**PREVALENCE OF HEPATITIS B INFECTION AND ASSOCIATED FACTORS AMONG STUDENTS OF TERTIARY INSTITUTION IN EKITI STATE, NIGERIA**

**Abstract**

Hepatitis B virus (HBV) infection remains a major global public health challenge, with a disproportionately high burden in sub-Saharan Africa. This study investigated the prevalence, associated risk factors, awareness, and vaccination status of HBV among students of the College of Health Sciences and Technology, Ijero Ekiti, Nigeria. A cross-sectional design was employed, involving 544 participants who completed structured questionnaires and underwent serological testing for hepatitis B surface antigen (HBsAg). Findings revealed that 20 students (4%) were HBsAg-positive, while 524 (96%) tested negative. Residence significantly influenced infection rates, with urban dwellers showing a higher prevalence (7.3%) compared to rural residents (2.6%, p = 0.018). Key behavioral risk factors included unprotected sexual intercourse (7.6% vs. 2.7%, p = 0.016) and sharing of sharp objects (6.8% vs. 2.2%, p = 0.019). Awareness of HBV was relatively high (80.9%), with 66.2% correctly identifying it as a viral disease. However, misconceptions persisted, particularly regarding mother-to-child transmission and vaccine availability. Vaccination uptake was notably poor, with only 6.7% of participants ever vaccinated, and just 20% completing the three-dose schedule. Lack of awareness (57.8%) was the most commonly reported barrier to vaccination. In conclusion, HBV prevalence among students was of intermediate level, with infection strongly associated with risky behaviors and inadequate vaccination coverage. Strengthening routine vaccination programs and implementing targeted health education interventions are urgently needed to reduce HBV transmission and improve health outcomes in this population

**Keywords:** Hepatitis B virus (HBV), Vaccination, Seroprevalence, HBV Risk behaviors, Awareness, Nigeria

**Introduction**

Hepatitis B virus (HBV) infection is a major global public health challenge, with an estimated 296 million people living with chronic HBV worldwide in 2019 and about 820,000 annual deaths due to complications such as cirrhosis and hepatocellular carcinoma (WHO, 2021). The global prevalence of HBV varies geographically, with the highest rates recorded in sub-Saharan Africa and East Asia, where the prevalence of chronic HBV infection ranges from 5–12% in the general population (Al-Busafi & Alwassief, 2024; Kaewdech et al., 2025; WHO, 2017, Schweitzer et al., 2015). In contrast, regions such as North America and Western Europe record much lower prevalence, typically below 2% (WHO, 2022).

In Africa, approximately 81 million people are chronically infected with HBV, representing a regional prevalence of about 7.5% (WHO, 2021). Transmission is commonly sustained through perinatal infection, horizontal transmission among children, unsafe medical practices, and traditional cultural practices involving scarification or tattooing (Mohamud et al., 2024). In Asia, the burden remains significant, with countries such as China reporting HBV prevalence of 5-7%, and parts of Southeast Asia reporting rates as high as 8-10%, despite widespread introduction of vaccination programs (Kaewdech et al., 2025; Al-Busafi & Alwassief, 2024; Li et al;, 2021; Schweitzer et al., 2015; Ott et al., 2012).

Nigeria bears one of the highest burdens of HBV infection globally, with prevalence estimates ranging between 8% and 12% in the general population (Ajuwon et al., 2021; Musa et al., 2015; Ogoina et al., 2014a; Kramvis and kew, 2007). A recent systematic review and meta-analysis reported a pooled prevalence of 12.2% among Nigerians, classifying the country as a highly endemic region (Musa et al., 2015). This translates to millions of individuals at risk of HBV-related complications, with significant implications for healthcare delivery and the economy. The persistence of high prevalence in Nigeria is attributed to vertical transmission, poor vaccination uptake, limited screening, and widespread risky cultural practices such as sharing sharp instruments and unsterile body modifications (Oti et al., 2017).

Despite the availability of effective vaccines and antiviral therapy, awareness and knowledge of HBV infection remain suboptimal in many Nigerian communities. Studies have shown that misconceptions about HBV transmission, poor integration of HBV education into primary healthcare, and inadequate public health campaigns contribute to sustained transmission (Li, et al., 2024; Oti et al., 2017). Young adults, who constitute a large proportion of the Nigerian population, are particularly vulnerable due to risky practices and limited access to preventive services.

