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Short Communication

Prevalence of Hepatitis B Virus Infection in Tertiary Health Insitutions in Bayelsa State, Nigeria

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Abstract

Introduction: Hepatitis B virus (HBV) is a severe liver infection with potentially fatal consequences. It ranks as the 10th leading cause of mortality globally and is closely linked to the development of liver cirrhosis and hepatocellular carcinoma. Consequently, the primary objective of this study is to determine the prevalence of HBV infection in tertiary health institutions in Bayelsa State, Nigeria. Methods: This cross-sectional study was conducted from September 2020 to January 2023 with September 2021 to June 2022 in Yenagoa. A total of 656 participants, comprising both males and females, were recruited for this research. Each participant's HBsAg b virus status was assessed using a test strip. Results: Among the 656 participants screened, 10.1% tested positive for HBsAg, with the highest prevalence of HBsAg infections observed in participants aged 26 to 35, demonstrating statistical significance ($P < 0.05$, $P = 0.097$). Among the participants, females had a 5.5% infection rate with HBsAg B Virus, compared to their male counterparts, although this difference was not statistically significant ($P > 0.05$, $P = 0.763$). Conclusion: This study reveals the significant prevalence of HBV infection in two major tertiary health institutions in Bayelsa State. Consequently, it underscores the critical need for raising awareness and implementing rigorous public health policies to mitigate the risk of both vertical and horizontal transmission of the Hepatitis B virus.

INTRODUCTION

Global public health is profoundly concerned about the potentially deadly hepatitis B virus (HBV), a liver infection that has a significant impact. HBV is responsible for hepatitis, which stands as one of the most prevalent infectious diseases worldwide [1]. According to Janahi et al. [2], hepatitis B infection ranks as the tenth leading cause of death on a global scale. This infection is closely associated with the development of hepatocellular carcinoma (HCC) and liver cirrhosis, leading to over a million fatalities annually. While some individuals infected with hepatitis B remain asymptomatic, others endure various challenges, such as jaundice, vomiting, fatigue, diarrhea, and difficulties in eating [3].

An estimated 350 million people across the world, approximately one-third of the global population, suffer from chronic HBV infection, as reported by the Ogoina et al. [4]. Most of these cases are concentrated in low-income Sub-Saharan African nations Ogoina et al., [5]. Geographically, HBV distribution exhibits three endemic patterns: areas with high endemicity (prevalence exceeding 8%), moderate endemicity (prevalence between 2% and 8%), and low endemicity (prevalence less than 2%) [6].

Several behavioral risk factors contribute to transmitting the Hepatitis B virus infection. These include engaging in unprotected sexual contact, using contaminated needles, intravenous drug abuse, receiving tattoos or piercings, being in proximity to young children or infants in highly endemic regions, contact with contaminated blood or bodily fluids, exposure to infants born to infected mothers, interaction with healthcare workers, receiving blood transfusions, prolonged incarceration, and traveling to highly endemic areas [7].

Nigeria, according to research by the United Nations, is one of the countries with the highest rates of chronic viral hepatitis. According to the United Nation's report, Nigeria is considered as one of the greatest disease burdens from chronic viral hepatitis. The United Nations estimated about 211.4 million as Nigeria's population in 2021 [8,9]. Consequently, Nigeria is one of the African nations most affected by hepatitis, with an estimated 19 million individuals affected by the disease Muanya [10]. Experts have expressed concern about the increasing prevalence of hepatitis B and hepatitis C viruses in Nigeria, with prevalence rates of 8.1% and 1.1%, respectively.

Several key factors influence the high endemicity of HBV

infections in a specific geographic region. These factors include poor hygienic practices, a lack of awareness and knowledge regarding the common transmission routes of the hepatitis B virus, geographical location, exposure to risk factors, limited access to healthcare services, inadequate vaccination coverage, preventive and control measures, and host genetic factor. According to Hassan-Kadle et al., [11]. A study conducted at the Niger Delta University Teaching Hospital (NDUTH) in Bayelsa State during 2011-2012 to assess the vaccination rate for Hepatitis B among Nigerian healthcare workers revealed that approximately 38.2% had never been vaccinated, indicating a high prevalence of infection Ogoina et al. [5]. Additionally, pregnant women in Yenagoa exhibited a seropositive rate of 4.6% for the hepatitis B surface antigen and 2.7% for hepatitis C viral antibodies Kotingo and Allagoa [12]. Given the substantial incidence of HBV infections in Nigeria, a comprehensive prevalence dataset is essential to support efforts for HBV prevention, control, and eradication.

