Infectious disease

Risk factors of HIV/AIDS among men who have sex with men in Akwa Ibom State, Nigeria

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Keywords

Risk factors • HIV/AIDS • Sexual and Gender Minorities • Akwa-Ibom State • Nigeria

Summary

Introduction. *Men who have sex with men (MSM) belong to the key population group which contributes to the high burden of human immunodeficiency viruses (HIV)/acquired immunodeficiency syndrome (AIDS) despite the ongoing HIV prevention programs in Nigeria. The current study assessed the risk factors of HIV/AIDS among men who have sex with men in Akwa-Ibom State, Nigeria.*
Methods. *This study was a cross-sectional study of 400 men who have sex with men selected from three senatorial zones in Akwa Ibom. A statistical package for service solution version 23 was used to analyze the data. Descriptive statistics, Relative risk and Binary logistic regression were used to compare proportions between risk factors and HIV/AIDS among the MSM.*
Results. *More than half (50.5%) of the respondents were between the ages of 20-29 years. Above 66% of the respondents made their debut into MSM at the age bracket of 13-19 years. 50% of the respondents preferred unprotected sex with fellow men. About 99% of the respondents have multiple sexual partners. More than 72% of the respondents had engaged in group sex. About 64% of the respondents use tramadol before sex. Greater than half (54%) of the respondents have shared injection needles. Averagely, 97% of the respondent engaged in transactional sex in the past 3 months. 11.8% of the 400 respondents tested positive for HIV. There was a significant association between risk factors and HIV among the MSM studied.*
Conclusions. *MSM in Akwa Ibom State engage in high-risk behaviors, therefore, a risk reduction program targeted at each specific identified risk is highly recommended.*

Introduction

Nigeria has one of the largest HIV epidemics in the world [17]. Despite this, only over 1% of adults are living with HIV. However, the size of Nigeria's population means that close to 2 million people were living with HIV by 2019. Six of Nigeria's states account for 41% of people living with HIV, including Kaduna, Akwa Ibom, Benue, Lagos, Oyo, and Kano. HIV prevalence is higher in southern Nigeria – particularly Akwa Ibom – where an estimated 5.5% of the population is living with HIV [12]. It is lowest in the southeast where only 1.8% are living with HIV [25].
UNAIDS estimates that two-thirds of the new HIV infections in Nigeria this year came from heterosexual people and half of the new HIV cases in sub-Saharan Africa [24]. In Nigeria's mixed epidemic, 3.4% of the population – men who have sex with men, sex workers, and people who inject drugs – are only responsible for 32% of new HIV infections [21].
MSM are people who have sexual contact with males, including heterosexuals. MSM make up less than 1% of Nigeria's population and about 0.07% of the Akwa Ibom population [21]. The term MSM was created in the 1990s by epidemiologists to study the spread of disease among men who have sex with men, regardless of identity [23]. Compared with non-MSM males, studies show that MSM typically have multiple sexual partners and a higher proportion of unprotected sex behaviour suggests that they are also a high-risk group for HIV transmission.
Sex between men occurs in every culture and society. However, the extent and public acknowledgement vary from place to place [25]. This can depend on how tolerant the society or culture is towards homosexuality. For example, in Nigeria Global AIDS Response Progress Reporting (GARPR) 2015 reports from National Agency for Control of AIDS (NACA) state that 'no provision of this law will deny anybody in Nigeria access to HIV treatment and other medical services.
However, the World Health Organization International Classification of Diseases states that according to Nigeria GARPR 2015 report, the Nigerian government had in 2014 increased the punishment for homosexuality to 14 years in jail [23].
Sex between men is significant in the context of HIV because when unprotected, anal sex carries a very high risk [5].
A risk factor is any attribute, characteristic or exposure of an individual that increases their likelihood of developing a disease or injury. The risk of acquiring HIV among men who have sex with men is 22 times higher than in the general population. It's also increased by factors such as injection drug use and sex work. This is because condom use is low among these groups [23].
Available data from previous studies suggest that the

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HIV epidemic among gay, bisexual and other male-to-male sex has intensified and continues to spread globally. Globally, MSM is disproportionately affected by HIV more than those in the general population [4]. In spite of huge investments bringing resources for global HIV programming and expanded antiretroviral treatment programs that have resulted in significant declines for other populations including the general population, female sex workers and injection drug users, HIV among MSM has remained on a sustained increase globally [5].

Justification of the study

The relative increase in HIV incidence among MSM in the era of expanded Antiretroviral Therapy (ART) Program and in which there's been HIV decline among other groups has been termed "resurgent epidemic in MSM and future studies among this group may benefit from this study to estimate the HIV incidence rate among MSM in Akwa Ibom [21].

The quality of knowledge of HIV risk factors among MSM is concerning and how this knowledge translates into practice appears to be substantially lacking in Akwa Ibom State. In this study, more findings about the major drivers of spread of HIV/AIDS among the MSM will be useful in planning for strategic intervention towards the HIV epidemic control in Akwa Ibom State [12].

This study tends to provide an insight on their behavioral pattern that exposes them to HIV infection in Akwa Ibom State, Nigeria.

Materials and methods

Ethical considerations

Ethical approval to undertake the study was obtained from the State ministry of health. The participants were briefed on the objectives of the study, and their written consent was also obtained before proceeding with the research. This is a cross-sectional study carried out on MSM residents in Akwa Ibom State. At the onset of this study, an entry visit was paid to the gatekeepers and heads of the MSM community in Akwa-Ibom State to explain the essence of the study and further seek their buy-in and support to carry out the survey.

Population of the Study: the study included men who have sex with men in Akwa Ibom State, Nigeria. Eligibility criteria for the participants included being biologically male, 18 years and above, identified as having had sex with another man in the preceding year, and currently living in Akwa Ibom State.

Study Area: the study was carried out in Akwa Ibom State. It is in the South-South geopolitical zone, lying between Latitudes 4o 32N and 5o 33North and Longitudes 7o25E and 8o 25 East. The State capital is Uyo, with over 500,000 inhabitants. Akwa Ibom has an airport and two major seaports. The State covers a total land area of 7,081 kilometers square. It is currently the highest oil and gas-producing State in the country. Akwa Ibom has an airport and two major seaports. Akwa-Ibom State consists of thirty-one local government areas and 13 major cities. The main spoken languages are English, Ibibio, Annang, Eket and Oron. The people of Akwa Ibom thrive in fishing, Oil and Gas business, crafts, sales of goods and services, palm oil production and fishing farming.

Sample size calculation

The sample size was determined using the formula for calculating sample size for an unknown population.

$$\text{Sample size (n)} = \frac{Z^2 \times Pq}{d^2}$$

n = sample size

Z^2 = confidence interval (95%) = 1.96

P = proportion of the population having the characteristics (unknown use 0.5)

d = degree of accuracy desired (5%) = 0.05

q = estimate of the true proportion of factor of interest in the population (1-P)

$$n = \frac{1.96^2 \times 0.5 \times (1 - 0.5)}{0.052}$$

$$n = \frac{3.8416 \times 0.25}{0.0025} = \frac{0.9604}{0.0025} = 384.16$$

$$n = 384.16 \sim 400$$

The sample size was rounded up to 400 men to make room for dropouts.

Sampling procedure

To select respondents for this study, a snowball sampling technique was used. The study was done in three senatorial zones of Akwa Ibom State (*i.e.*, Ikot Ekpene, Uyo and Eket Senatorial Zones) with participants across 26 out of 31 LGAs of the State. A total of 400 MSM residents from the 3 senatorial zones were recruited for the study; 150 living in Uyo, 125 living in Ikot Ekpene and 125 living in Eket. For working with the MSM community lead/gatekeepers, HALG – a non-governmental organization whose mission is to prevent HIV/AIDS among key populations including people who have sex with men – nominated three lead gatekeepers per zone. These gatekeepers were trained on how to work with the research assistants and provided financial compensation for their work (N 40,000.00 each per zone). With a snowball sampling approach, first, the initial seed person added one more to whom he had contact and so on. The referral continued until the required sample size was attained. At each identified location where there were MSM groups or "hotspots", they were approached at their convenience times and convenient locations (including restaurants, bars, cafes, lessons centres church football).

