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PREVALENCE OF HEPATITIS B VIRUS INFECTION AMONG HIV PATIENTS IN BENUE SOUTH SENATORIAL DISTRICT, NIGERIA

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ABSTRACT

Hepatitis B infection seriously threatens global public health, especially in developing nations. Despite several efforts on ascertaining the true prevalence of HBV, it tenaciously varies across different locations and sub-populations, particularly among those at risk of infection such as the HIV-infected population. This study aimed at determining the sero-prevalence of HIV-HBV co-infection in Benue South Senatorial District, Nigeria. This cross-sectional study was conducted in four anti-retroviral therapy (ART) specialized clinics between May 1, and September 2023 using pretested questionnaires, after obtained ethical approval and informed consent.Blood samples of participants were screened using HBsAg testing kitsand the results were interpreted according to the manufacturer's instructions. The screening for HIV-HBV co-infection showed a sero-prevalence of 25/457 (5.47%). The distribution based on clinic location was 12(48%) GH Otukpo, 8(32%) GH Oju, 2(8%) GH Ugbokpo and 3(12%) SMH Okpoga. The distribution also revealed that most cases were in the age group 40-49 and the female gender.The prevalence showed that only 3/25 (12.0%) reported a history of sexually transmitted diseases other than HIV while 2/25 (8.0%) had a history of multiple sex partners. Most co-infected cases 23/25(92.0%) had no history of same-sex relationships and 23/25(92.0%) had recent history of unprotected sex. In Nigeria, hepatitis B infection remains a significant public health problem. Notable preventive strategies include abstinence from sex, avoidance of multiple sex partners, strict adherence to safe sex, and avoiding contact with infected body fluids. Other strategies such as averting mother-to-infant hepatitis B transmission, scale-up of screening programs and extensive vaccination programs are eminently recommended in the course of HBV control.

Keywords: Hepatitis B virus, human immunodeficiency virus, co-infection, seroprevalence, Benue State

INTRODUCTION

Hepatitis B virus (HBV) infection is a global health problem that is associated several diseased conditions such as cirrhosis, hepatocellular carcinoma, and liver failure (Malu *et al.*, 2020). The sero-prevalence of chronic HBV is based on the detection of the hepatitis B surface antigen (HBsAg) and there has been variance as regards the prevalence globally. Although a highly effective HBV vaccine is available, immunization among adult populations in sub-Saharan African countries is neither free nor universal (Mirambo *et al*., 2015; Seremba *et al*., 2017). In Asia, Africa, and South America countries, carrier rates as high as 8% have been reported by the World Health Organization, with sub-Saharan Africa linked to about 20% of the global burden (WHO, 2017). In Nigeria, HBsAg prevalence of 5% was earlier reported in Makurdi, Benue (Malu *et al*, 2020).

Health risks associated with HBV in most cases are aggravated due to co-infection with other viral etiological agents including the human immunodeficiency virus (HIV).In Nigeria, the national HIV prevalence was 1.4% among adults aged 15–64 years, 1.8% among females and 1.0% among males (NAIIS Report, 2019). The co-infection of these viral diseases is a serious public health problem since most therapeutic protocols are designed for the management and control of a single infection (Shahriar *et al*., 2022).Over the years, HIV-HBV co-infection remains a clinical health challenge because these viruses share similar routes of transmission such as the exchange of infected blood or other body fluids via syringes, needles, sexual contact, or mother-to-child (Modi and Feld, 2007; Petty *et al*., 2014). The clinical manifestation of HIV-HBV is critical and can provoke chronic HBV infection, which could result in hepatocellular carcinoma (HCC) (Maponga *et al*., 2020). Reportedly, HIV-HBV co-infection alters the natural characteristics of HBV and triggers a higher rate of progression toward end-stage liver disease (Ndifontiayong *et al*., 2021).

