

HIV Prevalence and associated Risk Factors among Men who have Sex with Men in Dar es Salaam, Tanzania

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ABSTRACT

Introduction: Limited studies and differential risk behaviours among men who have sex with men (MSM) in Africa calls for population specific studies. We present results from the largest integrated bio-behavioural survey among MSM in Africa to inform programming.

Methods: This was a cross-sectional study utilizing respondent driven sampling to recruit MSM aged 18 and above. Data on socio-demographic characteristics and HIV-related risks were collected and all participants were tested for HIV, Herpes Simplex Virus Type-2 (HSV-2), Hepatitis-B Virus (HBV) and Syphilis.

Results: A total of 753 MSM with a mean age of 26.5 years participated in the study and 646 (85.7%) gave blood for biological testing. The prevalence of HIV was 22.3%, HSV-2 40.9%, syphilis 1.1 %, and HBV 3.25%. Significant risk factors for HIV were age above 25, having no children (aOR), 2.4, 95% CI: 1.4-4.2), low HIV-risk perception (aOR, 2.6, 95% CI: 1.2-5.3), receptive position (aOR, 8.7; 95% CI 1.2-5.3), and not using water-based lubricants (aOR, 2.6, 95% CI: 1.0-4.5) during last anal sex. Also associated with HIV infection was, having sexual relationships with women (aOR, 8.0, 95% CI: 4.1-15.6), engaging in group sex (aOR, 3.8, 95% CI: 1.6-8.4), HSV-2 seropositivity (aOR, 4.1, 95% CI: 2.6- 6.5) and history of genital ulcers (aOR, 4.1, 95% CI: 1.1-7.2).

Conclusions: HIV infection and HSV-2 were highly prevalent among MSM. Low perceived HIV risk, practice of risk behaviours and infection with HSV-2 were significant predictors of HIV infection. Behavioural interventions, HSV-2 suppressive therapies and Pre-exposure Prophylaxis are highly needed.

Key words: Men who have sex with Men, HIV, risk behaviours, Tanzania

INTRODUCTION

Worldwide, the incidence of HIV-1 has decreased by 38% since 2001¹. In Tanzania, HIV prevalence in the general population decreased significantly from 7.0% in 2004 to 5.1% in 2012². This success in HIV programming has been ascribed to the strengthening and scaling up of antiretroviral treatment and concerted efforts in behavioural intervention³⁻⁵. Despite significant decrease in HIV infection due to efforts taken to address the epidemic, little attention has been given to population at higher HIV infection risk. It has been urged that, in order to end the HIV epidemic more quickly and to sustain the success, more focus to key population at higher risk of HIV infection is needed with use of behavioural and biomedical approaches such as pre-exposure prophylaxis (PrEP)^{4,6}.

Men who have sex with men (MSM) are among the population subgroups which remain at heightened risk of HIV transmissions sub Saharan Africa. Limited number of studies have revealed that the rate of HIV infection among MSM is 2-20 times higher than that of the general population⁷⁻¹⁰. Moreover, geographical variations in the practice or risk behaviours due to differences in socio-cultural and legal context have been reported across Africa calling for population specific studies⁹⁻¹².

Most available studies in the region have utilized small sample size and sometimes lacking external validity and power^{10,13,14}. We conducted the largest so far in Africa, integrated bio-behavioural survey among MSM in Dar es Salaam Tanzania to explore their HIV prevalence and risk behaviours to provide population and context specific data to inform programming including possible PrEP.

METHODS

Study design

This was a baseline cross sectional study design utilizing a respondent driven sampling method (RDS) to recruit participants from various strata of MSM community in Dar es Salaam.

Study setting

The project was conducted in Dar es Salaam, the largest city in Tanzania with a population of about 5 million people. The city has been among the areas in Tanzania where the prevalence of HIV infection has been consistently high. Currently, the prevalence of HIV in the general population in Tanzania stands at 5.1%, while that of Dar es Salaam is 6.9%². No published data on size estimation of MSM in Dar es salaam but a consensus triangulation data indicated that Tanzania might have 49,000 MSM (range 41,000 to 71,000. Participants recruitment took place from April to August, 2014 and involved all the three Municipality of Dar es salaam, namely, Kinondoni, Ilala and Temeke.

Participants

Men were eligible to participate in this study if they were aged 18 years and above, currently living in Dar es Salaam (Residents) and who may, at times or regularly, have sex with a man (or men). Participants were directly asked if they have ever had sex with a man and whether they have had sex during the past 6 months preceding the study. Residence was based on having an address in Dar es Salaam and having lived in the city for the past 6 months preceding the survey.

