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Gender Expression and Risk of HIV Infection among Black South African Men Who Have Sex with Men

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Abstract

To explore demographic, behavioral and psychosocial risk factors for HIV infection in South African MSM we recruited 480 MSM (aged 18 and 44 years) using respondent-driven sampling. Data were collected through individual computer-assisted face-to-face interviews. Participants were tested for HIV. RDS-adjusted HIV prevalence is 30.1% (unadjusted 35.6%). Few participants had ever engaged in both receptive and insertive anal sex; sex with women was frequently reported. Independent demographic and behavioral correlates of HIV infection include age, education, number of male sexual partners, ever having been forced to have sex, and ever having engaged in transactional sex; engagement in sex with women was a protective factor. Psychosocial risk factors independently associated with HIV infection were feminine identification, internalized homophobia, and hazardous drinking. Our findings confirm what has been found in other studies, but also suggest that the dynamics and context of sexual transmission among MSM in South Africa differ from those among MSM in Western countries.

Keywords

South Africa; MSM; HIV prevalence; risk factors; femininity

INTRODUCTION

In the past decade several studies have demonstrated a high prevalence of HIV among MSM in sub-Saharan Africa, providing convincing evidence that even in generalized epidemics, MSM are at elevated risk, with studies reporting a prevalence of up to 50% (1–18). Beyrer and colleagues (19), in a review of the global epidemiology of HIV infection among MSM, concluded that with an estimated prevalence of 18% in sub-Saharan MSM, the level is

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substantially higher than that in the general population adult men; they estimated these odds to be 3.8 (20).

Risk factors for HIV infection in sub-Saharan MSM, primarily of demographic and behavioral nature, have been identified as well. Studies have shown that older MSM are more likely to be infected than younger MSM (8, 10, 11, 15, 17, 18, 21, 22), although incidence seems higher among younger MSM (7). HIV infection also seems to be associated with indicators of social vulnerability, including lower levels of education (9, 10), being unemployed (5), and low income (11). Behavioral risk factors for HIV infection in sub-Saharan MSM include having engaged in receptive anal intercourse (6, 8, 9, 11), number of sexual partners (15, 16), having been paid for sex (12, 16, 18, 21) (while having paid for sex seems to be a protective factor (9)), and having experienced violence (5, 17, 22).

One of the few psychosocial factors that have been shown to be associated with HIV infection among sub-Saharan MSM is self-identification as gay (4, 8, 16, 17, 22). Ross and colleagues reported, for instance, that MSM who identified as gay or homosexual had an over three times higher odds [Adjusted Odds Ratio (AOR) 3.06; 95% Confidence Interval (CI) 1.01 to 9.31] of being HIV infected compared to MSM who did identify as bisexual or in another way.

The aim of the present study is to assess HIV prevalence in a community of South African MSM and to explore whether there are psychosocial risk factors of HIV infection in addition to gay identity and independent of demographic and behavioral risk factors. Explored together, these risk factors may enhance our understanding of how HIV is transmitted in this population and inform policy and program priorities. Same-sex sexuality was illegal in South Africa until the end of apartheid; the 1996 Constitution includes explicit prohibition of discrimination based on sexual orientation (23, 24). However, same-sex sexuality remains highly stigmatized, as in other sub-Saharan countries, being among the countries with the lowest level of social acceptance worldwide (25). In addition, gender seems to be a significant factor in the expression of same-sex sexuality, much more so than in developed countries. Display of feminine behaviors and participation in traditionally feminine occupations appears more prominent in the Black gay population in South Africa compared to gay populations in the Western world (26–30).

