Epidemiological Study of Hepatitis B Virus Infection among Selected Students in a Tertiary Institution North Central Nigeria.

Sharon O. Bello[1], James A. Ndako*[2], Onaiwu T. Ohiengbomwan[3], Olubunmi O. Helen[1]., Ogechukwu Y.Ozoadibe[4] Christy J.Ndako,[5], Rachael Funke Ajala[1] Shammah I. Ayodele[1]

[1]Department of Microbiology Landmark University,Omuaran-Kwara State-Nigeria

[2]Department of Medical Laboratory Science, Adeleke University Ede-Nigeria

[3]Department of Medical Laboratory Science, Redeemer's University Ede-Nigeria

[4]Department of Medical Laboratory Science, Niger Foundation Hospital, Enugu-Nigeria

[5]Department of Nursing Science, Adeleke University Ede-Nigeria

***Corresponding Author**

DOI: https://doi.org/10.51584/IJRIAS.2026.11070034

Received: 10 July 2026; Accepted: 15 July 2026; Published: 29 July 2026

ABSTRACT

Hepatitis B virus (HBV) infection remains a major global public health challenge because of its associated long-term health hazards, particularly among young individuals. This study evaluated the seroprevalence of hepatitis B surface antigen (HBsAg) and its related risk factors among students at a tertiary institution in Oro, Kwara State, Nigeria. One hundred and ninety-five (195) apparently healthy students were screened, and the obtained serum samples were separated and analyzed for HBsAg using a commercially available Enzyme-Linked Immunosorbent Assay (ELISA)-based kit. A qualitative 5-panel HBV test was subsequently carried out to determine viral seromarkers among seropositive subjects, while structured questionnaires were utilized to assess potential risk factors.Out of the 195 samples screened, 16 (8.2%) were seropositive. Subjects aged 18–25 years recorded a 20.5% positivity rate ($X^2 = 6.351$; $p > 0.05$), while female subjects showed 12.5% positivity compared to 6.1% positivity in males ($X^2 = 2.333$; $p > 0.05$). Regarding lifestyle risk factors, alcohol consumption was recorded at 11.4% among the screened population, whereas a history of blood transfusion was found in 5.6% of positive male subjects compared to none among females ($X^2 = 0.311$; $p = 0.577$). The 5-panel test revealed significant variations in seromarkers among seropositive individuals, which helps define the precise phase and degree of viral infectivity. Notably, a majority of the study population demonstrated a substantial lack of knowledge regarding the virus and had never received a vaccine. Based on these findings, public awareness campaigns should be prioritized, while a comprehensive vaccination program is strongly advocated within the community.

Keywords: Hepatitis B Virus, Infection, Students, Tertiary Institution.

BACKGROUND OF STUDY

Hepatitis is defined as an inflammation of the liver that occurs when inflammatory cells infiltrate liver tissue, meaning the primary predilection site for the disease is the liver itself. The name of the virus is derived from the Greek term *"hepar,"* which translates directly to "liver." The hepatitis B virus is a circular, double-stranded DNA virus belonging to the *Hepadnaviridae* family [1]. By multiplying inside parenchymal cells known as hepatocytes, the virus primarily compromises the liver's operational capacity, thereby affecting millions of children and adults worldwide [2].

Approximately one-quarter of chronic HBV carriers eventually acquire severe liver disorders, such as chronic hepatitis, cirrhosis, and hepatocellular carcinoma, which together result in over 1.4 million deaths annually [2,

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue VII July 2026

3]. Epidemiological estimates suggest that one-third of the global population has been exposed to HBV, with roughly 5% remaining lifelong chronic carriers [2]. This hepatic inflammation can either be self-limiting or progress into extensive fibrosis, irreversible cirrhosis, and terminal liver cancer, leading to elevated replication, reactivation, and high chronicity rates following an acute encounter [1, 4].