Data collection

The respondents were contacted for the study and were sent questionnaires about their medical and HIV testing history, as well as socio-economic status and demographic information. The research assistants administered the validated questionnaires to the participants themselves. These were checked

for accuracy, and any mistakes were noted. The frequency of risky behaviour was collected using self-administered questionnaires with informed consent from all participants. A pre-counselling session was conducted by HIV counsellor tester among the research assistants and HIV test was done on site.

Screening for HIV

Each participant underwent a pre-counseling and HIV test following the national testing algorithm. Those reactive on the 'Determine' testing kits were confirmed using the Unigold kits and the clients who were positive were given post-test counseling. They were then referred to further follow-up and ART initiation by HALG.

Data analysis

The data were analyzed using IBM SPSS Version 20. The distributions of the variables were shown in the frequency table, and the comparison of the frequency proportions was done using chi-square and Fisher exact tests where appropriate. P-values less than 0.05 were considered a statistically significant difference and there was a statistically significant association between the dependent variable and independent variable.
To adjust for multiple covariates, the Logistics regression model was conducted with HIV status as the dependent variable and several covariates that were significant in bivariate analysis were included. The output was expressed in odds ratio (OR) with a 95% confidence interval (95%). The model adjusted for covariates was statistically significant $\chi^2(37) = 129.23$, $p < 0.001$. The model explained 53.6% (Nagel Kerke R2) of variance in HIV positivity in the study population.

Results

Results in Table I showed that more than half (50.5%) were between the ages of 20-29 years and (29.8%) were ≤ 19 years. About (49.5%) of the respondents had tertiary education, (45.3%) completed secondary education and (5.5%) completed primary education. Some (30%) of the respondents were students, (13.3%) were artisans, (6.5%) were farmers, 19.3% were traders and 26.8% were unemployed. However, about (4.3%) of the respondents were in other occupations. The vast majority (81.8%) of the respondents were single, 8.0% were married, 6.3% were separated and 4% were once married and now divorced. The majority (41.8%) of the respondent leave alone, (34.8%) leave with family, (18.8%) leave with a male friend and about (4.5%) leave with a female friend. More than half (52%) of the respondents stay in a public yard, (33.5%) stay in a detached house and about (14.3%) stay in a hostel. About (69%) of the respondents are independent of their monthly income while (29.2%) are dependent. However, (1.8%) of the respondents are not dependent or independent of their monthly income.
Results on Table II showed that majority (94.8%) of the respondents are members of MSM community while few (5.3%) are not members. About (39.8%) of the respondents describe themselves as MSM, (36.5%) bisexual and (23.5%) gay. Vast majority (66.3%) of the respondents were between 15-20 years of age when they had first sex with male partner, some (18.5%) were between 21-25 years, few (9%) were between 9-14 years while very few (5.5%) were between 26-30 years. Some (26.5%) of the respondents joined the MSM community voluntary, (26%) joined due to peer pressure, (20.5%) joined the MSM community because of financial need, few (7.8%) were forced to join, (5.3%) joined because of career pursuit (Tab. II).
About (45.5%) of the respondents are versatile, (29.3%) preferred the role of being on top while (25.3%) preferred the bottom role. Some (44%) prefer men in higher authority as male sex partner, (34.5%) prefer the same age bracket while (21.5%) prefer adolescents. More than half (74.3%) of the respondents had sex with a male partner

Tab. I. Socio-demographic characteristics of the respondents.

Variable	Frequency (F)	Percentage (%)
Age group		
≤ 19 years	119	29.8
20-29 years	202	50.5
30-39 years	59	14.8
≥ 40 years	20	5
Educational status		
Primary	22	5.5
Secondary	181	45.3
University	197	49.3
Occupation		
Student	120	30
Artisan	53	13.3
Farmer	26	6.5
Trading	77	19.3
Unemployed	107	26.8
Other	17	4.3
Marital status		
Single	327	81.8
Married	32	8
Separated/Divorced	25	6.3
Widowed	16	4
Others	-	-
Leaving with		
Alone	167	41.8
With family	139	34.8
With male friend	75	18.8
With female friend	18	4.5
Others	1	0.3
Resident		
Public yard	208	52
Detached	134	33.5
Hostel	57	14.3
Others	1	0.3
Income Status		
Dependent on monthly income	117	29.3
Independent of monthly income	276	69
Others	7	1.8

Tab. II. Sexual orientation among the respondents.

Variable	Frequency (F)	Percentage (%)
Member of MSM community		
Yes	379	94.8
No	21	5.3
Typology		
Gay	94	23.5
Bisexual	146	36.5
MSM	159	39.8
Others	1	0.3
Age you had first sex with male partner		
≤ 12 years	36	9
13-19 years	265	66.3
20-29	74	18.5
≥ 30	25	6.3
Why I joined MSM community		
Forced	31	7.8
Hormonal/involuntary	28	7.0
Voluntary	106	26.5
Peer pressure	104	26.0
Financial need	82	20.5
Career pursuit	21	5.3
Respect of authority	28	7.0

Tab. III. Sexual lifestyle among the respondents.

Variable	Frequency (F)	Percentage (%)
Preferred role during sex		
Top	117	29.3
Bottom	101	25.3
Versatile	182	45.5
Others	-	-
Preferred choice of male partner		
Men in higher authority	138	34.5
Same age bracket	176	44
Adolescents	86	21.5
Others	-	-
Sex with male partner within last 3 month		
Yes	297	74.3
No	100	25
Others	3	0.8
Sex you preferred not to use condom with		
Same sex	200	50
Opposite sex	58	14.5
Both sexes	135	33.8
Others	7	1.8

within the last 3 months, (25%) indicated 'no' as not having sex with a male partner within the last 3 months. Some (33.8%) prefer not to use condom with both sexes, (50%) with same sex and (14.5%) with opposite sex. However, few (1.8%) uses condom (Tab. III).

In the last 3 months, slightly less than half (47.5%) of the respondents sometimes do not use condom during sex, (30.5%) almost every time do not use condom while (21.8%) do not use condom every time they have sex. About (42.5%) of the respondents sometimes had multiple sex partner, (35.3%) almost every time while (21.5%) every time. However, (0.8%) had no multiple sex partner. Slightly less than half (45.8%) sometimes had group sex, (14.8%) almost every time had group sex while (12.8%) had group sex every time. However, about (26.8%) of the respondent did not have group sex. Some (36.8%) of the respondents sometimes use psychoactive drugs, (15%) every time, (12%) almost every time while (36.3%) did not use psychoactive drugs.

Slightly more than half (54.3%) did not share injection syringes/needle, about (30.5%) sometimes share injection syringes/needle, (6%) share injection syringes/needle almost every time while (9.3%) share injection syringes/needle every time.

Slightly less than half (48.3%) of the respondents sometimes do not use lubrication during sex, (26.8%) almost every time do not use lubrication, (14.8%) do not use lubrication every time during sex while few (10.3%) uses lubrication during sex. Majority (62.5%) sometimes

Tab. IV. Behavioral lifestyle of the respondents.