Study size

The sample size was calculated in reference to the prevalence of HIV among MSM in Zanzibar of 12 %¹⁵. We hypothesized that the HIV prevalence among MSM in Dar Es Salaam

to be 25% due to higher background prevalence in the general population in Dar es Salaam. A sample size of 747 was adequate to achieve an 80% power to detect a difference (P1-P0) of 10 percentage point with an actual significance level achieved by this test of 0.0495.

Recruitment methods

RDS a method developed for the sampling of populations for which a sampling frame cannot be constructed, was used to recruit participants. RDS builds on a mathematical model which provides a theoretical basis for estimation of population proportions and their variances through statistical adjustment. When certain assumptions are met, RDS will asymptotically approach unbiased estimates of characteristics in the population under study. First-order Markov modelling allows calculation of sample weights and standard errors that adjust for the otherwise biased recruitment pattern¹⁶.

Five seeds representing different sociodemographic groups were identified particularly among members of our initial studies or other studies of MSM in Dar es Salaam^{17,18}. Each seed invited three other members of the same population to form a recruitment chain which was measured in waves. Those who accepted the invitation were in turn enrolled into the study, and also given three recruitment coupons to pass on to their acquaintances. This process was repeated until the desired number of participants was reached. Both the sample size and equilibrium was reached after five waves of recruitment chain.

Participants Interviews

Face-to-face interviews using a structured interview guide were conducted by trained interviewers (not MSM) using a pilot tested survey tool. The interview guide collected information on socio-demographic characteristics, sexual practices, HIV risk perception, and alcohol and substance use. All interviews were conducted in Swahili, the language spoken by practically all Tanzanians. The interviews were collected in careful selected venues within the city in collaboration with MSM community. Blood specimen collection was done after the

interview and each participant was invited to a discussion about HIV/STI and provided with sexual practice-relevant health education. Blood specimen collection for biological testing was collected from all consenting participants regardless of previous history of HIV and STI testing.

Laboratory procedures

HIV serostatus was determined using AllereDetermine™ HIV-1/2 assay (Allere Medical Co., Ltd, Japan). Reactive samples were confirmed on a second rapid assay; Uni-Gold™ HIV-1/2 (Trinity Biotech Plc, Ireland). Discrepancies between the first and second test were resolved by Enzygnost HIV Integral II Antibody/Antigen ELISA (Siemens, Germany). Screening for the presence of Hepatitis B surface antigen (HBsAg) was done using the SD Bioline rapid test (Standard Diagnostics, Inc., Korea) and reactive samples were confirmed on a micro particle enzyme immune-assay (MEIA) (Abbott, Germany). Syphilis screening was performed using the Venereal Disease Research Laboratory assay (VDRL; Omega Diagnostic, UK) and reactive samples were confirmed by Treponemal Particle Hemagglutination Assay (TPHA; Omega Diagnostic, UK). Herpes simplex virus 2 (HSV-2) serostatus was determined using HSV-2 IgG ELISA (Abbott Murex, UK) and reactive specimens were tested further on HSV-2 IgM ELISA to identify active infection.

Data analysis

Data analysis for this study was done using RDSAT software package for analysis of RDS data¹⁹ together with STATA version 14 for Windows. To control for selection probability for each participant, data were weighted according to network size by calculating weights as the inverse of the participants' network size^{16,20}. To reduce clustering and ensure that the whole sample was reflected in the analysis, we multiplied the weight by the sample size and divided it by the sum of the weights. Categorical variables were summarised by calculating proportions and means and standard deviations were used to summarize continuous variables.

To identify independent association between HIV serostatus and various risk factors, logistic regression models were built. Variables with $p < 0.2$ in the bivariate analysis were included in the multivariable logistic regression model. It is important to note that, analysis of risk factors emanate from cross sectional study design which inherently limit conclusion of causality. All analyses were two-tailed and the significance level was set at 5%.

Ethical considerations

The study was ethically reviewed and approved by the Muhimbili University of Health and Allied Sciences ethical committee. All participants provided written informed consent for intervenes and blood sample collection. To maintain confidentiality and to enable effective collection of biological samples, interviews were conducted within the premises of the University referral laboratory. All participants were given appointments to come for collection of their test results from the same interviewers who provided the pre-test counselling. Participants who had a positive STI results were treated and those with a positive HIV test result received post-test counselling were assisted to access health care services from a convenient and friendly health facility of their choice.