Viral hepatitis places an immense, heavy burden on the healthcare delivery system due to widespread public ignorance, inadequate diagnostic access, inaccurate staging, and prohibitive treatment costs [2, 5]. Because infected carriers are frequently unaware of their status due to the characteristically asymptomatic nature of the infection [6], horizontal transmission continues to propagate the virus silently across generations, significantly multiplying communal health risks [7]. In Nigeria, horizontal transmission remains a prominent path for viral spread, yet the strategic deployment of protective vaccines and secondary preventions such as safe sexual practices and standardized sanitary habits, remains sub-optimal [5, 8]. Furthermore, measures targeting early detection through routine serological diagnostics and timely therapeutic interventions have not yet received the public health attention they critically deserve [9]. Consequently, this research aimed to determine the infectious status, prevalence rates, and clinical serological markers of the Hepatitis B virus among this vulnerable tertiary student populace.

Objectives

- To determine the prevalence of HBV infection among the targeted study population.
- To identify the specific serological biomarkers of HBV among the seropositive individuals.
- To evaluate liver involvement via Alanine Aminotransferase (ALT) assessment among seropositive subjects.
- To evaluate the underlying risk factors driving viral transmission among the screened participants.

METHODOLOGY

Study Area

This cross-sectional study was carried out among male and female subjects at a tertiary institution situated within the Oro community of Kwara State, Nigeria.

Study Population

The study cohort comprised one-hundred and ninety-five (195) apparently healthy student volunteers. The inclusion criteria accommodated individuals of both sexes who were 16 years of age and above. Informed consent forms were issued to participants immediately following an educational enlightenment seminar, after which structured questionnaires were distributed to gather demographics and pertinent clinical data prior to sample collection.

Sample Size

A total of 195 eligible individuals were successfully recruited from the institution.

Data Collection

Information was gathered via administered questionnaires following proper enlightenment and formal consent. Each questionnaire was labeled with a unique Participant Identification Number (PIDN). These responses served to map demographic trends, epidemiology, and specific drivers of vulnerability to HBV infection. All collected records were kept strictly confidential in compliance with the World Medical Association Declaration of Helsinki; as an extra safety measure, only PIDNs were transcribed onto the active laboratory investigative forms.

Ethical Consideration

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue VII July 2026

Informed consent was explicitly obtained from every volunteer before initiating any test procedures, and formal ethical approval for this research was granted by the Public Health Department of the Kwara State Ministry of Health.

Sample Collection

Standardized clinical protocols were strictly observed during sample collection. A clean tourniquet was applied to the forearm, and the antecubital fossa was disinfected using cotton wool soaked in methylated spirit. Using a sterile disposable syringe, approximately 3 to 5 mL of whole venous blood was drawn from each volunteering subject.

Sample Processing

Each blood sample was immediately transferred from the syringe into a labeled vacutainer containing Ethylenediaminetetraacetic acid (EDTA) and stored temporarily at 4°C. The samples were then centrifuged to separate the serum from cellular components. The resulting supernatant plasma was carefully decanted into new, correctly coded cryovial tubes and kept frozen at -20°C until analysis.

Laboratory assays were performed at the Medical Laboratory Department of the Landmark University Health Centre in Omu-Aran, Kwara State, Nigeria. The testing protocol involved qualitative diagnostics utilizing an HBsAg strip test, a rapid 5-panel marker kit, and quantitative ELISA screening specifically conducted on all seropositive subjects.

Data Analysis

The raw seroprevalence was calculated by dividing the number of positive subjects by the total number of participants, expressed as a percentage:

$$\text{Percentage (\%) of infected people} = \frac{number\ of\ infected\ individuals}{total\ number\ of\ examined\ subjects} \times 100$$

$$\text{Prevalence} = \frac{16}{195} \times 100 = 8\%$$

Data extracted from the questionnaires were analyzed using SPSS software. Chi-square analytical methods were applied to evaluate categorical associations, where a p-value of less than 0.05 was considered statistically significant. This software package helped determine statistical relationships across variables including age, gender, educational status, lifestyle habits, and previous clinical history.