METHODS

Study population

Participants were recruited using respondent-driven sampling (RDS) (31, 32), a strategy chosen because of the hidden nature of homosexuality in South Africa and the importance of fostering a strong sense of confidentiality and safety in potential participants. Eligibility criteria for study participation included age older than 18; having engaged in oral, anal, or masturbatory sex with another man in the prior 12 months; living, working, or socializing in the Tshwane metropolitan area; fluency in English, Sepedi (Northern Sotho), or isiZulu; and willingness to take an HIV rapid test. Consistent with RDS methodology, seeds, 20 in total, distributed between three and five coupons to eligible men from their social networks. Once these men enrolled in the study and completed study procedures, staff provided them with

recruitment coupons for further distribution, and so on. Aside from meeting all study eligibility criteria, the seeds were Black and were purposively selected. Based on suggestions in current theoretical literature describing procedures for increasing the probability of long and diverse recruitment chains (31–33), we developed a priori a matrix of demographic characteristics (e.g. age, sexual orientation/gender identity, geographic residence) and identified individuals already known to us through previous field work as being able to recruit from large networks (i.e. “sociometric stars”). This approach to identifying and selecting seeds has been described in several studies where RDS has been successfully implemented (22, 34). All study participants received vouchers to be redeemed at a supermarket as primary incentive for their own participation, as well as secondary incentives for each successful referral to the study. All participants were linked using their coupon identification numbers.

Study procedures and measures

All participants completed a 90-minute interviewer-administered computer-assisted personal interview. All interviews were conducted in a safe private space by choice of the participant either in the office of the Human Sciences Research Council in the Center of Pretoria or in one of the townships, e.g., in a community health center. Research staff involved in screening, interviewing, HIV testing, and instruction for participant recruitment were trained in a three-day session.

The survey addressed demographic characteristics (age, education, housing quality (35), financial problems (36, 37)) and behavioral attributes, including engagement in receptive and insertive anal sex, sex with women, and group sex; having received money or other incentives in return for sex (transactional sex); having experienced sexual abuse as a child; and number of male partners. For the current analyses we used lifetime indicators to increase the chances of identifying risk factors that most likely have preceded the infection. Not having information about when infection took place, we considered recent indicators, such as number of partners in the past year, less appropriate.

Sexual attraction was assessed with the question “Do you currently feel more sexually attracted to men or to women?” and a 5-point response scale (1=“Only to women”; 5=“Only to men”). Sexual identification was assessed with the question “What word would you use to describe your sexuality? Would you call yourself gay, bisexual, or straight, or would you use another word?” Self-perceived femininity was assessed with a 6-item scale with 3 items assessing level of masculinity and femininity each (38); Cronbach alpha in this study was . 947. Sexual identity confusion and internalized homophobia were assessed with subscales adapted from the Lesbian, Gay, and Bisexual Identity Scale (LGBIS) (39, 40); sexual identity confusion was assessed with a 4-item scale (e.g., “I am not totally sure what my sexual orientation is”) and internalized homophobia was assessed with a 7-item scale (e.g., “I wish I were only sexually attracted to women”); Cronbach alpha was .892 and .849, respectively. Secrecy about one’s sexual orientation was assessed with an 8-item scale based on (41); Cronbach alpha = .960). Hazardous drinking was assessed with the 10-item Alcohol Use Disorders Identification Test (AUDIT)(42–46), e.g., “How often during the last year have you had a feeling of guilt or remorse after drinking?” The AUDIT has a theoretical

range of 0–40, and a dichotomous score was calculated using the recommended criterion of 8 or higher to indicate hazardous drinking. Drug problems were assessed with 9 items from the Drug Abuse Screening Test (45), e.g., “Are you always able to stop using drugs when you want to?” A dichotomous variable was calculated to indicate a “yes” response to at least one of the 9 drug problem questions.

Following completion of the survey, participants met with a staff nurse for rapid HIV testing. Participants were given the option to learn their HIV status, either immediately or up to 6 weeks after the test. HIV blood testing was conducted following a serial algorithm in accordance with South African national guidelines (47). All participants were screened by licensed nurses using two licensed rapid test kits (EZ Trust HIV 1 & 2, CS Innovation; First Response, Premier Medical Corporation). Non-reactive samples were interpreted as negative. Samples that were reactive on both tests were confirmed as positive. There were no indeterminate results.

