

# Prevalence of Hepatitis B Co-infection with HIV/AIDS: A Three-Year Retrospective Study at Federal University of Health Sciences Teaching Hospital, Otukpo.

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## ABSTRACT

**Introduction:** Hepatitis B virus (HBV) and Human Immunodeficiency Virus (HIV) co-infection is common and constitutes a significant global public health burden, particularly in regions with high HIV prevalence. This increases the risk of complications and mortality among people living with HIV. Despite the international concern, there is a paucity of data on HBV co-infection among individuals living with HIV who attend the HIV clinic at the Federal University of Health Sciences, Otukpo (FUHSO), Benue State, Nigeria. This study aims to determine the prevalence of HBV co-infection among HIV-infected individuals receiving care at the FUHSO HIV/AIDS clinic.

**Methods:** A retrospective study design was employed for this study, conducted between December 2021 and November 2024. Overall, 3000 case files were reviewed (150, 600, 850, and 1400 in 2021, 2022, 2023, and 2024, respectively). Individuals with incomplete clinical records were excluded from the study. **Results:** Three thousand (3000) case files were analyzed, and the overall prevalence of Hepatitis B Co-infection amongst the HIV patients enrolled in the study was 10.3% (310/3000). The prevalence was higher in females (6.9%) than in males (3.1%). The relationship between the age of patients and the HIV/HBV Co-infection was statistically significant.

**Conclusion:** Though our study indicates a low prevalence of Hepatitis B co-infection in HIV infected people in our center, reduction of the rate is still strongly necessary. Reduction can be achieved by solidification of the uptake of the Hepatitis B vaccine.

**Keywords:** Co-infection, HBV, HIV and AIDS, Otukpo

## INTRODUCTION

Hepatitis B virus (HBV) is a double-stranded DNA virus transmitted through blood and bodily fluids. It is the most important and prevalent infectious agent leading to inflammation of human liver<sup>1-3</sup>. According to WHO, hepatitis B surface antigen carrier rates is as high as 8% in countries across Asia, Africa, and South

America, with sub-Saharan Africa alone accounting for about 20% of the global HBV burden.<sup>4</sup> In Makurdi, Benue State, a 2020 study by Malu et al. found an HBsAg prevalence of 5% among the general population.<sup>5</sup> According to current literature review, 360 million people worldwide are experiencing the chronic forms of HBV infection.<sup>6</sup> It has been documented that protracted forms of hepatitis B (active and in-active) can

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lead to several complications among the subjects such as Hepatocellular Carcinomas (HCC) and cirrhosis.<sup>7</sup>

HBV-related health risks are often exacerbated by co-infection with other viral pathogens, such as HIV. In Nigeria, the National HIV/AIDS Indicator and Impact Survey (NAIIS) reported a national HIV prevalence of approximately 1.4% among adults aged 15–49 years (1.9% in females and 0.9% in males), with rates rising slightly about 1.5% when including those aged 15–64.<sup>8,9</sup> As people living with HIV are living longer due to improved access to antiretroviral therapy, liver disease has emerged as a significant cause of death among those co-infected with hepatitis B or C.<sup>10-12</sup>

Chronic hepatitis B co-infection raises the risk of antiretroviral therapy-related liver toxicity by three- to fivefold<sup>13,14</sup>, and drug cross-resistance between HIV and HBV treatments is frequently observed<sup>15,16</sup>. Fortunately, tenofovir, a backbone component of many ART regimens, is also the most effective long-term therapy for chronic HBV. It provides sustained viral suppression, facilitates regression of cirrhosis and fibrosis, and markedly lowers HBV-related mortality.<sup>17</sup> Understanding the global burden of HBsAg co-infection in people living with HIV is essential to identify the most affected regions and to guide screening and clinical care programs worldwide. About 7–10% of PLHIV (2–4 million individuals) have chronic HBV, but these figures stem from a small number of studies with unclear methods. Less than 5% of people living with HIV (PLHIV) know their HBV status globally,<sup>4</sup> 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. Despite a 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.<sup>18</sup> However, a recent study by Okopi et al. (2024) 2024 shows the sero-prevalence of HIV-HBV co-infection in Benue South senatorial district to be 5.47% and that of Otukpo to be 12%.<sup>19</sup> The purpose of this study is to assess the prevalence of HBV and HIV co-infection among HIV patients treated at the ART clinic of FUHSTO between 2021 and 2024.

## METHODOLOGY

**Study Area:** The Federal University of Health Sciences Teaching Hospital, Otukpo, is a tertiary Health facility in Benue State, North Central Nigeria. It is a multi-disciplinary facility providing medical services to clients from Benue State and the surrounding States of Enugu, Nasarawa, Taraba, and Cross Rivers. It has an HIV care and treatment centre supported by APIN.

**Study Design:** A retrospective study design was employed for this study.

**Study population:** All registered HIV patients, enrolled in the HIV treatment centre of FUHSTHO between December 2021 and November 2024, were used as the study population. No contact with human subjects occurred; only secondary unlinked data were used. A total of 3000 HIV infected patients' case files were obtained during the study period. Patients with incomplete clinical records were excluded from the study.