RESULTS

A total of 195 blood samples were analyzed for HBV from individuals within an overall age range of 17 to 70 years. The cohort was predominantly male, accounting for 131 (67.2%) participants, while females constituted 64 (32.8%). Out of the total population, 16 samples tested positive for HBsAg, while 179 samples were negative, establishing an overall HBV seroprevalence of 8.2% in this community.

Looking at gender distribution, the 16 positive cases were evenly split: 8 (6.1%) occurred among males and 8 (12.5%) occurred among females (**Table 1**). Although the percentage rate appeared higher in females, statistical analysis yielded a p-value of 0.127 ($p > 0.05$), indicating that HBV status does not statistically depend on gender.

Stratifying by age group (**Table 2**), the 18–20 age bracket showed 6 positive cases out of 100 subjects (6.0%), while the 21–25 bracket yielded 10 positive cases out of 69 subjects (14.5%). No positive cases (0.0%) were identified in any of the older age categories spanning 26 to 75 years, indicating that the infection is heavily concentrated among young adults. Young students accounted for 87.7% of all positive samples (**Table 5**).

With respect to education, an 8.2% prevalence was fixed among individuals at the tertiary level of attainment (**Table 4**). Behavioral and lifestyle variables (**Table 7**) revealed a prevalence of 11.4% among active alcohol

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue VII July 2026

consumers and a notable 65.4% among those reporting multiple or non-spousal sexual partners. Furthermore, a 9.2% prevalence was noted among individuals sharing sharp objects, while those sharing toothbrushes showed positive rates between 12.3% and 13.3% (**Table 6**). Individuals bearing traditional tribal marks demonstrated a 17.6% prevalence rate (**Table 7**). Regarding clinical history, subjects with a background of blood transfusions had a prevalence of 5.6%, whereas individuals who had previously donated blood demonstrated a 9.1% positivity rate (**Table 6**).

Table 1: HBV Infection Based on Gender

Characteristics	**Category**	**Hepatitis Screening Result**		**No. of serum samples examined**	**Chi square (X^2)**	**P. value**
		No. + (%)	***No. - (%)***			
Sex	Male	8 (6.1)	123 (93.9)	131	2.333	0.127
	Female	8 (12.5)	56 (87.5)	64		
	Total	16 (8.2)	179 (91.8)	195		

Table 2: HBV Infection Based on Age Range

Characteristics	**Category**	**Hepatitis Screening Result**		**No. of serum samples examined**	**Chi square (X^2)**	**P. value**
		No. + (%)	***No. - (%)***			
Age range	18 - 20 years	6 (6.0)	94 (94.0)	100	6.351	0.096
	21 -25 years	10 (14.5)	59 (85.5)	69		
	26 - 30 years	0 (0.0)	4 (100.0)	4		
	> or = 31 years	0 (0.0)	20 (100.0)	20		
	Total	16 (8.3)	177 (91.7)	193		

Table 3: Prevalence of HBV Infection Based on Marital Status

Characteristics	**Category**	**Hepatitis Screening Result**		**No. of serum samples examined**	**Chi square (X^2)**	**P. value**
		No. + (%)	***No. - (%)***			
Marital Status	Single	16 (9.1)	159 (90.9)	175	1.893	0.388
	Married	0 (0.0)	15 (100.0)	15		
	Divorced or separated	0 (0.0)	4 (100.0)	4		
	Total	16 (8.2)	178 (91.8)	194		

Table 4: HBV Infection Based on Educational Attainment

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue VII July 2026

Characteristics	**Category**	**Hepatitis Screening Result**		**No. of serum samples examined**	**Chi square (X^2)**	**P. value**
		No. + (%)	***No. - (%)***			
Educational Attainment	Secondary	0 (0.0)	1 (100.0)	1	0.090	0.764
	Tertiary	16 (8.2)	178 (91.8)	194		
	Total	16 (8.2)	179 (91.8)	195		