Ethical considerations

All study procedures were approved by the New York State Psychiatric Institute Institutional Review Board in the US and the Human Sciences Research Council Research Ethics Committee in South Africa. Participants provided separate written informed consent for the survey and HIV testing components of the study. Study staff provided referrals for further HIV testing and counseling, mental health, or primary care as indicated. All individuals who tested HIV-positive were referred for specialized HIV follow-up care.

Data analysis

Since RDS was the recruitment method used for this sample, all data were adjusted prior to analyses using a RDS II estimator (33, 48). This approach gives greater weight to those with a small personal network size (PNS), since those men presumably would be less likely to be recruited into the study. Weights were calculated as the inverse of the participant’s PNS. This value was then multiplied by the sample size (N) and then divided by the sum of weights (Σw). The following weighting formula reflects the original sample size of 480: $(1 / PNS) * (N / \Sigma w)$. Note that when data are weighted, the Ns produced in different analyses are often slightly discrepant; therefore, Ns may not always add up to 480.

HIV prevalence rates and 95% confidence intervals were calculated for various subsamples and chi-square tests were used to compare HIV prevalence rates among these subsamples. Logistic regressions were run to determine what factors were associated with HIV status. Initially bivariate models were tested with each independent variable (IV) included in the regression individually. Then a backward step-wise regression was used to identify which of the multiple factors within the various domains would be most strongly associated with HIV status. In this approach, the regression model begins with all IVs all in one regression model. It then repeatedly removes the least significant variable and re-runs the model until all the variables in the model are significantly associated with the dependent variable. In this case a backward stepwise approach is strongly indicated because it reduces degrees of freedom by removing unrelated or highly correlated variables and unlike the forward stepwise approach it allows the model to take predictor variable interactions into account.

RESULTS

In total 480 eligible participants were recruited in 18 waves between August 2011 and January 2013. The mean age in the sample was 24.5 years (Standard Deviation 5.3); 52.2% had some post-secondary education; 69.9% identified as gay or transgender; 44.3% had ever had sex with a woman (see Table 1).

We estimate that 30.1% of Black MSM in the Tshwane metro are HIV infected. MSM who have ever tested for HIV are more likely to test HIV positive in this study than men who have never tested [79.2% versus 67.3%; OR: 1.83, 95% CI: 1.15–2.90]. Among men who have ever tested for HIV, those who had tested one year ago or longer are more likely to be HIV positive than men who had tested within the past year (OR 2.36, 95% CI 1.49–3.94). Among MSM who tested HIV positive, nearly half (48.3%) thought that it was unlikely or very unlikely that they were HIV-infected.

Correlates of HIV infection

In RDS-adjusted bivariate analyses, HIV infection is associated with all included demographic variables. HIV-positive MSM are more likely to be older, have a lower level of education, have regular income from work, live in housing of poorer quality, and have financial problems (see Tables 1 and 2).

In terms of sexual behavior, men who have engaged in anal sex exclusively as the insertive partner have lower odds of being HIV infected compared to men who either only have practiced receptive anal sex exclusively, or both receptive and insertive anal sex. The more male sexual partners men report (lifetime, log transformed), the more likely it is that they are HIV infected. Men who ever had sex with a woman are less likely to be infected compared to men who never had sex with a woman. Men who ever have been forced by a man to have sex, and men who ever engaged in transactional sex, are more likely to be HIV positive. Having been sexually abused as a child and ever having engaged in group sex are not associated with HIV infection.

In bivariate logistic regressions, HIV infection is also associated with most of the psychosocial variables included in the analyses. Men who report exclusive sexual attraction to men (versus predominant attraction toward men, or any attraction toward women), identification as gay or transgender (versus straight or bisexual), and perception of oneself as relatively more feminine are more likely to be HIV-infected. Men who experience more confusion about their sexual identity and more internalized homophobia, and who are more secretive about their sexual orientation, are less likely to be HIV infected. Men with alcohol use problems are more likely to be infected. Having drug use problems is not associated with HIV infection.

