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FACTORS ASSOCIATED WITH HIV TESTING AMONG MEN WHO HAVE SEX WITH MEN IN WESTERN KENYA: A CROSS-SECTIONAL STUDY

Sylvia Shangani, ScM^{1,2,4}, Violet Naanyu, PhD^{3,4}, Ann Mwangi, PhD^{3,4}, Heleen Vermandere, PhD⁶, Ethan Mereish, PhD¹, Andrew Obala, PhD⁵, Davy Vanden Broeck, PhD⁶, John Sidle, MD^{4,5,7}, and Don Operario, PhD¹

¹Department of Behavioral Social Sciences, School of Public Health, Brown University, Rhode Island, United States

²School of Public Health, Moi University, Eldoret, Kenya

³Department of Behavioral Science, College of Health Sciences, School of Medicine, Moi University, Eldoret, Kenya

⁴Academic Model Providing Access to Healthcare (AMPATH), Eldoret, Kenya

⁵School of Medicine, College of Health Sciences, Moi University, Eldoret, Kenya

⁶International Centre for Reproductive Health, University of Ghent, Belgium

⁷Department of Medicine, School of Medicine, Indiana University, Indianapolis, United States

Abstract

HIV diagnosis is an important step in the HIV cascade of prevention and treatment. However, men who have sex with men (MSM) in low and middle income countries have limited access to HIV care services. We examined the factors associated with prior HIV testing in last 12 months among MSM in western Kenya. We recruited 95 MSM ages 18 years and older, and who reported at least one sexual contact with a man in the past 6 months, however, this analysis is restricted to 89 participants who completed questions on HIV testing. Logistic regression model was used to determine factors associated with HIV testing in the past one year. Results indicate that 23 (26%) had not been tested in the past 12 months. Bivariate analyses demonstrated that condomless anal sex (odds ratio [OR] =3.29, 95% confidence interval [CI] =1.18–9.17) and comfort with healthcare providers (OR =1.15, 95 % CI =1.05–1.26) were associated with higher odds of HIV testing in the past 12 months. Experiencing social stigma was associated with lower odds of HIV testing in the last 12 months (OR =0.91, 95 % CI =0.84–0.94). In multivariable models, social stigma remained significantly associated with lower odds of HIV testing in the last 12 months OR =0.90, 95 % CI =0.82–0.99) after inclusion of sexual risk and individual level variables. Development of MSM-sensitive HIV testing services, addressing stigma, and training healthcare workers to provide culturally sensitive services may assist in effectively engaging MSM in the HIV treatment cascade.

Keywords

HIV testing; men who have sex with men; stigma; Kenya

Introduction

Despite the advancement of HIV prevention efforts, MSM continue to bear a disproportionately heavy burden of HIV infection compared to the general adult population.^{1,2} According to surveillance data in low- and middle-income countries, MSM are 19.3 times more likely to be living with HIV than the general population,³ yet, only 14% have access to HIV/AIDS prevention and treatment services.² Early linkage to antiretroviral therapy (ART) has been shown to be effective in reducing HIV transmission and mortality among those who are HIV positive. Early diagnosis, prompt linkage and retention in care, receipt of ART, and viral suppression constitute key points along a comprehensive continuum of HIV care.⁴ However, more than 75% of MSM in low- and middle-income countries lack access to HIV testing services.² To achieve WHO (2011) recommendations of annual HIV testing among MSM and UNAIDS goal of creating an AIDS free generation,⁵ it is important to expand counselling and testing services to MSM - especially among those residing in sub-Saharan Africa where HIV epidemic strikes hardest.