Table 5: Infection Based on Occupation of Subjects Screened

Characteristics	**Category**	**Hepatitis Screening Result**		**No. of serum samples examined**	**Chi square (X^2)**	**P. value**
		No. + (%)	***No. - (%)***			
Occupation or Profession	Student	15 (8.8)	156 (91.2)	171	1.699	0.889
	Civil Servant	0 (0.0)	9 (100.0)	9		
	Teaching	0 (0.0)	4 (100.0)	4		
	Self Employed/Business	0 (0.0)	2 (100.0)	2		
	Privately Employed	1 (12.5)	7 (87.5)	8		
	Others	0 (0.0)	1 (100.0)	1		
	Total	16 (8.2)	179 (91.8)	195		

Table 6: Distribution of Hepatitis B Virus Infection Based on Clinical Risk Factors

CHARACTERISTICS	**RESPONSE**	**HBV SCREENING RESULT**		**NO OF SAMPLES EXAMINED**	**CHI P SQUARE VALUE**	
		No. + (%)	***No. - (%)***			
Blood transfusion	Yes	1 (5.6)	17 (94.4)	18	0.311	0.577
	No	15 (9.6)	142 (90.4)	157		
	Total	16 (9.1)	159 (90.9)	175		
Have you at any time donated blood?	Yes	1 (9.1)	10 (90.9)	11	0.000	0.000
	No	15 (9.1)	149 (90.9)	164		
	Total	16 (9.1)	159 (90.9)	175		
	Yes	1 (2.3)	42 (97.7)	43	3.189	0.074
	No	15 (11.4)	117 (88.6)	132		

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue VII July 2026

Do you have prior knowledge of the hepatitis virus before?	Total	16 (9.1)	159 (90.9)	175		
Have you received vaccination for Hepatitis B before?	Yes	0 (0.0)	8 (100.0)	8	0.844	0.358
	No	16 (9.6)	151 (90.4)	167		
	Total	16 (9.1)	159 (90.9)	175		
Do you share any sharp object with your friends?	Yes	9 (12.3)	64 (87.7)	73	1.530	0.216
	No	7 (6.9)	95 (93.1)	102		
	Total	16 (9.1)	159 (90.9)	175		
Do you share a toothbrush with friends/family members?	Yes	2 (13.3)	13 (86.7)	15	0.347	0.556
	No	14 (8.8)	146 (91.3)	160		
	Total	16 (9.1)	159 (90.9)	175		

Table 7: Distribution of HBV Infection Based on Lifestyle

Lifestyle Characteristics	**Response**	**No. Positive (%)**	**No. Negative (%)**	**Total**	**Chi-Square (X^2)**	**p-value**
Take Alcohol?	Yes	4 (11.4)	31 (88.6)	35	0.275	0.600
	No	12 (8.6)	128 (91.4)	140		
	Total	16 (9.1)	159 (90.9)	175		
Have Tribal Marks?	Yes	3 (17.6)	14 (82.4)	17	1.639	0.200
	No	13 (8.2)	145 (91.8)	158		
	Total	16 (9.1)	159 (90.9)	175		
Have Tattoos?	Yes	0 (0.0)	3 (100.0)	3	0.307	0.579
	No	16 (9.3)	156 (90.7)	172		
	Total	16 (9.1)	159 (90.9)	175		
Sexual Partners (Last 3 Yrs)	None	10 (10.3)	87 (89.7)	97	5.523	0.238
	One	1 (2.2)	45 (97.8)	46		
	Two	2 (11.8)	15 (88.2)	17		
	Three	1 (20.0)	4 (80.0)	5		
	\ge Four	2 (22.2)	7 (77.8)	9		

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue VII July 2026

	Total	16 (9.2)	158 (90.8)	174		
Active Intercourse (3 Yrs)?	Yes	1 (7.7)	12 (92.3)	13	0.036	0.850
	No	15 (9.3)	147 (90.7)	162		
	Total	16 (9.1)	159 (90.9)	175		