Hepatitis B prevalence has been reported in various regions of Nigeria. For instance, among Antenatal Care (ANC) attendees in Gamawa Local Government Area, Bauchi State, the overall prevalence was found to be 6.7% [13]. Additionally, among patients attending a tertiary hospital in Port Harcourt, Nigeria, the overall prevalence was reported to be 10.9% [14]. But information in Bayelsa State appears scanty in literature, therefore, the study aim to determine the prevalence of HBV infection in two major tertiary health institutions in Bayelsa State, Nigeria.

MATERIALS AND METHODS

Study Area, Design and Population

This cross-sectional study was conducted in Yenagoa Local Government Area of Bayelsa State in the South-South region of Nigeria. The research was carried out at two healthcare facilities, the Federal Medical Centre (FMC) and the Niger Delta University Teaching Hospital (NDUTH) in Okolobiri. The study spanned from September 2020 to January 2023 with September 2021 to June 2022 and was primarily based at the Federal Medical Centre in Yenagoa. Ethical approval for the study was obtained from both hospitals' Ethics and Research Committees. The research included all individuals who sought HBsAg testing at the Microbiology Laboratory Department and those attending the Gastroenterology Clinics in both hospitals.

Sampling Technique

For the purpose of the study, a total of 656 male and female participants who underwent HBV testing from September 2020 to January 2023 with September 2021 to June 2022 were enrolled. The researcher and research assistants conducted interviews with the participants using a semi-structured questionnaire to collect data on sociodemographic characteristics, including age and gender. To isolate plasma from red blood cells, aseptic collection of two (2) milliliters of whole blood was performed from the patients. The collected blood was then placed in an ethylene diamine tetra-acetic acid (EDTA) container and subsequently centrifuged for five minutes at 3000 rpm.

Laboratory Examination

The obtained plasma was employed for the HBsAg screening. The screening test for HBsAg status was conducted using the Surge-lab rapid immuno-chromatographic test strip, and the Skytec test kit, in accordance with the manufacturer's instructions and following the WHO standard algorithm [4]. The procedure involved removing the protective foil cover from the test card and applying 50 microliters of plasma to the sample pad, allowing it to flow. After a 15-minute incubation period, the test result was read and recorded.

Statistical Analysis

The Statistical Package for the Social Sciences (SPSS) version 21 was utilized in order to perform the analysis on the data generated. Chi-square tests were used to make comparisons between the variables. A statistically significant p-value was determined to be lower than 0.05. Tables, bar chart and percentage breakdowns were used to show the findings.

RESULTS

Table 1 results indicate that out of the 656 subjects screened for HBsAg, 475 (72.4%) were females, and 181 (27.6%) were males. The age distribution revealed that 301 (45.9%) subjects were in the 26-35 age range, 120 (18.3%) were aged 36-45, 118

Table 1: Demographic Presentation of Participants

AGE GROUPS	MALE (%)	FEMALE (%)	TOTAL (%)
<15	11 (1.7)	19 (2.9)	30 (4.6)
16-25	28 (4.3)	90 (13.7)	118 (18.0)
26-35	50 (7.6)	251 (38.3)	301 (45.9)
36-45	40 (6.1)	80 (12.2)	120 (18.3)
46-55	25 (3.8)	13 (2.0)	38 (5.8)
≥56	27 (4.1)	22 (3.4)	49 (7.5)
TOTAL	181 (27.6)	475 (72.4)	656

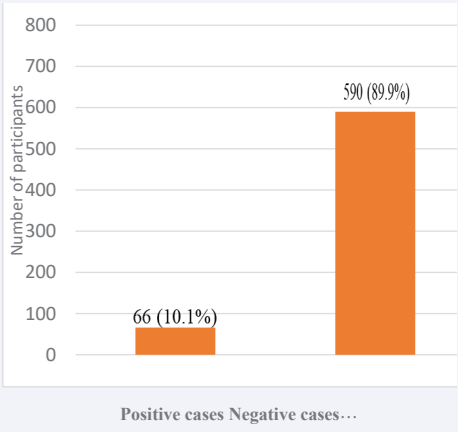

Figure 1 Prevalence of HBV infection in two major tertiary health institutions in Bayelsa State, Nigeria.