Variable	Frequency (F)	Percentage (%)
Non-use of condom during sex		
Every time	87	21.8
Almost every time	122	30.5
Sometimes	190	47.5
Others	1	0.3
Multiple sex partner		
Every time	86	21.5
Almost every time	141	35.3
Sometimes	170	42.5
Others	3	0.8
Group sex		
Every time	51	12.8
Almost every time	59	14.8
Sometimes	183	45.8
Others	107	26.8
Use of psychoactive drugs		
Every time	60	15
Almost every time	48	12
Sometimes	147	36.8
Others	145	36.3
Sharing of injection syringes/needle		
Every time	37	9.3
Almost every time	24	6.0
Sometimes	122	30.5
Others	217	54.3
Non-use of lubrication during sex		
Every time	59	14.8
Almost every time	107	26.8
Sometimes	193	48.3
Others	41	10.3
Transactional sex		
Every time	65	16.3
Almost every time	74	18.5
Sometimes	250	62.5
Others	11	2.8

had transactional sex, (18.5%) almost every time, (16.3%) every time while (2.8%) of the respondents did not have any transactional sex. MSM who sell sex may also be those who are in lower socioeconomic status or use drugs, putting them at higher risk of HIV infection (Tab. IV).
About (30.5%) of the respondents indicated that unprotected sex with both sexes exposes one more to getting infected with HIV, (28.8%) indicated unprotected sex with opposite sex, (24.8%) indicated unprotected sex with same sex while (16%) indicated that none of the above can expose one more to getting infected with HIV. Majority (72.3%) of the respondents do not know their casual male sex partner HIV status, (27%) indicated negative while few (0.8%) indicated positive. About (62.3%) HIV status of the main male sex partner were unknown, (30%) were negative while (7.8%) of the main male sex partner are positive. Majority (75.5%) of the respondents' female sex partner HIV status was unknown, about (23.5%) were HIV negative while (1%) were HIV positive. The average number of the self-reported sex partners was 7.3% in the past 6 months, with more than one-third of them (36.9%) reporting having more than 11 male partners in those six months. These sex partners were either regular partners (76.1%, n = 305), casual partners (18.0%), or paying partners (5.9%). About 38.2% of the participants reported that they were not aware of their sex partners' HIV status.

Tab. V. Perception of HIV risk factors and willingness to use HIV preventive measures.

Variable	Frequency (F)	Percentage (%)
Which exposes one more to HIV infection		
Unprotected sex with same sex	99	24.8
Unprotected sex with opposite sex	115	28.8
None of the above	64	16
Unprotected sex with both sexes	122	30.5
HIV status of casual male partner		
Positive	3	0.8
Negative	108	27
Unknown	289	72.3
HIV status of main male partner		
Positive	31	7.8
Negative	120	30
Unknown	249	62.3
HIV status of female partner		
Positive	4	1.0
Negative	94	23.5
Unknown	302	75.5
Use of pre-exposure prophylaxis		
Yes	137	34.3
No	124	31
Not aware	139	34.8
Awareness of HIV preventives services		
Very much aware	315	78.8
Not aware	51	12.8
Never aware	34	8.5

Tab. VI. Prevalence of HIV infection among the respondents.

Variable	Frequency (F)	Percentage (%)
Positive	47	11.8
Negative	353	88.3
Total	400	100

About (34.8%) indicated not aware of using Pre-exposure prophylaxis in the past three months, (34.3%) used pre-exposure prophylaxis while (31%) indicated no. Majority (78.8%) of the respondents were very much aware of HIV preventive services for the members of MSM community, (12.8%) were not aware while about (8.5%) were never aware (Tab. V).
The result in Table VI below revealed that vast majority (88.3%) of the respondents were HIV negative while few (11.8%) were HIV positive.
Table VII shows the relationship between the variables and HIV/AIDS among the respondents. About 13.0% of the respondent within 20-29 years age group tested positive for HIV, while 12.1% of those within 30-39years age group tested positive for HIV and only 6.7% of the respondents ≥ 40 years, tested positive for HIV. The risk analysis showed non-statistical significance association of the Age group with HIV positive status with p-value of 0.41.
About 17.7% of the respondents who attended at most secondary school, tested positive for HIV, while 9.1% of those respondents with primary school education, tested positive for HIV and about 6.6% of those with university education, tested positive for HIV. The risk analysis showed statistical significance association between educational status and HIV status, with a p-value of 0.003 [Odd ratio = 2.49 (95% CI = 0.32-19.75)]. About 36.3% of those respondents who are unemployed, tested positive for HIV, 11.7% of the respondents that are traders, tested positive for HIV, 9.4 of the respondents that are artisans, tested positive to HIV, 7.5% of the respondents who are students, tested positive while 3.8% of those respondents that are farmers tested positive for HIV. The risk analysis showed non-statistical significance with p-value of 0.1. A total of 13.1% of the respondents who were single, tested positive for HIV, while about 12.5% of the married respondents, tested positive for HIV. The risk analysis shows that there is a statistical significance association between marital status and HIV positive outcome, with a p-value of 0.01 [Odd ratio = 2.64 (95% CI = 0.49-14.2)]. The respondents who said they were living with their family had about 18.7% of them who were tested positive for HIV, while about 9.6% of those respondents living alone, tested positive and the respondents who were living with their male friend had about 5.3% of them tested positive for HIV. About 15.4% of the respondents who are residing in a public yard, tested positive for HIV, while 8.2% of those respondents who are resident in a detached house, tested HIV positive and 5.3% of the respondents residing in a hostel, tested positive for HIV. The risk analysis showed a statistical significance with p-value

Tab. VII. Relationship between sociodemographic variables and HIV /AIDS.

		HIV Status			
Variable	Category	Positive (%)	Negative (%)	χ^2	p-value
Age group	≤ 19	0 (0)	17 (100)	2.79	0.41
	20-29	33 (13.0)	221 (87.1)		
	30-39	12 (12.1)	87 (87.9)		
	≥ 40	2 (6.7)	28 (93.3)		
Educational status	Primary	2 (9.1)	20 (90.0)	11.47	0.003
	Secondary	32 (17.7)	149 (82.3)		
	University	13 (6.6)	184 (93.4)		
Occupation	Student	9 (7.5)	111 (92.5)	8.91	0.1
	Artisan	5 (9.4)	48 (90.6)		
	Farmer	1 (3.8)	25 (96.2)		
	Trading	9 (11.7)	68 (88.3)		
	Unemployed	20 (18.7)	87 (81.3)		
	Other	3 (17.6)	14 (82.4)		
Marital status	Single	43 (13.1)	284 (86.9)	5.92	0.01
	Married	4 (12.5)	28 (87.5)		
	Separated	0 (0)	25 (100)		
	Divorced	0 (0)	16 (100)		
Living with	Alone	16 (9.6)	151 (90.4)	10.6	0.03
	With family	26 (18.7)	113 (81.3)		
	With male friend	4 (5.3)	71 (94.4)		
	With female friend	1 (5.6)	17 (94.4)		
	Others	0 (0)	1 (100)		
Resident	Public yard	32 (15.4)	176 (84.6)	11.03	0.009
	Detached	11 (8.2)	123 (91.8)		
	Hostel	3 (5.3)	54 (94.7)		
	Others	1 (100)	0 (0)		
Monthly income	Dependent	15 (12.8)	102 (87.2)	2.57	0.25
	Independent	30 (10.9)	246 (89.1)		
	Others	2 (28.6)	5 (71.4)		

of 0.009 [Odd ratio = 0.93 (95% CI = 0.32-2.78)]. About 28.6% of the respondents who chose not to disclose their monthly income status, tested positive for HIV, 12.8% of the respondents who said they are dependent on monthly income source, tested positive for HIV, while 10.9% of those who said they are independent on monthly income source, tested positive for HIV. The risk analysis showed a non-statistical significance relation of the income dependability with HIV with a p-value of 0.25 (Tab. VII). Table VIII showed the relationship between the sexual orientation of the respondents and their HIV status. About 12.1% of those respondents who belonged to the MSM community social group, tested HIV positive, while 4.8% of those respondents who did not belong to any MSM community social group, tested positive for HIV. The risk analysis showed no statistical significance with a p-value of 0.5. The respondents who self-identified as gay, had about 18.1% of them tested positive for HIV, while 16.4% of the respondents who identified as bisexual, tested positive for HIV and only 3.8% of those respondents who chose to be identified as MSM, tested positive for HIV. The risk analysis showed a statistically significant association between bisexual and HIV positivity with a p-value of < 0.001 [Odd ratio = 1.51 (95% CI = 0.56-4.05)]. About 12.8% of those respondents who made their debut into MSM at the age bracket of 20-29 years, tested positive for HIV, while 11.7% of the respondents who had their first sex with men at the age range of 13-19 years, tested positive for HIV. The risk analysis showed no statistically significant association between age of debut into MSM and HIV positivity as seen with a p-value of 0.8. About 23.8% of the respondents who joined MSM in search of career pursuit, tested positive for HIV, 15.1% of those that voluntarily joined MSM, tested positive, 13.4% of those respondent who joined MSM due to financial need, tested positive, about 9.6% of those who joined MSM due to peer pressure, tested positive, while 6.5% of those who were forced into MSM, tested positive and only about 3.6% of those joined MSM due to respect for higher authority, tested positive for HIV. The risk analysis showed a non-significant relationship between mode of debut into MSM and HIV positive outcome, with a p-value of 0.29 (Tab. VIII).

