



# Gender Differences in Predictors of HIV Testing Among African American Young Adults

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## Abstract

**Objective** The primary aim of this study was to examine gender differences in predictors of past HIV test behavior among young African Americans.

**Method** Data from ( $n = 190$ ) young adults participating in an evidenced-based safer sex behavioral intervention were analyzed. Participants completed measures of previous HIV testing, HIV test attitudes, HIV knowledge, HIV test behavior, and HIV risk behaviors. A series of  $t$  tests and chi-square tests were performed to assess gender differences in these variables. Multivariate logistic regressions were performed to examine the influence of HIV test attitudes, knowledge of where to get tested, and HIV risk behaviors on having previously been tested for HIV.

**Results** Overall, approximately 58% of the sample had been previously tested for HIV. There were significant differences between groups on HIV risk factors (i.e., number of sexual partners), such that men reported a significantly higher number of sexual partners in the past 3 months. Men also reported more negative HIV testing attitudes compared with women. Predictors of past HIV testing differed by gender. Negative attitudes about HIV testing were associated with significantly lower odds of past HIV testing among men, but this was not a significant predictor of testing among women. Older age was significantly associated with greater odds of past HIV testing among women, but not among men.

**Conclusions** Understanding gender differences in predictors of HIV testing can provide important information for clinicians, counselors, and others working to increase rates of HIV testing among young Black/African American adults.

**Keywords** Young adults · HIV testing · HIV prevention · Minority health

## Introduction

African American adolescents and young adults represent over half (57%) of HIV infections among persons ages 13 to 24 in the USA [1]. The disproportionate rate of HIV infection among this age group is even greater than the rate of infection among African Americans in general, who overall represent 45% of HIV infections among all HIV-positive persons in the USA. [2]. African American males ages 13 to 24 are diagnosed with HIV two times the rate of Hispanic/Latino males, and three times that of White males in the same age group. Among females in this age group, African American females are diagnosed with HIV nearly four times the rate of both

Hispanic/Latino and White female youth [3]. The majority of HIV infections among persons ages 13 to 24 occur among young adults ages 20–24 [3]. Current prevalence estimates indicate that 1 in 20 African American men and 1 in 48 African American women will become infected with HIV within their lifetime [4].

A critical barrier to preventing new HIV transmissions among young African Americans is the high rate of undiagnosed HIV infection among this age group. Among HIV-positive persons ages 13–24—the majority of whom are African American—over 50% are unaware of their HIV-positive status [3]. The rate of undiagnosed HIV infection in this age group is much higher than the rate of undiagnosed infection among HIV-positive African Americans in general, among which 16% are unaware of their positive status [4]. High rates of undiagnosed HIV infection among young adults combined with higher rates of HIV among African American young adults indicate that African American young adults are the group most likely to be living with an undiagnosed or undetected HIV infection [5]. Increasing HIV testing is the

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only way to decrease the rate of undiagnosed HIV infection and is crucial to preventing HIV transmission among African American young adults. The purpose of this study was to better understand factors associated with increased likelihood of HIV testing by gender. The findings from this study may help us to understand factors that motivate young African American adults to be tested for HIV and whether these factors differ for men versus women.

## HIV Testing Benefits

HIV testing is one of the most cost-effective methods in HIV prevention and provides several benefits. Receiving an HIV test informs individuals of their HIV status, which is important given that undiagnosed infections are responsible for more than 50% of new HIV infections [6]. HIV-positive persons who are aware of their infection are less likely to pass on the virus [6].

Routine testing encourages a “treatment as prevention” strategy, by identifying HIV-positive persons and quickly linking them to antiviral therapy (ART). Initiating treatment early can reduce chances of virus transmission during vaginal sex by up to 96% [7] if HIV-positive persons are able to get their viral loads down to an “undetectable” status. High rates of undiagnosed HIV infection among young African American adults result in the lack of connection to treatment for this group. As such, this population is unable to obtain the benefits of a treatment as prevention approach.