Given this background, there is a pressing need for localized data on HBV prevalence, awareness, and associated factors across different Nigerian populations. Such evidence is critical for guiding targeted interventions, improving vaccination coverage, and reducing the long-term burden of HBV-related morbidity and mortality.

Therefore, this study was conducted to determine the prevalence of HBV infection and identify associated sociodemographic and behavioral factors among participants in a tertiary institution in Ekiti state, Nigeria.

**Methodology**

A descriptive cross-sectional study was conducted among students of the College of Health Sciences and Technology, Ijero-Ekiti, Ekiti State, Nigeria, from May to July 2025. Eligible participants were individuals aged ≥18 years who provided informed consent, while those with bleeding disorders or who declined participation were excluded. The sample size was determined using Taro Yamane’s (1967) formula for populations less than 10,000 (Yamane, 1967). A total of 544 consenting participants were screened for hepatitis B surface antigen (HBsAg) and completed a structured questionnaire.

Data collection involved a validated, structured questionnaire and HBsAg screening. The questionnaire comprised six sections: socio-demographic characteristics, knowledge of HBV, risk behaviors, vaccination/testing history, medical history, and family background. HBsAg detection was performed using the PROMED rapid test kit (lateral flow immunoassay) following the manufacturer’s instructions. Approximately 30–50 µL of capillary blood was applied to the test cassette, followed by assay buffer. Results were interpreted at 15 minutes: two lines (C and T) indicated a positive result, one line (C) negative, and absence of the C line invalid. Positive and negative controls were routinely included for quality assurance (Shenge et al., 2021; Amini et al., 2017).

Ethical approval (Ref: CHSTI/CRID/25/006) was obtained from the College Research Innovation and Development Unit. written informed consent was secured from all participants, following international ethical standards for human research (World Medical Association, 2013). Data were entered into Microsoft Excel (version 2021) and analyzed using descriptive statistics to generate frequencies and percentages. HBV prevalence was expressed as the proportion of HBsAg-positive participants, and associations between variables were assessed using Chi-square tests at a significance level of p < 0.05.

**RESULTS**

**Sociodemographic characteristics of study participants**

Table 1: Sociodemographic characteristics of study participants

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Category | Frequency | Percent |
| Age (years)  Mean ± SD =  23.40 ± 7.14 | >20 | 120 | 22.1 |
| 20-29 | 361 | 66.4 |
| 30-39 | 26 | 4.8 |
| 40-49 | 33 | 6.1 |
| >50 | 4 | 0.7 |
| Gender | Male | 69 | 12.7 |
| Female | 458 | 84.2 |
| Other | 17 | 3.1 |
| Marital Status | Single | 444 | 81.6 |
| Married | 84 | 15.4 |
| Divorced | 7 | 1.3 |
| Widowed | 9 | 1.7 |
| Educational Level | No formal education | 22 | 4.0 |
| Primary | 6 | 1.1 |
| Secondary | 17 | 3.1 |
| Tertiary | 499 | 91.7 |
| Which course did you study? | Health-related course | 514 | 94.5 |
| Engineering | 4 | 0.7 |
| Administration | 26 | 4.8 |
| Occupation | Student | 497 | 88.1 |
| Civil Servant | 41 | 7.5 |
| Community Health | 11 | 2.0 |
| Self-employed | 12 | 2.2 |
| Banker | 1 | 0.2 |
| Religion | Christianity | 401 | 73.7 |
| Islam | 136 | 25.0 |
| Traditional | 5 | 0.9 |
| Other | 2 | 0.4 |
| Location | Urban | 218 | 40.1 |
| Rural | 326 | 59.9 |
| Ethnicity | Hausa | 17 | 3.1 |
| Igbo | 19 | 3.5 |
| Yoruba | 485 | 89.2 |
| Others | 23 | 4.2 |
| Total | 544 | 100.0 |