However, less than 5% of people living with HIV (PLHIV) know their HBV status globally (WHO, 2017) and there is a dearth of information on HIV-HBV co-infection from several regions of the world including Benue State in North central Nigeria. In spite of the

recent rise in efforts geared toward HBV screening, gaps in knowledge still exist in some communities due to limited coverage of diagnosis and poor management practices (Okwori *et al*., 2013). Improved understanding of co-infections and patterns of HIV-HBV will reduce the infection burden and provide strategic policy framework on the management and awareness gaps on HBV transmission. In Benue State, Nigeria little is known about viral hepatitis co-infection status due to unavailability of free testing kits and significant proportion of the patients couldn't afford the charges to get tested in private health facilities. The current unavailability of free HBV testing kits in most HIV treatment centers is worrisome especially Benue South, as pregnant women are also made to pay out-of-pocket to know their status(Anejo-Okopi *et al*., 2023). This diagnostic gap constitutes a barrier to the efforts designed towards curtailing hepatitis-related infections in Nigeria. The paucity of research on HIV-HBVco-infection in Benue, Nigeria also remains a big challenge to the management of liver-related viral disease in the district. The aim of this study was to determine the sero-prevalence of HIV-HBV co-infection in Benue South Senatorial District, Nigeria.

MATERIALS AND METHODS

Study area and study design

This cross-sectional study was conducted in four anti-retroviral therapy (ART) specialized clinics and it involved HIV infected individuals aged ≥18 years at General Hospital Ugbokpo, General Hospital Otukpo, General Hospital Oju and St. Mary Hospital, Okpoga in Benue South Senatorial district. This study was carried out between May 1, and September 2023. The study sites were selected purposefully from different Federal Constituencies (Otukpo/Ohimini, Apa/Agatu, Ado/Ogbadibo/Okpokwu, and Obi/Oju) to ensure unbiased representation across the different zones of Benue South.

Sample size determination

The sample size for this study was calculated using a simple formula based on the prevalence rate,

$$\text{Sample size} = \frac{Z^2 P(1-P)}{d^2}$$

Where Z= 1.96 at confidence level of 95%, d= a precision of 3% and P= estimated HIV-HBV co-infection prevalence of 7.6% (Platt *et al*., 2020) and 8.4% (Shahriar *et al*., 2022).The minimum sample size as obtained was 300 and 329 participants. The sample size considered for this study was 478 after considering a 10% non-response rate.

Ethical consideration

The study ethical approval was obtained from the Institutional Ethical Review Board of the Federal University of Health Sciences Otukpo. Permission was also obtained from Benue StateHealth Management Board and site-specific hospital management to access the patients. The consent of each enrolled participant was obtained before their enrolment. The confidentiality of enrollees was protected and the data collected ensured anonymity.

Laboratory procedure and data collection

Comprehensive training on infection management, safety protocols, participants' privacy, and consent necessity was conducted to properly equip the research team. The pretested questionnaire administered involved socio-demographic data and a history of exposure to potential sex-related risk factors.Venipuncture was carried out to get whole blood samples into plain test tubes from which blood serum was obtained. Hepatitis B surface antigen (HBsAg) rapid test kits (ProMed, Boston USA) were placed on a clean level surface, and a dropper was used to transfer two drops of serum to the test kits followed by a drop of buffer. The test kits were allowed to stand for 5 minutes before the first reading, 10 and 15 minutes for the second and third readings, respectively. The results were interpreted as positive by the formation of the control line and test line while the formation of only the control line and absence of the test line indicates a negative result. The absence of both control and test line was interpreted as void and the tests were repeated. The assays were strictly performed following standard operating procedures, including quality controls according to the manufacturer's instructions. A positive HBsAg test was considered evidence of HBV infection. The results of enrolee HBV status were filled on the space provided in the retrieved questionnaires and the laboratory test results were anonymously linked to individual questionnaire information through their unique identifiers.

Data analysis

The data obtained were analyzed using SPSS software v.17.0 (Chicago, IL, USA). Descriptive statistics was used in determining the prevalence as expressed in percentages (%) while cross-tabulations and Chi-Square were used in evaluating statistical relationships among the participants and the reported prevalence using a statistical significance of 0.05. Demographic and clinical characteristics of HIV patients were presented in tables and graphs.

