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The prevalence of High-risk Behaviors and the Associated Infections among MSM in Benue State, Nigeria

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Abstract
Objective: High-risk behaviors among MSM have continually made this group susceptible to HIV and other STIs. Therefore, the study seeks to assess the prevalence of high-risk behaviors among MSM in Nigeria.
Methodology: This quantitative descriptive cross-sectional survey examined the high-risk behaviors among MSM. The study was conducted in the state's three local government areas using a multistage cluster sampling technique. Data collection was done using an interviewer-administered structured questionnaire, and analysis was performed with IBM-SPSS version 25.0.
Result: A significant number, 91.2% (114) of MSM in Benue State, had anal sex but mostly without protection, 75.2% (94). However, 108 (94.7%) used lubricants during anal sex, particularly those with multiple sexual partners (79, 63.2%). Also, 66 (52.8%) used/inject drugs. Sexual health was also challenging as 110 (88.0%) had been diagnosed with STIs. Most participants with STIs (118, 94.3%) said their sexual partner infected them. A substantial proportion, 16 (76.2%) of MSM aged 18-20 years, were using or injecting drugs, likewise those aged 21-25 years (14, 63.6%) ($p<0.05$). Furthermore, 22 (75.9%) of the unemployed and 17 (58.6%) employed were using or injecting drugs. About 60% (42) of homosexuals use or inject drugs.
Conclusion: The findings in this study revealed that condomless intercourse, drug injection, multiple sexual partners, and poor lubricant use are significant determinants of high-risk behaviors among MSM. The study also showed that MSM is exposed to HIV and other STIs due to these behaviors, making them even more susceptible given the sex they primarily practice.

Keywords: High-risk Behaviors, MSM, Benue, Nigeria, Injection

Plain English Summary

This study aimed to assess the prevalence of high-risk behaviors among men who have sex with men (MSM) in Nigeria, focusing on three local government areas in Benue State. The study was a quantitative descriptive cross-sectional survey; data were collected via an interviewer-administered structured questionnaire and analyzed using IBM-SPSS version 25.0. The results showed that 91.2% of MSM had anal sex without protection, and 52.8% used/injected drugs, leading to a high rate (88%) diagnosed with STIs. Findings revealed significant determinants of high-risk behaviours among MSM include condomless intercourse, drug injection, multiple sexual partners, and poor lubricant use - all contributing to increased exposure and susceptibility to HIV and other STIs within this population group.

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Introduction

The level of high-risk behaviors among men who have sex with men (MSM) continually exposes them to human immunodeficiency virus (HIV) and other sexually transmitted infections (STIs). Studies have reported a high prevalence of HIV among MSM in the United States, United Kingdom, and other countries (1, 2, 3). Besides female sex workers and people injecting drugs, MSM have been listed as one of the most vulnerable groups at risk of contracting and transmitting HIV (4). In Nigeria, MSM had a higher HIV rate than the general population; this is because Unprotected anal intercourse (UAI) remains the leading risk factor for HIV among MSM and studies have demonstrated the high transmission efficiency of HIV through anal sex (5, 6, 7). Furthermore, there have been little data on HIV-infected MSM, resulting in underreporting of the case. This is because men avoid circumstances in which their sexuality or HIV infection status may be exposed due to feelings of prejudice or stigma associated with such disclosures (7).

The HIV prevalence in Nigeria among MSM was calculated to be 22.9 percent in the 2014 Integrated Biological and Behavioral Surveillance Study (IBBSS), a rise from 17.2 percent in the IBBSS 2010 (8). These figures are about five times higher than the HIV prevalence rate in the population as a whole (9, 10). Around 2013 and 2016, the TRUST cohort recruited 862 MSM in Nigeria and found a 55 percent HIV prevalence. Chlamydia was diagnosed in 17 percent of Abuja residents and 18 percent of Lagos residents (11). In comparison, gonorrhea was diagnosed in 19 percent of Abuja residents and 26 percent of Lagos residents, suggesting a high STI prevalence; an Incident of STI was discovered to be linked to HIV infection (11, 12). Sexual risk behaviors for HIV and STIs overlap, with condom-less anal sex with a serodiscordant viremic individual being the most effective form of HIV transmission by sexual interaction (13). Also, MSM and illegal injection drug use are significant HIV transmission routes (14). Genital ulcerative diseases (GUD) are caused by STIs, resulting in a breakdown of the genital mucosa and genital bleeding, which increases the chance of contracting HIV (15, 16). GUD further strengthens the spread of HIV from an HIV-infected individual by increasing genital HIV shedding (17, 18, 19, 20). Healthcare facilities are critical for effective antiretroviral therapy (ART) to achieve viral suppression and, as a result, limit onward transmission, a concept known as Treatment as Prevention (TasP). At a six-month follow-up, the TRUST MSM cohort in Nigeria reported that disclosing MSM status to a healthcare provider was associated with treatment adherence and HIV viral load suppression (21).

