housing, dismissal from school, and denial of health/ life insurance and health care (Young and Bendavid, 2010; Maher, 2013). Requiring an HIV test raises many ethical issues regarding an individual's privacy. Employment of persons with life-threatening conditions such as HIV/AIDS will predictably have a significant impact at the workplaces. However, HIV is considered a disability and people with disabilities are legally protected from discrimination. The true association between employment and HIV testing needs to be clarified in future study.

Utilization of the large NHIS data set, which is representative of nearly the entire U.S population, is one strength of this study. However, it does have several limitations. First, the sample did not include institutionalized or incarcerated individuals. This is concerning based on the high risk for HIV transmission among prisoners. Incarceration contributes to high-risk sex behaviors and increased numbers of sexual partners which increases exposure to HIV (Knittel et al., 2013). Additionally, incarcerated men are likely to have sexual relationships with other men while incarcerated, which poses the greatest risk for HIV transmission (Knittel et al., 2013). In 2010 the rate of diagnosed HIV infection among inmates in state and federal prison was five times greater than the rate among individuals who were not incarcerated (HIV among Incarcerated Populations, 2017). Second, the self-reporting methods used to collect data for the NIHS may result in biased results through underreporting of HIV testing due to the stigma surrounding HIV. Finally, the NIHS data set lacks some vital demographic characteristics such as income and educational attainment, and resiliency factors such as social support and self-efficacy, which likely have a substantial impact on testing within the population.

CONCLUSION

Since HIV testing is critical to improve prevention efforts, more research is needed to understand the characteristics of individuals who get tested for HIV to inform the design of innovative interventions to motivate younger adults and individuals from different marital status categories to seek HIV testing. Additionally, more researches are needed to clarify the association between employment and HIV testing.

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