RESULTS AND DISCUSSION

The descriptive data of the study participants and their baseline characteristics are shown in Table 1. A total of 457 HIV-positive patients were enrolled in which 129 (28.2%) were males and 328 (71.8%) were females with a mean age of 43 ± 13 years. Most of the participants 318 (69.6%) were in the age category 30-59 years while ≤30 years (17.9%) and ≥60 years (12.5%) were the least represented category.

Table 1: Socio-demographics of the study population

Characteristics	Frequency [n= 457 (%)]
Age	
18-19	53 (11.6)
20-29	29 (6.3)
30-39	100 (21.9)
40-49	129 (28.2)
50-59	89 (19.5)
60-69	48 (10.5)
≥70	9 (2.0)
Sex	
Male	129 (28.2)
Female	328 (71.8)
Marital Status	
Single	93 (20.4)
Married	244 (53.4)
Separated/Divorced	13 (2.8)
Widow/Widower	107 (23.4)
Educational Status	
No Formal Education	71 (15.5)
Primary	167 (36.5)
Secondary	162 (35.4)
Tertiary	57 (12.5)
Occupation	
Student	67 (14.7)
Unemployed	42 (9.2)
Self-Employed	294 (64.3)
Employed	54 (11.8)
Residence	
Rural	353 (77.2)
Urban	104 (22.8)

It was also observed that the majority of the participants were married 244 (53.4%). Based on the level of education, 386 (84.5%) were formally educated in which primary education was 167 (36.5%) and secondary education 162 (35.4) represented the highest category. Based on occupational status, self-employed formed the majority 294 (64.3%), followed by students 67 (14.7%). Based on residence, the majority of the participants were rural dwellers 353 (77.2%).

The descriptive data in this study, as regards gender distribution, agrees with previous studies that reported higher seroprevalence of HIV in female individuals than males (Vandormael *et al*., 2019; Haeuser *et al*., 2022). In females, the elevated prevalence of sexually transmitted diseases (STDs) including HIV has been attributed to the female urogenital anatomy which makes females exposed and more vulnerable than the male since the vaginal mucosa is delicate, thin and prone to easy penetration by the infectious agents (Van Gerwen *et al*., 2022).

Most of the participants represented in this study (69.6%) were in the age category 30-59 years while age categories ≤30 years and ≥60 years were the least represented category. This agrees with a survey on the population infected with HIV in which the least represented categories were ≤30 years and ≥60 years (Payne *et al*., 2023). Previous studies have reported a decrease in prevalence among younger age groups in comparison to older age groups (Payne *et al*., 2023). This could be attributed to improved health awareness about viral diseases especially among individuals of reproductive age (Akinnibosun *et al*., 2024).In Central and West Africa, the occurrence of new HIV cases in adults and young people living with HIV has been projected to decline by 9% and 33% respectively between 2010 and 2050 (Khalifa *et al*., 2019). The decline observed in participants older than 60 years is unlikely to be due to mortality because the introduction of antiretroviral therapy (ART) has significantly decreased HIV-associated mortality over the years (Rodriguez-Garcia *et al*., 2021). The decline in 60 years and older participants could be due to natural causes as a survey on life expectancy in Nigeria reported an average of 64.3 years for male and female individuals as at 2019 (Angell *et al*., 2022).

In this study, the participants' behavioral characteristics sex related risk factors as shown in Table 2 revealed that the highest level of STDs related history was observed in age group 20-29 (44.8%) followed by 30-39(44.0%) while based on the female gender (32.6%) has the highest level of STDs related history. This aligns with the previous report that highlighted a higher association of STD-related history among young adults and female individuals (Moges *et al*., 2020). The efforts required in the control of STDs among young adults have been immense and remain a great challenge for health workers globally (Folasayo *et al*., 2017). Previous findings also revealed that different factors that influence the level of these sexually transmitted diseases include previous history of STDs, multiple sex partners, and the practice of unprotected sexual intercourse (Kassie *et al*., 2019). In this study, the low level of statistical significance observed as regards same-sex relationships in comparison to other risk factors could be attributed to the largely uneven distribution of the sex practice as most participants (≤ 2.4%) do not practice same sex relationships. Notably, the separated/divorced participants and those that reside in urban communities are associated with higher risk levels as regards STDs related history. However, based on educational status, the least proportion of those associated with higher risk factors was observed among participants with no formal education. Most of the participants' behavioral practices revealed significant associations with the tested variables except for their level of education and place of residence. Contrarily, a low level of formal education has been previously associated with limited information on sexual health and preventive measures (Remera *et al*., 2024). This highlighted the influence of non-formal education, cultural values, and religious values in combating sexual-related risk practices as the study was conducted in a region where cultural and religious practices are held in high esteem.