The relatively high STIs among MSM can be explained by various reasons, including individual practices and characteristics of their sexual interactions (14, 22, 23). For example, the presence of multiple sexual partners, the rate of partner sharing, lack of sexual education, and the frequency of condomless intercourse all impact a person's risk of contracting STIs (14). Also, MSM network characteristics such as high STI prevalence, interconnectedness and concurrency of sex partners, substance misuse and drug injection, and potentially inadequate access to healthcare, prohibiting MSM from accessing proper vaccines, all influence the risk of contracting an STI (22, 23, 24). Additionally, stigmatization, discrimination, verbal abuse, and physical abuse based on sexual orientation are correlated with heightened sexual danger activity in MSM (25).

All these factors particularly unprotected sex with multiple partners and sharing needles, often make MSM susceptible to HIV and other STIs. With an individual's sex partners, the risk of getting infected and transmitting HIV and other STIs rises sharply, mainly when relationships arise over a brief period or concurrently (26). The infection chances are even higher when MSM engages in condomless sexual intercourse. HIV is eighteen times more likely to be transmitted during unprotected receptive anal intercourse than unprotected vaginal intercourse (27, 28). The frequency of unprotected sex raises the risk of HIV infection. Disinhibiting agents, such as alcohol, crystal methamphetamine, and other recreational drugs, are also the main factors enhancing MSM's high risk-taking conduct (29). Therefore, the study seeks to determine the prevalence of high-risk behaviors among MSM in Benue state.

Methodology

Study Location

The sample frame of this study was Men who had sex with men in Benue State, Nigeria. The study was conducted across three local government areas (LGAs) in Benue state namely; -Ukum LGA, Makurdi LGA, and Oturkpo LGA out of 23 LGA in the state. These LGAs were selected because MSM is ubiquitous in these local government areas in Benue state.

Study design
This study was a quantitative descriptive cross-sectional survey that examined the high-risk behaviors among MSM in Benue State, Nigeria. Three Geopolitical zones within the state where MSM are commonly found were covered, and a random sample size determination technique/formula was used in determining the number of respondents. After consenting with the available MSM in the chosen zones, they were all interviewed.

Study Population
The study population comprised men who have sex with men across three geo-political zones (Zone A -UKUM LGA; Zone B- MAKURDI LGA; Zone C- OTURKPO LGA) in Benue State. MSM aged 16 years and above ready to participate in the study were included, while those less than 16 years and transgender were excluded.

Sample Size Determination
The sample size was determined based on the estimated population size of MSM in Benue State, Nigeria. For point estimates, a 5% margin of error was used at a 95% confidence interval. The number of MSM in Benue state was estimated at 372 in 2020, and HIV prevalence was 21% (30).
The formula below was used for sample size calculations

Sample size n = $N \frac{\frac{Z^2 x\ P\ (1-P)}{e^2}}{N-1+\frac{Z^2 x\ P\ (1-P)}{e^2}}$

Where N represents the total number of MSM in Benue State = 372, Z = z score at 95% confidence interval = 1.96, P = prevalence of HIV among MSM in the state = 21%= 0.21 1-P = 1-0.21 = 0.79, and e = marginal error = 5% = 0.05.
Inputting all the parameters in the formula above,

n = $372 \text{ x } \frac{\frac{1.96^2 x\ 0.21\ (1-0.21)}{0.05^2}}{(372-1)+\frac{1.96^2 x\ 0.21\ (1-0.21)}{0.05^2}}$

$= \frac{372 \text{ x } 255}{371+255} = \frac{94860}{626} = 151.5 = 152$

Adding 10% attrition; 0.1 x 151 = 15.1
151 + 15 = 166
The minimum sample size for this study was 152 MSM. However, only 125 (82.2%) MSM were willing to participate in this study.

Sampling Techniques
The study employed a multistage cluster sampling technique to allow a close approximation of a representative sample. The stages involved the zone selection stage, venue (spot) selection stage, and random recruitment of respondents. In the three zones, regular sites of MSM were mapped, and the number of potential respondents was identified using the random selection technique. The exponential non-discriminative snowball sampling (referral) method was used to aid the easy way of contacting the respondents. The interviews were conducted privately to ensure their privacy rights were not infringed.

Data Collection Instruments
Structured questionnaires were used to obtain respondents' data. The instruments were designed in English and the relevant local dialect, with questions cross-checked for context to ensure that data collectors could use them in English or pidgin. The questions in the questionnaire include inquiries about their bad habits like; getting drunk and using drugs, examining their knowledge of infections associated with anal sex, sharing needles and syringes, etc.