Multivariate analyses

In the multivariate backward stepwise logistic regression analysis, age and education continue to be associated with HIV infection (Table 2). Behavioral characteristics independently associated with greater odds of HIV infection are number of male sexual partners (lifetime, log transformed), ever having had sex with a woman, ever having been

forced by a man to have sex, and ever having engaged in transactional sex. Men who report more lifetime male sex partners, ever had been forced by a man to have sex, and ever engaged in transactional sex are more likely to be infected. Men who ever engaged in sex with a woman or in group sex are less likely to be HIV infected.

Psychosocial characteristics independently associated with HIV infection are femininity, internalized homophobia, and hazardous drinking. Men who see themselves as feminine, experience less internalized homophobia, and engage in hazardous drinking are more likely to be infected.

DISCUSSION

Our study documents a prevalence of HIV of 30.1% among Black MSM living in Tshwane. This is at the higher end of the prevalence range of other studies conducted among MSM in South Africa (4, 8, 11, 17, 22). Differences in HIV prevalence between studies—ranging from 13.2% (11) to 28.3% (22) for RDS-adjusted estimates and from 10.4% (4) to 49.5% (8) for unadjusted estimates—are likely to reflect differences in provincial HIV prevalence levels (49) in addition to difference in sampling methods, sample characteristics, moment when studies were conducted, and whether or not estimates were RDS-adjusted. The prevalence reported in this study is higher than what is reported for the population in general in Gauteng province and comparable to the prevalence among young women observed in antenatal care clinics (50). That men who tested HIV positive in this study are less likely to have been tested in the past year compared to men who test negative might suggest an avoidance of HIV testing due to an awareness of increased risk of infection. It could also be that for some men there was no reason to get tested in the past year because they had tested positive before; however, while 145 men tested HIV positive in the study, only 29 men said that it was very likely that they were positive of whom 16 actually tested negative.

Our results show a clear association between HIV and underexplored psychosocial factors that are specific to emerging African gay communities. In particular, the gender nonconforming subset of the MSM population has significantly higher odds of HIV infection as measured through feminine gender identification. Conversely, sexual identity confusion, i.e. men’s uncertainty about their same-sex desires, also correlates with decreased risk of HIV infection, as does internalized homophobia and secrecy about sexual identity or behavior. These factors appear to operate quite differently from what has been observed in US MSM populations. In contrast to the US literature, which has demonstrated internalized homophobia to be positively associated with sexual risk behavior and HIV infection (51–56), our findings suggest internalized homophobia to have a protective effect against HIV infection. We attribute this to the comparatively larger proportion of non-gay identifying MSM, who are gender conforming and more likely to exclusively adopt the insertive role in anal sex, experience greater sexual identity confusion, and therefore are less open about their same-sex desires or practices; because of their sexual role, their infection risk is lower than that of the gay-identifying feminine men who are more likely to engage in receptive anal intercourse, and be more open about their sexuality (8, 57, 58); preliminary analyses seem to support this interpretation (59).

Regarding demographic and behavioral risk factors of HIV infection our findings confirm those of other studies and offer some additional insights. Demographic factors suggest that social vulnerability, including low education, poor housing and no regular income, are risk factors for HIV infection in this population (5, 9–11), as it has been found in the South African population in general (49). Most behavioral variables are bivariately associated with HIV infection in the expected direction. As in other studies, lifetime number of male partners is associated with greater likelihood of being infected (15, 16), as is engagement in receptive anal intercourse (6, 8, 9, 11). Transactional sex and forced sex by men (life time) turn out to substantially increase men's risk for HIV infection, independent of other factors (5, 12, 16–18, 21).