Table 2: Participants' sexual behavioral characteristics towards sex related risk factors

Characteristics	History of other STDs			History of multiple sex partners			History of same sex relationship			Recent history of unprotected sex		
	Yes (%)	No (%)	P-value	Yes (%)	No (%)	P-value	Yes (%)	No (%)	P-value	Yes (%)	No (%)	P-value
Age												
18-19	4(7.5)	49(92.5)	0.000	0(0.0)	53(100.0)	0.008	0(0.0)	53(100.0)	0.710	1(1.9)	52(98.1)	0.000
20-29	13(44.8)	16(55.2)		7(24.1)	22(75.9)		1(3.4)	28(96.6)		21(72.4)	8(27.6)	
30-39	44(44.0)	56(56.0)		20(20.0)	80(80.0)		1(1.0)	99(99.0)		98(98.0)	2(2.0)	
40-49	46(35.7)	83(64.3)		29(22.5)	100(77.5)		4(3.1)	125(96.9)		129(100.0)	0(0.0)	
50-59	18(20.2)	71(79.8)		18(20.2)	71(79.8)		3(3.4)	86(96.7)		88(98.9)	1(1.1)	
60-69	8(16.7)	40(83.3)		12(25.0)	36(75.0)		2(4.2)	46(95.8)		47(97.9)	1(2.1)	
≥70	2(22.2)	7(77.8)		0(0.0)	9(100.0)		0(0.0)	9(100.0)		9(100.0)	0(0.0)	
Sex												
Male	28(21.7)	101(78.3)	0.021	38(29.5)	91(70.5)	0.000	3(2.3)	126(97.7)	0.943	99(76.7)	30(23.3)	0.000
Female	107(32.6)	221(67.4)		48(14.6)	280(85.4)		8(2.4)	320(97.6)		294(89.6)	34(10.4)	
Marital Status												
Single	18(19.4)	75(80.6)	0.006	12(12.9)	81(87.1)	0.111	0(0.0)	93(100.0)	0.199	30(32.3)	63(67.7)	0.000
Married	84(34.4)	160(65.6)		56(23.0)	188(77.0)		6(2.5)	238(97.5)		244(100.0)	0(0.0)	
Separated/Divorced	7(53.8)	6(46.2)		2(15.4)	11(84.6)		1(7.7)	12(92.3)		134(100.0)	0(0.0)	
Widow/Widower	26(24.3)	81(75.7)		16(15.0)	91(85.0)		4(3.7)	103(96.3)		106(99.1)	1(0.9)	
Educational Status												
No Formal Education	16(22.5)	55(77.5)	0.051	13(18.3)	58(81.7)	0.052	2(2.8)	69(97.2)	0.893	69(97.2)	2(2.8)	0.002
Primary	41(24.6)	126(75.4)		25(15.0)	142(85.0)		3(1.8)	164(98.2)		136(81.4)	31(18.6)	
Secondary	59(36.4)	103(63.6)		30(18.5)	132(81.5)		4(2.5)	158(97.5)		134(82.7)	28(17.3)	
Tertiary	19(33.3)	38(66.7)		18(31.6)	39(68.4)		2(3.5)	55(96.5)		54(94.7)	3(5.3)	
Occupation												
Student	9(13.4)	58(86.6)	0.004	2(3.0)	65(97.0)	0.000	0(0.0)	67(100.0)	0.125	10(14.9)	57(85.1)	0.000
Unemployed	15(35.7)	27(64.3)		6(14.3)	36(85.7)		3(7.1)	39(92.9)		42(100.0)	0(0.0)	
Self-Employed	88(29.9)	206(70.1)		56(19.0)	238(81.0)		7(2.4)	287(97.6)		288(98.0)	6(2.0)	
Employed	23(42.6)	31(57.4)		22(40.7)	32((92.3)		1(1.9)	53(98.1)		53(98.1)	1(1.9)	
Residence												
Rural	102(28.9)	251(71.1)	0.577	66(18.7)	287(81.3)	0.903	11(3.1)	342(96.9)	0.068	317(89.8)	36(10.2)	0.000
Urban	33(31.7)	71(68.3)		20(19.2)	84(80.8)		0(0.0)	104(100.0)		76(73.1)	28(26.9)	

