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Original Research Article

Hepatitis B Virus Knowledge, Preventive Practices, and Vaccination Status Among People Living with HIV at the Nigerian Institute of Medical Research, Lagos: A Cross-Sectional Study

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ABSTRACT
Hepatitis B Virus (HBV) co-infection substantially increases liver-related morbidity and mortality among people living with HIV (PLHIV). Although vaccination remains the most effective strategy for prevention HBV infection, its uptake is conventionally assumed to depend on adequate knowledge and positive attitudes towards vaccination. This study assessed knowledge, attitudes, and practices regarding HBV vaccination among HIV-positive patients and examined whether knowledge significantly predicts vaccination uptake. A cross-sectional institutional survey was conducted among 374 HIV-positive patients receiving care at the Nigerian Institute of Medical Research (NIMR), Yaba, Lagos State. Participants were selected using purposive sampling. and data were collected using a structured questionnaire. Data were analysed using SPSS version 26.0, through descriptive statistics, chi-square tests, and logistic regression with statistical significance set at $p<0.05$. The majority of respondents were female (70.2%), married (62.9%), and had tertiary-educated (40.7%). Overall, 82% of participants demonstrated low levels of knowledge regarding HBV infection and vaccination (Mean=1.20±0.443), while 58% exhibited negative attitudes toward HBV vaccination (Mean=2.73±0.580). Despite these findings, self-reported HBV vaccination uptake was relatively high (79.6%, Mean = 1.4\11±0.423). Healthcare facilities were identified as the primary source of HBV related information. Education level were significantly associated with vaccination status ($p=0.025$), while gender was significantly associated with knowledge level ($p = 0.010$). Occupation was not significantly associated with attitude ($p = 0.466$). Logistic regression analysis indicated that knowledge was not a significant predictor of vaccination uptake ($\chi^2 = 4.49$, $p = 0.106$, $R^2 = 0.018$). The findings demonstrate a notable disconnect between knowledge and predominantly negative attitudes. This challenge the conventional assumption that knowledge necessarily drives vaccination behavior and suggest that health-system factors, including routine vaccine provision and health-care provider recommendations, may play a more important role in vaccination uptake among PLHIV. Interventions should therefore combine improved vaccine accessibility and provider-led vaccination strategies with targeted education, particularly through the integration of HBV vaccination into routine HIV care.

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INTRODUCTION

Hepatitis B Virus (HBV) infection remains a major global public health challenge. The World Health Organization (WHO) estimates that approximately 296 million people are chronically infected with HBV worldwide, with 1.5 million new infections occurring annually (WHO, 2021). Chronic HBV infection leads to cirrhosis, liver failure, and hepatocellular carcinoma, accounting for an estimated 1.1 million deaths each year (Global Hepatitis Report, 2024). Sub-Saharan Africa bears a disproportionate burden of the disease, with prevalence rates exceeding 8% in many countries, placing the region in the WHO-defined hyperendemic category (Spearman et al., 2017; Musa et al., 2020).

Nigeria has an estimated HBV prevalence of 5.4–13.6%, translating to over 20 million chronically infected individuals (Musa et al., 2020; Olayinka et al., 2016). The country accounts for a significant proportion of the global HBV burden, yet screening, vaccination, and treatment coverage remain unacceptably low, Akabuike et al., (2024). Several studies across Nigerian states have reported wide variability in awareness and vaccination uptake, with rural-urban disparities and significant knowledge gaps among the general population (Magaji et al., 2024; Akabuike et al., 2024).

Ladan et al, (2026) studied the knowledge, attitude, and practice of HIV patients towards Hepatitis B vaccination. Among 309 HIV patients that were interviewed 59.3% had good knowledge about Hepatitis B virus and vaccination, with an average mean score of 4.21, 51.6% had good attitude, with an average mean score of 4.31. Their findings also revealed a significant association on social – demographic variables.

People living with HIV (PLHIV) are at substantially higher risk of HBV infection due to shared routes of transmission, including unprotected sexual contact, contaminated blood products, needle-sharing among people who inject drugs, and mother-to-child transmission (WHO, 2015). Globally, an estimated 8–15% of PLHIV have chronic HBV co-infection, with higher rates in sub-Saharan Africa, Singh et al., (2017). HIV-HBV co-infection accelerates liver disease progression, increases the risk of hepatotoxicity from antiretroviral therapy, and reduces the likelihood of spontaneous HBV clearance, Thio, (2009).

The HBV vaccine is highly effective and recommended as the cornerstone of prevention for all susceptible individuals, including PLHIV (WHO, 2015). However, HIV-positive individuals may have lower seroconversion rates compared to immunocompetent populations, particularly those with low CD4 counts, making early vaccination critical, Chou et al., (2019). Despite clear guidelines, HBV vaccination coverage among PLHIV in Nigeria remains suboptimal in many settings, with reported uptake ranging from 20% to 60%, Shoyemi et al., (2026).