RESULTS

A total of 753 MSM with a mean age of 26.5 (Standard deviation \pm 6.6 years) participated in the study. About half (51.8%) were youth (younger than 24 years) while 10% were over thirty-five years. A large majority (83.2%) were single at the time of the interview; and only 6.3% were married. Almost a third (29.5%) of the respondents had children, the majority (72%) of whom had only one child.

Almost all (98.9%) had formal education even though 16.1% were primary or secondary school dropouts. A third (31.3%) of the study participants reported to be living with their

parents or guardians, 34.4% were living alone, and 19.6% were living with other relatives (Table 1).

Practice of HIV related Risk behaviours

Age at first sexual debut varied from 6 to 32 years with a median of 16 years (IQR 14-18 years). About a quarter (195; 26%) of the respondents reported to have had their initial sexual intercourse with a man or a woman) before the age of fifteen years whereas about a third (239; 31.7%) had engaged in sex for the first time after reaching 18 years of age. Almost two thirds (483; 64.1%) had their first sexual experience with a female sexual partner whereas 39% (n=294) said their first sexual intercourse was with another man. A significantly higher proportion of those who had their first sexual intercourse before the age of 15 reported that the first sexual partner was a male compared to those who had their first experience at a later age ($P < 0.001$).

A small proportion of the study participants (118; 15.7%) had taken any precaution against HIV/STI infection during their first sexual intercourse and the lower the age at first sex, the less likely the person was to have used any protective measure against HIV/STI infections. In this population, 62.7% (n=472) of the participants reported to have taken an HIV test before and of these, 92.9% (n=438) attended post-test counselling and got their results. However, participants were not inquired about their test results.

Sexual position has a bearing on the risk of HIV infection among MSM. In our study population, about two-thirds (60.8%) of the participants reported to take the insertive position, 31.8% assumed the receptive position and only 7.4% reported both insertive and receptive positions.

Among the 84% (n=632) who reported ever having sex with a woman, 84.1% had 3 or more lifetime partners, 8.2% had 2 partners and 7.7 had only 1. Among the 79.2% (n=596) of men

who had sex with a woman within the last 3 months, 27.9% had 3 or more female partners, 26.4% had 2 partners, 45.7% had only 1. Overall, 65.8% (n=495) of men reported having sex with both male and female partners in the last 3 months. Among men that had sex with at least one female partner in the last 3 months, 25.0% had sex with three or more male sexual partners, 28.2% had two and 38% reported only one.

Condom use with both male and female partners was not a common practice. Less than half reported that they (for insertive) or their partners (for receptive) used a condom during their last sex with a male partner. Condom use during the last sexual encounter was more common with male sexual partners (340, 45.5%) than with female sexual partners (177, 27.5%).

While 89.1% (n=671) of MSM reported to have ever used lubricants during their last anal sex, *KY jelly* (water-based lubricant) was the most common type used (32%), followed by Vaseline (26%), saliva (10%) and the remaining used other different types of non-water based lubrications.

Involvement in group anal sexual intercourse was reported by 27.5% of the study participants and slightly more than 7% had been involved in such sexual activity in the last three months preceding the study.

Nearly two thirds (66%) used alcohol. Beer was the most common drink used (99.5%) followed by hard drinks (31.1%) and wines (6.6%). Among those who used alcohol, 40.9% did so the last time they had sex and almost a third (32.6%) said they had been drunk the last time they had sex.

Biological estimates

Of the 753 participants interviewed, 646(85.7%) gave blood for HIV, HSV2, HBV and Syphilis testing. Blood specimen was collected from all participants regardless of previous history of HIV testing. While the most common reason for not consenting for blood testing

was fear of results, there was no difference in socio-demographic characteristics between those who consented and those who did not. The prevalence of HIV infection was 22.3% (95% Confidence interval: 18.5-26.2) and the HSV-2 prevalence stood at 40.9% (95% CI: 36.3-45.6). The syphilis prevalence was 1.1% (95%CI: 0.9- 2.0) and the prevalence of HBV was 3.25% (95% CI: 2.5-7.0).

HIV infection and HSV2 were highly prevalent among MSM who assumed the penetrated position during anal sex followed by those who practiced both penetrated and penetrating positions (Figure 1).

HIV prevalence was statistically significant higher among those from aged 25 years and above (349; 26.3%) and among men reporting to have no children (493; 25.9%) (Table 2).