Table IX shows relationship between sexual lifestyle of the respondents and HIV status.

About 15.8% of those respondents who chose to play the role of bottom during sexual intercourse with fellow

Tab. VIII. Relationship between Sexual Orientation of the Respondents and HIV Status.

		HIV Status			
Variable	Category	Positive	Negative	X^2	p-value
MSM community member	Yes	46 (12.1)	333 (87.9)	0.45	0.5
	No	1 (4.8)	20 (95.2)		
Typology	Gay	17 (18.1)	77 (81.9)	19.14	< 0.001
	Bisexual	24 (16.4)	122 (83.6)		
	MSM	6 (3.8)	153 (96.2)		
	Others	0 (0)	1 (100		
Age at First sex	≤ 12	0 (0)	10 (100)	0.92	0.8
	13-19	27 (11.7)	203 (88.3)		
	20-29	20 (12.8)	136 (87.2)		
	≥ 30	0 (0)	4 (100)		
Why MSM	Forced	2 (6.5)	29 (93.5)	0.72	0.29
	Hormonal/involuntary	2 (7.1)	26 (92.9)		
	Voluntary	16 (15.1)	90 (84.9)		
	Peer pressure	10 (9.6)	94 (90.4)		
	Financial need	11 (13.4)	71 (86.6)		
	Career pursuit	5 (23.8)	16 (76.2)		
	Respect of authority	1 (3.6)	27 (96.4)		

Tab. IX. Relationship between sexual lifestyle of the respondents and HIV status.

		HIV Status			
Variable	Category	Positive	Negative	X^2	p-value
Role in Sex	Top	11 (9.4)	106 (90.6)	2.28	0.31
	Bottom	16 (15.8)	85 (84.2)		
	Versatile	20 (11.0)	162 (89.0)		
	Others				
Choice of male partner	Men in authority	10 (7.2)	128 (92.8)	4.48	0.11
	Same age bracket	26 (14.8)	150 (85.2)		
	Adolescents	11 (12.8)	75 (87.2)		
MSM sex in last 3 month	Yes	30 (10.1)	267 (89.9)	4.46	0.11
	No	16 (16.0)	84 (84.0)		
	Others	1 (33.3)	2 (66.7)		
Use Condom Preferred sex	Same sex	12 (6.0)	188 (94.0)	17.2	< 0.001
	Opposite sex	6 (10.3)	52 (89.7)		
	Both sexes	27 (20.0)	108 (80.0)		
	Others	2 (28.6)	5 (71.4)		

men, tested positive for HIV, while 11.0% of those respondents who are versatile, tested positive and 9.4% of those respondents that ply the Top role during sex with men, tested positive for HIV. The risk analysis showed a non-significant relationship between the role and HIV positive outcome with a p-value of 0.31. More than 14% of those respondents who preferred having sex with men of same age bracket, tested positive for HIV, while 12.8% of the respondents that preferred sex with adolescent men, tested HIV positive and 7.2% of those MSM who chose to have sex with men in higher authority, tested positive to HIV. The risk analysis showed a non-significance relationship between the choice of male sex partner and HIV positive outcome with a p-value of 0.11. The respondents who were neutral about their sexual activeness in the past 3 months, had about 33.3% of them tested positive for HIV, while 16% of those who said they never had sex within the last 3 months, tested HIV positive and about 10.1% of those respondents who had sex with men within the last 3 months, tested positive for HIV. The risk analysis showed a non-significant relationship between sexual activeness and HIV positive outcome with a p-value of 0.11. About 28.6% of the respondents who do not use condom during sex, tested positive for HIV, 20% of the respondents who use condom while having sex with both male and female, tested positive to HIV, while 10.3% of the respondent who uses condom during sex with opposite partners only, tested positive for HIV and 6.0% of those that use condom only with same sex, tested positive for HIV. The risk analysis showed a statistically significant association between unprotected sex and HIV positivity, with a p-value of < 0.001 [Odd ratio = 4.13 (95% CI = 0.38-44.52)] (Tab. IX).

Table X shows relationship between risk behaviors of the respondents and HIV status.

About 14.9% of the respondents who do not use condom every time they have sex, tested positive, 14.2% of those who sometimes do not use condom during sex, tested positive for HIV, while 5.7% of the respondents who almost every time do not use condom, tested positive for HIV. The risk analysis showed a non-significance relationship between the rate of non-condom use during sex and HIV positive outcome with a p-value of 0.06. About 23.3% of the respondents who engage every time with multiple sex partners, tested positive for HIV, while about 10.0% of the respondents who sometimes engage with multiple sex partners, tested HIV positive. The risk analysis showed a statistical significance association between multiple sex partner engagement and HIV positive outcome with a p-value of 0.004 [Odd ratio = 0.30 (95% CI = 0.09-1.03)]. More than 25% of the respondents who engage in a group sex with men every time, tested positive for HIV, about 14.8% of the respondents who sometimes engage in a group sex with fellow men, tested positive for HIV, while 6.8% of those that almost every time engage in group sex, tested HIV positive. The risk analysis showed a statistically significant relationship between group sex engagement and HIV positive outcome with a p-value of < 0.001 [Odd ratio = 0.47 (95% CI = 0.14-1.59)]. About 25% of the respondents who use psychoactive substances every time they want to have sex, tested positive for HIV, while about 17.7% of the respondents who sometimes use psychoactive substances during sex, tested HIV positive, above 10% of the respondents who almost every time use psychoactive substances during sex, tested HIV positive and less than 1% of the respondents who do not consume psychoactive substances, tested positive for HIV. The risk analysis showed a statistical significance relationship between intake of psychoactive substances by the respondents and HIV positive outcome with a p-value of < 0.001 [Odd ratio = 0.37 (95% CI = 0.08-1.87)]. Greater than 13% of the respondents who sometimes share injection syringes/needles, tested positive to HIV, while about 11.5% of the respondents who do not share syringes/needles, tested positive for HIV, and greater than 8% of the respondents who share needles almost every time, tested positive for HIV. The risk analysis showed a non-significance relationship between the sharing of syringes/needles among the respondents and HIV positive outcome with a p-value of 0.82. About 15.3% of the respondents who do not use lubricant every time during sex, tested HIV positive, while about 14.6% of those who use lubricant during sex, tested HIV positive and 14.5% of those who sometimes do not use lubricant during sex, tested HIV positive. The risk analysis showed a statistical

Tab. X. Relationship between risk behaviors of the respondents and HIV status.