The highest proportion of participants associated with a history of multiple sex partners was observed in age group 60-69 (25.0%) while the male participants had a higher proportion (29.5%) in comparison to the female participants. Similarly, the married, employed, and employed participants were observed to be more associated with multiple sex partners in comparable groups. Most of the participants in this study have no history of same-sex relationships. However, females, separated/divorced, and those with tertiary education are associated with higher risks than other comparable groups. Based on recent history of unprotected sex, the data obtained in this study revealed that most participants are immensely associated with unprotected sex in which is more prevalent among participants that are of age group ≥30 years. The lackadaisical attitudes of individuals towards safe and protected sex activities have been reported in several studies (Zin *et al*., 2019; Nzoputam *et al*., 2022), thereby exposing them to imminent consequences which include STDs and unwanted pregnancies. Similarly, females, those with no formal education, and urban residents are exposed to higher risks within comparable groups. Increased levels of education, urbanization, and exposure to Western media have all been implicated as risk factors that could promote the incidence of STDs in developing nations (Nzoputam *et al*., 2022). However, the single participants and the students are lowly associated with unprotected sex. In this study, most of the sexual behavioral characteristics risk factors evaluated showed significant association with exposure to STDs. The effect of the evaluated variables as notable risk factors has been earlier emphasized in several studies (Kassie *et al*., 2019; Moges *et al*., 2020; Nzoputam *et al*., 2022).

In total, the sero-prevalence of HIV-HBV was 25/457 (5.47%) while 432/457 (94.53%) were HBV negative. The distribution of HIV-HBV co-infection among the 457 tested participants patients based on clinic location as observed was 12(48%) GH Otukpo, 8(32%) GH Oju, 2(8%) GH Ugbokpo and 3(12%) SMH Okpoga as shown in Table 3.

Table 3: Sero-prevalence of HBV and among HIV patients from the selected ART clinics

S/N	ART Sites	Number tested	HBsAg positive (%)	P-value
1	GH Otukpo	218	12	0.334
2	GH Oju	90	8	
3	GH Ugbokpo	49	2	
4	SMH Okpoga	100	3	
	Total	**457**	**25(5.47)**	

GH=General Hospital, SMH=Saint Mary Hospital, HBsAg=Hepatitis B surface antigen

Table 4: Distribution of the HIV-HBV co-infection based on socio-demographics

Characteristics	HIV-HBV Co-infection [n= 25]	P-value
Age		
18-19	2 (8.0)	0.649
20-29	0 (0.0)	
30-39	6 (24.0)	
40-49	10 (40.0)	
50-59	4 (16.0)	
60-69	2 (8.0)	
≥70	1 (4.0)	
Sex		
Male	6 (24.0)	0.629
Female	19 (76.0)	
Marital Status		
Single	3 (12.0)	0.599
Married	13 (52.0)	
Separated/Divorced	1 (4.0)	
Widow/Widower	8 (32.0)	
Educational Status		
No Formal Education	4 (16.0)	0.844
Primary	11 (44.0)	
Secondary	7 (28.0)	
Tertiary	3 (12.0)	

The seroprevalence of HIV-HBV based on age groups revealed that most HIV-HBV co-infection cases (40%) as observed were in the age group 40-49 and most of the cases (76.0%) were also observed in the female gender as shown in Table 4. Additionally, majority of the cases were observed in married individuals (52.0%) followed by widow/widower (32.0%). The highest prevalence was observed in individuals with primary education (44.0%) while the least was observed in individuals with tertiary education (12%).