Validity of Research Instrument
After obtaining an acceptable alpha coefficient, a pilot study was conducted to test the validity and reliability of the research instrument. This was done by issuing interviewer-administered questionnaires to respondents.
Cronbach's alpha (α) was computed as follows:
$\alpha = K / (K - 1) [1- (\Sigma\sigma_k^2 / \sigma total^2)]$ ---------- Equation (1) Where K is the number of items, $\Sigma\sigma_k^2$ is the sum of the k item score variances, and $\sigma total^2$ is the variance of scores on the total measurement (31).

Recruitment and Training of Research assistants
Locally recruited research assistants were taught on the data-collecting instrument for two days, and a field experimentation exercise was conducted to evaluate equipment and make necessary improvements.

Data Collection and Management Procedures
The quantitative data were collected in real-time, where all the research assistants had access to the data for regular quality checks. Research assistants administered the questionnaires after a two-day training. Six data collectors were recruited, and two were allocated to each region. Only authorized individuals were given access to the data to ensure confidentiality.

Analysis and dissemination of results
The completed data were coded and analyzed using IBM-Statistical Package for Social

Sciences (IBM-SPSS) version 25.0 for Windows *IBM* Corp., Armonk, NY, USA. Analyses were categorical and included point estimates, confidence intervals for descriptive data, and chi-square/logistic regression (with generalized estimated equations to account for the cluster effect). Data cleaning was done by running frequencies of all variables. Statistics analysis included descriptive univariate, bivariate, and multivariate, respectively, and applicable. The statistical significance level was set at P<0.05.

Result

Due to the unwillingness to participate in the study by some MSM in the selected zones, only 125 responses were obtained out of the 166-sample size designed for this study; hence the total response rate was 75.3%.

Demographic characteristics of MSM in Benue State

Background characteristics of men who have sex with men in Benue State are shown in Table 1. The age distribution shows that more respondents were 26-30 years (42, 33.6%), followed by 31 years and above (40, 32.0%). More than three-fifths (79, 63.2%) had completed secondary school. Employed and unemployed respondents were at an equal rate of 23.2% (29), while 53.6% (67) were self-employed. More than 60% (78) were single. A higher proportion were homosexuals (69, 55.2%) compared to bisexuals (56, 44.8%). Most MSM were Christians (103, 82.4%), and 67.2% (84) of respondents lived in rented apartments.

Table 1: Background characteristics of men who have sex with men in Benue State

Variable	Characteristics	Frequency	Percentage %
Age category	18-20	21	16.8
	21-25	22	17.6
	26-30	42	33.6
	31 & above	40	32.0
Educational Level	None	2	1.6
	Primary	3	2.4
	Secondary	79	63.2
	Tertiary	41	32.8
Occupation	Unemployed	29	23.2
	Employed	29	23.2
	Self Employed	67	53.6
Marital Status	Single	78	62.4
	Married/Living with a woman	8	6.4
	Living with a man	36	28.8
	Divorce/Widowed/Separated	3	2.4
Sexual Identity	Gay/Homosexual	69	55.2
	Bisexual	56	44.8
Religion	Christianity	103	82.4
	Islam	15	12.0
	Traditional	7	5.6
Type of Dwelling	Own	26	20.8
	Rent	84	67.2
	Parent's House	15	12.0

High-risk behaviors among MSM in Benue state

As shown in Table 2, a significant number of MSM in Benue State had anal sex (94.7%) but mostly without protection (75.2%). However, 94.7% said they use lubricants during anal sex, particularly those with multiple sexual partners (63.2%). Also, 52.8% said they use/inject drugs, while 12.8% said they use psychoactive drugs. About 40.0% had patronized commercial sex hawkers, 35.2% had sex partners whom they had sex with casually, and 24.8% had steady sex partners. However, only 13.3% share syringes and needles with their partners. More than half (56.0%) of the MSM preferred getting 'high'

(intoxicated) by drinking alcohol or injecting drugs before engaging in sexual intercourse with the same sex. The remaining 44.0% choose to be moderate about their consumption.