Table 8: HBV 5-Panel Seromarker Results for Selected Subjects

S/N	GENDER	HBsAg	HBsAb	HBeAg	HBeAb	HBcAb
1	Female	Positive	Negative	Negative	Positive	Positive
2	Male	Negative	Negative	Negative	Negative	Negative
3	Male	Negative	Negative	Negative	Negative	Negative
4	Female	Negative	Positive	Negative	Negative	Negative
5	Male	Negative	Positive	Negative	Negative	Negative
6	Male	Negative	Negative	Negative	Negative	Negative
7	Female	Negative	Positive	Negative	Negative	Negative
8	Male	Positive	Positive	Negative	Positive	Positive
9	Male	Negative	Negative	Negative	Negative	Negative
10	Female	Negative	Negative	Negative	Negative	Negative
11	Female	Negative	Negative	Negative	Negative	Negative
12	Male	Negative	Negative	Negative	Negative	Negative
13	Female	Positive	Negative	Negative	Negative	Negative
16	Male	Positive	Negative	Negative	Negative	Positive
15	Female	Negative	Negative	Negative	Negative	Negative
16	Female	Negative	Negative	Negative	Negative	Negative

DISCUSSION

Out of the 195 subjects systematically screened in this study, an overall seroprevalence of 8.2% was recorded, with the bulk of infections concentrated within the 17–25 age bracket. This result aligns closely with epidemiological patterns observed among young cohorts in central Nigeria, where similar trends have been reported [10]. Conversely, other regional evaluations conducted among sub-populations in Northern and Central Nigeria have highlighted how heavily local dynamics and regional variations influence specific transmission rates [11, 12].

Broadly speaking, the distribution of HBV varies according to geographic location, cohort age, and localized behavioral risk factors. Geographically, Oro community is a developing semi-urban area within Kwara State.

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue VII July 2026

The comparative lack of specialized medical infrastructure and sub-optimal waste management practices represent major structural vulnerabilities that drive transmission risks within this community, matching patterns observed in other semi-urban environments within North-Central Nigeria [13].

During interactive sessions at our community awareness program, over 90% of the volunteers stated they had never been tested for hepatitis prior to this exercise. This dynamic mirrors findings in urban centers like Abuja, where significant gaps in testing access and institutional screening programs persist [5]. Furthermore, the questionnaire results (**Table 6**) revealed that nearly 100% of the seropositive individuals possessed zero prior knowledge of the virus, underscoring a critical lack of public awareness, which has also been heavily documented among vulnerable cohorts in neighboring West African settings [14].

This vulnerability is deepened by institutional gaps, such as the total absence of structured adult vaccination protocols. As shown in **Table 6**, 100% of our positive subjects were entirely unvaccinated, matching structural deficits documented across the broader African continent where vaccine supplies, policy frameworks, and implementation challenges remain highly restricted [15, 16].

Regarding sexual behaviors (**Table 7**), 37.5% of the seropositive individuals acknowledged having multiple sexual partners within the past three years. This behavioral factor heavily exposes young adults to transmission, reinforcing earlier assertions that high-risk sexual practices remain a principal driver of horizontal spread among key populations, such as individuals living in high-density areas [17].

Similarly, sharing personal items such as nail cutters, needles, and toothbrushes, which frequently come into contact with blood or bodily fluids, poses a clear danger. Indirect exposure via these routes was evident, with 25.6% of infected individuals reporting that they regularly shared sharp objects, a route frequently implicated in molecular epidemiological investigations across diverse Nigerian states [18]. This problem is widespread across sub-Saharan Africa, where personal hygiene items are frequently pooled due to economic or cultural habits.

In addition, blood safety remains an issue in developing regions. Local medical facilities sometimes lack the advanced multiplex diagnostic assays or stringent protocols required for thorough screening [9]. Because 9.1% of our infected subjects reported a history of blood donation, undetected window-period donations or screening shortfalls may inadvertently drive up communal prevalence rates.