		HIV Status			
Variable	Category	Positive	Negative	X^2	p-value
Non-use of Condom	Every time	13 (14.9)	74 (85.1)	7.4	0.06
	Almost every time	7 (5.7)	115 (94.3)		
	Sometimes	27 (14.2)	163 (85.3)		
	Others	0 (0)	1 (100)		
Multiple sex partner	Every time	20 (23.3)	66 (76.6)	12.83	0.004
	Almost every time	10 (7.1)	131 (92.9)		
	Sometimes	17 (10.0)	153 (90.0)		
	Others	0 (0)	3 (100)		
Group sex	Every time	13 (25.5)	38 (74.5)	20.96	< 0.001
	Almost every time	4 (6.8)	55 (93.2)		
	Sometimes	27 (14.8)	156 (85.2)		
	Others	3 (2.8)	104 (97.2)		
Use of Psychoactive drugs	Every time	15 (25.0)	45 (75.0)	39.16	< 0.001
	Almost every time	5 (10.4)	43 (89.6)		
	Sometimes	26 (17.7)	121 (82.3)		
	Others	1 (0.7)	144 (99.3)		
Sharing of syringes/needle	Every time	3 (8.1)	34 (91.9)	1.01	0.82
	Almost every time	2 (8.3)	22 (91.7)		
	Sometimes	17 (13.9)	105 (86.1)		
	Others	25 (11.5)	192 (88.5)		
Non-use of lubricant	Every time	9 (15.3)	50 (84.7)	10.6	0.01
	Almost every time	4 (3.7)	103 (96.3)		
	Sometimes	28 (14.5)	165 (85.5)		
	Others	6 (14.6)	35 (85.4)		
Transactional sex	Every time	13 (20.0)	52 (80.0)	19.7	< 0.001
	Almost every time	7 (9.5)	67 (90.5)		
	Sometimes	21 (8.4)	229 (91.6)		
	Others	6 (54.5)	5 (45.5)		

significance relationship between non-use of lubricant during sex and HIV positivity outcome with a p-value of < 0.01 [Odd ratio = 1.43 (95% CI = 0.44-6.23)]. About 54% of the respondents who do not transact sex, tested HIV positive, while 20% of the respondents who transact sex every time, tested positive for HIV, above 9% of the respondents who transact sex almost every time, tested HIV positive and about 8.4% of those that transact sex sometimes, tested HIV positive. The risk analysis showed a statistical significance relationship transactional sex and HIV positive outcome with a p-value of < 0.001 [Odd ratio = 2.96 (95% CI = 0.41-21.4)] (Tab. X).

Table XI shows relationship between perception of HIV risk factor and HIV status.

Greater than 17% of those who believed that unprotected sex with both male & female partners poses a higher risk, tested HIV positive, while 12% of the respondents who do not believe that unprotected sex with neither male nor female sexual partner exposes them more to contracting HIV, tested positive for HIV, while about 10.1% of those who believed it is only unprotected sex with male partner posed a higher risk of HIV contraction, tested positive for HIV, and about 7.0% of those who believed only unprotected sex with female partner that poses a high risk exposure, tested HIV positive. The risk analysis showed a non-significant relationship between this variable and HIV positive outcome with a p-value of 0.1. About 33.3% of the respondents whose casual male partner were HIV Positive, tested positive for HIV; Above 13% of those respondents who did not know the HIV status of their casual male partners, tested positive for HIV, and about 6.5% of those respondents whose male casual partner was HIV negative, tested positive for HIV. The risk analysis showed a non-significance relationship between this variable and HIV positive outcome with a p-value of 0.07. More than 35.5% of the respondents who has HIV positive main male partners, tested positive for HIV, while 10.8% of those who do not know the HIV status of their main male partner, tested HIV positive and 7.5% of those whose HIV status of their main male partner is Negative, tested positive for HIV. The risk analysis showed a statistical significance relationship between awareness of the main male partners' HIV status and HIV positive outcome with a p-value of < 0.001 [Odd ratio = 0.14 (95% CI = 0.04-0.52)]. Exactly 25.0% of the respondents who are aware of their female partners, HIV positive status, tested HIV positive, while 11.9% of those who are not aware of their female partners' HIV status, tested HIV positive and about 10.6 of the respondents who are aware of their female partner's HIV negative status, tested HIV positive. The risk analysis showed a non-significance relationship between this variable and HIV positive outcome with a p-value of 0.47.

More than 23% of the respondents who do not use Pre-Exposure Prophylaxis (PrEP), tested HIV positive, while about 6.6% of those who take PrEP, tested HIV positive and slightly less than 6.6% of those who are not aware of PrEP, tested positive for HIV. The risk analysis showed a statistical significance relationship between awareness/uptake of PrEP and HIV positive outcome with a p-value of < 0.001 [Odd ratio = 5.10 (95% CI = 0.04-0.52)]. Close to 13.8% of those who were not much aware of HIV preventive services going on in the State, tested positive, while about 12.4% of those who are aware of the ongoing HIV preventive services in the State, tested positive and less than 3% of those were never aware of any ongoing HIV preventive program in the State, tested positive. The risk analysis showed a non-significant relationship between this variable and HIV positive outcome with a p-value of 0.47 (Tab. XI).

Tab. XI. Relationship between perception of HIV risk factor and HIV status.

		HIV Status			
Variable	Category	Positive	Negative	X^2	p-value
What causes more Exposure	Unprotected same sex	10 (10.1)	89 (89.9)	6.2	0.1
	Unprotected opposite sex	8 (7.0)	107 (93.0)		
	None of the above	8 (12.5)	56 (87.5)		
	Unprotected sex with both	21 (17.2)	101 (82.8)		
Casual male partner HIV status	Positive	1 (33.3)	2 (66.7)	5.72	0.07
	Negative	7 (6.5)	101 (93.5)		
	Unknown	39 (13.5)	250 (86.5)		
Main male partner HIV status	Positive	11 (35.5)	20 (64.5)	14.7	< 0.001
	Negative	9 (7.5)	111 (92.5)		
	Unknown	27 (10.8)	222 (89.2)		
Female partner HIV status	Positive	1 (25.0)	3 (75.0)	1.37	0.47
	Negative	10 (10.6)	84 (89.4)		
	Unknown	36 (11.9)	265 (88.1)		
Use of PEP	Yes	9 (6.6)	128 (93.4)	21.09	< 0.001
	No	29 (23.4)	95 (76.6)		
	Not aware	9 (6.5)	130 (93.5)		
Preventive services awareness	Very much aware	39 (12.4)	276 (87.6)	2.89	0.22
	Not aware	7 (13.7)	44 (86.3)		
	Never aware	1 (2.9)	33 (97.1)		

Tab. XII. Multivariate analysis.

Variable	Categories	Odd Ratio (95% CI)
Education	Primary‡	1
	Secondary	2.49 (0.32-19.75)
	Tertiary	0.81 (0.10-6.39)
Marital Status	Single‡	1
	Married	2.64 (0.49-14.2)
	Separate	0
	Divorced	0
Living	Alone‡	1
	With family	1.97 (0.7-5.52)
	With male friend	1.14 (0.2-4.97)
	With female friend	1.31 (0.11 -1.31)
	Other	0
	Public yard‡	1
Resident	Detached	0.93 (0.32-2.78)
	Hostel	0.34 (0.10-1.76)
	Others	
Typology	Gay‡	1
	Bisexual	1.51 (0.56-4.05)
	MSM	0.48 (1.20-1.92)
	Others	
Use of condom	Same sex‡	1
	Opposite sex	0.91 (0.21-32.95)
	Both sexes	1.84 (0.637-5.32)
	Others	4.13 (0.38-44.52)
Multiple Sex	Every time‡	1
	Almost every time	0.19 (0.05-0.69)*
	Sometimes	0.30 (0.09-1.03)
	Others	
Group Sex	Every time‡	1
	Almost every time	0.04 (0.006-0.30)*
	Sometimes	0.47 (0.14-1.59)
	Others	0.45 (0.05 -3.58)
Use of Psychoactive substances	Every time‡	1
	Almost every time	0.37 (0.08-1.87)
	Sometimes	0.35 (0.11-1.07
	Others	0.014 (0.001-0.17)*
Non-use of Lubricant	Every time‡	1
	Almost every time	0.54 (0.12-2.58)
	Sometimes	1.48 (0.43-5.12)
	Others	1.02 (0.17-6.15)*
Transact Sex	Every time‡	1
	Almost every time	0.98 (0.2-4.47)
	Sometimes	1.43 (0.44-6.23)
	Others	2.96 (0.41-21.4)
HIV Status of Main male partner	Positive‡	1
	Negative	0.13 (0.03-0.57)*
	Unknown	0.14 (0.04-052)*
Use of PrEP	Yes‡	1
	No	5.10 (1.59-16.4)*
	Not aware	2.70 (0.68-10.67)

‡ Reference variable. * Independent covariate statistically significantly associated ($p < 0.05$) with HIV positivity. p-value < 0.05 = Significant.

