


Characteristics and Sexual Risk Behavior of Men Who Never Tested for HIV in Zambia

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Abstract

Compared with women and girls, proportionately fewer men and boys in sub-Saharan Africa receive HIV testing, treatment, and other services. This study determined factors associated with never testing for HIV and examined never testing as a predictor of sexual risk behavior among men in Zambia. The sample included 2,609 men aged 15 to 24 from the 2018 Zambia Demographic and Health Survey. Logistic regression results revealed that compared with men who ever tested for HIV, men who never tested were more likely to be younger, have less education, have no children, be unemployed, and belong to the low wealth bracket. They also had a higher likelihood of not using a condom at last sex but were less likely to have more than five lifetime sexual partners. HIV prevention programs can use sociodemographic characteristics to identify those who have a lower likelihood of testing for HIV. Prevention programs can use sociodemographic characteristics to develop profiles of those who may especially need to be targeted by initiatives to promote HIV testing. Awareness does not always engender behavior change; therefore, in addition to knowledge of HIV status, risk reduction should also be emphasized.

Keywords

HIV testing, sexual risk behavior, men, youth, Zambia

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Introduction

Sub-Saharan Africa is home to more than two thirds of the total number of people living with HIV in the world, and the region where most new HIV infections occur (World Health Organization [WHO], 2021). Data from the Joint United Nations Program on HIV/AIDS (UNAIDS) indicate that the heaviest burden in the region is among young people, particularly women aged 15 to 24 years (UNAIDS, 2020). As in other parts of the world, sub-Saharan Africa has seen a decrease in new HIV infections and AIDS-related deaths, and much of the success in incidence reduction is attributed to increased coverage of HIV testing and treatment as the region closes in on UNAIDS's 90–90–90 target (UNAIDS, 2020).

HIV testing is integral to curbing the HIV epidemic. Knowledge of an HIV diagnosis empowers individuals with the information needed to make decisions about HIV prevention, treatment, and management, and can provide information about appropriate HIV services (WHO, 2015). Those with a negative diagnosis can take

steps to help them remain negative, including using condoms, taking pre-exposure prophylaxis, and limiting risky sexual behaviors (Kirunga & Ntozi, 1997; Pinkerton & Abramson, 1997; Thigpen et al., 2012). Those who test positive can not only use condoms and reduce risk behaviors but can also receive life-saving antiretroviral therapy (ART; Grinsztejn et al., 2014). An added advantage of ART is the concept of undetectable = untransmittable (U = U). When taken as prescribed, ART can decrease the HIV viral load to undetectable levels (Eisinger et al., 2019). There is an overwhelming body of evidence that people with an undetectable viral load cannot transmit

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HIV sexually (Davies et al., 2018; Eisinger et al., 2019), indicating that U = U can be an additional benefit derived from testing. For pregnant women who test positive, ART can reduce the risk of transmitting HIV to the unborn child (Tippett Barr et al., 2018).

Compared with women and girls, proportionately fewer men and boys in Africa receive HIV testing, treatment, and other services. Indeed, it has been documented from previous research in southern Africa that men are less likely than women to get tested for HIV (Mills et al., 2012; Shisana et al., 2014). Recent UNAIDS data have supported these disparities, revealing that in 2019, in west and central Africa, only 63% of men tested for HIV compared with 77% of women, while in east and southern Africa, 84% of men compared with 91% of women tested (UNAIDS, 2020). An assessment of HIV testing coverage and case finding among adults in 20 sub-Saharan African countries indicated that, overall, most of the countries reported higher HIV case finding among women than among men. The same study reported that men were half as likely as women to receive an HIV test (Drammeh et al., 2020). The literature also demonstrates that men in Africa are less likely than women to be on ART (Mills et al., 2012; UNAIDS, 2020), but more likely to initiate ART at advanced HIV stages, and to pause or discontinue treatment (Mills et al., 2012). There is also evidence from sub-Saharan Africa that men have higher mortality from AIDS (Bor et al., 2015; Druyts et al., 2013) and lower life expectancy after starting ART (Johnson et al., 2013). Arguably, women may have greater exposure to testing and ART through antenatal services. In a previous study, however, although pregnancy was a significant determinant of ART access, it explained only a small fraction (<10%) of the difference in access between women and men (Bärnighausen et al., 2013).