The sociodemographic characteristics of the study participants in Table 1 revealed that the mean age was 23.40 ± 7.14 years, with the majority (66.4%) aged between 20–29 years, followed by 22.1% who were younger than 20 years, while only a few were above 30 years. Females constituted the majority of the participants (84.2%), compared to 12.7% males and 3.1% identifying as other genders. Most participants were single (81.6%), while 15.4% were married, and a small proportion were divorced (1.3%) or widowed (1.7%). Educational attainment was generally high, with 91.7% having tertiary education, while only 4.0% had no formal education and fewer than 5% had primary or secondary education. A large proportion of participants (94.5%) studied health-related courses, while smaller numbers were in administration (4.8%) and engineering (0.7%). In terms of occupation, the majority were students (88.1%), followed by civil servants (7.5%), with small percentages engaged in community health work (2.0%), self-employment (2.2%), or banking (0.2%). Christianity was the dominant religion (73.7%), followed by Islam (25.0%), with very few participants practicing traditional or other religions. More participants resided in rural areas (59.9%) compared to urban settings (40.1%). Regarding ethnicity, most respondents were Yoruba (89.2%), while Igbo (3.5%), Hausa (3.1%), and other ethnic groups (4.2%) accounted for a minority.

4.2 Objective 1: Prevalence of Hepatitis B virus (HBV) infection among the study population.

Figure 1: Prevalence of Hepatitis B infection among the study participants

Figure 1 shows that out of the 544 study participants, 20 individuals (4%) tested positive for Hepatitis B infection, while the vast majority, 430 participants (96%), tested negative.

Table 2: Association between demographic factors and HBV infection among study participants

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Category | Hepatitis B infection | | Total | ᵪ*2, p*-value |
| Positive | Negative |
| Age (years) | >20 | 2(1.7) | 118(98.3) | 120 | 2.978, 0.562 |
| 20-29 | 15(4.2) | 346(95.8) | 361 |  |
| 30-39 | 2(7.7) | 24(92.3) | 26 |  |
| 40-49 | 1(3.0) | 32(97.0) | 33 |  |
| >50 | 0(0) | 4(100) | 4 |  |
| Gender | Male | 5(7.2) | 64(92.8) | 69 | 3.213, 0.201 |
| Female | 14(3.1) | 444(96.9) | 458 |  |
| Other | 1(5.9) | 16(94.1) | 17 |  |
| Educational Level | No formal education | 0(0) | 22(100) | 22 | 1.327, 0.723 |
| Primary | 0(0) | 6(100) | 6 |  |
| Secondary | 1(5.9) | 16(94.1) | 17 |  |
| Tertiary | 19(3.8) | 480(96.2) | 499 |  |
| Location | Urban | 13(6.0) | 205(94.0) | 218 | 5.372, **0.020** |
| Rural | 7(2.1) | 319(97.9) | 326 |  |

\* n (%): Frequency (Percentage) ᵪ*2*: Pearson’s chi-square, *p*<0.05 is significant

Table 2 show the association between demographic factors and Hepatitis B infection among study participants. Age did not show a statistically significant association with HBV infection (χ² = 2.978, p = 0.562), although the highest prevalence was observed among participants aged 30–39 years (7.7%), followed by those aged 20–29 years (4.2%). Similarly, gender was not significantly associated with HBV infection (χ² = 3.213, p = 0.201), although infection appeared slightly higher in males (7.2%) compared to females (3.1%) and those identifying as other (5.9%). Educational level also showed no significant relationship with HBV status (χ² = 1.327, p = 0.723), with infection occurring across different categories, mostly among those with tertiary education (3.8%). In contrast, location was significantly associated with HBV infection (χ² = 5.372, p = 0.020), with urban dwellers showing a higher prevalence (6.0%) compared to those in rural areas (2.1%).