(18.0%) were between 16-25 and 49 years, 38 (5.8%) were in the 46-55 age group, and 30 (4.6%) were under 15, while 7.5% were older than 56. Figure 1 shows that out of the 656 participants, 66 (10.1%) tested positive for HBsAg, while 590 (89.9%) tested negative.

Table 2 reveals that among the 656 participants, 37 (5.6%) in the 26-35 age group were HBsAg positive, 14 (2.1%) in the 36-45 age group, 9 (1.4%) in the 16-25 age group, 9 (1.1%) in the >56 age group, 3 (0.5%) in the 46-55 age group, and 2 (0.3%) in the >15 age group tested positive for HBsAg. The analysis, with a P-value of <0.05 indicating significant variations, suggests no significant association between age groups and HBsAg positivity (P = 0.097).

Table 3 results show that out of the 656 subjects in this study, 36 (5.5%) of the female subjects were HBsAg positive, while 30 (4.5%) of the male subjects tested positive. The analysis, with a P-value of <0.05 indicating significant variations, suggests no significant association between gender and HBsAg positivity (P = 0.763).

Table 4 provides the distribution of Hepatitis B virus infection prevalence by age and gender. Out of the 66 HBV-positive subjects, 1 (0.2%) was positive for both males and females under the age of 15. In the 16-25 age group, 4 (0.6%) were males and 5 (0.8%) were females who tested positive. For the 26-35 age group, 12 (1.8%) were males and 25 (3.8%) were females with HBV infection. In the 36-45 age group, 10 (1.5%) were males and 4 (0.6%) were females who tested positive. For the 46-55 age group, 2 (0.3%) were males and 1 (0.2%) were females who tested positive. In the age group of 56 years and older, 1 (0.2%) was male and 0 (0.0%) were female who tested positive.

Table 2: Prevalence of HBsAg by Age.

Age group	Total No. Examined (%)	Positive (%)	Negative (%)
<15	30 (4.6)	2(0.3%)	28 (4.3)
16-25	118 (18.0)	9 (1.1%)	109 (16.6)
26-35	301 (45.9)	37 (5.6%)	264 (40.2)
36-45	120 (18.3)	14 (2.1%)	106 (16.2)
46-55	38 (5.8)	3(0.5%)	35 (5.3)
≥56	49 (7.5)	1 (0.1%)	48 (7.3)
Total	656	66	590 (90.0)
Chi square value	4.667		-
p-value	0.097		-

Table 3: Prevalence of HBsAg by Gender

Gender	Positive (%)	Negative (%)	Total (%)
Male	30 (4.5)	151 (23.0)	181 (27.6)
Female	36 (5.5)	439 (66.9)	475 (72.4)
Total	66 (10.0)	590 (90.0)	656
Chi square value	0.091	-	-
p-value	0.763	-	-

Table 4: Distribution of Hepatitis B Virus Infection Prevalence by Age and Gender

Age	MALE			FEMALE		
Groups	N.E(%)	N.I(%)	N.N(%)	N. E (%)	N.I(%)	N.N (%)
<15	11 (1.7)	1 (0.2)	10(1.5)	19 (2.9)	1 (0.2)	18 (0.3)
16-25	28 (4.3)	4 (0.6)	24(3.7)	90 (13.7)	5 (0.8)	85(1.4)
26-35	50 (7.6)	12 (1.8)	38(5.8)	251 (38.3)	25 (3.8)	226 (5.6)
36-45	40 (6.1)	10 (1.5)	30(4.6)	80 (12.2)	4 (0.6)	76 (2.1)
46-55	25 (3.8)	2 (0.3)	23(3.5)	13 (2.0)	1 (0.2)	12 (0.5)
≥56	27 (4.1)	1 (0.2)	26(4.0)	22 (3.4)	00	22(3.4)
TOTAL	181(27.6)	30 (4.6)	151(23.0)	475 (72.4)	36 (5.5)	439(66.9)

N.E: Number Examined; N.I: Number Infected, NN: Number Negative

DISCUSSION

HBV is globally associated with hepatocellular carcinoma, liver cirrhosis, and chronic hepatitis. In Nigeria, vertical transmission remains the primary mode of HBV infection. Early diagnosis and treatment of infected individuals are not widespread, and primary preventive strategies like immunization and post-exposure prophylaxis, as well as secondary prevention measures such as safe sexual and sanitary practices, are not yet universally implemented in the country. This study examined the prevalence of Hepatitis B virus infection among patients visiting tertiary hospitals in Bayelsa State.