Despite the noteworthy progress that has been made in access to HIV testing and care in sub-Saharan Africa, the gender disparities remain a large unaddressed gap in HIV services (Cornell et al., 2021), with an underrepresentation of men in testing, treatment, and other services. Although HIV care is available to both men and women and is nominally free of charge (WHO, 2005), men continue to have poorer outcomes in the HIV cascade.

Because knowledge of HIV status could foster behavior change to maintain HIV-negative status or to prevent transmitting HIV to others, research has also examined the impact of HIV testing on sexual risk behavior. The literature reveals mixed findings, with some studies demonstrating decreases (Jean et al., 2014; Rucinski et al., 2018), while others report increases (Baird et al., 2014), or no change in sexual risk behavior post testing (George et al., 2019). Also, some findings reveal decreases in some sexual risk behaviors but not others (Cawley et al., 2014). These mixed findings regarding the relationship

between testing and sexual risk behavior warrant more research.

Zambia is a country in southern Africa, with a population of about 18.4 million (United Nations, Department of Economic and Social Affairs, Population Division, 2019). The country experiences a generalized epidemic and has an estimated prevalence of 11% among adults 15 to 49 years (UNAIDS, 2020). As in other countries in sub-Saharan Africa, despite the availability of free HIV testing services, including ART, uptake among men in Zambia has been low. Data from the 2018 Zambia Demographic and Health Survey (ZDHS) indicate that in the year before the survey, 25% of men aged 15 to 49 years were not tested for HIV compared with 15% of women in the same age group (Zambia Statistics Agency et al., 2019). Given the importance of HIV testing and the persisting gender disparities across the HIV continuum (Cornell et al., 2021), it is critical to gain more understanding of the factors associated with lack of testing for HIV in the male population. The current study was designed to (a) determine factors associated with never testing for HIV and (b) examine never testing for HIV as a predictor of sexual risk behavior among men in Zambia. The findings of this study could provide preventive programs with useful information on meeting the HIV testing needs of men in sub-Saharan Africa and could shed more light on the relationship between HIV testing and sexual behavior.

Method

Participants

The sample for this study was drawn from the 2018 ZDHS, a nationwide survey with a nationally representative sample of approximately 13,625 selected households (Zambia Statistics Agency et al., 2019). The survey was designed to produce reliable estimates for key indicators at the national level as well as for urban and rural areas in each of the 10 provinces of Zambia. All men and women aged 15 to 49 who are usual members of the selected households or who spent the night before the survey in the selected households were eligible for individual interviews. The core questionnaire included questions on fertility and mortality, anthropometry, family planning, maternity care, child feeding, vaccination, child morbidity, and HIV/AIDS. Our sample comprised 2,609 sexually active and unmarried men aged 15 to 24 years.

Ethics Approval

This study used secondary data obtained from the ZDHS. The protocols for ZDHS methodology and all instruments were approved by institutional review boards (IRBs) at Inner City Fund (ICF) International and the Tropical

Diseases Research Centre in Zambia (Approval Number 00003729). Both IRBs approved the protocols before the commencement of data collection activities. At the beginning of the survey, every participant was informed that participation in the survey was completely voluntary, participants could skip any questions and stop the interview any time, and the information in the survey was strictly confidential. Participants provided written informed consent before the interview. For our secondary data analysis, authorization for the use of the ZDHS data was granted by the Demographic and Health Surveys Program, which makes data publicly available at <https://dhsprogram.com>. The data are de-identified; therefore, no informed consent was required from the participants for the current study. The ZDHS data are available for public use through a formal request on the Demographic and Health Surveys Program website.