**Table 3: Behavioural and lifestyle factors that may contribute to HBV transmission among study participants**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Category | Hepatitis B Virus infection | | Total | ᵪ*2, p*-value |
| Positive | Negative |
| Have you ever had unprotected sexual intercourse? | Yes | 12(6.5) | 172(92.4) | 184 | 6.356, **0.012** |
| No | 8(2.2) | 352(97.8) | 360 |  |
| Do you have multiple sexual partners? | Yes | 2(3.7) | 52(96.3) | 52 | 0.144, 0.704 |
| No | 18(3.7) | 472(96.3) | 472 |  |
| Have you ever shared sharp objects (razor, needles, clippers)? | Yes | 15(5.8) | 245(94.2) | 260 | 6.159, **0.013** |
| No | 5(1.8) | 279(98.2) | 284 |  |
| Have you ever received a blood transfusion? | Yes | 3(5.8) | 49(94.2) | 52 | 0.711, 0.399 |
| No | 17(3.5) | 475(96.5) | 475 |  |
| Do you have tattoos or body piercings? | Yes | 0(0) | 36(100) | 36 | 1.471, 0.225 |
| No | 20(3.9) | 488(96.1) | 508 |  |
| Do you use injectable drugs? | Yes | 5(5.2) | 92(94.8) | 97 | 0.728, 0.393 |
| No | 15(3.4) | 432(96.6) | 447 |  |
| Have you ever been diagnosed with any liver disease? | Yes | 0(0) | 19(100) | 19 | 0.751, 0.386 |
| No | 20(3.8) | 505(96.2) | 525 |  |

\* n (%): Frequency (Percentage) ᵪ*2*: Pearson’s chi-square, *p*<0.05 is significant

Table 3 indicate that certain behavioural and lifestyle factors were significantly associated with Hepatitis B virus (HBV) infection among study participants. Those who had ever engaged in unprotected sexual intercourse showed a higher prevalence of infection (6.5%) compared to those who had not (2.2%), and this association was statistically significant (χ² = 6.356, p = 0.012). Similarly, sharing of sharp objects such as razors, needles, or clippers was significantly linked to HBV infection, with 5.8% of those who shared being positive compared to 1.8% among those who did not (χ² = 6.159, p = 0.013). In contrast, no significant associations were observed between HBV infection and having multiple sexual partners, history of blood transfusion, tattoos or body piercings, use of injectable drugs, or prior diagnosis of liver disease.

**Table 4: Level of awareness and knowledge about Hepatitis B infection among study participants**

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Category | Frequency | Percent |
| Have you heard about Hepatitis B before? | Yes | 444 | 81.6 |
| No | 100 | 18.4 |
| What is the main cause of Hepatitis B? | Virus | 353 | 64.9 |
| Bacteria | 47 | 8.6 |
| I don't know | 92 | 16.9 |
| Other | 52 | 9.6 |
| How is hepatitis B transmitted? | Unprotected sex | 318 | 58.5 |
| Sharing needles/blades | 201 | 36.9 |
| Mother to child during birth | 160 | 29.4 |
| Blood transfusion | 163 | 30.0 |
| Through food and water | 32 | 5.9 |
| I don't know | 109 | 20.0 |
| Can Hepatitis B be prevented? | Yes | 433 | 79.6 |
| No | 24 | 4.4 |
| I don't know | 87 | 16.0 |
| Is there a vaccine for Hepatitis B? | Yes | 382 | 70.2 |
| No | 42 | 7.7 |
| I don't know | 120 | 22.1 |
| Total | 544 | 100.0 |

Table 4 show the level of awareness and knowledge about Hepatitis B infection among study participants. A large majority, 444 (81.6%), had heard about Hepatitis B, while 100 (18.4%) had not. Regarding knowledge of the cause, 353 (64.9%) correctly identified a virus, whereas 47 (8.6%) incorrectly attributed it to bacteria, 52 (9.6%) mentioned other causes, and 92 (16.9%) admitted not knowing. Awareness of modes of transmission varied, with 318 (58.5%) recognizing unprotected sex, 201 (36.9%) identifying sharing of needles or blades, 163 (30.0%) citing blood transfusion, and 160 (29.4%) mentioning mother-to-child transmission during birth. However, 32 (5.9%) incorrectly thought it could be transmitted through food and water, and 109 (20.0%) did not know how it is transmitted. Most participants, 433 (79.6%), knew that Hepatitis B can be prevented, though 24 (4.4%) thought it could not and 87 (16.0%) were unsure. Similarly, 382 (70.2%) were aware that a vaccine exists, but 42 (7.7%) said there was none and 120 (22.1%) did not know.