HIV testing may also prompt individuals to be tested for other sexually transmitted infections (STIs). This is important given the twofold role of STIs in facilitating HIV transmission. If an HIV-negative person with a current STI is exposed to HIV during unprotected sex, the presence of that STI increases one’s risk of contracting HIV [8]. In addition, a person who is currently HIV positive and infected with another STI is more infectious to others should they have unprotected sex [8]. Higher rates of STIs among African American young adults increase their risk for HIV infection [9]. Thus, encouraging young adults to be tested for other STIs—in addition to being tested for HIV—has an important role in overall HIV prevention.

## What Factors Contribute to HIV Testing?

African American young adults are more likely to have had an HIV test than young adults from other racial/ethnic groups [10]. In considering African American young adults only, several factors contribute to HIV testing. These include demographic factors such as gender [10–12], attitudes and beliefs (e.g., HIV stigma, HIV knowledge, attitudes toward testing) [13], and HIV risky behaviors (e.g., consistent condom use, number of partners) [14]. African American women are more likely to have had an HIV test than African American men

[10, 15]. Greater knowledge of HIV is associated with higher testing rates [13]. Perceived risk is also associated with higher testing levels among both young adult men and women [16]. However, African American young adults in general perceive themselves to have low risk for HIV [17, 18]. Moreover, some research suggests that African American men compared to African American women perceive themselves to be at lower risk for HIV, although they engage in more HIV risk behaviors [13].

## Purpose

Despite the benefits of HIV testing and the high rates of undiagnosed HIV infection, limited research has examined factors that influence HIV testing among African American young adults [19]. While the rates of HIV testing are well known among this population, few studies have gone *beyond* an examination of who is getting tested for HIV to further our understanding of *predictors* of HIV testing. The purpose of this study was to examine gender differences in predictors of HIV testing among young African American adults and to determine potential key differences in the decision to receive—or not to receive—HIV testing. The study findings have implications for understanding how to promote HIV testing.

## Method

### Data and Procedure

Data for this study were collected as part of a larger project on HIV prevention among African American young adults. Data were collected from participants participating in an evidenced-based intervention entitled Video Opportunities for Innovative Condom Education & Safer Sex (VOICES) [20]. VOICES is a small group single session intervention that aims to increase condom use among young African American adults. Sessions were peer-led by trained VOICES facilitators and were held separately for men and women. The VOICES intervention includes three main components: a 15-min video, a post-video group discussion, and a condom use demonstration. Participants were offered free condoms and sex educational resources after participation. Following informed consent, participants completed the intervention and post-intervention measures. A subset of items relating to HIV testing, attitudes about HIV testing, sexual behavior, and sociodemographics were included in the current study’s data analyses. Institutional Review Board (IRB) approval was obtained prior to VOICES implementation and data collection. Data were collected from November 2015 through November 2017.

## Analytic Sample

The initial sample included 201 individuals who met the study's inclusion criteria. Inclusion criteria included participants who were self-identified as Black/African American and reported a history of sexual experience. Exclusion criteria included one person who identified as transgender (female to male) and ten participants who did not respond to the question about previous HIV testing. Inclusion and exclusion criteria resulted in a final sample of 190 participants.

## Primary Outcome Variable

**HIV Test History** HIV test history was the primary outcome variable of interest for the current study. Test history was assessed by participants' responses to the following single-item question: "Have you ever been informed of your HIV status (that is, whether or not you are HIV-positive) based on the result of an HIV test?" Categorical response options were *no* (coded as "0") or *yes* (coded as "1"). Respondents who left this question blank ( $n = 10$ ) were excluded from analyses.

## Independent Variables

**HIV-Antibody Testing Attitudes** The ten-item HIV-Antibody Testing Attitude Scale (HTAS) [21] was administered to participants to assess general attitudes regarding HIV testing. Responses are rated on a 7-point scale from *strongly disagree* (1) to *strongly agree* (7). Higher scores indicate more negative attitudes towards HIV-antibody testing. Sample items on this scale include "HIV antibody testing is not really confidential" and "Anyone who is tested for HIV is disgusting." Scores for this scale were obtained by reverse coding items 9 and 10, then calculating the mean score. This scale demonstrated an internal consistency of  $\alpha = 0.77$ .