The KAP model has been widely used to understand health behaviors, including vaccination uptake. The model assumes that increasing knowledge leads to positive attitudes, which in turn translate into appropriate practices, Andrade et al., (2020). Numerous studies on HBV vaccination in Nigeria have reported low knowledge, negative attitudes, and low uptake, reinforcing the KAP framework, Musa et al., (2020). However, this model has been challenged in settings where health system factors (e.g., vaccine availability, provider recommendation, cost, convenience) override individual cognitive factors (Dubé et al., 2021; MacDonald et al., 2015).

Preliminary evidence from some Nigerian tertiary hospitals suggests that vaccination uptake may be higher than knowledge levels would predict, but this paradox has not been systematically investigated among HIV-positive patients, Shoyemi et al., (2026). If high uptake can occur despite low knowledge, then public health strategies that focus exclusively on awareness campaigns may be inefficient. Instead, strengthening health system delivery may yield greater returns. This study, aim to assess the levels of knowledge, attitude, and practice regarding HBV vaccination among HIV-positive patients at NIMR, Lagos. Examine associations between socio-demographic factors (education, gender, occupation) and KAP, and determine whether knowledge significantly predicts HBV vaccination uptake.

MATERIALS AND METHODS

Study Design

A cross-sectional institutional-based survey design was adopted. This design collects data from a defined population at a single point in time and is suitable for assessing KAP without manipulating variables. A quantitative survey method was employed.

Study Area

The study was conducted at the Nigerian Institute of Medical Research (NIMR), Yaba, Lagos State, a federal institution providing comprehensive HIV treatment, care, and research services. NIMR serves approximately 5,006 active HIV-positive patients.

Study Population

The population comprised HIV-positive patients receiving care at NIMR. This group is at elevated risk for HBV and represents a priority population for vaccination.

Sampling Technique

Purposive sampling was used to deliberately select HIV-positive patients meeting inclusion criteria, ensuring relevance to study objectives.

Sample Size Determination

The sample size was calculated using the Taro Yamane formula to determine sample sizes when the population size is known.

$n = N / (1 + N(e^2))$

Where:

n = required sample size

N = population size (5,006 active ART patients)

e = degree of precision/margin of error (set at 0.05 or 5%)

1 = constant

Calculation

$n = 5,006 / (1 + 5,006 \times (0.05)^2)$

$n = 5,006 / (1 + 5,006 \times 0.0025)$

$n = 5,006 / (1 + 12.515)$

$n = 5,006 / 13.515$

$n = 370.4 \approx 371$ participants

Inclusion and Exclusion Criteria

Inclusion

HIV-positive, aged ≥18 years, receiving care at NIMR, willing to provide informed consent.

Exclusion

Age <18 years, unable to provide consent, not currently attending NIMR HIV clinics.

Data Collection Instrument

Data collected using a structured, self-administered questionnaire, divided into Section A, Socio-demographics (age, gender, marital status, religion, education, occupation). Section B, Knowledge of HBV infection and vaccination (ten items). Section C, Attitudes toward HBV vaccination (eight items). Section D, Self-reported vaccination practices

Validity and Reliability

The questionnaire was reviewed by three public health experts for content validity. It was pretested on 30 HIV-positive patients outside the study population to identify ambiguities. Cronbach's alpha for the knowledge section was 0.81, indicating acceptable internal consistency.

Data Analysis

Data were coded and analyzed using SPSS version 26. Descriptive statistics (frequencies, percentages, means, standard deviations) summarized KAP levels. Chi-square tests assessed associations between categorical variables. Logistic regression identified predictors of vaccination status. Statistical significance was set at $p < 0.05$.

Ethical Considerations

Ethical approval was obtained from the NIMR Institutional Review Board (Approval Number: NIMR/IRB/2025/044). Written informed consent was obtained from each participant. Participation was voluntary, and confidentiality was ensured through anonymisation.

RESULTS AND DISCUSSION

Socio-demographic Characteristics

A total of 374 HIV-positive patients participated. The largest age group was 42–49, (30.0%). Females constituted 70.2% (n = 269). Most participants were married (62.9%) and Christian (82.5%). Tertiary education was the highest level attained for 40.7%, and business was the predominant occupation (61.1%) (Table 1).