Table 2: High-risk behaviors of MSM in Benue State

Variables		Frequency	Percentage
Occasionally have sex with a woman	Yes	73	58.4
	No	52	41.6
Currently have a female sex partner	Yes	64	51.2
	No	61	48.8
Have regular anal sex with men	Yes	114	91.2
	No	11	8.8
Use lubricants during anal sex	Yes	108	94.7
	No	7	5.3
Have regular unprotected anal sex	Yes	94	75.2
	No	31	24.8
Frequency of protected sex	Often	62.5	50.0
	Not often	62.5	50.0
Have multiple sexual partners	Yes	79	63.2
	No	46	36.8
Types of sexual partner	Steady	31	24.8
	Casual	44	35.2
	Commercial sex	50	40.0
Regularly use or inject drugs	Yes	66	52.8
	No	59	47.2
Substance use	Tobacco	20	30.3
	Alcoholic Beverages	26	39.4
	Marijuana	15	22.7
	Cocaine/Crack	1	1.5
	Inhalants	4	6.1
Injecting Psychoactive	Yes	16	12.8
	No	109	87.2
Mode of administration	Neck	4	3.2
	Arm	10	8.0
	Lap	2	1.6
Usually, get drunk	Yes	70	56.0
	No	55	44.0
Use a condom while high/drunk	Yes	57	58.8
	No	40	41.2
Do share syringes and needles	Yes	17	13.6
	No	108	86.4
Been vaccinated against susceptible infections	Yes	44	35.2
	No	81	64.8
Know any infections associated with anal sex	Yes	77	61.6
	No	48	38.4

Sexual health was also challenging as 88.0% had been diagnosed with STIs, of which syphilis was the highest (57.6%). Most participants with STIs (94.3%) said their sexual partner infected them. However, most (94.0%) of the MSM with STIs said they got treated at healthcare facilities, with 68.8% treated immediately. Although 47.2% said it took a relatively long or longer time to discover they were infected with STIs, the remaining 52.8% were able to know on time (Table 3).

Table 3: Sexual health distribution of men who have sex with men in Benue State

	Parameters	Frequency	Percentage
Are you aware of your HIV status	Yes	116	92.8
	No	9	7.2
Been diagnosed with HIV/AIDS	Yes	52	41.6
	No	73	58.4
Aware of the sexual partner(s) HIV status	Yes	77	61.6
	No	48	38.4
Has any of your partner(s) ever been diagnosed with HIV/AIDS	Yes	73	58.4
	No	52	41.6
Ever been recommended for HIV testing	Yes	105	84.0
	No	20	16.0
Have been infected with an STI	Yes	110	88.0
	No	15	12.0
If infected with STIs, what type?	Gonorrhea	45	36.0
	Chlamydia	6	4.8
	Syphilis	72	57.6
	Anal human papillomavirus (HPV)	2	1.6
Did your sexual partner infect you?	Yes	118	94.3
	No	7	5.7
How long did it take before you found out you were infected	Very long	8	6.4
	Long	7	5.6
	Not so long	44	34.9
	Short	66	52.8
MSM with both HIV and STIs	Not at all	9	7.2
	Having one	79	63.2
	Having both	37	29.6
Were you able to get treatment for HIV or STI	Yes	118	94.0
	No	7	6.0
How long did it take to get treatment	Immediately	70	56.0
	Almost immediately	16	12.8
	Not so fast, not so slow	37	29.4
	Took a while	2	1.8

As shown in Table 4, age 18 – 20 years, unemployment, and being a gay/homosexual were individually associated with drug injection among the MSM (P<0.05), but no factor was identified as a significant predictor of drug injection at AOR level {P>0.05). However, MSM aged 18-20 and 21 – 25 were AOR = 2.48 [95% CI: 0.59-12.82] and AOR = 1.36 [95% CI: 0.40-4.67] times more likely to inject drugs than those above 30 years. Also, the odds of drugs injection was AOR = 3.76 [95% Ci; 0.36-39.67] higher among MSM that attained secondary education and AOR = 7.14 [95% CI: 0.64-79.80] for tertiary education than the less educated (primary and below). Unemployed and employed MSM were AOR = 1.72 [95%CI: 0.44-6.69] and AOR = 2.41 [95% CI: 0.74-7.84] more likely to inject drugs than the self-employed. The odds of injecting drugs was AOR = 3.49 [95%CI: 0.16-75.08] times higher among single MSM, AOR = 5.59 [95% CI: 0.21-149.91] among married/living with a woman, and AOR = 2.70 [95% CI: 0.12-62.96] among those living with a man than the divorced/widowed/separated. Christian and Muslim MSM were ARO = 2.27 [95% CI: 0.32-15.86] and AOR = 2.65 [95%CI: 0.29-24.51] more likely to inject drugs than traditional drug worshippers. MSM living in rented apartments and those living with their parents were AOR = 1.51 [95%CI: 0.45-5.05] and AOR = 0.68 [95%CI: 0.15-3.14] more likely to inject drugs than those that own houses.