Predictors of HIV infection among MSM in Dar es Salaam

We examined for independent determinants of HIV infection among MSM in Dar es Salaam using multivariable logistic regression modelling. Men aged 25 years and above had a significantly higher odd of HIV infection as compared to those aged below 25 years. Not having children and low perceived risk of HIV infection was associated with increased odds of being HIV seropositive (aOR, 2.4, 95%CI: 1.4-4.2 and aOR, 2.6, 95%CI: 1.2-5.3, respectively).

While men who were assuming both position during anal sex (insertive or receptive) had three times the probability of being HIV seropositive (aOR 3.4, 95%CI: 1.4-9.7), those who practiced receptive anal sex were almost nine times more likely to be HIV seropositive as compared to those practicing insertive (aOR, 8.7; 95%CI 1.2-5.3).

The results also indicated that MSM who were having sexual relationship with women had eight times higher odds of being HIV seropositive (aOR, 8.0, 95%CI: 4.1-15.6) and those

cohabiting with women having almost six times the probability of testing positive for HIV (aOR, 5.5, 95%CI: 1.6-8.4).

In this population of MSM, men who were engaging in group sex (aOR, 3.8, 95%CI: 1.6-8.4) and those infected with HSV-2 (aOR, 4.1, 95%CI: 2.6- 6.5) were about four times more likely to be HIV positive than their counterpart. Moreover, not using water-based lubricants (aOR, 2.6, 95%CI: 1.0-4.5) and having a history of genital ulcers (aOR, 4.1, 95%CI: 1.1-7.2) significantly increased the odds of HIV infection among MSM in Dar es Salaam (Table 2 and 3).

DISCUSSIONS

This was the first survey in Africa that recruited the largest number of men who have sex with men (N=753) in a single city in such a short period of time despite the anticipated socio-cultural and legal barriers.

A typical man who is having sex with another man in Dar es Salaam was a young, not married, completed primary education, who lives alone without a child and having sexual relationship with women. These findings are similar to what has been reported from other studies within and outside Tanzania^{9,13,15,17,21}.

HIV prevalence among men who have sex with men in Dar es Salaam increased by age and was four times and about two and a half higher than that of the general population in Tanzania and the population in Dar es Salaam, respectively²². Although these estimates are relatively low than what was reported in another study conducted four years ago in Dar es Salaam (22.3% versus 30.2%)¹⁴. The differences between these two estimates cannot entirely be explained by a possible decrease in infection rates but potential selection bias and low study power of the previous study (only recruited 200 men of the calculated 310 MSM needed in each city which was also based on a high prevalence estimates from Kenya) could have played a role. Despite the difference, MSM in this city continue to carry the largest burden of HIV infection calling

for concerted efforts to scale up prevention, care and treatment to be able to achieve the intended zero new infection.

Practice of high HIV risk behaviours including group sex was common among MSM in Dar es Salaam and this is supported by other studies elsewhere^{7,9,22}. Nearly half (346/753, 46%) of MSM in this population did not use condom during the last anal sex and of those who reported engaging in group sex (n=178), 42% (75/178) reported to have had unprotected anal sex the last time they participated in group sex. The high rates of unprotected sex were similar to what has been reported earlier in the region and elsewhere^{13,23}. Additionally, use of water-based lubricants was rare in this population with only 32% reporting such use during the last anal sex. This reported estimate is lower than what has been reported elsewhere. Data from other studies in the country elude that, higher cost, lack of knowledge on the importance of use of these lubricants and availability could explain such a low use^{9,11,24}.

MSM in this study reported to have high sexual contact with women (bisexuality behaviours) with 66% of them reporting having a female sexual partner at the time of the study. Contrary to what has been reported in Kenya, having sex with a women or married/cohabiting with one was associated with increased likelihood of testing seropositive for HIV in this study²⁵.

However, these results were similar to our study involving 406 men conducted in Dodoma region, central Tanzania as well as a recent study in Malawi^{24,26}. Due to stigma associated with homosexuality in Tanzania and Africa at large, some MSM would engaging sexually with women to avoid such stigma. Studies have shown that, MSM who opt for such camouflage are more likely to have less-self efficacy and self-esteem for HIV prevention^{12,24}.

Our study also indicates that, a substantial proportion of MSM who engage in sexual relationship with women reports multiple sexual partnership with both male and female^{11,27}.

These risk behaviours could partly explain the high rate of HIV infection in this group of MSM.

The link between MSM and women in the general population has an implication in the spread of the HIV epidemic and hence the development of preventive interventions²⁴. Targeting both populations in HIV programming is therefore crucial in ending the HIV epidemic in the country.