In Kenya, HIV prevalence among MSM is almost four times higher than that in the general adult population.⁶ Latest statistics show that in 2010, HIV prevalence among MSM was an estimated 18.2%⁷, yet most HIV resources are directed to the heterosexual epidemic. In Kenya, as in other African countries except South Africa sex acts between men are criminalized and carry a maximum penalty of 14 years imprisonment but generally this is not actively enforced.⁸ However stigma is a major issue for MSM due to conservative political and religious (Christian and Muslim) segments of Kenyan society and hostile public attitudes. Although the government has recently prioritized HIV prevention activities among MSM, the numbers among those who test for HIV is still very low.^{6,9} Findings from the three regions of Kenya - Coast, Kisumu, and Nairobi - indicate that MSM are at higher risk for HIV infection and in need of targeted intervention.⁹⁻¹² A 2009 report by the Kenya National AIDS Control Council estimated that MSM accounted for 15.2% of new HIV infections,¹³ for example, estimates from coastal Kenya show HIV incidence of 8.6 per 100 person-years among MSM only and 5.6 per 100 person-years among men who have sex with men and women.¹² HIV prevalence among the MSM population in western Kenya is presently unknown despite the region having highest HIV epidemic compared to other parts of Kenya⁶, and because MSM are more vulnerable to HIV infection, we may be unaware of an HIV epidemic among this sub-population. Early initiation of ART therapy, a consequence of HIV testing, reduces rates of sexual transmission of HIV and mortality.¹⁴ It is estimated that new HIV infections could be reduced by 30% per year if all HIV-positive individuals were aware of their serological status.¹⁵ WHO (2011) recommends that all MSM test for HIV at least annually and those MSM who have multiple or anonymous partners or use illegal drugs should test at least every 3 or 6 months. National public policy in Kenya has recently taken a more proactive approach to HIV prevention and control for most-at-risk

populations including recommendations to increase HIV testing among MSM.⁶ Our study aids these efforts by providing preliminary data from western Kenyan MSM.

Despite improvements in policies that increasingly promote more frequent and universal HIV testing, MSM in Kenya may experience barriers to HIV testing. Factors such as low self-esteem, negative social consequences, lack of knowledge about HIV/AIDS, voluntary counselling and testing (VCT), ART, perceived risk, anxieties about positive test results, fears about being seen accessing HIV services, and discrimination by health care providers, income, sexual identity have been found to be associated with utilization of HIV testing in low- and middle-income countries.^{16–21} Qualitative findings from Kisumu and Coastal Kenya revealed reasons for not accessing care that included discrimination, lack of privacy and confidentiality in health care facilities and discomfort with health care provider.^{22,23} In the whole of western Kenya, Kisumu is the only county that has provided data on MSM, however this is the first study to document correlates of HIV testing among MSM in western Kenya. It is intended that the results of this study will inform interventions to expand HIV testing programs to include those who are at-risk of HIV infection and who do not test frequently.

METHODS

Study area

The study was based in Eldoret, the fifth largest city in Kenya with approximately 894,179 people and home to one of Kenya's largest public universities and referral hospital which hosts the USAID-Academic Model Providing Access to Healthcare (AMPATHplus) program. AMPATHplus is a broad teaching and treatment initiative implemented in 2002 by Moi Teaching and Referral Hospital (MTRH) and Moi University School of Medicine (MUSoM), in collaboration with Indiana University (Indianapolis, USA) and its partners.²⁴ AMPATHplus is the largest HIV clinical care program in East Southern Africa, providing services to over 150000 patients.

Study design and population

This paper reports on findings from a parent study on health and HIV risk in MSM conducted from February to April 2014 in western Kenya. The parent study utilized both qualitative and quantitative approaches to collect data. Prior to data collection, mapping and description of the general context of MSM in western region was carried out. This mapping exercise provided information to guide targeted recruitment strategies. Quantitative surveys were administered to MSM. Only data from quantitative surveys are reported here.

Study sample

The population included men who are residents of Eldoret and neighbouring communities. The inclusion criteria for this sample were men who were: 1) willing to participate; 2) aged 18 years old; 3) reporting having anal or oral sex with a man within the previous six months; 4) residing in Eldoret. Chain-link referrals Sampling technique²⁵ was used to enrol participants in the study. The sampling began with a set of initial participants ("seeds") recruited with the help of key informants and MSM who are "out of the closet". The initial

seeds were different from each other in terms of income, age, and occupation. These seeds initiated the expanding chain of referrals, where respondents from each link in the chain introduced the interviewers to 2–3 MSM who are known to them if those individuals agree. In total, 95 participants met eligibility criteria, but 89 completed the survey.