The seroprevalence of HIV-HBV co-infection as observed in this study was 25/457 (5.47%). This aligns with previous studies which reported that average HIV-HBV prevalence varies between 5–15% across regions (Xie *et al*., 2016; Akindigh *et al*., 2019; Platt *et al*., 2020; Shahriar *et al*., 2022). Several cases of multiple viral pathogens colonizing the same host simultaneously or successively with resultant elevated complications in disease manifestations have been reported (Cookey*et al*., 2021; Shahriar *et al*., 2022).Previous studies have emphasized the rates of HIV-HBV co-infection which varies significantly across geographical locations thereby reflecting diverse patterns of transmission (Coffin *et al*., 2013; Zaw *et al*., 2013).Other risk factors that could influence HIV-HBV co-infection include age, sex, and marital status (Shahriar *et al*., 2022).

Co-infection of viral diseases has vastly impeded human health over the years and they have been linked to major morbidity and mortality cases globally especially in immunocompromised individuals. The epidemiological reports on HIV-HBV co-infection vary geographically, but the burden of infection in sub-Saharan Africa tends to be more due to poor early detection and clinical management (Platt *et al*., 2020). In Nigeria, most rural and semi-urban have limited access to free HBV testing kits which adversely affect proper case management. The history of HIV-HBV co-infection has demonstrated elevated liver-related mortality and HCC-related risks in comparison to individuals with HBV mono- or HIV mono-infection (Pinchoff *et al*., 2016; Rajbhandari *et al*., 2016).

Based on gender, most HIV-HBV co-infection cases as observed in this study were females and married individuals. This aligns with the previous report on HIV-HBV co-infection where the highest prevalence of co-infections was observed in married individuals and the female gender (Seremba *et al*., 2017). Contrarily, other studies reported that co-infection prevalence was higher in males than females (Porras-Ramírez and Rico-Mendoza, 2020). This was reportedly attributed to the fact that males are exposed to riskier sexual behaviors than females such as having multiple sexual partners (Omatola *et al*., 2019).

The seroprevalence of HIV-HBV co-infection based on sex-related history, and sex-related risk factors as shown in Figure 1 revealed that 3/25 (12.0%) had a history of other sexually transmitted diseases while 22/25 (88.0%) had no history of other STDs before HIV. Similarly, the data revealed that 2/25 (8.0%) had a history of multiple sex partners while 23/25 (92.0%) had no history of multiple sex partners. Additionally, most HIV-HBV co-infection cases 23/25(92.0%) had no history of same-sex relationships while lesser cases 2/25(8.0) reportedly have a history of same-sex relationships. However, most HIV-HBV co-infection cases 23/25(92.0%) have a recent history of unprotected sex while others 2/25(8.0) have no recent history of unprotected sex. In this study, HIV-HBV co-infection among the patients based on sex-related history and sex-related risk factors showed that most of the participants acclaimed to have no history of sexually transmitted diseases before HIV and also had no history of multiple sex partners. Although HIV and factors such as STDs and multiple sex partners are usually closely related, the low reportage as observed could be attributed to the traditional social system and stigmatization concerns which serve as a barrier to communicating sexually transmitted diseases and sex-related information.