Measures

The aims of our study were to determine factors associated with never testing for HIV, and to examine never testing for HIV as a predictor of sexual risk behavior. Therefore, never testing for HIV was used as both an outcome and a predictor in the analyses. It was assessed by asking participants whether they had ever been tested for HIV. For our study, this variable was coded as 0 = yes, 1 = no. Other outcome variables were lifetime sexual partners and condom use at last sex. For lifetime sexual partners, participants reported the number of different people with whom they had had sexual intercourse in their lifetime. ZDHS data indicate that the mean number of lifetime sexual partners among men aged 15 to 49 is 4.5. Setting the cut-off at five partners, we created a variable coded 0 = 1 to 5 partners and 1 = >5 partners. Participants were asked whether a condom was used the last time they had sexual intercourse. We coded this variable as 0 = yes and 1 = no.

Explanatory variables included age, educational level, employment, having children, residence (rural or urban), and wealth. Age was measured as a continuous variable, from which we created a dichotomous measure coded as 0 = 15 to 19 years and 1 = 20 to 24 years. For educational level, participants were asked what the highest level of school they attained was, and this was categorized as no education, primary education, secondary education, and higher than secondary education. We created a variable coded as 0 = secondary or higher and 1 = primary or less. For employment, participants provided information on the type of employment in which they were engaged. We dichotomized this variable into 0 = employed and 1 = unemployed. Participants indicated the number of children they had, and this variable was coded as 0 = none and 1 = one or more. For residence, information was collected on whether participants resided

in a city, a town, or a village. We coded this variable as 0 = urban and 1 = rural. The ZDHS includes a wealth index, which is a composite measure of a household's cumulative living standard. It is calculated using easy-to-collect data on a household's ownership of selected assets, such as televisions and bicycles; materials used for housing construction; and types of water access and sanitation facilities. From the index, we created a variable with three wealth categories, coded 0 = high, 1 = middle, and 2 = low.

Data Analysis

We used descriptive statistics to characterize the sample and bivariate analyses to explore associations between variables. For the logistic regression analyses, we estimated two models. In the first model, we assessed sociodemographic predictors of never being tested for HIV, thus never being tested was the outcome variable in the first model. In the second model, we assessed never being tested for HIV as a predictor of sexual risk behavior, with condom use at last sex and multiple sexual partners as outcome variables. The second model controlled for age, educational level, whether they had children, employment status, residence, and wealth. The associations were estimated in terms of odds ratios (ORs) with 95% confidence intervals (CIs). The logistic regression models were checked for fit and multicollinearity. Data were analyzed using IBM SPSS Statistics version 27.

Results

Description of the Sample

Of the 2,609 participants, 34.2% reported having never been tested for HIV. Table 1 presents the characteristics of the study sample, overall and by history of HIV testing.

There were roughly equal proportions of participants aged 15 to 19 and 20 to 24 years, with a mean age of 19.6 years and a standard deviation of 2.5. Of the 2,609 participants, 61.6% ($n = 1,606$) had at least a secondary school education, 62.5% ($n = 1,630$) were employed, and 90.9% ($n = 2,371$) reported having no children. Rural dwellers comprised 63.5% ($n = 1,657$) of the sample, while 40.4% ($n = 1,054$) belonged to the "high" wealth bracket. The proportion of those who reported having one to five lifetime sexual partners was 79.3% ($n = 2,069$), and of those who provided information on condom use, 52.8% ($n = 1,036$) reported not using a condom the last time they had sex. Most of those who never tested (vs. ever tested) for HIV were younger, had completed some primary school or less, were unemployed, had no children, resided in the rural areas, and were in the low wealth

Table 1. Description of the Sample by History of HIV Testing.