Table 4: Demographic distribution of MSM using or injecting drugs in Benue State

Parameter	MSM using or injecting drugs		COR [95% CI]	P-value	AOR [95% CI]	P-value
	Yes n (%)	**No** n (%)				
Age category						
18-20	16 (76.2)	5 (23.8)	3.91 [1.20–12.7]	0.024*	2.48 [0.59-12.82]	0.199
21-25	14 (63.6)	8 (36.4)	2.14 [0.73-6.23]	0.163	1.36 [0.40-4.67]	0.627
26-30	18 (42.9)	24 (57.1)	0.92 [0.38-2.19]		0.61 [0.22-1.65]	0.330
31 & above	18 (45.0)	22 (55.0)	Ref		Ref	
Educational Level						
Primary and below	1 (20.0)	4 (80.0)	Ref		Ref	
Secondary	39 (49.4)	41 (50.6)	3.90 [0.42-36.46]	0.233	3.76 [0.36-39.67]	0.271
Tertiary	26 (63.4)	15 (36.6)	6.93[0.71-67.90]	0.096	7.14 [0.64-79.80]	0.110
Occupation						
Unemployed	20 (69.0)	9 (31.0)	3.10 [1.23-7.80]	0.017*	1.72 [0.44-6.69]	0.435
Employed	18 (62.1)	11 (37.9)	2.28 [0.93-5.57]	0.071	2.41 [0.74-7.84]	0.143
Self Employed	28 (41.8)	39 (58.2)	Ref			
Marital Status						
Single	43 (55.1)	35 (44.9)	2.46 [0.21-28.24]	0.470	3.49 [0.16-75.08]	0.425
Married/Living with a woman	5 (62.5)	3 (37.5)	3.33 [0.20-54.53]	0.398	5.59 [0.21-149.91]	0.305
Living with a man	17 (47.2)	19 (52.8)	1.79 [0.15-21.54]	0.647	2.70 [0.12-62.96]	0.536
Divorce/Widowed/Separated	1 (33.3)	2 (66.7)	Ref			
Sexual Identity						
Gay/Homosexual	42 (60.9)	27 (39.1)	2.07 [1.01-4.25]	0.046*	2.25 [0.73-6.97]	0.160
Bisexual	24 (42.9)	32 (57.1)	Ref			
Religion						
Christianity	54 (52.4)	49 (47.6)	1.47 [0.31-6.90]	0.625	2.27 [0.32-15.86]	0.409
Islam	9 (60.0)	6 (40.0)	2.00 [0.32-12.33]	0.455	2.65 [0.29-24.51]	0.391
Traditional	3 (42.9)	4 (57.1)	Ref			
Type of Dwelling						
Own	15 (57.7)	11 (42.3)	Ref			
Rent	42 (50.0)	42 (50.0)	0.73 [0.30-1.78]	0.494	1.51 [0.45-5.05]	0.504
Parent's House	9 (60.0)	6 (40.0)	1.10 [0.30-4.01]	0.885	0.68 [0.15-3.14]	0.620

*P<0.05 is significantly different

Sexual-health risk behavior

As shown in Table 5, the odds of contracting HIV are 18.33 [18.33 (95% CI: 2.02 - 166.73); p<0.05] times higher among MSM aged 21 – 25 years. On the other hand, education was not a significant predictor of HIV among the study participants (p>0.05). Gainfully employed MSM were 5.39 [5.39 (95% CI: 1.45 – 20.00); p<0.05] more likely to be infected with HIV than the unemployed. Also, MSM living with a man was 10.18 [10.18 (95% CI: 3.99 – 26.00); p<0.05] more likely to be infected with HIV than singles, similarly homosexuals were 3.31 [3.31 (95% CI: 1.47 – 7.45); p<0.05] more likely to contract HIV than bisexual, in addition, MSM that does not have sexual intercourse with women are 5.49 [5.49 (95% CI: 2.42 – 12.46); p<0.05] more likely to be infected with HIV than those who have sex with women. The odds ratio of MSM that has anal sex with men is 1.19 [1.19 (95% CI: 0.28 – 5.04); p<0.05], more likely to be infected than those who do not. Similarly, MSM with unprotected anal sex is 2.14 [2.14 (95% CI: 0.75 – 6.10); p<0.05] more likely to be infected than those with protected anal sex with men. Similarly, those with partners diagnosed with HIV are 5.54 [5.54 (95% CI: 1.66 – 18.55); p<0.05] more likely to be infected than those whose partners did not have HIV.