Two counterintuitive findings need further explanation: having engaged in insertive anal sex and ever having had sex with women resulted in lower odds of HIV infection. These findings can only be understood by taking into account specific characteristics of this population. Among African MSM populations, the proportion of men who also have sex with women is much higher than what usually is observed in samples of MSM populations in the US. Furthermore, these men are much more likely to only engage in insertive anal sex when they have sex with men. However, MSM who do not have sex with women are much more likely to engage exclusively in receptive anal intercourse (6, 60–62). Given the higher efficiency of HIV transmission for receptive anal sex (63), insertive sex and sex with women are likely to be "protective" factors in the population of African MSM (8, 11, 57).

Another surprising finding is that experiences of child sexual abuse are not associated with HIV infection, while this has been identified among Western gay men as an important determinant of sexual risk behavior (64) as well as HIV infection (65). As far as we know, none of the studies that identified risk factors for HIV infection in African MSM has established childhood sexual abuse as a risk factor, potentially indicating that the effect of this abuse is overshadowed by other factors or is culturally specific.

All psychosocial variables included in the study, except for drug use problems, are bivariately associated with HIV infection. The observed association between hazardous drinking and HIV infection has been noted in other studies (66), and could reflect either that those engaging in excessive alcohol consumption are more likely to engage in risky sexual interactions; or that problem drinking is a coping behavior among HIV-positive MSM (67). However, because of what is known about alcohol consumption patterns among black South African MSM (68), it is more likely that hazardous drinking has an enduring character and is associated with a way of living that also includes risky sexual practices. Both behaviors should be seen in the context of strong societal rejection of same-sex sexuality that might promote risky sexual practices as well as hazardous alcohol consumption.

Multivariate modeling of demographic and behavioral risk factors shows results that are remarkably consistent with other scholarship from the region. However, our analysis includes psychosocial factors which independently contribute to the risk of HIV infection. Furthermore, while other studies (4, 8, 11, 69−71) have shown the higher risk among gay-identified MSM in Africa but also in the US and the Caribbean, our analysis shows the

importance of gender non-conformity which may intersect with gay identification to produce unique risks (72).

Our findings suggest two other conclusions about HIV transmission among MSM in South Africa. Bivariate results suggest that those MSM most affected by HIV are not actually driving the epidemic among South African MSM. Given the smaller likelihood of transmission from a receptive to an insertive partner than vice versa (63), those MSM most affected are rather likely endpoints in high-transmission networks centered on men who have sex with both men and women (MSMW) and who are exclusively insertive with other men. These MSMW potentially allow for bi-directional transmission to both women and receptive MSM.

The observed relative exclusivity of receptive and insertive sexual roles (lifetime), also observed in Latin American MSM (73, 74), suggests that HIV prevalence could potentially be much higher among South African MSM if role versatility were more prevalent. Modeling studies have shown that HIV spreads more rapidly if MSM engage in both receptive and insertive anal sex (75–78). With over a third of the men only having engaged in either receptive or insertive anal sex during their life, our study found a sexual role exclusivity that is substantially greater than what studies among Western MSM show. Studies among Western MSM populations demonstrate that many MSM have a preference for insertive or receptive anal sex (or for both roles), and that preference cross-sectionally corresponds with actual practice (79). Behaviorally and over a longer time period these MSM are, however, more likely to engage in both roles. For instance, 63% of the 4295 MSM from 6 major US-cities had a versatile behavior pattern over a 30-month period (80). Other studies report similar or even bigger proportions of MSM who engage in both receptive and insertive anal sex (57, 81–85). Our ethnographic research suggests that versatility may be becoming more prevalent among MSM in South Africa, as local MSM communities, through increased exposure, adopt sexual practices and identities informed by the ideologies of global gay-identified communities, particularly those of the North American, Western European, and Australian gay communities whose sexualities are currently most in vogue in emerging gay community contexts. This development, also observed in other non-Western cultures (86), would imply a critical moment for HIV prevention to prevent a sudden rise in infections.