Characteristic	n (%)			p values
	All men	Tested for HIV	Not tested for HIV	
Age				
15–19	1,314 (50.36)	716 (27.44)	598 (22.92)	<.001
20–24	1,295 (49.64)	1,000 (38.33)	295 (11.31)	
Educational level				
Primary or less	1,003 (38.44)	515 (19.74)	488 (18.70)	<.001
Secondary and higher	1,606 (61.56)	1,201 (46.03)	405 (15.52)	
Employment				
Unemployed	979 (37.52)	596 (22.84)	383 (14.68)	<.001
Employed	1,630 (62.48)	1,120 (42.93)	510 (19.55)	
Children				
None	2,371 (90.88)	1,510 (57.88)	861 (33.00)	<.001
One or more	238 (9.12)	206 (7.90)	32 (1.23)	
Residence				
Urban	952 (36.49)	717 (27.48)	235 (9.01)	<.001
Rural	1,657 (63.51)	999 (38.29)	658 (25.22)	
Wealth index				
Low	937 (35.91)	505 (19.36)	432 (16.56)	<.001
Medium	618 (23.69)	413 (15.83)	205 (7.86)	
High	1,054 (40.40)	798 (30.59)	256 (9.81)	
Condom use at last sexual intercourse				
No	1,036 (52.83)	606 (30.90)	430 (21.93)	<.001
Yes	925 (47.17)	721 (36.77)	204 (10.40)	
1–5 sex partners				
1–5	2,069 (79.30)	1,321 (50.63)	748 (28.67)	<.001
>5	540 (20.70)	395 (15.14)	145 (5.56)	

bracket. They also reported a higher frequency of non-use of condoms at last sex but a lower frequency of having more than five lifetime partners.

Predictors of Never Testing for HIV

The unadjusted and adjusted ORs for never testing for HIV are presented in Table 2. Results from the adjusted logistic regression showed that compared with men who had ever tested for HIV, untested men were more likely to be younger (adjusted odds ratio [aOR], 0.50; 95% CI [0.42, 0.61]), have a lower educational level (aOR, 1.98; 95% CI [1.64, 2.40]), have no children (aOR, 0.41; 95% CI [0.27, 0.61]), be unemployed (aOR, 1.28; 95% CI [1.07, 1.54]), and belong to the low wealth bracket (aOR, 1.73; 95% CI [1.32, 2.26]). Area of residence (aOR, 1.13; 95% CI [0.88, 1.44]) and being in the middle wealth bracket (aOR, 1.14; 95% CI [0.88, 1.49]) were not associated with never testing for HIV.

Association Between Never Testing for HIV and Sexual Risk Behavior

Adjusted logistic regression results are displayed in Table 3. Results revealed that compared with those who had ever

been tested for HIV, men who had never been tested were twice as likely to use no condom at last sex (aOR, 2.12; 95% CI [1.72, 2.63]). Education, whether one had children, and wealth were also associated with lack of condom use at last sexual intercourse. For lifetime sexual partners, we found that the odds of having more than five lifetime sexual partners were lower among men who had never been tested for HIV than among men had ever been tested (aOR, 0.73; 95% CI [0.58, 0.92]). Having more than five lifetime sexual partners was also associated with age, whether one had children, and residence.

Discussion

The objectives of this study were to determine factors associated with never being tested for HIV and to examine sexual risk behaviors associated with never testing among men.

The likelihood of never testing for HIV was lower among young adults compared with adolescents, a finding consistent with other studies, where findings demonstrated that men who had never been tested for HIV were younger (Ajayi et al., 2020; Hensen et al., 2015; Quinn et al., 2019). The lower likelihood of never being tested

Table 2. Predictors of Never Testing for HIV.