**Table 5: HBV testing and vaccination history of study participants**

|  |  |  |  |
| --- | --- | --- | --- |
| Variable | Category | Frequency | Percent |
| Have you ever been tested for Hepatitis B? | Yes | 74 | 13.6 |
| No | 470 | 86.4 |
| If yes, what was the result? (N=74) | Positive | 25 | 33.8 |
| Negative | 49 | 66.2 |
| Have you been vaccinated against Hepatitis B? | Yes | 45 | 8.3 |
| No | 411 | 75.6 |
| Not sure | 88 | 16.2 |
| If vaccinated, how many doses did you receive? (N=45) | One | 30 | 66.7 |
| Two | 2 | 4.4 |
| All Three doses | 5 | 11.1 |
| I don't know | 8 | 17.8 |
| If not vaccinated, why? (N=411) | Not aware of the vaccine | 200 | 48.7 |
| Not available | 76 | 18.5 |
| Too expensive | 30 | 7.3 |
| Fear of injection | 50 | 7.5 |
| Other | 55 | 12.2 |
| Have you ever had a liver function test (e.g., ALT, AST)? | Yes | 29 | 5.3 |
| No | 460 | 84.6 |
| Don't know | 55 | 10.1 |
| Have you had any imaging tests like liver ultrasound or CT scan? | Yes | 36 | 6.6 |
| No | 508 | 93.4 |
| Total | 544 | 100.0 |

Table 5 provide insight into the testing and vaccination history of the study participants regarding Hepatitis B. Only a small proportion of participants had ever been tested for Hepatitis B, with 74 (13.6%) reporting previous testing, and among them, 25 (33.8%) were positive while 49 (66.2%) tested negative. With respect to vaccination, just 45 participants (8.3%) reported being vaccinated against HBV, whereas the majority, 411 (75.6%), had not received the vaccine, and 88 (16.2%) were unsure of their vaccination status. Among those vaccinated, completion of the recommended three-dose schedule was very low, as most had received only one dose (66.7%), while 11.1% had completed all three doses, 4.4% had two doses, and 17.8% could not recall the number of doses received. For the unvaccinated participants, the most frequently cited reason was lack of awareness of the vaccine (48.7%), followed by unavailability (18.5%), fear of injection (7.5%), high cost (7.3%), and other reasons (12.2%). Regarding clinical assessments, only 29 participants (5.3%) had ever undergone a liver function test such as ALT or AST, while 460 (84.6%) had not, and 55 (10.1%) were unsure. Similarly, uptake of imaging investigations was low, with just 36 participants (6.6%) reporting a liver ultrasound or CT scan compared to 508 (93.4%) who had never undergone such tests.

**Table 6: Association between Hepatitis B infection and history of vaccination against HBV among study participants**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Category | Hepatitis B virus infection | | Total | ᵪ*2, p*-value |
| Positive | Negative |
| Have you been vaccinated against Hepatitis B? | Yes | 2(4.4) | 43(95.6) | 45 | 0.094, 0.954 |
| No | 15(3.6) | 396(96.4) | 411 |  |
| Not sure | 3(3.4) | 85(96.6) | 88 |  |

\* n (%): Frequency (Percentage) ᵪ*2*: Pearson’s chi-square, *p*<0.05 is significant

The analysis of the association between Hepatitis B infection and history of vaccination against HBV in Table 6 showed no statistically significant relationship (χ² = 0.094, p = 0.954). Among participants who reported being vaccinated, 2 (4.4%) were positive for Hepatitis B compared to 15 (3.6%) of those who were not vaccinated and 3 (3.4%) of those who were unsure of their vaccination status.

Table 7: Effect of HBV infection on BMI of the participants

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Parameter | Positive (n=20)  Mean ± SD | Negative (n=429)  Mean ± SD | t-value | df | p-value | Mean Difference | 95% CI  (Lower – Upper) | Significance |
| BMI | 147.56 ± 47.96 | 134.23 ± 53.03 | 1.105 | 497 | 0.270 | 13.32 | -10.373-37.022 | **No** |

\* SD: Standard deviation, df: Degrees of freedom, p<0.05 is significant, 95% CI: 95% Confidence Interval

The analysis in Table showed that the mean BMI of the positive group (147.56 ± 47.96) was slightly higher than that of the negative group (134.23 ± 53.03), with a mean difference of 13.32. However, this difference was not statistically significant (t = 1.105, df = 497, p = 0.270).