Study procedures and measures

All data collection activities were facilitated by five research assistants who recruited participants, administered surveys, and managed data, under the supervision of study investigators. All research assistants had prior experience administering surveys with similar sensitive questions related to sexual behavior and HIV/STI. In addition, they received intensive training on the study, confidentiality, mapping and interviewing. Research assistants were also instructed on consenting and questionnaire administration. They were also expected to hold at least a college diploma, and be fluent in English and Kiswahili and be of good standing in the community and respectful of MSM. The standard questionnaire which lasted approximately 40 minutes was administered in private and secure space depending on the participants' preference. Participants received Kshs.150 (\$1.5 USD) reimbursement at the end of each interview session. They were also informed about available free care for HIV at Moi Teaching and Referral Hospital (MTRH) and other health care facilities in Eldoret. All study procedures were approved by the Moi University College of Health Sciences and Moi Teaching and Referral Hospital Institutional Research and Ethics Committee (IREC).

The survey instrument was adapted from Behavioural Surveillance Surveys for populations at risk of HIV.²⁶ Additional questions were developed and included in the semi-structured interview to address local cultural issues in western Kenya. The survey assessed a variety of topics; for this paper, we focused on questions concerning HIV testing, demographic background, sexual risk behaviours, psychosocial factors, and healthcare seeking practices. Demographic information included age, education, ethnicity, income, marital status, and sexual identity.

To assess condom use with male partners, participants were asked “In the past six months when you had anal sex, did you or your male partner use a condom?” Response options were dichotomized to “yes” vs “no” condomless anal sex. We also assessed participants' sexual experiences with females; “Think about the last time you had sex with a female partner during the past 6 months, was a condom used?” Response options were dichotomized to “yes” vs “no” condomless vaginal sex. To assess STI/STD infection, participants were asked if they had ever had any genital ulcer/sore or genital discharge, and responses were dichotomized to reflect any or no STI/STD infection history. To capture HIV knowledge of care clinics, participants were asked whether they had ever heard of HIV care clinics and responses were either “yes” or “no”. To assess our study outcome, which was HIV testing in the last 12 months, participants were asked, “Have you ever had an HIV test in the last 12 months?” Response options included “yes” and “no”.

Social stigma was assessed with a twelve item measure that assessed occurrence of interpersonal negativity and discrimination related to being gay, including the experience of being mistreated (e.g “Someone was unwilling to share a meal with you?”) and the

experience of social avoidance by others because of sexual identity (e.g. “Someone was unwilling to be your neighbour?”). Responses were rated on a 4-point frequency scale (“0=Never” to “3=Often”). A scale score was computed by summing up the scores across the twelve items. The hypothetical score ranged from 0–36 with higher scores representing greater perceived levels of social stigma. The scale demonstrated good internal consistency ($\alpha=0.90$).

Participant experiences of self-stigma were assessed using seven items. Sample items included: “I hang with the wrong crowd because I am a MSM” and “I should be ashamed of being MSM”. Four-point Likert scale response options ranged from “strongly agree (3) to strongly disagree” (0) (Cronbach’s $\alpha=0.78$). All scores were then summed up to produce a scale of self-stigma, the hypothetical score ranged from 0–21 with higher scores indicating increasing levels of self-stigma.

Participants completed a seven item measure that assessed their comfort in accessing health care services. Sample items included “I feel comfortable discussing my sexual practices with the healthcare provider” and “I feel safe discussing my sexual orientation with the healthcare provider”. Responses ranged from agree strongly (3) to disagree strongly (0) (Cronbach’s $\alpha=0.91$). A scale score was computed by summing up the scores across the seven items, the hypothetical score ranged from 0–27 with higher scores indicating greater levels of comfort with healthcare provider.