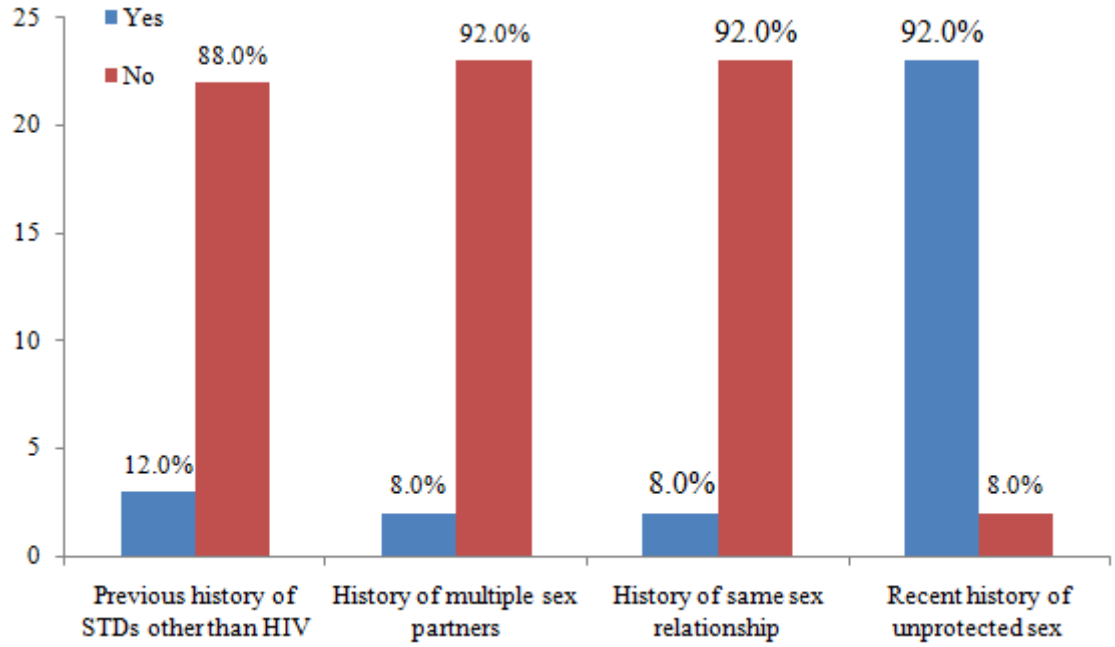

Figure 1: Distribution of HIV-HBV co-infection among the patients based on sex related risk factors

In this study, most HIV-HBV co-infection cases as observed reported no history of same sex relationship. Notably, the rate of infection among the few individuals practicing same-sex relationships [2/11(18.2%)] infers higher tendencies of HIV or HIV-HBV transmission in comparison with the 23/446(5.2%) observed among those that do not practice same-sex relationships. This agrees with a similar study that reported that those practicing same-sex activities are at higher risk of acquiring HIV and other STDs (Beyrer *et al*., 2012). Previous report has also emphasized the influence of same-sex activities on the transmission of STDs and that the probability of getting infected during unprotected anal sex is almost 20 times higher than vaginal sex (Baggaley *et al*., 2010). This is because rectal-related sex promotes the transmission of STDs. After all, the rectal gut is prone to higher levels of friction and also contains a higher number of CD4-expressing cells in the proximal sub-mucosa thereby influencing individuals' susceptibility (Baggaley *et al*., 2010). The lower overall prevalence of infected individuals practicing same-sex relationships in comparison to those that don't could be attributed to significant homogeneity of the study participants as less than 3% of the population under study were reportedly involved in same-sex relationships. However, most HIV-HBV co-infection cases are associated with a recent history of unprotected sex. This aligns with other reports which stated that individuals practicing unprotected sex, especially with multiple partners are highly vulnerable to sexually transmittable infections (Awili *et al*., 2020; Murewanhema *et al*., 2022).

CONCLUSION

This study has provided information on HIV-HBV co-infection status in Benue South senatorial district, Benue, Nigeria. The prevalence is comparable to those observed in related studies, with slight variance which could be due to differences in prevention strategies. Sex abstinence and the practice of safe sex with the use of condoms is highly encouraged since multiple sex partners and unprotected sex were notable factors associated with elevated risks of HIV-HBV co-infection. Proper adherence to preventive and safety measures that could cause transmission via blood, body fluids, and percutaneous injuries is also necessary. Co-infection of HIV-HBV has been notably linked to increased risk of morbidity and mortality. Therefore, routine screening and adequate monitoring are encouraged in co-infected and also mono-infected patients to curtail viral spread and therapeutic complications. Regular sensitization programs on sexual-related infections, the implementation of free and universal HBV vaccination, and also adequate government interventions in funding antiretroviral therapy in HIV patients' treatment are strongly recommended.

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Conflicts of Interest

The authors declared that there is no conflict of interest.

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