**Discussion**

This study assessed the prevalence of hepatitis B virus (HBV) infection and its associated factors among students in a tertiary institution. The findings revealed a prevalence rate of 4%, indicating that HBV remains an important public health issue in this population. This aligns with previous reports from Nigeria, where HBV prevalence has been consistently classified as high-intermediate endemicity (8-12%) (Ajuwon et al., 2024; Musa et al., 2015). Studies in other parts of West Africa, such as Togo, also show a similarly high burden, particularly among young adults (Kolou et al., 2017). The relatively high prevalence observed in this student cohort reflects ongoing transmission risks and limited uptake of preventive measures (Schweitzer et al., 2015; WHO, 2017).

Demographic factors, including age and marital status, showed variation in HBV infection rates. The higher prevalence among younger participants (21-30 years) is consistent with earlier reports that HBV infection often occurs in early adulthood due to risky behaviors such as unprotected sexual activity and sharing of sharp objects (Mohamud et al., 2024; Mohammed et al., 2023; Mohammed et al., 2022; Uneke et al., 2005). Similar findings have been reported in studies from Makurdi (Mbaawuaga et al., 2024) and Ibadan (Adeyemi et al., 2013), where young adults demonstrated both significant exposure to infection and limited knowledge about prevention.

Behavioral and lifestyle factors were more strongly predictive of HBV status. Unprotected sexual intercourse and sharing of sharp objects were both significantly associated with HBV infection. This is consistent with the established epidemiology of HBV as a sexually transmitted and blood-borne pathogen (Tripathi & Mousa, 2023). Several Nigerian studies have similarly reported higher HBV prevalence among those with histories of risky sexual behavior or sharp object sharing (Alabi et al., 2023, Issa et al., 2023; Keffi (Pennap et al., 2011; Uneke et al., 2005). In contrast, other anticipated risk factors such as history of blood transfusion, multiple sexual partners, tattoos/piercings, or injectable drug use were not significantly associated with infection in this study. This may reflect the young age structure of participants, underreporting of sensitive behaviors, or the relatively small number of HBV-positive cases, limiting statistical power.

Another important finding was the low uptake of HBV vaccination among participants. Despite being one of the most effective measures against HBV transmission, coverage in Nigeria remains suboptimal, especially among young adults and health-care workers (Olakunde et al., 2022Eleje et al., 2021). Only 8.3% reported being vaccinated against HBV, and among them, just 11.1% had completed the recommended three-dose series. Lack of awareness (48.7%), unavailability (18.5%), and fear of injections (7.5%) were the main barriers reported in this study. A study in Ibadan revealed that although awareness of HBV was relatively high, access to vaccination services and actual uptake remained poor (Orabueze et al., 2024; Issa et al., 2023; Chang et al., 2018; Adeyemi et al., 2013). The low vaccination coverage represents major key factor that limit prevention of HBV in the studied area.

Awareness and knowledge of HBV were relatively high in this study, with over 80% of participants having heard of the infection and nearly two-thirds correctly identifying it as viral in origin. Nonetheless, misconceptions persisted: almost one in five respondents did not know the cause of HBV, and 6% incorrectly attributed transmission to food and water. Knowledge of vaccination was suboptimal, with 22% unaware of the vaccine. These findings is similar to studies among Nigerian students and healthcare trainees where awareness was moderate, but detailed knowledge remained incomplete (Atekoja et al., 2025; Nwodo et al., 2023; Ogoina et al., 2014). Importantly, gaps in knowledge may translate into low preventive uptake.

This study show moderate endemicity HBV infection in this setting, with transmission primarily driven by sexual and blood-contact exposures and low vaccine uptake despite relatively high awareness levels. The clustering of infection among urban residents, sexually active individuals, and those sharing sharp objects underscores the need for targeted health education, behavioral interventions, improved access to testing and vaccination services, especially for young adults and students

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