Data analysis

This analysis is restricted to participants who completed questions on HIV testing ($n=89$). Data were analysed using STATA v.10 (Stata Corp 2002; College Station, Texas, USA). The main outcome “HIV testing in the last 12 months” was assessed as a binary variable. In the descriptive analysis mean and standard deviations were estimated for continuous variables and proportions were calculated for categorical variables. “Ever HIV tested” were defined as participants who reported undergoing HIV testing in the past 12 months and “not HIV tested” were defined as those who reported no prior history of HIV testing in the last 12 months. In bivariate analysis, we used logistic regression models to estimate the odds of HIV testing in the past 12 months for individual variables which included socio-demographic, sexual risk and psychosocial factors (social stigma, self-stigma and comfort seeking care). Odds ratio (OR) with 95% confidence intervals were used to measure associations. A p-value of 0.05 or less was considered as indicating a statistically significant association.

Hierarchical logistic set regression was used to estimate the odds of HIV testing during the past year. This approach is an extension of traditional logistic regression, but with sets of conceptually and statistically related variables entered in sequential steps. Significance tests, calculated as the difference in the -2 log likelihood of the successive models, assessed the impact of each additional set entered beyond the previously entered sets.²⁷ We used social epidemiologic framework from Poundstone et al 2004²⁸ to estimate the odds of HIV testing in the past 12 months for psychosocial factors (self-stigma, social stigma, and comfort seeking care) (model 1), the components of model 1 with sexual risk variables (ever having STI or STD symptoms and condomless anal sex (model 2), and finally the components of

model 2 with individual variables (age, sexual identity, and education) (model 3). The goal was to examine whether the strength of psychosocial factors (social stigma, self-stigma and comfort with healthcare provider) are weakened with further additions of other variables in the model. This is based on prior literature and our bivariate associations that have showed that psychosocial factors are significantly associated with HIV testing.

Results

Table 1 shows descriptive characteristics of the sample. Most participants were between the age of 18–24 (52%) with 48% aged 25 and older. Participants were primarily single (67.9 %), and more than half (60%) had monthly income of less than Kshs. 5000 (\$50 USD). Fifty percent of the sample described themselves as “homosexual or gay” while 35.2% described themselves as “bisexual” and 13% as “heterosexual”. The majority in this sample had children (80%) and had at least a university or college degree (58.43%). In terms of sexual behaviour, 51% had had condomless anal sex, and 23% reported ever having STI/STD symptoms. Of the sample, 74% reported ever having been tested for HIV in the past one year.

Results from bivariate analyses are presented in Table 2. Of the 13 variables, five variables were associated with HIV testing in the past 12 months. Experiences of social stigma [odds ratio (OR) =0.91, 95%CI = 0.84–0.94] was associated with lower odds of HIV testing in the past 12 months. However, comfort with health care providers (OR=1.15, 95% CI=1.05–1.26) and condomless anal sex (OR=3.29, 95% CI =1.18–9.17) were significantly associated with greater odds of HIV testing in the past 12 months. Additionally, ever having STI/STD symptoms (OR= 3.93, 95% CI 0.84–18.52) and higher educational level (OR=2.28, 95% CI=0.87–5.97) were not significant at 5%.

Table 3 shows results from hierarchical logistic regression analysis with the outcome of ever testing for HIV in the past 12 months. In model 1 containing psychosocial factors, social stigma [adjusted OR (AOR) =0.92, 95% CI=0.86–0.99] was associated with lower odds of HIV testing in the past one year, whereas comfort with health care providers (AOR=1.14 95%CI=1.03–1.27) was associated with greater odds of HIV testing in the past one year. In model 2, which included the psychosocial and sexual risk variables, social stigma (AOR=0.92, 95% CI=0.84–0.99) remained significantly associated with lower odds of HIV testing in the past one year but comfort with health care provider was no longer significant. In our final model 3, including all model 1 and model 2 variables in addition to participant characteristics, only social stigma (AOR=0.92, 95% CI=0.84–0.99) continued to be significantly associated with lower odds of HIV testing in the past 12 months. Also in our final model, higher education level (AOR=3.72, 95% CI=1.02–13.48) was significantly associated with higher odds of HIV testing.