Our findings have several practical implications. First and foremost, our findings make clear that MSM as a category comprise diverse expressions in terms of self-identification, gender identification, and sexual role patterns. This diversity has implications for how these different groups can be reached and should be addressed. Because of their visibility, the more feminine men who identify as gay are probably the easiest to reach, although in accessing services they might encounter specific stigma related to their gender-nonconforming behavior. The men who do not identify as gay can probably best be reached through their gay-identifying sexual partners or by mainstreaming prevention and including attention for transmission through anal sex and sex between men in prevention efforts targeting the general population. Because the engagement in sex varies, men need different skills to protect themselves; while feminine men need the competence to negotiate that their insertive partners use condoms, the men who are more likely to have the insertive role need

to be convinced of the need to protect themselves, but more importantly, their receptive partner. These negotiations are of course complicated by other factors, such as the relative scarcity of insertive partners, and lack of resources and resulting transactional sex. Interventions focusing on the promotion of HIV testing seem particularly relevant for MSM who identify as gay and feminine.

While our study focused on comparisons between men, it should be stressed that their behaviors occur in a social context in which acceptance of same-sex sexuality is extremely low compared to Western contexts. As others have argued and demonstrated, this context contributes to risky sexual practices as well as a lack of adequate policy responses (87–89), indicating the relevance of interventions that include structural components (90–92).

The cross-sectional design of the study limits the ability to make causal inferences. Other limitations are related to the assumptions of the RDS methodology; it is possible that not all subgroups of MSM are proportionally represented. In addition, to recruit the required sample size we had to use a larger than optimal number of seeds. Due to transportation challenges in a low-resource environment, the recruitment period was long. Furthermore, there is a potential selection bias towards those who sought HIV testing in a competent care environment. It is possible that sensitive behaviors were underreported (e.g., transactional sex, receptive sex) or over-reported (e.g., exclusively insertive sex). Although we assessed assumed likelihood of being HIV positive, we did not identify men who knew they were HIV positive; linkage to and retention in care, and medication adherence were also not assessed. Finally, it could be that there are unmeasured co-founders that were not taken into account in the multivariate models.

CONCLUSIONS

This study confirms the high prevalence of HIV among South African MSM. The identified risk factors for HIV infection confirm findings from other studies but also reflect the distinctiveness of this population of South African MSM, with sex role exclusivity being relatively frequent and feminine self-identification being relatively common. The dynamics and context of sexual transmission among MSM in South Africa seem to differ from those among MSM in Western countries.

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Table 1

Characteristics of men who have sex with men (MSM) and HIV infection in Tshwane, South Africa (RDS-adjusted).

	Total N (%)	HIV prevalence % (95% CI)
Education		
Secondary or lower	229 (47.8)	37.6 (31.5 – 44.0) ***
Post secondary	250 (52.2)	23.2 (18.4 – 28.8)
Regular income		
No	312 (64.9)	26.6 (22.0 – 31.8) *
Yes	169 (35.1)	37.7 (29.8 – 44.2)
Sexually abused as child		
No	429 (89.4)	29.1 (25.0 – 33.6)
Yes	51 (10.6)	39.2 (27.0 – 52.9)
Anal sex (ever)[a]		
Receptive only	170 (35.4)	43.5 (36.3 – 51.1) ***
Insertive only	142 (29.7)	12.7 (08.1 – 19.2)
Receptive and insertive	165 (34.3)	35.7 (24.4 – 38.3)
Ever sex with a woman		
No	267 (55.7)	42.7 (36.9 – 48.7) ***
Yes	212 (44.3)	14.2 (10.1 – 19.5)
Ever group sex		
No	392 (81.7)	28.6 (24.3 – 33.2)
Yes	88 (18.3)	37.5 (28.1 – 48.0)
Ever forced sex by man		
No	417 (87.1)	24.2 (20.4 – 28.6) ***
Yes	62 (12.9)	69.4 (57.0 – 79.5)
Ever transactional sex		
No	369 (76.9)	23.8 (19.8 – 28.5) ***
Yes	111 (23.1)	50.5 (41.3 – 59.6)
Sexual attraction		
Only attracted to men	317 (66.0)	37.2 (32.1 – 42.7) ***
Also attracted to women	163 (34.0)	16.0 (11.1 – 22.4)
Sexual identification		
Gay or transgender	332 (69.6)	38.0 (32.9 – 43.3) ***
Bisexual, straight or other	145 (30.4)	13.1 (08.5 – 19.6)
Hazardous drinking		
No	267 (55.6)	24.7 (19.9 – 30.2) **
Yes	213 (44.4)	37.1 (30.9 – 43.8)
Drug problems		
No	427 (88.8)	30.2 (26.0 – 34.7)