Although a substantial proportion of MSM in this study reported to have tested for HIV infection, about half (353/753; 47%) had moderate to low perceived risk of HIV infection. Perceived risk is an important aspect of behavioural practices and this low perceived risk may have contributed into the observed high risk behaviours and infection rates on this population¹⁷.

Biological risk factors for HIV infection could be playing a major role in the observed high HIV rates in this population. The prevalence of HSV-2 was very high and together with history of genital ulcers during the past 12 months, they were associated with increased odds of HIV infection. These results indicate that preventive intervention and HSV-2 suppressive therapy as well as PrEP should be included in the existing MSM intervention package in Tanzania⁴.

The results of this study should be interpreted in light of a number of limitations. Firstly, sensitive data such as those related to sexual behaviours are prone to desirability bias and this may have underestimated some of the association presented. Secondly, this was a cross sectional study design and limit temporal relationship. However, most of the factors identified have been proved by more robust studies. Lastly, respondent driven sampling may, to some extent affect the external validity of this survey. However, robust analytical methods were employed to address some of the recruitment biases expected.

CONCLUSIONS

Results of this study highlights the fact while HIV infection is at decrease in the general population, the rates are still high among MSM. Low perceived risk of HIV infection, practice of risk behaviours and high prevalence of HSV-2 infection plays a major role in HIV transmission in this population. HIV epidemic among MSM is highly linked to that of the general population. Intensification of ongoing intervention and use of newer biomedical approach such as HSV-2 suppressive therapy and Pre-exposure prophylaxis are highly needed to address this risk group and facilitate government efforts to achieve zero new infection.

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Table 1: Social demographic Characteristics of the Study sample

Variable	Category	n (%)
Age groups	18-24	346 (46.3)
	25-34	308 (41.2)
	35 and above	99 (12.4)
Marital status	Single	623 (83.2)
	Married/cohabiting	74 (5.9)
	Divorced/separated/widowed	52 (6.9)
District o residence	Ilala	190 (25.2)
	Temeke	159 (21.1)
	Kinondoni	389 (51.7)
Education level	No formal education	8 (1.1)
	Primary School dropout	35 (4.7)
	Primary School completed	284 (38.2)
	Secondary School drop out	85 (11.4)
	Secondary School Complete	308 (41.5)
	Post-Secondary Education	23 (3.1)
Occupation	Employed by Govt/Parastatal	17 (2.8)
	Employed by Private Company	91 (15.1)
	Self employed	200 (33.2)
	Student	39 (6.5)
	Petty trader	240 (39.8)
Currently living with	Alone	258 (34.4)
	Parents/Guardians	236 (31.3)
	Relatives	148 (19.6)
	Wife and Children	44 (5.8)
	Other	67 (8.9)

Table 2: Univariable and Multivariable logistic regression of Socio-demographic risk factors for HIV infection among MSM in Dar es Salaam, Tanzania (N=646)

Variable	Category	n	%HIV uninfected	% HIV infected	COR(95%CI) ≠	aOR(95%CI) *	P-value [∞]
Municipality	Kinondoni	157	80.3	19.7	ref	ref	
	Temeke	299	78.0	22.0	1.1 (0.5-5.4)	1.0(0.4-5.8)	0.795
	Ilala	190	71.7	28.3	1.3(0.4-3.7)	1.4(0.3-4.7)	0.683
Age groups	18-24	291	81.8	18.2	ref	ref	
	25-34	264	73.3	26.7	1.7(1.1-3.4)	1.6(1.0-3.2)	0.032
	35 and above	85	74.0	26.0	1.9(1.1-5.3)	1.5(1.0-4.9)	0.044
Marital status	Single	520	76.1	23.9	ref	ref	
	Married/cohabiting	74	86.8	13.2	0.6(0.3-1.2)	0.5(0.3-1.4)	0.765
	Divorced/separated	52	83.3	16.7	0.8(0.2-1.4)	0.8(0.2-1.5)	0.899
Occupation	Student	39	84.8	15.4	ref	ref	
	Petty traders	299	81.6	18.4	0.9(0.5-6.1)	0.8(0.4-6.3)	0.543
	Self-employed/petty trader	200	64.5	35.5	2.2(0.7-5.1)	1.8(0.6-5.5)	0.219
	Employed by govt/parastatal	17	58.8	41.2	2.4(0.9-7.1)	2.0(0.7-7.5)	0.167
	Employed by private	91	57.2	42.8	2.4(0.8-5.2)	2.1(0.8-5.9)	0.142