The 5-panel serological analysis (**Table 8**) provides deeper insights into host immune status and viral progression. Following exposure to HBV, the first antibody to appear in response to the core antigen is anti-HBc, which presents initially as IgM anti-HBc during acute flares [4]. While IgM anti-HBc marks recent or acute infection, IgG anti-HBc typically persists for life, serving as an indicator of past or chronic exposure [4]. An isolated anti-HBc profile occurs when IgG anti-HBc is detected in the absolute absence of both HBsAg and anti-HBs [19].

Anti-HBe positivity was noted among several infected individuals. In the natural history of HBV, seroconversion from HBeAg to anti-HBe is a critical clinical milestone, typically marking the transition from an active, high-replication phase to a low-replicative state [4]. This shift is generally associated with decreased necro-inflammatory activity in the liver and a reduction in overall infectivity [1, 4].

Conversely, anti-HBs positivity reflects protective immunity. This profile is seen in individuals who have successfully cleared a natural infection or those who have been vaccinated [4, 19]. Meanwhile, chronic infection is clinically defined by the persistence of HBsAg for six months or longer [19]. When HBsAg is detected without detectable IgM anti-HBc, it strongly indicates a chronic carrier state [19].

Persistent HBeAg expression points to elevated HBV DNA levels and higher transmissibility [1, 20]. However, when patients transition to an anti-HBe-positive status, viral replication slows down considerably, often resulting in normal hepatic aminotransferase levels [4]. Given these varied clinical profiles, it is critical that these positive individuals receive prompt medical evaluation to prevent progression toward cirrhosis or liver failure [2, 3].

CONCLUSION

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue VII July 2026

This study demonstrates that Hepatitis B virus (HBV) infection remains an important public health issue within the investigated locality. A combination of factors including low vaccination rates, limited healthcare access, poor viral awareness, risky sexual behaviors, and the sharing of sharp personal objects, drives the observed 8.2% seroprevalence among these tertiary students. The complete absence of structured immunization campaigns and targeted health education has further enabled the silent spread of the virus within this student population.

The high frequency of infection among tertiary students in Oro is a serious concern, particularly because chronic carriage frequently leads to long-term liver disease and hepatocellular carcinoma [2, 3]. Surveys elsewhere have similarly highlighted that low disease awareness among young populations stems from inadequate institutional health education and fragmented preventive services [21].

Our findings are consistent with wider epidemiological assessments in Nigeria, which show a consistently high burden of HBV across various sub-populations, including pregnant women and clinic attendees [13, 22, 23]. Addressing this requires immediate intervention, including widespread catch-up vaccination campaigns, accessible institutional screening, and robust public health education [15, 24]. Collaborative partnerships between government bodies and academic institutions could help provide subsidized or free vaccine series to students, while targeted peer-led education programs could effectively reduce high-risk behavioral transmission.

To minimize the long-term impact of HBV in Kwara State's semi-urban communities, structured health policies must be implemented. A coordinated, multifaceted strategy is essential to address the HBV burden in these communities, protect young adults, and reduce the long-term incidence of chronic liver diseases [2, 24] and based on our findings, we propose the following strategic recommendations:

- **Widespread Immunization Campaigns:** State health agencies and institutional authorities should collaborate to roll out free or heavily subsidized Hepatitis B vaccine series across tertiary campuses to protect susceptible youth [24].
- **Targeted Health Education Initiatives:** Implement mandatory awareness seminars during student orientation focusing on transmission routes, personal hygiene, and the asymptomatic nature of the virus [21].
- **Enhanced Access to Medical and Diagnostic Facilities:** Establish accessible, confidential screening programs within institutional health centers, ensuring that students can easily verify their status and receive timely care [5, 9].
- **Promotion of Safe Behavioral Practices:** Encourage behavioral modifications, including safe sexual practices, abstinence, and a strict avoidance of sharing sharp personal items or toothbrushes [18].

Funding: This research project was entirely self-funded by the authors.