Table 5: Multivariate analysis of demographic predictors of HIV/AIDS among MSM in Benue State

Variable	Parameter	Diagnose with HIV/AIDS			
		YES n (%)	**NO** n (%)	**Odds ratio (95% CI)**	**P-value**
Age category	18-20	1 (6.3)	15 (93.8)	1.00	
	21-25	11 (55.0)	9 (45.0)	18.33 [2.02 - 166.73]	0.010*
	26-30	13 (31.0)	29 (69.0)	6.72 [0.80 – 56.43]	0.079
	31 & above	18 (47.4)	20 (52.6)	13.50 [1.62 – 112.70]	0.016*
Occupation	Unemployed	4 (16.7)	20 (83.3)	1.00	
	Employed	14 (51.9)	13 (48.1)	5.39 [1.45 – 20.00]	0.012*
	Self Employed	25 (38.5)	40 (61.5)	3.13 [0.96 – 10.21]	0.059
Marital Status	Single	14 (19.7)	57 (80.3)	1.00	
	Married/Living with a woman	2 (25.0)	6 (75.0)	1.36 [0.247 – 7.46]	0.073
	Living with a man	25 (71.4)	10 (28.6)	10.18 [3.99 – 26. 00]	< 0.001*
	Divorce/Widowed/Separated	2 (100.0)	0 (0.0)	---	---
Sexual Identity	Gay/Homosexual	31 (49.2)	32 (50.8)	3.31 [1.47 – 7.45]	0.004*
	Bisexual	12 (22.6)	41 (77.4)	1.00	
Occasionally have sex with woman/women?	Yes	14 (20.9)	53 (79.1)	1.00	
	No	29 (59.2)	20 (40.8)	5.49 [2.42 – 12.46]	< 0.001*
Has a partner that had been diagnosed with HIV/AIDS	No	4 (12.5)	28 (87.5)	1.00	
	Yes	19 (44.2)	24 (55.8)	5.54 [1.66 – 18.55]	0.005*

*P<0.05 is significantly different

As shown in Table 6, the odds of being infected with STI are 0.75 [0.75 (95% CI: 0.15 – 3.84); p<0.05] times higher among those that had completed secondary education and 1.29 [1.29 (95% CI: 0.13 – 12.93); p<0.05] times higher among those of primary education. Similarly, occupation, marital status, age category, sexual identity, religion, types of dwelling, and having sex with women are not significant predictors of STI among the respondents. On the other hand, MSM that had anal sex is 5.35 [5.35 (95% CI: 1.35 – 21.20); p<0.05] more likely to be infected with STIs than those who do not. Also, those that used lubricant are 12.50 [12.50 (95% CI: 2.16 – 72.28); p<0.05] more likely to be infected with STI than those that do not. However, MSM with unprotected sex is 12.12 [12.12 (95% CI: 3.11 – 47.16); p<0.05] more likely to be infected with STI, and those using protection and those having multiple male sexual partners are 15.17 [15.17 (95% CI: 3.24 – 71.00); p<0.05] more likely been infected with STIs than those with one. From the results, MSM that has multiple male sexual partners have the strongest tendency of having HIV/STI infections.

Table 6: Multivariate analysis of demographic predictors of STI among MSM in Benue State

Variables	Parameter	Have been diagnosed with STIs		Odds ratio (95% CI)	P-Value
		YES, n (%)	**NO** n (%)		
Educational Level	Primary or below	4 (80.0)	1 (20.0)	1.29 [0.13 – 12.93]	0.828
	Secondary	75 (94.9)	4 (5.1)	6.05 [1.76 – 20.75]	0.004*
	Tertiary	31 (75.6)	10 (24.4)	1.00	
Do you have anal sex with men	No	7 (63.6)	4 (36.4)	1.00	
	Yes	103 (90.4)	11 (9.6)	5.35 [1.35 – 21.20]	0.017*
	No	3 (50.0)	3 (50.0)	1.00	

Use lubricant during anal sex with men	Yes	100 (92.6)	8 (7.4)	12.50 [2.16 – 72.28]	0.005*
Do you have unprotected anal sex with men	No	13 (65.0)	7 (35.0)	1.00	
	Yes	90 (95.7)	4 (4.3)	12.12 [3.11 – 47.16]	<0.001*
Have multiple male sexual partners	No	33 (71.7)	13 (28.3)	1.00	
	Yes	77 (97.5)	2 (2.5)	15.17 [3.24 – 71.00]	0.001*

*Significant at p<0.05 level

Discussion

This study reported several risky behaviors among MSM, the significant determinants for the prevalence of HIV and STIs among MSM in Benue as examined in this study were due to five major factors, which include; educational level, anal sex with men, the use of lubricant during anal sex with men, having unprotected anal sex with men and having multiple male sexual partners. These behaviors endanger their individual lives and include those they come in sexual contact with because it exposes them to the risk of contracting and transmitting HIV and other STIs. A systematic review and meta-analysis of HIV transmission risks in anal sex reported a 1.4% transmission probability per act of unprotective receptive anal intercourse and 40.4% (6.0–74.9) per partner probability (32). All these studies show how risky anal sex is; however, this study displayed a significant use of lubricant, which may limit the transmission of infections but is still unreliable.