**Knowledge of Where to Get Tested** Knowledge of where to get tested was obtained by participants' responses to the following single-item question: "Would you know where to go near where you live to see a health care professional regarding HIV/AIDS or other sexually transmitted health issues?" Responses included *no* (coded as "0") and *yes* (coded as "1").

**Sexual Behavior** Participants were assessed on the following sexual behavior items: condom use during last sex and number of sexual partners in the past 3 months. Condom use was assessed by responses to the following question: "The last time you had sex (vaginal, oral, or anal), was it protected or unprotected?" Responses included *unprotected* (coded as "0") and *protected* (coded as "1"). Number of sexual partners was assessed by open-ended response to the following question: During the past 3 months, how many sexual partners have you had?

## Sociodemographic Variables

The following items were included as sociodemographic questions: gender (*male, female, transgender [male to female], or transgender [female to male]*), age, current college status (Are you currently attending college?; *no* or *yes*), sexual orientation (How would you describe yourself?; *straight/heterosexual, bisexual, gay/lesbian, or unsure*), marital status (*never married, married, or divorced/separated/widowed*), and health insurance status (Do you have health insurance?; *no* or *yes*).

## Data Analyses

This study analyzed a subset of questions included in a post-intervention survey. Prior to data analyses, all data were screened for normality, missing data, and test assumptions. A series of *t* tests and chi-square tests were performed to assess gender differences in past HIV testing, HIV test attitudes, HIV knowledge, HIV test behavior, and HIV risk behaviors. Following chi-square tests of associations and independent samples *t* tests, two multivariate logistic regressions examined the relation between HIV test attitudes, knowledge of where to get tested, condom use during last sex, number of sexual partners, and having previously been tested for HIV. Age was used as a control variable in the logistic regression models predicting HIV testing, given previous research indicating that older age increases the likelihood of HIV testing [22, 23]. A power analysis conducted using multivariable logistic regression guidelines of a minimum of ten cases per independent variable determined that both models were adequately powered [24]. The results of the chi-square tests, *t* tests, and logistic regression models are presented below.

## Results

### Participant Characteristics

The sample was 66.8% female and 33.2% male, and the mean age was approximately 22 years of age ( $M = 21.67$ ,  $SD = 1.88$ ). In terms of sexual orientation, 84.7% identified as heterosexual, 9% identified as bisexual, and 5.8% identified as gay or lesbian. The majority reported that they were currently in college (88.4%), whereas 11.6% were not in college. Half of the sample (50%) reported using a condom during their last sexual act. The mean score on the HIV testing attitude scale was 2.25 ( $SD = 1.11$ ), indicating that participants on average did not have negative attitudes about being tested for HIV. Overall, participants had an average of 1.82 ( $SD = 1.81$ ) sexual partners in the past 3 months and 57.5% had previously

been informed of their HIV status. Additional demographic information is presented in Table 1.

### Differences in Sexual Behavior

Prior to conducting the primary analyses, a series of independent sample *t* tests and chi-square tests of association were performed to assess potential differences by gender across several sexual behavior items. In analyzing differences between males and females on number of sexual partners in the past 3 months, Levene's test for equity of variances revealed that the assumption of homogeneity of variances was violated. A *t* test performed based on equal variances not assumed yielded a statistically significant effect,  $t(82.34) = 3.00, p = 0.004$ . Males were significantly more likely to have had more sexual partners,  $M_{\text{Males}} = 2.47 (SD = 2.451)$  than  $M_{\text{Females}} = 1.51 (SD = 1.251)$ . Chi-square tests of association revealed there were no significant differences between groups on recent sex in the past 30 days or engagement in unprotected sex.