Informed Consent Statement: Formal informed consent was voluntarily signed and obtained from all participating student volunteers prior to screening.

Data Availability Statement: The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable academic request.

ACKNOWLEDGMENTS

The authors express their sincere gratitude to all the student volunteers who participated in this study. Special thanks goes to the Medical Laboratory Scientists and Technicians at the Landmark University Medical Center for their technical assistance during sample collection and processing.

Conflicts of Interest

The authors declare that they have no competing financial or personal conflicts of interest regarding the conduct or publication of this research.

REFERENCES

1. Aliu TB, Majiyebo AJ, Tsado AN, Ibrahim HA, Berinyuy EB. Biology and molecular pathogenesis of hepatitis B virus infection. BIOMED Nat Appl Sci. 2022;2(2):28-36. https://doi.org/10.53858/bnas02022836
2. Hsu YC, Huang DQ, Nguyen MH. Global burden of hepatitis B virus: current status, missed opportunities and a call for action. Nat Rev Gastroenterol Hepatol. 2023;20(8):524–537. https://doi.org/10.1038/s41575-023-00760-9
3. Oliveira D, Pereira F, Martins MDR, Castro R, Cordeiro L, Fronteira I. A systematic review of the maternal and neonatal complications in hepatitis B infection. J Clin Virol. 2020;133:104680. https://doi.org/10.1016/j.jcv.2020.104680
4. Bertoletti A. The immune response in chronic HBV infection. J Viral Hepat. 2024;31 Suppl 2:43–55. https://doi.org/10.1111/jvh.13962
5. Akabuike OM, Aworh MK, Uzoebo NL, Erwat J, Agukwe O, Ngong K, et al. Evaluating hepatitis B screening, prevalence, vaccination coverage, and linkage to care in Abuja, Nigeria: insights from a cross-sectional study. BMC Public Health. 2024;24(1):3475. doi: 10.1186/s12889-024-21017-3.
6. di Filippo Villa D, Navas MC. Vertical Transmission of Hepatitis B Virus-An Update. Microorganisms. 2023;11(5):1140. https://doi.org/10.3390/microorganisms11051140
7. Riches N, Henrion MYR, MacPherson P, Hahn C, Kachala R, Mitchell T, et al. Vertical transmission of hepatitis B virus in the WHO African region: a systematic review and meta-analysis. Lancet Glob Health. 2025;13(3):e447–e458. https://doi.org/10.1016/S2214-109X(24)00506-0
8. Ségéral O, N'Diaye DS, Prak S, Nouhin J, Chhun S, Khamduang W, et al.; ANRS 12328 12345 Study Group. Usefulness of a serial algorithm of HBsAg and HBeAg rapid diagnosis tests to detect pregnant women at risk of HBV mother-to-child transmission in Cambodia, the ANRS 12328 pilot study. J Clin Virol. 2018;109:29–34. https://doi.org/10.1016/j.jcv.2018.10.007
9. Ukagebu CJ, Alao JO, Bamigboye FO, Ukaegbu JC, Oladipo EK. Evaluating Hepatitis B Screening During Pregnancy: A Study on Diagnostic Accuracy and Infection Control in Nigeria. J Viral Hepat. 2025;32(2):e70002. https://doi.org/10.1111/jvh.70002
10. Mohammed HI, Pennap GR, Oti VB, Adoga MP. Markers of hepatitis B virus infection in a subset of young people in central Nigeria. Scientific African. 2019;5:e00121. doi: 10.1016/j.sciaf.2019.e00121.
11. Mado Sani M, Abdullahi Sakinatu M, Idris Hafsat W, Yakubu Alhassan M, Sani M, Ibrahim A. Prevalence of Hepatitis B Viral Infection at Paediatric Gastroenterology Clinic of ABUTH, Zaria. Nigerian Journal of Basic and Clinical Sciences. 2018;15(2):114–117.
12. Chikwendu A, Unikutelle HL, Olumide AT. Hepatitis B and C virus prevalence among patients and healthcare workers´ prevention practices towards the viruses in a secondary healthcare facility in Northern Nigeria. Pan African Medical Journal. 2023;46:82. doi: 10.11604/pamj.2023.46.82.40530.
13. Omatola CA, Okolo MO. Hepatitis B and Asymptomatic Malaria Infection among Pregnant Women in a Semiurban Community of North-Central Nigeria. Journal of Environmental and Public Health. 2021;2021:9996885. doi: 10.1155/2021/9996885.
14. Kwadzokpui PK, Akorsu EE, Abaka-Yawson A, Quarshie SS, Amankwah SA, Tawiah PA. Prevalence and Knowledge of Hepatitis B Virus Infection among Pregnant Women in the Ningo-Prampram District, Ghana. Int J Hepatol. 2020;2020:7965146. https://doi.org/10.1155/2020/7965146
15. Sonderup MW, Spearman CW. HBV elimination in Africa-Current status and challenges. Clin Liver Dis. 2024;23(1):e0166. https://doi.org/10.1097/CLD.0000000000000166
16. Geremew D, Tajebe F, Ambachew S, et al. Seroprevalence of HIV among pregnant women in Ethiopia: a systematic review and meta-analysis. BMC Res Notes. 2018;11:908. https://doi.org/10.1186/s13104-018-4022-1
17. Omatola CA, Idofe J, Okolo MO, Adejo PO, Maina MM, Oyiguh JA. Seroprevalence of HBV among people living with HIV in Anyigba, Kogi State, Nigeria. African Health Sciences. 2019;19(2):1938–1946. doi: 10.4314/ahs.v19i2.17.
18. Egbe KA, Ike AC, Akanbi OA, Ojedele RO, Imam KI, Chukwu C, et al. Molecular epidemiology of hepatitis B virus from blood samples obtained from persons in Enugu and Nasarawa States, Nigeria. BMC Infectious Diseases. 2025;25(1):772. doi: 10.1186/s12879-025-11166-0.
19. Terrault NA, Lok ASF, McMahon BJ, Chang KM, Hwang JP, Jonas MM, et al. Update on prevention,