Discussion

We found that 74% of Kenyan MSM analysed in the survey had ever tested for HIV in the past 12 months. This proportion is similar to that of the recent national figure⁶ and the integrated Bio-Behavioural survey (IBBS) conducted in Nairobi and Mombasa in 2011.

Although this number is high, our sample might not be generalizable to all MSM in western Kenya. However, we believe this proportion could be increased to achieve Kenya National AIDS Strategic plan (NACC) goal of expanding HIV testing and counselling services by 80% to all adults ²⁹ given the advancement of HIV testing technologies and revision of testing policies. However, more substantial improvements are necessary to achieve the WHO (2011) recommendation of at least annual HIV testing among MSM.

Our study also found that experiencing social stigma was consistently associated with lower odds of HIV testing in the past 12 months, over and above all other variables assessed in this survey. The relationship between social stigma and HIV testing among MSM corresponds with earlier work done in both high income and low-middle income countries. ^{20,30–35} A study in Atlanta found that HIV-negative black MSM with greater stigma had longer gaps in time since their last HIV appointment. ³⁶ Similarly, recent qualitative findings from South Africa by Sandfort and team showed that anticipated stigma from healthcare providers was linked to HIV testing; ³⁷ men stated that discrimination from healthcare workers hindered many MSM from seeking HIV testing services. Current findings and earlier studies demonstrate that MSM in sub-Saharan experience multiple types of stigma. ^{3,38} Stigma - defined as a negative attribute that represents failure to meet social expectations³⁹ has been found to be associated with lower access to condoms, basic health care services, as well as HIV treatment for HIV-positive MSM in sub-Saharan Africa.^{40,41} Previous qualitative research with MSM in coastal Kenya has reported on the internalization of stigma among MSM, contributing to low levels of self-worth and self-efficacy. ⁴² Given Kenyan criminalization of same-sex practices and that many Kenyan harbour stigmatizing attitudes and beliefs against those infected with HIV, ⁴³ HIV-positive MSM may suffer twofold stigma related to their sexuality and their HIV-status, which may compromise their ability to seek HIV treatment and care services.

As in other prior studies, ^{34,44,45} comfort with health care providers was linked to HIV testing in the past 12 months. For instance, qualitative findings from Coastal and Kisumu Kenya showed that MSM were more likely to seek care that they perceived to be friendly, non-judgmental, confidential and responsive to individual needs. ^{22,23} Similarly, Lane et al. reported that verbal abuse targeting MSM from healthcare workers barred MSM in South Africa from seeking care. ⁴⁶ From this study and earlier work it is obvious that distrust of the health care system, in combination with social stigma, creates a barrier to HIV testing among MSM. Training of healthcare providers to ensure culturally and clinically competent care is important. For instance a study in Coastal Kenya evaluated a two-day training about homosexuality and HIV prevention targeting Kenyan healthcare workers.⁴⁷ After 3-months post training, participants were found to have reductions in homophobic attitudes and improvements in knowledge. Similar training may be applied in western Kenya, although infrastructural and cultural issues that differentiate western versus coastal Kenya must be considered.

Our study also yielded an association between HIV testing in the past 12 months and having a higher education attainment which corresponds with earlier studies conducted in Ethiopia ⁴⁸ and recently in Zambia. ⁴⁹ Although we did not include knowledge about HIV in this analysis, intervention outreach efforts should particularly target Kenyan MSM of lower

socio economic status in order to improve their awareness of and engagement in HIV testing programs. Also, in this study, we found that condomless anal sex was associated with recent HIV testing, contrary to findings by Scott and team.⁵⁰ Findings in this study might suggest that HIV testing reflects perceived vulnerability among MSM who engage in condomless sex.