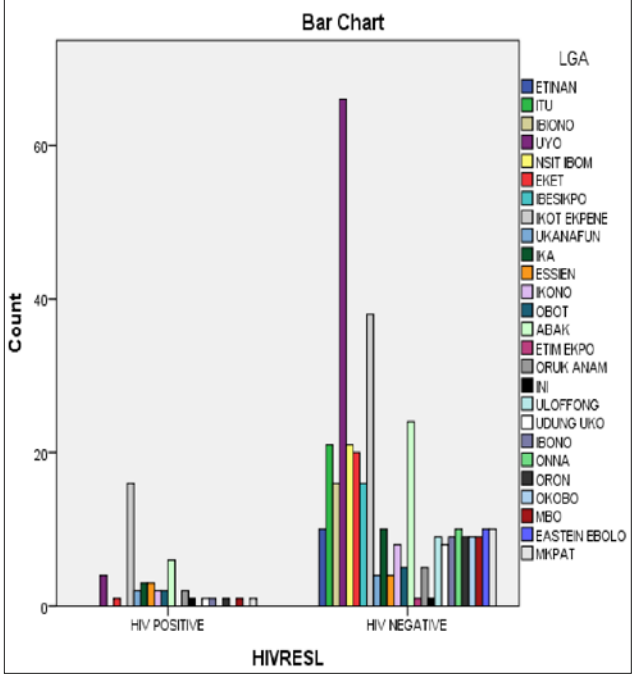
Table XII shows the multivariate analysis. To adjust for multiple covariates, Logistics regression model was performed with HIV status as dependent variable and several covariates that were significant in bivariate analysis were entered. The output was expressed in odd ratio (OR) with 95% confidence interval (95% CI). The logistic regression model was statistically significant, $\chi^2(37) = 129.23$, $p < 0.001$. The model explained 53.6% (Nagel kerke R2) of the variance in HIV positivity in the study population. With other variables held constant education, marital status, typology, unprotected sex with both male/female partner (non-use of condom), multiple sex partner (almost every time), group sex (almost every time), Psychoactive drug (Others), Lubricant sex (others), HIV status of main male partner, Use of PrEP (No) were significantly associated ($p < 0.05$) with HIV positivity. The respondents who had at most secondary and tertiary education are 2.49 times more and 0.81 less likely to be HIV positive than those with only primary school education; with other variable held constant. The respondents who self-identified as bisexual are 1.51 more likely to be HIV positive when compared to those who strictly identified as Gay; with other variable held constant. The odd of being HIV positive is 4.13 times higher in those who engage in unprotected sex than those who use condom during sex; with other variable held constant.

The respondent who had multiple sex partners (almost every time) had 0.19 times lesser odd of HIV positivity to those who had multiple sex partners every time with other variable held constant. With all other variables held constant, the respondents who engage in group sex almost every time is 0.45 times lesser than those who engage in group sex every time. The respondents who do not use psychoactive substances during sex is 0.014 times less likely to become HIV positive when compared to those with regular (every time) intake of psychoactive substances; with other variable held constant. The respondents who do not use lubricant during sex (every time, stands 1.02 times chances higher of being HIV positive than those who use lubricant during sex; with other variable held constant. The respondents who do not engage and those who sometimes engage in transactional sex are 2.96 times and 1.43 times more likely to be HIV positive than those who transact sex every time; with other variable held constant. The respondent whose main male partner's HIV status is negative, is 0.13 times less likely to be HIV positive than those with HIV positive main male partner; with other variable held constant. The respondents who did not take PrEP (NO) and (unaware) are 5.10 and 2.70 times more likely to be HIV positive than those who used PrEP (yes); with other variable held constant (Tab. XII).

Distribution of HIV incidence among MSM across 26 LGAs covered in Akwa Ibom Ikot Ekpene LGA had 16 (34% positivity rate) while, Abak LGA had 6 (13% positivity rate) then followed by Uyo with 4 positives (9% positivity rate). The above results correspond with the NAIIS and AKAIS survey report with Ikot Ekpene LGA having saturation in terms of meeting the 1st 95 of the UNAIDS 95-95-95 target, while Uyo has a good number of unmet targets in HIV status identification among the general population.

Figure 1 shows the distribution of HIV positivity among the MSM in the 26 LGAs covered.

Fig. 1. Bar chart showing the distribution of HIV positivity among the MSM in the 26 LGAs covered.



Discussion

This study on the risk factors of HIV among men who have sex with men in Akwa Ibom marked the first among other studies on key populations in the State in focusing specifically on identifying the extent of engagement of the MSM in the established risk behaviors that exposes them more to HIV infection. The findings of this study reveal the statistical rate of participation in high HIV risk behavior among the MSM in Akwa Ibom beyond the usual estimated figures from the related research on the key populations.

The quality field data from the findings, has further given clue on the major drivers of HIV epidemic in the State and identified other risk factors on which actions can be taken to change the HIV epidemic rising among the MSM populations.

In this study, more than 50% of the total respondent are within the age group of 20-29 years and about 49.5% of the study group has attended up to university level while 45% stopped at Secondary school in terms of educational status. Almost 95% of the study group responded to have belonged to the MSM community social group, which they claim gives them the coverage, protection and easy access to other MSM in their cohort/cluster. Enquiry on the 5% of the study population not belonging to the MSM community social group revealed that most of them were self-identified as bi-sexual and are even scared of being stigmatized when noticed they are mingling with other fully known persons in the gay community. They rather prefer to communicate and reach out to their partners privately.

Further dip into the occupational status of the study population revealed that about 30% were students, 26.8% were unemployed while the remaining population were either artisan (13.3%), trader (19.3%) or farmers (6.5%). Sociodemographic/behavioral characteristics of the study population showed that about 81.8% were single, only 8% married while 10.3% were separated/divorced. This is in contrast with Chen et al. which proposed that to conceal their sexual orientation from friends/families, MSM often feel pressured to marry women [7]. However, high percent of the single MSM in the study population may be related to the greater percentage of them being student and unemployed.

More than half (52%) of the respondents were resident in a public yard to avoid people suspecting their sexual lifestyle while about 34% preferred detached apartment to enable their confidentiality. About 14% of the student MSM were resident in a hostel while the rest prefer to co-habit with their sexual partner in a detached apartment.

Only about 29% of the respondents were reported to be financial dependent and 69% of the participants responded that they were financially independent while the rest chose to be neutral about their monthly income status.

In line with Baral et al. who reported that male-male sex is often initiated during adolescent years and is very common in the repertoire of adolescent sexual experimentation, thus making them more vulnerable to risky sexual behaviours and perpetrators are seen as key vectors for HIV transmission, about 66% of this study respondents said they made their sexual debut into MSM at the age of 13 -19 years, while 19% responded to have had their first sex with fellow men by age of 20-29 years [3]. This agrees with Outlaw et al. which reported the average age of sexual debut into MSM for youth in the United States as 14.4 years, with approximately 7% reporting their sexual debut prior to age 13 [20]. This further agreed with our study where only about 9% reported to have made their debut at age bracket of 9 -13 years.