### HIV Testing, HIV Test Attitudes, and Knowledge of Where to Get Tested

Additional *t* tests and chi-square tests were performed to assess potential group differences by gender on items relating to HIV testing, HIV test attitudes, and knowledge of where to get tested. Levene's test for equity of variances revealed that the assumption of homogeneity of variances was violated. A *t* test performed based on equal variances not assumed yielded a statistically significant effect,  $t(75.47) = 4.10, p < 0.000$ . Men had significantly more negative attitudes about HIV testing,  $M_{\text{Males}} = 2.90 (SD = 1.24)$  compared to women  $M_{\text{Females}} = 2.11 (SD = 0.99)$ . There were no significant differences between groups in knowledge of where to go to talk to a health professional about HIV/STDs, or past HIV testing behavior.

### Predictors of HIV Testing

Two separate hierarchical logistic regression analyses were performed to determine the predictive effects of HIV testing attitudes, knowing where to get tested for HIV, condom use during last sex, and number of sexual partners on previous HIV test history. Each test was performed separately by gender. In the first step of each test, age was entered as a control variable. All the other variables were entered in the second step. Results of these analyses are presented in Table 2.

The first hierarchical logistic regression examined the predictive effect of the independent variables on HIV testing among men. The adjusted odds model revealed that HIV testing attitudes were a significant predictor of past HIV testing among men; men who reported more negative HIV testing attitudes were *less* likely to have been tested for HIV

**Table 1** Sample characteristics

Characteristic	<i>n</i> <sup>a</sup>	%
Age		
18–20	55	30.1
21–25	122	66.6
25+	6	3.3
Gender		
Male	63	33.2
Female	127	66.8
Sexual orientation		
Straight/heterosexual	160	84.7
Bisexual	17	9.0
Gay/lesbian	11	5.8
Unsure	0	0
Marital status		
Never married	176	93.1
Married	8	4.2
Separated/divorced/widowed	5	2.6
College status		
Not in college	22	11.6
In college	168	88.4
Health insurance		
No	28	15.0
Yes	159	85.0
Previous HIV test		
No	80	42.1
Yes	110	57.9
Condom during last sex		
No	94	50.5
Yes	92	49.5
Sexual partners in past 3 months		
No recent sexual partners	22	11.6
1 or 2 partners	128	67.3
3 to 5 partners	31	16.3
6+ partners	9	4.8
Knowledge of where to get tested		
No	17	8.9
Yes	173	91.1

<sup>a</sup> The overall sample size included 190 participants

(aOR = 0.51; CI 0.3–0.86). Age, knowledge of where to get tested, condom use during last sex, and number of sexual partners were not significant predictors of HIV testing among men ( $ps > 0.05$ ).

The second hierarchical logistic regression examined the predictive effect of the independent variables on HIV testing among women. The adjusted odds model revealed that age was a significant predictor of past HIV testing among women; women who were older were significantly *more* likely to be tested for HIV (aOR = 2.12; CI 1.461–3.06). Attitudes about

**Table 2** Multivariate outcomes of no previous HIV test vs. previous HIV test among men and women

Characteristic	No previous test vs. previous test			
	Men		Women	
	aOR (95% CI)	Sig. ( <i>p</i> *)	aOR (95% CI)	Sig. ( <i>p</i> *)
Step 1: control variable				
Age	1.014 (.742-1.387)	.930	2.115 (1.461-3.061)	.000**
Step 2: predictor variables				
Number of sexual partners in the past 3 months	1.050 (.806-1.368)	.720	1.213 (.873-1.683)	.250
Condom use during last sex (no/yes)	1.958 (.608-6.305)	.260	.431 (.183 1.017)	.055
Knowledge of where to get tested (no/yes)	.903 (.040-20.632)	.949	3.133 (.805-12.191)	.100
Attitudes about HIV Testing	.506 (.299-.855)	.011*	1.406 (.871-2.269)	.163

In the analysis, the age variable from Step 1 was entered into the model first. Then, variables from Step 2 are entered using stepwise logistic regression (LR), building on the model from Step 1

\* $p < 0.05$ ; \*\* $p < 0.001$

HIV testing, knowledge of where to get tested, condom use, and number of sexual partners were not significant predictors of HIV testing among women ( $p > 0.05$ ). Although the adjusted odds model revealed that condom use during last sex was not a significant predictor of past HIV testing among women, this predictor variable did approach significance in the direction of women being *less* likely to have tested for HIV if they used a condom during their last sexual encounter ( $p = 0.055$ ).