Although this study is the first to document HIV testing among MSM in western Kenya, there are also limitations that are important to highlight. Our use of convenience sampling may have created a selection bias for MSM who are connected to gay communities. There may also be selection bias for MSM who are particularly motivated to participate. However, this bias is likely to underestimate social stigma as the men who participated in the study disclosed their sexual practices to the research team. Another limiting factor was the use of non-random sampling, which may limit the external validity of the study findings. Also, these results may be subject to recall bias and social desirability; for instance, participants may have been more likely to overestimate HIV testing. In addition, given our population of interest, our sample size is small which may affect the internal validity of our study findings; however it is important to note that this is hard to reach population given criminalization of same sex practice in Kenya. Although our data showed that many MSM had children, we did not examine stigma in the context of social norms/gender roles/societal expectations, which in turn influence health seeking practices of MSM. Further research is necessary to better characterize this association. Lastly, we did not collect information around human rights violations or violence affecting MSM, which may likely limit HIV testing in contexts where same sex practices criminalized, this should likely be considered in future studies. Despite these limitations, these data are among the first to describe HIV-related stigma among MSM a population with increasing rates of HIV infection in Kenya.

Conclusion

This study is one of the first to examine correlates of HIV testing behaviour among western Kenya MSM, highlighting the role of stigma and comfort with providers as factors that might influence HIV testing. Many of our findings validate and corroborate findings from other research examining the relationship between social and structural factors and HIV prevention behaviours among MSM. Our study stressed concerns about mounting environment of fear, including fear of seeking health care services faced by MSM in settings that criminalise same-sex practices. The results of this study have several implications to prevent continued heavy burden of HIV among MSM in Kenya. First, strategies to reach MSM to engage in HIV testing and care in highly stigmatized environments are necessary to reduce time to HIV diagnosis and treatment. As recommended by WHO, decriminalisation of same sex behavior is key to address the high burden of HIV among MSM. Second, efforts to train health care providers about HIV testing and counselling with MSM are needed in order to improve the safety and accessibility of services for MSM clients. Third, broader social and policy-level efforts are needed to address general stigma toward MSM. Future research and prevention efforts should explore the role of peers, healthcare providers, and social support in addressing social stigma and access to HIV prevention including testing services among MSM and other sexual minority population.

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Table 1

Demographic characteristics and sexual behavior of the respondents N=89.

Characteristics	Mean (SD) or n (%)
Demographics	
Age group in years	
18–24	46 (51.69)
>25	43 (48.31)
Sexual orientation Identity	
Bisexual	31(35.23)
Homosexual	44(50.00)
Heterosexual	13 (14.77)
Income monthly	
<5000	46 (59.74)
>5000	31 (40.26)
Relationship status	
Single	55 (67.9)
married	28 (33.73)
Ever been married to a woman	
Yes	72 (80.9)
No	17 (19.1)
Have children	
Yes	67 (79.76)
No	17 (20.24)
No. of Children M (SD)	1.9(0.28)
Education	
≤Secondary	37 (41.57)
University or college	52 (58.43)
Sexual behaviors	
STI/STD Symptom	
yes	20 (22.47)
No	69 (77.53)
Condomless anal sex	
Yes	43 (51.19)
No	41 (48.81)
Condomless vaginal sex	
Yes	16 (31.37)
No	35 (68.63)
Knowledge of HIV care clinics	
Yes	75 (87.21)
No	11 (12.79)
Ever having sex with a woman	
Yes	70 (78.65)

Characteristics	Mean (SD) or n (%)
No	No (21.35)
Structural barriers	
Social stigma M(SD)	8.22 (1.67)
Self-Stigma M(SD)	6.14 (0.36)
Comfort seeking care M(SD)	9.11 (0.63)
Tested for HIV in the past one year	
Yes	66 (74.16)
No	23 (25.84)

Table 2

Relationships between demographic demographics, sexual risk indicators, psychosocial factors and HIV testing (N=89).