Enquiry into the possible mode of debut into MSM revealed that most of the respondents joined MSM voluntarily (27%), 26% joined via peer pressure, 21% joined as result of financial need, 8% reported to have been forced into MSM while about 7% reported to have joined because they biologically were wired as a female while the rest 7% joined because of respect to the higher authority within their environment. Our study revealed that greater percent of our respondents preferred to be classified/typed as versatile (46%), top (29%) and bottom (25%) regarding their preferred role during sex with fellow men while majority also preferred to have sex with men of same age bracket (44%), while 35% preferred sex with men in higher authority and only about 22% of them preferred sex with adolescents. This finding tends to disagree with Twahirwa et al. which found out that there were no differences found in age preferences for specific sex roles, except for somewhat lower minimum age preferred by tops [22]. With regards to relationship type preferences, versatile sought somewhat more sexual encounters. These findings imply

that men who have sex with men, may have a wider spectrum of traits preferred in a partner, like age, but not necessarily so for other traits. Additional studies could explore these preferences with regards to different sex roles among male homosexuals. The study revealed that sexual activeness and preferences for condomless sex among the study population ranges in the following order. About 75% of the respondents said to have had sex with male partners within the last 3 months while only 25% of them answered 'no' to sexual intercourse within the past 3 months. In same vein, 50% said they preferred unprotected sex with fellow men, 34% preferred condomless sex with both male and female partner, 14% preferred to have unprotected sex only with opposite partner while 2% of the respondents do not engage in unprotected sex with either male or female partner. This contradicts the findings by Yi et al. and Eluwa et al. on the decline of condomless sex preference among MSM [26, 11]. This might also be supporting the persistent rise in HIV incidence among MSM group despite the increasing HIV prevention/control program going on in the State. The greater percent that prefer unprotected sex also reiterated during further conversation that they drive more pleasure without condom and feel safer since they are having sex with their fellow men. On the other hand, more of the respondent, during Focused Discussion Interview (FDI) accepts that they were addicted to viewing Sexually Explicit Media (SEM); (*i.e.*, pornography) which correlates findings by Nelson et al. which suggests that viewing sexually explicit media (SEM); may be related to the sexual behaviors of men who have sex with men (MSM) [18]. Men who self-identified as bisexual, engaged in transactional sex, and reported greater agreement with sexual risk cognitions (*i.e.*, heat-of-the-moment thoughts about condom use) had significantly greater odds of reporting a preference for condomless sex in SEM [18].

This study findings gives room for future research on the estimating the role of SEM in the sexual health of MSM in Nigeria and the extent to which exposure to SEM among MSM alters their sexual behavior and preferences for condomless sex and how this might be addressed in HIV prevention programs. Almost all the respondents (about 99%) reported to have both concurrent and non-concurrent multiple sexual partners with only 1% reported to have only one sexual partner. This correlates with many other studies in the literature showcasing the engagement of MSM in high-risk behavior of having multiple sex partners among others [13, 11].

More than 72% of the respondents said they had engaged in group sex especially during their birthday parties, school graduation and other occasions such as burial wake keep. Recent studies have shown that private sex parties are an emerging risk environment for HIV among men who have sex with men (MSM) which agrees with the explanation by the respondents during FDI, that group sex occurs mostly on such occasions, as they get to meet with old friends and the new ones who are invited by their peer groups and on such parties, that access to alcohol and psychoactive drugs is usually common [16]. This finding agrees with Mimiaga et al. which found out that nearly one-third (32%) of their study population have engaged in one or more serodiscordant unprotected anal sex (SDUAS) acts at the most recent sex party attended [16]. This correlate with further findings on the individual response on involvement in the use of psychoactive substances during sex. The observation on the group sex participation of the respondents further correlates study by Chen et al. which found that specific countries indicated group sex was common among men who have sex with men (MSM), and men who reported group sex participation were at increased risk of human immunodeficiency virus (HIV)/sexually transmitted infections (STIs) [7].

64% of the respondents reported that they use psychoactive substances (such as tramadol) during and after sexual intercourse. This result is in line with findings by Hunter et al. who reported that substance use among men who have sex with men (MSM) is higher than in comparable non-MSM samples [15].

During focused discussion interview, majority of the respondent who use psychoactive substances claimed that it enhances their libido while others felt they will not feel shy when they are on drugs especially while meeting their new partner for the first time. Their claims tend to agree with Deimel and Graf who explained in their studies that main reported motives for chemsex are not only enhanced sexual performance and increased sexual pleasure but also the feeling of belonging and De-stigmatization while methamphetamine as a psychostimulant especially intensifies sensitivity, can maximize sexual pleasure, and enhances the feeling of intimacy [9, 14]. It might, therefore, help to establish relationships and facilitates sexual intercourse with more partners over a longer period [14].

The high prevalence of needle reuse and sharing practices highlights significant risks for onward transmission and acquisition of HIV and viral hepatitis [22]. However, this was not the same case from this study as greater percent (54%) of the study population responded to have never shared injection needles before, compared to Twahirwa et al. who had 91% of their participants reported ever sharing needles in their lifetime [22]. The findings on lubricant use by the respondents of this study which showed that about 90% do not use lubricant in their most recent sex, did not align with some other previous studies like Eluwa et al. which reported increasing use of lubricant among the MSM accessed during IBBS survey in Akwa Ibom, likewise the works of Oluyemisi which reported that 85.6% used lubricants mostly with condom, products used were KY jelly, body cream, saliva and Vaseline [11, 19]. In contrast, some, however, agreed to have only used saliva as lubricant during sex in the last 3 months. This call for attention towards increasing access to lubricant among the MSM community in Akwa Ibom. This result further disagreed with the findings by Crowell et al. which reported that From March 2013-November 2017, 2090 MSM and TGW enrolled in the TRUST/RV368 cohort, Consistent use of condoms with water-based CCLs during receptive anal sex was reported by

238 of 386 (61.7%) participants after nine months and 212 of 316 (67.1%) after 15 months in the study [8].

In this study, almost 97% of the respondent reported to have engaged in transactional sex in the past 3 months. This result correlates that of Crowell et al. who reported that almost half of their study population (50.9%) had received payment for sex while 45.4% had paid for sex in the past [8]. Transactional sex (TS) is generally defined as the trading (buying or selling) of sex for material benefit (*i.e.*, exchanging money, drugs, food, shelter, or other items for sex), Various studies have reported increased prevalence of TS among men who have sex with other men (MSM) [2]. Engagement in TS occurs along a spectrum of participation ranging from casual, infrequent encounters to continual professional exchange.

Transactional sex between men frequently involves anal intercourse which, if unprotected, carries a high risk of transmission of sexually transmitted infections for the receptive partner, and a significant risk for the insertive partner.

HIV risk perception among MSM in Akwa Ibom is among the very vital variables explored in this study. Perception of health risk is a key dimension of most health behavior models used to construct health promotion campaigns particularly those targeting HIV related risk behaviors.