## Discussion

Routine HIV testing among sexually active individuals aged 13 to 64 years is recommended by the Centers for Disease Control and Prevention (CDC) [25]. Routine testing provides an opportunity to discuss and reinforce the importance of safer sex behaviors with an HIV test counselor or health provider. Being tested for HIV informs individuals of their HIV status, provides an opportunity for those who are HIV positive to be linked to health care, and may also prompt other STI testing as well. This study was conducted to better understand factors that contribute to HIV testing among African American young adults who have higher rates of HIV infection compared to other racial/ethnic groups [1, 3]. More specifically, we were interested in whether predictive factors for HIV differed for men and women. Several findings emerged from this study.

Fifty-eight percent of participants in this study had received an HIV test. This high rate of HIV testing among participants may be due to college students comprising the majority (88%) of our sample. Students in our sample may have benefited from exposure to testing messages on campus (e.g., via posters, flyers, and health promotion events) and convenient access to testing (e.g., via the student health center and free on-campus testing events). In one study of African American

college students at an HBCU, 58% reported having received an HIV test in the previous year [15]. Other studies have found similar high rates of HIV testing among African American college students [26–28], ranging from 48 to 58%. In addition, a comprehensive study examining HIV testing rates among African American adults by educational level found that rates of HIV testing were higher among groups that reported higher educational attainment [29].

Several analyses examined potential differences in sexual behaviors and HIV testing between men and women. Findings revealed that men reported having more sexual partners than women, consistent with previous literature on young African American adults that found a greater number of sexual partners among men than women [26]. However, men and women did not differ regarding recent sexual behavior in the past 30 days or engagement in unprotected sex. Also, contrary to expectations, men and women did not differ in previous HIV testing behavior. Studies have shown that young African American women are more likely to receive an HIV test than African American men [16, 30]. Higher testing rates among young women compared to men may be attributed to annual gynecological screenings for women as HIV testing may be conducted during these screenings. One study by Payne et al. found that most students who had been previously tested for HIV did so as a part of a routine prevention exam (e.g., Pap smear), as opposed seeking an HIV testing specifically [27]. Our findings did not show this disparity, perhaps because of the availability and accessibility of testing on college campuses. Men and women also did not differ in knowledge of where to go to talk to a health professional about HIV/AIDs or STI's. Colleges typically have accessible and well publicized places in which to go to for HIV testing, which may explain this finding.

The findings from logistic regression models indicated different predictors of HIV testing for men and women. Among



men, HIV testing attitudes were a significant predictor of HIV test behavior. Men with more negative testing attitudes were less likely to have been tested. Among women, age was a significant predictor with older women being more likely to have been tested. The findings of different predictors suggest potentially differing factors that may influence testing among young adult African American males and females. Reducing negative attitudes toward testing should be considered in programs and interventions promoting HIV testing for African American men. Understanding why attitudes are negative is a first step. Negative testing attitudes among men may be associated with HIV stigma, and if this is the case, reducing HIV stigma may also increase testing motivation.