Education	No formal education	48	77.1	22.9	ref	ref	
	Primarycompleted	264	66.7	33.3	1.2(0.8-2.1)	1.0(0.7-2.4)	0.687
	Secondary	193	75.1	24.9	1.0(0.3-3.3)	0.9(0.3-3.6)	0.539
	Abovesecondary	141	85.1	14.9	0.7(0.2-2.6)	0.7(0.2-2.4)	0.592
Have children	Yes	153	87.6	12.4	ref	ref	
	No	493	74.1	25.9	2.6(1.3-3.9)	2.4(1.4-4.2)	0.001

COR; Crude Odds ratio; aOR; Adjusted odds ratio for all variables in the table; ∞p-value for aOR, HBV; Hepatitis B Virus, HSV-2; Herpes Simplex Virus Type 2.

Table 3: Univariable and Multivariable logistic regression of Behavioral and biological risk factors for HIV infection among MSM in Dar es Salaam, Tanzania (N=646)

Variable	Category	n	%HIV uninfected	% HIV infected	COR(95%CI) ≠	aOR(95%CI) *	P-value∞
Sexualposition	Insertive	393	89.6	10.4	ref	ref	
	Versatile/both	48	79.2	20.8	3.9(1.8-9.6)	3.4(1.4-9.7)	0.001
	Receptive	205	53.7	46.3	8.3(5.0-16.5)	8.7(5.1-14.6)	<0.001
Perceived risk of HIV	High	400	88.9	11.1	ref	ref	
	Moderate	123	76.2	23.8		2.2(0.4-6.9)	0.960
	No/low	123	75.7	24.3	5.1(2.0-9.7)	2.6(1.2-5.3)	0.011
Had sex with women	No	103	91.3	8.7	ref	ref	
	Yes	543	74.8	25.2	9.1(4.2-13.9)	8.0(4.1- 15.6)	<0.001
Married/Cohabiting with a woman§	No	33	91	9.0	ref	ref	
	Yes	41	91.0	39.0	6.0(1.6-15.8)	5.5 (1.5-19.6)	0.001
Had group sex	No	468	80.6	19.4	ref	ref	
	Yes	178	69.7	30.3	3.2(1.2-7.7)	3.8(1.6-8.4)	0.023
Used condom during last group sex	Yes	103	83.5	16.5	ref	ref	
	No	75	76.0	24	1.6(0.9-3.2)	1.5(0.9-2.8)	0.093
Used drugs during last anal intercourse α	No	368	82.6	17.4	ref	ref	
	Yes	278	77.0	23.0	1.3(0.6-3.0)	1.3(0.6-2.5)	0.796
Used alcohol during last anal intercourse	No	233	84.6	15.4	ref	ref	
	Yes	413	74.1	25.9	1.9(0.6-6.0)	2.1(0.8-5.1)	0.121
HBV serostatus	Negative	625	78.6	21.4	ref	ref	

	Positive	21	61.9	38.1	2.4(0.9-13.5)	2.2(0.9-16.2)	0.069
HSV-2 serostatus	Negative	388	87.5	12.5	ref	ref	
	Positive	258	63.0	37.0	4.5 (2.7-7.0)	4.1(2.6- 6.5)	<0.001
Syphilisserostatus	No	639	78.3	21.7	ref	ref	
	Yes	7	93.0	60.0	5.0(0.8-30.4)	5.4(0.8-32.7)	0.067
Used condom during last sex	Yes	407	81.6	18.4	ref	ref	
	No	239	77.4	22.6	3.4(1.5,6.6)	1.5(0.9-2.7)	0.093
Used water based lubricants during last anal sex	Yes	207	87.0	13.0	ref	ref	
	No	439	74.7	25.3	2.4(0.9-4.7)	2.6(1.0-4.5)	0.002
Treated for genital ulcers past 12 months	No	427	93.0	7.0	ref	ref	
	Yes	219	60.3	39.7	4.3(1.2-6.6)	4.1(1.1-7.2)	0.001
Treated for genital discharge past 12 months	No	369	88.1	11.9	ref	ref	
	Yes	277	82.4	17.6	1.5(0.7-10.1)	1.4(0.6-12.5)	0.391

§- Out of those who reported to be married/cohabiting; α -Out of those reporting using drugs, COR; Crude Odds ratio; aOR; Adjusted odds ratio for socio-demographic and all variables in the table; ∞ p-value for aOR, HBV; Hepatitis B Virus, HSV-2; Herpes Simplex Virus Type 2.