**Data Collection:** The Data sources used were patients' case files obtained from the record department of FUHSTHO. Relevant independent variables used were the patients' demographic information (Age and Sex).

**Data Analysis:** The data extracted from the case files were entered into a predesigned software program in Statistical Packages for the Social Sciences (SPSS) version 25 (SPSS Statistics for Windows, version 23.0, Armonk, NY: IBM Corp). Frequency Tables and charts were used to summarize the independent variables of interest. The Pearson chi-square ( $\chi^2$ ) test was used to assess the association between the demographic variables (Age and Sex) and the primary outcome of the study, with a statistical significance set at a p-value of 0.05.

## Ethical Consideration and Informed Consent

Ethical approval for the study was obtained from the Federal University of Health Sciences Teaching Hospital, Otukpo Health Research Ethics Committee, before the commencement of the study. Approvals from the management of the Federal University of Health Science Teaching Hospital, Otukpo, were also obtained.

## RESULTS

A total of 3,000 case files of HIV-infected patients were reviewed during the study period. The overall prevalence of hepatitis B co-infection was 10.3%, with males accounting for 3.1% and females for 6.9%.

### The Sociodemographic Characteristics of the Patients (Age and Sex)

Patients aged <20 years accounted for 190(6.3%), 21-40 years accounted for 2000(66.7%), 41-60 years accounted for 700(23.3%) while 60-85 years accounted for 110(3.7%). More than two-thirds (71.7%) were female, while 28.3% were male.

**Table 1: Age and Sex distribution of patients enrolled in the study (2021-2024)**

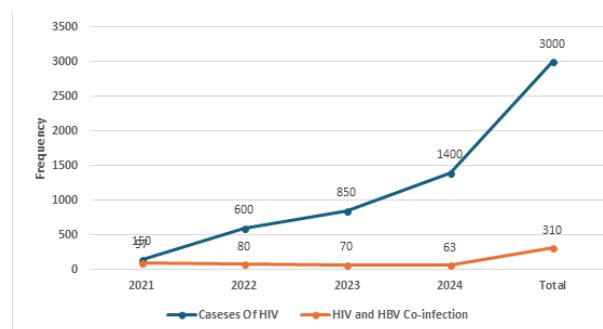
| Age/Sex                  | Frequency | Percentage |
|--------------------------|-----------|------------|
| <b>Age Group (Years)</b> |           |            |
| <20                      | 190       | 6.3        |
| 21-40                    | 2000      | 66.7       |
| 41-60                    | 700       | 23.3       |
| 60-85                    | 110       | 3.7        |
| <b>Sex</b>               |           |            |
| Male                     | 850       | 28.3       |
| Female                   | 2150      | 71.7       |

Mean Age=35.4 (11.82)years

### Prevalence of HIV/HBV Co-infection, and the Age and Sex Specific of HIV/HBV Co-infection

Figure 1 and Table 2 presents the annual prevalence of HIV/HBV Co-infection, and the Age and sex specific prevalence within the period under review. Of the 3000 cases reviewed, the prevalence of HIV and HBV co-infection was 10.3%. The number of HIV cases shows a sharp upward trend over the years. In 2021, there were 150 cases, which rose significantly to 600 in 2022 and further to 850 in 2023. The figure continued to rise steeply, reaching 1,400 cases in 2024. Overall, the cumulative number of HIV cases across the four years amounted to 3,000, demonstrating a progressive and substantial increase over time. In contrast, the trend for HIV and HBV co-infections remained relatively stable but fluctuating at lower levels compared to HIV cases. The co-infections were 80 cases in 2022, slightly dropped to 70 in 2023, and further to 63 in 2024, after starting at 97 in 2021. Despite the year-to-year fluctuations, the cumulative total of HIV/HBV co-infections reached 310, which is comparatively small

relative to the total HIV burden (Figure 1). Patients aged <20 years accounted for 32(10.3%), 21-40 years accounted for 60(19.4%), 41-60 years accounted for 190(61.3%) while 28(9.3%) are within the age range of 60-85 years.



**Figure 1: Annual trend of HIV cases and HIV+HBV Co-infection (2021-2024)**

**Table 2: Number of Hepatitis B Co-infection by age and sex**

| Age/Sex                  | Frequency | Percentage |
|--------------------------|-----------|------------|
| <b>Age Group (Years)</b> |           |            |
| <20                      | 32        | 10.3       |
| 21-40                    | 60        | 19.4       |
| 41-60                    | 190       | 61.3       |
| 60-85                    | 28        | 9.3        |
| <b>Sex</b>               |           |            |
| Male                     | 108       | 34.8       |
| Female                   | 202       | 65.2       |