Injection of drugs was another significant risky behavior reported in this study, asides from drug injection leading to intoxication and creating room for reckless actions. Using shared or unsterilized syringes and needles in drug injection can also lead to infections. Onovo et al (13) reported the high prevalence rate of needles and syringe sharing among MSM who inject drugs; this consistently increased the HIV and other STIs rate among this group. Several international organizations have also recorded how using unsterilized needles and syringes exposes those who inject drugs to infection (13, 33, 34). Mumtaz et al. also reported how drug injection led to intoxication and increased reckless sexual behavior, particularly among men. This study also recorded that a significant number of MSM preferred getting intoxicated before engaging in sexual intercourse, which further displays the high rate of risky behavior among this group because engaging in sexual practices while intoxicated increases the possibility of unprotected sex. Drug injection enhanced careless sexual intercourse, as intoxicated men tend not to use condoms.

This study also showed that many MSM has multiple sexual partners, possibly due to geosocial networking and psychosocial health problems. Beymer et al (2) and Francisco et al (35) reported how geosocial networking apps like Grindr and Badoo encourage multiple sexual partners, condomless anal sex, and increased HIV and other STIs, especially in Nigeria, where homosexuality is a criminal offense. Ogunbajo et al (36) also documented how psychosocial health problems like depressive symptoms, post-traumatic stress disorder, alcohol dependence, tobacco use, and hard-drug use were associated with an increasing number of male sexual partners among Nigerian gay, bisexual and other MSM. Additionally, significant numbers of respondents were occasionally and currently having sex with women, which may further increase the spread of these infections to even those that do not have sex with men. Studies have shown that a substantial number of diseases occur among MSM, many of whom have sex with women (28, 37).

The study showed significant awareness of personal and partner HIV status. Many have not been diagnosed with HIV, but many of their partners were found to have contracted HIV. The study found that STIs were more rampant among the respondents, of which syphilis was significantly higher. This result may be due to the way syphilis is being transmitted. Syphilis mainly spreads through contact with an infected person's sore during sexual activity. Since MSM primarily engages in anal sex, which is even riskier without using lubricants and condoms, the bacteria are likely to enter their body if they have minor cuts or abrasions in the skin (38, 39). The rate of syphilis has been reported to be alarmingly high among MSM, especially in the United States, where MSM accounts for about three-quarters of all syphilis cases (40). Studies have also reported how syphilis infection makes MSM more

susceptible to HIV, which may also explain the rate in this study (38, 41, 42).

The study also found that most respondents with STIs got the infection from their partners, which may be due to several reasons, ranging from unawareness of their partner's sexual health status or inappropriate use of condoms for partners. Hamill et al (43) discussed several ways condoms can fail when not properly applied. Other factors that may explain MSM getting infected with STIs from their partners may be due to promiscuity, especially partners engaging in condomless sex with others and through the injection of drugs (14, 44).

The study found that 21-25 years and 30 years and above significantly had more chances of contracting HIV than others. The high odds of 21-25 years MSM contracting HIV may be due to young age and beginning to gain confidence in their sexual identity, which may inspire engagement in reckless sexual activities. Mustanski et al. stated how young MSM are more likely to engage in unprotected anal intercourse, which increases their chances of contracting HIV. Balaji et al. also reported how young MSM should be considered a priority for HIV prevention, indicating the high prevalence among this group, particularly those in their early and mid-twenties. They further recorded the low HIV tests among sexually active young MSM (45). Regarding MSM aged 30 and above, a study in China also reported a high probability of this age group getting infected with HIV (46). This result may also be due to reckless behaviors like condom-less sex, multiple sexual partners, and the injection of drugs, which can further expose them to HIV infection.

Employed respondents were also more likely to contract HIV than unemployed MSM, depending on the type of employment. MSM who engage in transactional sex may also view themselves as employed because they make ends meet by being a sex worker, which may expose them to risky behaviors and increase their chances of contracting HIV. Studies have reported how MSM results in selling sex for money as a means of employment and income, which may explain their chances of contracting HIV in this study (47, 48). Also, employment provides income, which may empower MSM to engage in risky behaviors, like patronizing sex workers without condoms or lubricants, thereby exposing them to infection. MSM living with a man had higher odds of contracting HIV, which may be due to intimacy, familiarity, and lack of condom use since they may only engage in sexual activities with their resident partner. Mustanski et al (49) reported how MSM was more likely to have unprotected anal sex with their partner than casual partners. Davidovich et al (45) further explained that this act might be linked to trust, familiarity, and the perception that condoms interfere with intimacy.