	Total N (%)	HIV prevalence % (95% CI)
Yes	54 (11.2)	29.6 (19.1 – 42.9)

* $p \leq .05$;

** $p \leq .01$;

*** $p \leq .001$.

CI, confidence interval.

[a] Three men had engaged in neither insertive nor receptive anal intercourse.

Table 2

Risk factors for HIV infection among men who have sex with men (MSM) in Tshwane, South Africa (RDS-adjusted).

	HIV negative Mean/%	HIV positive Mean/%	Unadjusted OR (95% CI)	Adjusted OR (95% CI)[a]
Sociodemographic				
Age (years)	23.7	26.3	1.09 (1.05, 1.13) ***	1.15 (1.10, 1.22) ***
Education (post secondary)	57.4%	40.3%	0.50 (0.34, 0.75) ***	0.58 (0.35, 0.96) *
Regular income	31.8%	42.8%	1.61 (1.08, 2.41) *	
Housing quality	4.04	3.60	0.73 (0.62, 0.87) ***	
Money problems	2.62	2.88	1.28 (1.05, 1.56) *	
Behavioral				
Sexually abused as child	9.2%	13.8%	1.54 (0.84, 2.81)	
Only receptive anal sex (ever)	28.7%	51.7%	2.63 (1.76, 3.94) ***	
Only insertive anal sex (ever)	37.1%	12.6%	0.24 (0.14, 0.42) ***	
Number of male partners, lifetime[b]	0.83	1.26	7.03 (4.32, 11.42) ***	2.09 (1.12, 3.87) *
Ever sex with a woman	45.3%	20.8%	0.23 (0.14, 0.35) ***	0.43 (0.23, 0.83) *
Ever group sex	16.7%	22.8%	1.48 (0.91, 2.40)	0.43 (0.20, 0.93) *
Ever forced sex by man	5.7%	29.7%	7.00 (3.91, 12.54) ***	3.11 (1.43, 6.79) **
Ever transactional sex	16.4%	38.9%	3.27 (2.10, 5.09) ***	2.17 (1.15, 4.10) *
Psychosocial				
Sexual attraction only to men	59.2%	81.9%	3.09 (1.92, 4.97) ***	
Identification as gay/transgender 62.2%		86.9%	4.06 (2.39, 6.92) ***	
Femininity	2.69	3.49	2.21 (1.78, 2.74) ***	1.50 (1.11, 2.04) **
Sexual identity confusion	2.12	1.85	0.45 (0.31, 0.64) ***	
Internalized homophobia	2.23	1.88	0.25 (0.16, 0.37) ***	0.40 (0.22, 0.71) **
Secrecy about orientation	2.38	1.66	0.40 (0.31, 0.51) ***	
Hazardous drinking	40.0%	54.5%	1.98 (1.21, 2.67) **	1.81 (1.06, 3.07) *
Drug problems	11.3%	11.0%	0.98 (0.53, 1.83)	

OR = odds ratio; 95% CI = 95% confidence interval.

* $p \leq .05$;

** $p \leq .01$;

*** $p \leq .001$.

[a] Variables in the multivariate model are the variables that remained after backward stepwise procedures.

[b] Log-transformed.