ISSN No. 2454-6194 | DOI: 10.51584/IJRIAS |Volume XI Issue VII July 2026

diagnosis, and treatment of chronic hepatitis B: AASLD 2018 hepatitis B guidance. Hepatology. 2018;67(4):1560–1599. https://doi.org/10.1002/hep.29800

20. Yuen MF, Chen DS, Dusheiko GM, Janssen HLA, Lau DTY, Locarnini SA, et al. Hepatitis B virus infection. Nat Rev Dis Primers. 2018;4:18035. https://doi.org/10.1038/nrdp.2018.35
21. Breakwell L, Tevi-Benissan C, Childs L, Mihigo R, Tohme R. The status of hepatitis B control in the African region. Pan Afr Med J. 2017;27(Suppl 3):17. https://doi.org/10.11604/pamj.supp.2017.27.3.11981
22. Agboeze J, Nwali MI, Ukaegbe CI. Hepatitis B Virus Seroprevalence and Potential Perinatal Transmission Among Pregnant Women in Abakaliki, Nigeria. Niger Med J. 2023;64(4):582–590. https://doi.org/10.60787/nmj.v64i4.349
23. Olakunde BO, Adeyinka DA, Olakunde OA, Uthman OA, Bada FO, Nartey YA, et al. A systematic review and meta-analysis of the prevalence of hepatitis B virus infection among pregnant women in Nigeria. PLoS One. 2021;16(10):e0259218. https://doi.org/10.1371/journal.pone.0259218
24. Poovorawan Y, Inma P, Nilyanimit P, Kanokudom S, Jullapetch C. Lessons from Thailand's successful prevention of mother-to-child hepatitis B transmission: Advancing toward elimination by 2030. Asian Pac J Allergy Immunol. 2025;43(1):1–9. https://doi.org/10.12932/AP-220125-2021