Characteristic	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Age		
15–19	Ref.	Ref.
20–24	0.35 [0.30, 0.42]	0.50 [0.42, 0.60]
Education		
Secondary or higher	Ref.	Ref.
Primary or less	2.81 [2.38, 3.32]	1.98 [1.64, 2.40]
Children		
None	Ref.	Ref.
One or more	0.27 [0.19, 0.40]	0.41 [0.27, 0.61]
Employment status		
Employed	Ref.	Ref.
Not employed	1.41 [1.20, 1.67]	1.28 [1.07, 1.54]
Residence		
Urban	Ref.	Ref.
Rural	2.01 [1.68, 2.40]	1.13 [0.88, 1.44]
Wealth index		
High	Ref.	Ref.
Middle	1.57 [1.24, 1.93]	1.14 [0.88, 1.49]
Low	2.67 [2.20, 3.23]	1.73 [1.32, 2.26]

Note. OR = odds ratio; CI = confidence interval.

Table 3. Association Between Never Testing for HIV and Sexual Risk Behavior.

Characteristic	No condom use at last sexual intercourse		>5 Lifetime sexual partners	
	OR (95% CI)		OR (95% CI)	
	Unadjusted	Adjusted	Unadjusted	Adjusted
HIV testing				
Tested	Ref.	Ref.	Ref.	Ref.
Not tested	2.51 [2.06, 3.06]	2.12 [1.72, 2.63]	0.65 [0.53, 0.80]	0.73 [0.58, 0.92]
Age				
15–19	Ref.	Ref.	Ref.	Ref.
20–24	0.75 [0.63, 0.90]	1.02 [0.83, 1.23]	2.00 [1.65, 2.43]	1.64 [1.32, 2.04]
Education				
Secondary or higher	Ref.	Ref.	Ref.	Ref.
Primary or less	2.61 [2.16, 3.15]	2.04 [1.65, 2.53]	1.08 [0.89, 1.31]	1.16 [0.93, 1.45]
Children				
None	Ref.	Ref.	Ref.	Ref.
One or more	1.32 [0.99, 1.76]	1.79 [1.31, 2.43]	2.70 [2.04, 3.58]	1.97 [1.47, 2.65]
Employment status				
Employed	Ref.	Ref.	Ref.	Ref.
Not employed	0.97 [0.81, 1.17]	1.01 [0.83, 1.24]	0.47 [0.38, 0.59]	0.59 [0.47, 0.73]
Residence				
Urban	Ref.	Ref.	Ref.	Ref.
Rural	0.59 [0.49, 0.71]	0.99 [0.77, 1.28]	1.31 [1.07, 1.60]	1.34 [1.02, 1.76]
Wealth index				
High	Ref.	Ref.	Ref.	Ref.
Middle	1.67 [1.32, 2.12]	1.39 [1.06, 1.83]	1.10 [0.85, 1.41]	1.00 [0.75, 1.34]
Low	2.33 [1.90, 2.87]	1.53 [1.15, 2.04]	1.30 [1.05, 1.62]	1.13 [0.84, 1.53]

Note. OR = odds ratio; CI = confidence interval.

among older men could support the notion that adolescents may perceive themselves to be at low risk for HIV infection, as studies in that population have reported lower perceived risk for HIV infection (Shiferaw et al., 2014; Sychareun et al., 2013) and “optimistic bias,” which causes one to believe that they themselves are less likely to experience a negative event (Patton et al., 2011). However, other studies among men have reported contrary results, where increasing age was independently associated with not being tested for HIV (Bwambale et al., 2008; Gari et al., 2013), therefore other factors may influence the relationship between age and testing. Nevertheless, our finding is concerning, given the soaring prevalence of HIV among adolescents in sub-Saharan Africa.