### Association between Hepatitis B Co-Infection and the Socio-demographic Characteristics of the patients

The co-infection among those between 41-60 years was higher (61.3%), followed by 21-40 years (19.4%), less than 20 years (10.3%) and the least was those above 60 years (9.0%). Similarly, co-infection among the females was higher than the males (65.2% and 34.85 respectively). The relationship between Hepatitis B co-infection and patient age, and sex was statistically significant ( $p = 0.0001$  and  $0.011$  respectively),

**Table 3: The Age and Sex distribution of patients by HIV/HBV Co-infection Status**

| Age/Sex                                               | HBV co-infection (%) n=310 | NO HBV co infection (%) n=2690 | Total |
|-------------------------------------------------------|----------------------------|--------------------------------|-------|
| <b>Age Group (Years)</b>                              |                            |                                |       |
| <20                                                   | 32 (10.3%)                 | 169(6.3%)                      | 201   |
| 21-40                                                 | 60 (19.4%)                 | 1794(66.7%)                    | 1854  |
| 41-60                                                 | 190(61.3%)                 | 627(23.3%)                     | 817   |
| 60-85                                                 | 28(9.0%)                   | 100(3.7%)                      | 128   |
| <b>X<sup>2</sup> = 682.13, df= 3, p-value =0.0001</b> |                            |                                |       |
| <b>Sex</b>                                            |                            |                                |       |
| Male                                                  | 108 (34.8%)                | 750(27.9%)                     | 858   |
| Female                                                | 202 (65.2%)                | 1940 (72.1%)                   | 2142  |
| <b>X = 6.49, df= 1, p value =0.011</b>                |                            |                                |       |

## DISCUSSION

In our study, the prevalence of HIV and Hepatitis B Co-infection was 10.3%. The majority of the patients are within the age range of 41-60 years. The prevalence in females was 65.2% while in males it was 34.8%. The prevalence of Co-infection is higher than 1.2% reported in a survey conducted in Dar es Salaam and 20, 4% in Nairobi<sup>21</sup>, and 4.9% in China. Although our prevalence appears higher than the rates reported in Dar es Salaam, Nairobi, and China, this variation may be attributed to differences in population characteristics and the retrospective nature of our study, which relied on hospital-based data collected over a specified period rather than a population-wide survey. On the other hand, the prevalence in our study is lower than 19% in a similar survey conducted in Maiduguri, Northern Nigeria, in 2007.<sup>23</sup> On the other hand, the lower prevalence reported in our study, when compared with the earlier report from Maiduguri, could be attributed to the increasing availability of Hepatitis B vaccine, which is now amongst the vaccines that are available in the National Program on Immunization (NPI) in Nigeria. CO-infection decreases over time. In our study, the yearly trend of HIV cases reported increases over time. However, the co-infection decreases disproportionately probably be due to awareness campaign

In a similar study conducted by Okopi et al 2024 in some selected health facilities in Benue South senatorial district, the prevalence of HBV co-infection with HIV in General hospital, Otukpo was higher (12%), followed by General hospital, Oju (8%), General hospital,

Ugbokpo (2%), and General hospital Okpoga (3%)<sup>19, 20</sup>. The prevalence in our study is similar to those found in General hospital Otukpo and General hospital Oju. However, it is significantly higher than those found in General Hospital Ugbokpo and General Hospital Okpoga.

The possible reasons for the variation in the prevalence of HBV co-infection with HIV in this study and other findings could be poor public health awareness and immunization campaigns in those facilities, leading to poor immunization rates for mothers and children, and a low acceptance rate of immunization in those areas, probably due to cultural beliefs. Also, a high rate of unprotected sex could be implicated in that too. Availability of hepatitis vaccine in the facilities with lower prevalence is also a possible explanation.

The HIV co-infection rate amongst females (65.2%) was found to be higher than that amongst males (34.8%). The difference is statistically significant ( $p > 0.05$ ), however, this finding is contrary to the report of a study conducted in Kenya<sup>24</sup>. The findings suggest that women may be more frequently affected or more often detected with HBV co-infection, possibly due to increased health service utilization such as antenatal screening, blood transfusions associated with obstetric procedures, or other medical exposure.

The difference in co-infection rates between participants aged  $\leq 20$  years (10.3%) and those aged 41–60 years (61.3%) in our study was statistically significant ( $p < 0.01$ ). Adults were found to be at a significantly higher risk of co-infection compared to younger individuals.

This increased prevalence and risk among adults may be attributed to cumulative past exposure to unsafe practices, lifestyle, occupational hazards, underlying health conditions, poor hygiene, under-vaccination, or poor access to healthcare. This result is consistent with the findings of Laguna-Meraz (2022), who reported that HBV co-infection with HIV risk increases with advancing age (27).

## CONCLUSION

This study reveals a relatively high prevalence of hepatitis B virus (HBV) co-infection among HIV-infected patients in our facility. A significant reduction in the co-infection rate is both desirable and necessary. Strengthening the uptake of the hepatitis B vaccine through routine childhood immunization programmes remains a key strategy toward achieving this goal. Furthermore, additional research is warranted to investigate the underlying causes of increased vulnerability in specific age groups.

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