Variable	Ever HIV tested n=66	Not HIV tested n=23	OR (95% CI)	p
Age groups in years				
18–24 (ref)	46 (51.69)	34 (51.52)	1.00	
>25	43 (48.31)	12 (52.17)	1.02 (0.39–2.65)	0.95
Sexual orientation identity				
Bisexual/heterosexual (ref)	35 (53.03)	9 (40.91)	1.00	
Homosexual	31 (46.97)	13 (59.09)	0.61 (0.23–1.63)	0.32
Income monthly (Kshs.)				
<5000 (ref)	33 (55.93)	13 (72.22)	1.00	
>5000	26 (44.07)	5 (27.78)	2.04 (0.64–6.48)	0.22
Relationship status				
Single (ref)	41 (66.13)	14 (73.68)	1.00	
Married	21 (33.87)	5 (26.32)	1.43 (0.46–4.52)	0.53
Education level				
≤ secondary (ref)	24 (36.36)	13 (56.52)	1.00	
University or college	42 (63.64)	10 (43.4)	2.28 (0.87–5.97)	0.09
STI/STD symptoms				
Yes	18 (27.27)	2 (8.70)	3.93 (0.84–18.52)	0.06
No (ref)	48 (72.73)	21 (91.30)		
Condomless anal sex				
Yes	36 (59.02)	7 (30.43)	3.29 (1.18–9.17)	0.01
No (ref)	25 (40.98)	16 (69.57)		
Condomless vaginal sex				
Yes	13 (36.11)	3 (20.00)	2.26 (0.54–9.51)	0.25
No (ref)	23 (63.89)	12 (80.00)	1.00	
Knowledge of HIV care clinics				
Yes	57 (89.06)	18 (81.82)	1.81 (0.47–6.89)	0.38
No (ref)	7 (10.94)	4 (18.18)	1.00	
Ever having sex with a woman				
Yes	53 (80.30)	17 (73.91)	2.26 (0.54–9.51)	0.26
No (ref)	13 (19.70)	6 (26.09)	1.00	
Social stigma M(SD)	7 (0.89)	11.74 (1.12)	0.91 (0.84–0.94)	0.005
Self-stigma M(SD)	5.8 (0.44)	7.10(0.65)	0.90 (0.78–1.03)	0.1
Comfort seeking care M(SD)	10.26 (0.71)	5.83 (1.10)	1.15 (1.05–1.26)	0.001

Table 3

Results of Hierarchical logistic regression: Variable associations with HIV testing in the past 12 months among MSM (N=89).

Variable	Model 1 AOR (95% CI)	Model 2 AOR (95% CI)	Model 3 AOR (95% CI)
Psychosocial factors			
Social stigma	0.92 (0.86–0.99)*	0.92 (0.84–0.99)*	0.90 (0.82–0.99)*
Self-stigma	0.92 (0.79–1.06)	0.96 (0.82–1.12)	0.96 (0.81–1.14)
Comfort seeking care	1.14 (1.03–1.27)**	1.09 (0.98–1.23)	1.11 (0.99–1.25)
Sexual risk factors			
STI/STD symptoms			
Yes		3.57 (0.60–21.13)	4.09 (0.63–26.8)
No (ref)		1.00	1.00
Condomless anal sex			
Yes		1.91 (0.60–z6.05)	1.56 (0.42–5.73)
No (ref)		1.00	1.00
Individual factors			
age			
>31			0.82 (0.22–3.06)
18–30			1.00
Sexual identity			
Homosexual			0.86 (0.22–3.33)
Heterosexual & Bisexual (ref)			1.00
Education			
University or college			3.72 (1.02–13.48)*
Secondary (ref)			1.00

AOR; Adjusted odds ratio ***p<0.001 **p<0.01 *p<0.05 CI interval confidence

STD – sexually transmitted disease

STI – sexually transmitted infections