We found that socioeconomic status (SES) variables (educational level, employment, and wealth) were associated with never being tested for HIV. Our results are in line with studies where those who had a lower educational level (Huchko et al., 2011; Ng'ang'a et al. 2014; Quinn et al., 2019), were unemployed (Mhlongo et al., 2013; Quinn et al., 2019; Venkatesh et al., 2011), and were less wealthy (Quinn et al., 2019) were less likely to ever test for HIV. Education can increase knowledge about HIV transmission and prevention, as well as empower youth to assess their risk and make decisions to obtain HIV services (Jamison et al., 2007). Also, people with low SES are more likely to have low levels of health literacy (Garcia-Codina et al., 2019), which is the ability to obtain, process, and understand basic health information needed to make appropriate health decisions. In an assessment using data from Zambia, researchers reported that health literacy was nearly thrice as high among urban dwellers as it was among rural dwellers (Schrauben & Wiebe, 2017). Higher health literacy has been associated with higher levels of HIV/AIDS knowledge (Hicks et al., 2006), which could explain why those from rural areas had higher odds of never being tested, although, of course, knowledge does not always translate into action. Our findings underscore the importance of improving the SES of rural populations, which may increase health literacy levels, which in turn, may increase uptake of HIV services.

Having no children increased the odds of never being tested, which is consistent with previous research (Quinn et al., 2019). It has been recognized that involving male partners in programs for the prevention of mother-to-child transmission (PMTCT) of HIV may improve program coverage and infant outcomes (WHO, 2015), and it has been demonstrated that along with the increased coverage of PMTCT services among pregnant women came an increase in uptake of HIV testing among male partners (Katz et al., 2009; WHO, 2015). Therefore, our finding of increased odds of testing among men with children could be indicative of HIV testing as a “side effect” of male

PMTCT involvement, as men who attend antenatal care visits with their partner are more likely to be exposed to opportunity to get tested for HIV.

Our results on HIV testing as a predictor of sexual risk behavior showed that condom non-use at last sex was more likely among those who had never been tested. This has been reported in other studies, whose findings demonstrate higher condom use among individuals who had ever tested for HIV than those who had never tested (Baird et al., 2014; George et al., 2019). Other studies have reported no differences in condom use between those who did and those who did not receive HIV testing (Cawley et al., 2014). Affirming previous evidence (Baird et al., 2014), we found a higher number of sexual partners among those who had received HIV testing. One would expect that knowledge of HIV status (positive or negative) would encourage safer sexual behavior, because individuals who test negative may want to protect themselves from acquiring HIV, while those who test HIV-positive may want to prevent transmitting it. Our finding demonstrates that some risk behaviors may be more prevalent among those who have ever tested for HIV than among those who have never tested, indicating that knowledge does not necessarily influence sexual behavior. This underscores the importance of accentuating risk reduction in addition to knowledge of one's HIV status. Contrasting findings have also been reported, where individuals who received HIV testing were significantly more likely to have fewer sex partners (Cawley et al., 2014). Our findings shed little light on the mixed results regarding HIV testing and sexual risk behavior.

Limitations

This study has some limitations. First, we did not have data on HIV test results. Therefore, we could not assess associations between demographic variables and test results, or between results and sexual risk behavior, which would have been informative. Second, the 2018 ZDHS did not include any information on attitudes toward testing or toward knowing one's test results. Such information would have given us more insight into reasons why some individuals have never been tested for HIV. These limitations notwithstanding, our study adds to the literature on HIV testing, related demographic factors, and sexual risk behavior among men, a population with less uptake of HIV services. Moreover, a strength of this study is that the ZDHS is a nationally representative population-based survey, which allows us to draw reliable conclusions about the male population in Zambia.

Conclusion

Men who are younger, have no children, and are from low-SES backgrounds have higher odds of never testing

for HIV. Finding ways to augment uptake of testing in these groups is essential. Prevention programs can use sociodemographic characteristics to develop profiles of those who have a lower likelihood of testing for HIV, which could help them identify youth who may especially need to be targeted by initiatives to promote HIV testing. Such information can also aid programs regarding how, where, and when to intervene to break the cycle of HIV transmission in sub-Saharan Africa. Considering the high incidence and prevalence of HIV among young people in sub-Saharan Africa, this could have a substantial public health impact, as testing is key to slowing the spread of HIV infection. At the same time, it is also important for public health professionals to be cognizant of the fact that awareness does not always engender behavior change; therefore, in addition to knowledge of HIV status, risk reduction should also be emphasized.

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