Understanding underlying beliefs in which negative HIV testing attitudes are based is another approach to consider. One belief is that negative HIV testing attitudes among African American men may also be linked to higher HIV conspiracy beliefs [31]. Conspiracy beliefs include beliefs that the “system” is an activity seeking to destroy or harm African Americans (malicious intent conspiracy beliefs), or that HIV is allowed to persist due to racism (benign intent conspiracy beliefs) [32]. African Americans are much more likely to endorse conspiracy beliefs than Whites, and African American men are more likely than African American women to endorse these beliefs [31]. Conspiracy beliefs about HIV may lead one to assume that HIV infection and HIV testing are outside of one’s individual control, if likelihood of HIV infection and decisions about HIV testing are thought to be controlled by larger institutional systems. Conspiracy beliefs might be attenuated with more positive testing attitudes resulting, if factual information on how HIV started in this country was delivered by a credible (i.e., trustworthy) source.

Another approach is normalizing testing such that testing is seen as a routine and important part of preventive health care. Encouraging routine testing as preventive health care may be especially challenging for men who are less likely than women to engage in prevention health care overall [11]. Eliciting the collaboration of health care providers in recommending HIV testing for patients who present for acute as well as preventive health visits should be helpful in communicating the importance of HIV testing.

Among women, age was the only significant predictor of HIV testing with older women more likely to have had a test than younger women. This finding is consistent with previous studies which found that older age increased the likelihood of HIV testing [22, 23]. The sample was predominately college students and it is likely that a longer period of matriculation in college provided more opportunities to hear HIV testing messages and also opportunities to obtain HIV testing. Another potential explanation for this finding is that as women age, they may be presented with more opportunities than men to be tested for HIV over time, given that many women receive HIV testing during routine gynecological screenings [27], which

often occur annually. There was also a non-significant finding among women that closely approached significance regarding the relationship between unprotected sex and HIV testing. Given that this finding only approached significance, more research is needed to elucidate whether this relationship might be stronger under other testing conditions and in other African American female populations.

Overall study findings suggest the need for more research on this topic. There are other factors that might contribute differentially to HIV testing behaviors that were not investigated in this study. For example, as mentioned earlier, HIV conspiracy theories might be implicated as a factor in HIV testing. Knowledge about HIV transmission and prevention might also increase HIV testing. For example, knowledge about PrEP could influence testing insofar as awareness of PrEP might decrease testing anxiety (and subsequently increase engagement in testing) since individuals taking PrEP medication know that their risk for infection is substantially reduced. More research on specific components of HIV knowledge, prevention strategies, and how these factors relate to HIV testing is suggested.

More research is also needed on methods and places of HIV testing outside of a professional healthcare setting. For example, would predictors differ if HIV testing was done at home and/or if testing was done in a non-healthcare facility such as a religious institution, an HIV testing event, or a local community center? Having testing done outside of health care facilities might destigmatize testing and encourage more testing. On the other hand, non-health care facilities might offer less privacy and anonymity.

## Limitations

There are some limitations that should be considered in the interpretation of the study findings. Data were collected from participants who had participated in an HIV-prevention intervention. This intervention may have influenced how participants thought about factors such as HIV testing attitudes and where to go to get information about HIV testing. While the intervention does not specifically target these constructs, the intervention may have primed participants to think about HIV testing more positively. The findings also may not be generalizable to all young African American adults. The sample was largely a college sample and testing may be more immediately accessible to this population when compared to a community sample who may not hear HIV testing messages often or live in close proximity of testing sites. In addition, the sample was composed of individuals who volunteered to participate in the HIV intervention; these individuals’ attitudes toward testing may be more positive than those in the general population.

## Conclusion

Approximately 58% of the young adult African American men and women in this study had received an HIV test. There were no differences between men and woman in previous testing behaviors and in knowledge of where to go for HIV testing. Negative testing attitudes emerged as a significant factor in HIV testing for men and not women. Age was a significant factor in HIV testing for women. The findings suggest that programs and interventions targeting HIV testing consider gender differences in predictors of testing.

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## Compliance with Ethical Standards

All study procedures involving human participants were approved by the appropriate institutional and/or national research ethic committee and were performed in accordance with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. This study was approved by an Institutional Review Board and informed consent was obtained from all participants prior to study participation.

**Conflict of Interest** The authors declare that they have no competing interests.

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