In this study, the respondents' perception of risk of HIV was assessed and the findings were as follows; almost 31% (122) of the respondent agreed that unprotected sex with both male and female partners exposes one more to risk of contracting HIV, 29% believed that unprotected sex with only opposite partner poses a high risk, 25% said only unprotected sex with same sex poses a high risk of HIV while about 16% of the respondent still did not believe that unprotected sex with either same or opposite sex poses a high risk of contracting HIV. On the knowledge of HIV status of the respondents' sexual partner, about 28% of the respondents knew their sexual partners HIV status of which less than 1% said their male sexual partner were HIV positive while 27% reported their sexual partners' HIV status as negative. However, greater than 72% of the participants reportedly do not know the HIV status of their sexual partners. In this study, there was no significant difference among the group of respondents who agreed to be aware and use Pre-Exposure Prophylaxis (PrEP) (34.2%), those that are aware but do not use PrEP (31%) and those that were not even aware of PrEP prior to the time of this stud (34.8%). Greater than 78% of the respondents in this study said they are aware of HIV preventive services going on in Akwa Ibom while 12.8% not aware and 8.5% reported never aware of any HIV preventive program in the State. The findings of this study on HIV risk perception correlate that of which stated that HIV risk perception and comprehensive HIV knowledge are very low among MSM in Nigeria [11]. Majority of the respondent in this study, agreed to have been tested for HIV though more than 3 months prior to the time of the study. However, a fresh HIV test was conducted for all the 400 participants selected for this study. About 11.8% of the study population tested positive for HIV. This result correlate with the findings by Amobi et al. who reported, in their study on HIV prevalence among MSM and people who inject drugs (PWID) that Among MSM in all states, the median HIV prevalence in the FCT was the highest (20.0%, 95% CI 3.4-25.9), followed by Lagos (13.5%, 95% CI 10.6-18.2) and Akwa Ibom state (12.0%, 95% CI 10.2-16.9) [1]. The risk analysis showed non-statistical significance association of the Age group with HIV positive status with p-value of 0.41. However, it disagrees with the CDC HIV Basic statistics which suggests that HIV affects mostly younger persons. This contradicts the finding by Chen et al. that age, residence, and wealth status may be important factors associated with HIV seropositivity and Eluwa et al. who reported that MSM aged ≥ 25 years, were more likely to be HIV positive, when compared to those aged 16-19 years and 20-24 years [7, 11]. The risk analysis showed statistical significance relationship between educational status and HIV status, with a p-value of 0.003 [Odd ratio = 2.49 (95% CI = 0.32-19.75)]. This contradicts the finding by Chapotera et al. who reported that education was not found to be associated with being HIV-positive. The risk analysis shows that there is a statistical significance association between marital status and HIV positive outcome, with a p-value of 0.01 [Odd ratio = 2.64 (95% CI = 0.49-14.2)]. This agrees with the finding by Chapotera et al. who reported that lifetime number of sexual partners, may be important factors associated with HIV seropositivity [6]. The risk analysis shows that there is a statistical significance association between the resident and the HIV positivity outcome with a p-value of 0.03 [Odd ratio = 1.97 (95% CI = 0.7-5.52)]. This agrees with the finding by Chapotera et al. who reported that residence, and wealth status may be important factors associated with HIV seropositivity [6]. The finding on the significant association between bisexual role of MSM and HIV positivity rate with a p-value < 0.001 [Odd ratio = 1.51 (95% CI = 0.56-4.05)] agrees with Eluwa et al. which reported that HIV prevalence among the bisexual is high and serves as a bridge between the key population and general population [11]. The risk analysis showed no statistically significant association between age of debut into MSM and HIV positivity as seen with a p-value of 0.8. This agrees with the study by Nelson et al. who stated that there was no difference in the HIV seroconversion among those MSM who had first sex with male partner earlier or later in life [18]. The risk analysis showed a non-significance relationship between the role and HIV positive outcome with a p-value of 0.31 This disagrees with Eluwa et al. who reported that those who engage only in Insertive Anal sex (Top) are more likely to have HIV positive than the bottom and versatile [11]. The risk analysis showed a statistically significant association between unprotected sex and HIV positivity, with a p-value of < 0.001 [Odd ratio = 4.13 (95% CI = 0.38-44.52)]. The risk analysis showed a non-significance relationship between the rate of non-condom use during sex and HIV positive outcome with a p-value of 0.06. This contradicts Eluwa

et al. which reported that the increase in consistent condom use observed during transactional sex may explain the low perceived risk of HIV among MSM. The risk analysis showed a statistical significance association between multiple sex partner engagement and HIV positive outcome with a p-value of 0.004 [Odd ratio = 0.30 (95% CI = 0.09-1.03)] [11]. This agrees with García et al, 2016 who reported that A large proportion of the MSM who were surveyed reported engaging in multiple and/or concurrent sexual partnerships, rendering them especially vulnerable not only to becoming HIV infected, but to infecting their sex partners as well [13]. The risk analysis showed a statistically significant relationship between group sex engagement and HIV positive outcome with a p-value of < 0.001 [Odd ratio = 0.47 (95% CI = 0.14-1.59). The risk analysis showed a statistical significance relationship between intake of psychoactive substances by the respondents and HIV positive outcome with a p-value of < 0.001 [Odd ratio = 0.37 (95% CI = 0.08-1.87)]. This corroborates with Beyrer et al. which reported that drug use especially use of methamphetamine has been associated with HIV among MSM [4]. The risk analysis showed a non-significance relationship between the sharing of syringes/needles among the respondents and HIV positive outcome with a p-value of 0.82. The risk analysis showed a statistical significance relationship between non-use of lubricant during sex and HIV positivity outcome with a p-value of < 0.01 [Odd ratio = 1.43 (95% CI = 0.44-6.23). The risk analysis showed a statistical significance relationship transactional sex and HIV positive outcome with a p-value of < 0.001 [Odd ratio = 2.96 (95% CI = 0.41-21.4). The risk analysis showed a statistical significance relationship between awareness of the main male partners' HIV status and HIV positive outcome with a p-value of < 0.001 [Odd ratio = 0.14 (95% CI = 0.04-0.52). The risk analysis showed a statistical significance relationship between awareness/uptake of PrEP and HIV positive outcome with a p-value of < 0.001 [Odd ratio = 5.10 (95% CI = 0.04-0.52)]. This supports the study by Elion et al., (2019) which found that PrEP use by young Black MSM was the most efficient strategy in preventing HIV infection, with ten young Black MSM needing to be treated with PrEP to prevent one new HIV infection. The respondents in this study cut across the 3 senatorial zones and span throughout the 31 LGAs of Akwa Ibom State which makes generalization of the data very significant.

It is possible that the ever-rising HIV epidemic among MSM and other key population can be mitigated by clear understanding of the rate/extent of exposure to the high HIV risk -related behaviors among the MSM community and allocate appropriate resources, policy and other comprehensive intervention plan. This is in line why recent scientific reviews of HIV among MSM in Africa have called for improvements in HIV surveillance systems and the reporting of key HIV indicators [4]. This study is very vital in the broader initiative to inform HIV programming for key populations in Nigeria and Akwa Ibom through the Enhancing Nigeria's Response to HIV/AIDS. Through this study, we have been able to provide the level of exposure to high HIV risk behaviors among the MSM community in Akwa Ibom. Though the HIV screening only revealed 11.7% of the population tested as positive, continuous exposure to high-risk behavior will likely increase the HIV incidence rate in Akwa Ibom, if not urgently followed up.

More MSM hotspots were discovered in addition to the earlier ones identified by Lo et al. 2021 [27] in their study –mapping key population hotspots in Nigeria for targeted HIV program planning earlier mapped hotspots. Lesson centres as well as shopping malls in the city were among the new hotspots identified in addition to the existing ones.

Conclusions

MSM in Akwa Ibom State are at high risk of acquiring and transmitting HIV because of the high-risk behaviors they engage in with both men and women. In addition, the HIV testing done among the participants shows significantly high prevalence rate of 11.8% (47 positives of 400 tested) among the MSM in Akwa Ibom, however, there may be increase in the HIV burden if the risk factor making the MSM prone to HIV infection is not urgently addressed. Greater percentage of the MSM engage in unprotected sex, multiple sex partners, group and transactional sex and do not know the HIV status of their partners. On the other hand, the bisexual nature of most MSM serves as a linkage to the general population. With the age group of 20-29 years recording highest among the MSM community and having their first debut into having sex with fellow men at 13-19 years speaks volume at the most exposed age bracket and probably calls for adolescent targeted HIV program intervention. Despite the condom availability at the health facilities, the MSM community in Akwa Ibom still prefers having an unprotected anal and vaginal sexual intercourse. This calls for total behavioral re-orientation and other biomedical interventions. There is need for targeted interventions for MSM who bisexual, married, and male sex workers are. In response to the multifaceted risks and vulnerabilities that put Nigerian MSM at a greater risk of HIV infection, future interventions targeting MSM should focus on a comprehensive intervention approach that includes behavioral, biomedical, and structural interventions (combination prevention approach) [3].

Suggestion for Future Research

Considering the higher number of respondents in this study who self-identified as bisexual with high-risk behaviors capable of exposing them to HIV infection, it would be appropriate if another research is carried out on identifying the risk of HIV/AIDS among the MSM bisexuals and their male/female partners.

Study on the prevalence of HIV/AIDS among the bisexual and their partners in Akwa Ibom is highly recommended.

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Conflict of interest statement

We declare no conflict of interest.

Authors' contributions

NA: concept. CE: methodology. EG: proof reading. UW: formatting.

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