Gay men were also reported to be more likely to contract HIV than bisexuals, possibly due to them mainly engaging in anal sex. Patel et al (50) explained how anal sex biologically makes MSM more susceptible to HIV, which increases the chances among gay, because this may be the only type of sex they practice. Also, this result may be due to the role variability among MSM; the chances of contracting HIV are higher for men who practice receptive unprotected anal sex. A bisexual who practices incentive anal sex is less likely to contract HIV than a receptive homosexual (51). This might also explain why, according to this study, MSM who do not have sex with women regularly are more likely to develop HIV. MSM with partners diagnosed with HIV also had higher odds of contracting HIV in this study. The possibility of MSM getting HIV when they have an HIV-positive partner is even higher when they are not repositioning. Cassels & Katz (52) explained how sero-positioning effectively reduces the risk of contracting. At the same time, Philip et al (53) indicated that this practice is still dangerous because sexual carelessness is bound to happen with intimate partners, especially when it becomes a daily routine. Eluwa et al (41) also noted how the role of sero-positioning is unknown in Nigeria, with about 70% of MSM ever being tested for HIV. They further indicated that it is unlikely the practice is widespread, which may explain the possibility of respondents with HIV-positive partners getting infected (41).

The study also reported that those who have completed secondary school education were more likely to be infected with STIs, including those who have sex with men unprotected and without lubricant, which may be due to risky sexual behaviors involved discussed earlier in the study. Several studies have reported how MSM who engage in sexual activities with several partners stands the risk of getting infected with at least an STI (54, 55).

Injection of drugs was found to be significant among young adults (18-25 years), which may be due to experimentation, risk-taking, and reward-seeking from peers (56, 57). Youth tend to enjoy experimenting even when it involves risky practices. The odds of young adults engaging in risky behaviors are even higher when pressured

by their peers (57, 58). This result can also be due to the minority stress model, as Meyer asserts that young sexual minorities are susceptible to more significant stress levels and, consequently, display higher rates of drug use (59, 60). Other studies have also reported that young adults may inject drugs due to negative experiences like neglect and physical, sexual, and emotional abuse (61, 62). Employment was also significantly associated with the injection of drugs, which may be due to resources at their disposal since most of these hard drugs are expensive. Onovo et al (59, 60) reported how pharmaceutical opioids, cocaine, and heroin were mainly injected, which are costly and require a constant source of income. However, these drugs are highly addictive and can damage users' general well-being, affecting their source of income. Gays were also significant injectors of drugs in this study, which may result from the social and mental abuse they suffer, especially in countries like Nigeria, where homosexuality is criminalized (27, 63, 64).

Limitations

The study was conducted in three geo-political zones in Benue State, restricting extrapolation to all MSM in the state and Nigeria. Nevertheless, it is a decent representation of MSM prevalence in Benue state, given that the study was done in LGAs with a high MSM concentration.

Conclusion

The findings in this study revealed that condomless intercourse, drug injection, multiple sexual partners, and poor lubricant use are significant determinants of high-risk behaviors among MSM.

MSM has been documented to be exposed to HIV and other STIs due to these behaviors, which makes them even more susceptible given the type of sex they primarily practice. As a result, there is a need for the continuous enlightenment of MSM on high-risk behaviors, sexual health risks, and substance use through intervention programs, healthcare workers' counseling, and other enlightening social gatherings.

List of Abbreviations

GUD: Genital ulcerative diseases
HIV: Human Immunodeficiency Virus
IBBSS: Integrated Biological and Behavioral Surveillance Study
MSM: Men who have sex with men
STIs: Sexually transmitted infections
TasP: Treatment as Prevention

Declarations

Ethics approval, and Consent to Participate

Ethical clearance was sought and obtained via written approval with Ref number: MOH/STA/204/VOL.1/165, from the Benue State Ministry of Health Research Ethics Committee. All information obtained from the respondents was kept confidential and only used for the study. The study protocol was explained to the respondents in English and Pidgin English (the local form of communication in Nigeria). Written consent was obtained and signed by questionnaire respondents who agreed to participate in the study. All data collected was de-identified and there was no link to the respondents.

Consent for publication

All the authors gave consent for the publication of the work under the creative commons Attribution-Non-Commercial 4.0 license.

Availability of data and materials

The data and materials associated with this research will be made available by the corresponding author upon reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

AOE: Conceptualization; Writing – original draft; Writing – review & editing; Resources
APO: Supervision, review and editing
SF: Data curation, data analysis, and literature search
SJO: Study administration and literature search
OPO: Study administration and literature search

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