The World Health Organization classifies HBV infection into three levels of prevalence: high, intermediate, and low [15]. According to this classification, a majority of more than 8% is considered high, 2% to 8% is considered intermediate, and less than 2% is considered low. The results of this study revealed that out of 656 individuals, 66 (10.1%) tested positive for HBsAg, while 560 (89.9%) tested negative for HBV. Based on this data, it can be inferred that approximately 10.1% of Yenagoa's population was likely infected with HBV between 2022 and 2023 with 2021 and 2022.

Hepatitis B prevalence has been reported in various regions of Nigeria. For instance, among Antenatal Care (ANC) attendees in Gamawa Local Government Area, Bauchi State, the overall prevalence was found to be 6.7% [13]. Additionally, among patients attending a tertiary hospital in Port Harcourt, Nigeria, the overall prevalence was reported to be 10.9% [14].

These findings align with the estimated 10.9% prevalence among patients attending a tertiary hospital in Port Harcourt, Nigeria [14], 12.2% prevalence of HBV reported by Olayinka et al., [16] and corresponpond with the overall 9.6% prevalence in Nigeria as reported by Owhonda et al. [17], and higher than the value of 6.7% reported among ANC attendees in Gamawa Local Government Area, Bauchi State, Nigeria [13]. The high HBV frequency among the study participants could be attributed to various factors, including inadequate hygiene and a lack of awareness regarding the standard modes of HBV transmission.

As suggested by Hassan-Kadle et al. [11] and Schweitzer et al. [18], variations in HBV prevalence rates between this study and others may result from differences in study populations, sample sizes, geographical regions, exposure to risk factors, healthcare access, vaccination coverage, endemicity, prevention, and control measures, and host genetic factors.

Infection with the Hepatitis B Virus is commonly associated with engaging in risky behaviors, such as unprotected sexual contact with an infected person, using contaminated needles, intravenous drug abuse, and procedures like ear piercing and tattooing, among others. This study's results reveal that individuals between the age groups of 26-35 years and 36-45 years exhibited the highest prevalence of HBsAg infection, as presented in Table 2. This could be attributed to the fact that these age groups are the most active in terms of engaging in sexual activities and drug-related matters. This finding aligns with the study conducted by Frank-Peterside and Ayodele [15], which also reported the highest prevalence of HBsAg within these age groups. On the other hand, subjects aged 56 years and above had the lowest prevalence of HBsAg infection compared to the other age groups, possibly due to a decrease in sexual activity in this particular age group. This finding is in line with the results of Gentile and Borgia [7], which associated the transmission of HBsAg B virus with sexual behaviors.

In this study, the number of female subjects was higher than their male counterparts, suggesting that females seek medical care at hospitals more frequently than males. Frank-Peterside and Ayodele [15] also confirmed a higher ratio of female patients than males in their studies. Additionally, the rate of HBsAg B virus infection in females was higher than in males. This might be connected to a higher proportion of females participating in this study. However, this finding contradicts the study by Vilibic et al. [19], which suggested that males are more susceptible to HBsAg B virus infections. The difference in findings could be attributed to unique factors associated with females.

Moreover, Nigeria has made significant progress in controlling and preventing hepatitis B infection, adopting a four-pronged strategy recommended by the World Health Organization, WHO to address hepatitis as a global health concern. These strategies encompass monitoring cancer cases linked to hepatitis, establishing national guidelines for infection control among healthcare workers, enforcing vaccine requirements, and screening all donated blood. However, it is regrettable that no clear national policies have been implemented to prevent mother-to-child transmission of this infection, let alone achieving the complete eradication of HBV. This is reflected in the current findings where the prevalence of HBV stands at 10.0%.

This prevalence aligns with the findings of Musa et al. [20-22], which reported a 14.0% exposure to HBV infection among Nigerians between 2000 and 2013. Similarly, it is consistent with the estimate of 12.2% of people being infected with HBsAg B virus, as Olayinka et al [16].

CONCLUSION

This study has revealed a significant prevalence of HBV in Yenagoa, Bayelsa State. Consequently, it emphasizes the critical need for raising awareness and implementing rigorous public health policies to prevent both vertical and horizontal transmission of HBV.

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