Table 1: Socio-demographic characteristics (N=374)

Variables	N(%)
Age	
18-25	4 (1.0)
26-33	34 (8.9)
34-41	66 (17.2)
42-49	115 (30.0)
50-57	88 (23.0)
58 and above	76 (19.8)
Gender	
Male	114 (29.8)
Female	269 (70.2)
Marital status	
Single	83 (21.7)
Married	241 (62.9)
Divorced	11 (2.9)
Widowed	36 (9.4)
Separated	12 (3.1)

Variables	N(%)
Religion	
Christian	316 (82.5)
Muslim	61 (15.9)
Others	6 (1.6)
Level of education	
None	4 (1.0)
Primary	78 (20.4)
Secondary	145 (37.9)
Tertiary	156 (40.7)
Occupation	
Healthcare	29 (7.6)
Technology	16 (4.2)
Education	31 (8.1)
Art	13 (3.4)
Business	234 (61.1)
Service Industry	39 (10.2)
Unemployment	21 (5.5)

Knowledge, Attitude, and Practice Levels

Overall, 82% of participants demonstrated low knowledge of HBV infection and vaccination (Mean = 1.20, SD = 0.443). Negative attitudes were observed in 58% (Mean = 2.73, SD = 0.580). Despite these findings, self-reported vaccination uptake was 79.6% (Mean = 1.11, SD = 0.423) (Table 2).

Table 2: Knowledge, attitude, and practice levels

Variables	N(%)	Mean(SD)
Knowledge about hepatitis B infection and vaccination		
Low Knowledge	314(82)	1.20(0.443)
Medium Knowledge	62(16.2)	
High Knowledge	7(1.8)	
Attitude towards hepatitis B infection and vaccination		
Negative	222(58.0)	
Moderate	128(33.4)	2.73(0.580)
Positive	26(6.8)	
Missing	7(1.8)	
Practice towards hepatitis B infection and vaccination		
No	78(20.4)	1.11(0.423)
Yes	305(79.6)	

Source of Information

Hospitals were the primary source of information about HBV for most participants (Figure 1), indicating that health system exposure drives awareness.

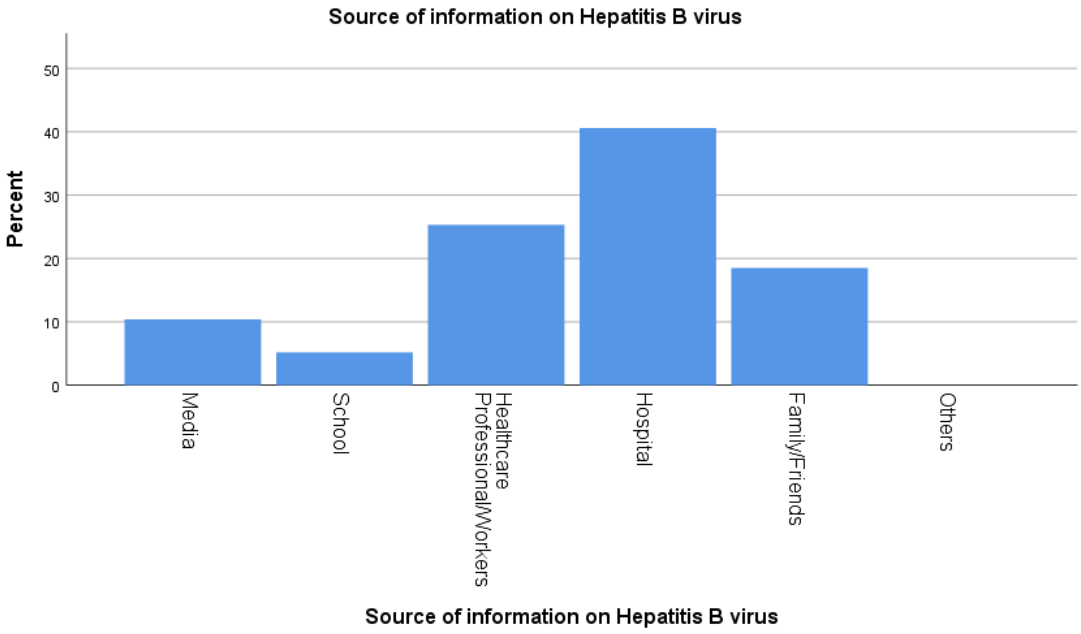

Figure 1: Demonstrates that hospitals were the primary source of Hepatitis B information for most participants

Chi-square Analysis (Associations)

As shown in Table 3, chi-square analysis revealed significant associations between key variables. A positive association was found between education level and vaccination status (p = 0.025). Additionally, gender was significantly associated with knowledge about Hepatitis B infection and vaccination (p = 0.010). However, no significant association was observed between occupation and attitudes toward Hepatitis B prevention (p = 0.466).

Table 3: Logistic Regression (Knowledge as Predictor of Vaccination)

Variable	Have you received hepatitis B vaccination			P-value
Level of education	No	Yes		
None	0	4		0.025
Primary	8	70		
Secondary	29	116		
Tertiary	41	115		
	Knowledge about hepatitis B infection and vaccination			
Gender	Low Knowledge	Moderate Knowledge	High Knowledge	0.010
Male	85	24	5	
Female	229	38	2	
	Attitude about hepatitis B infection and vaccination			
Occupation	Negative	Moderate	Positive	0.466
Health	29	5	3	
Technology	11	5	0	
Education	14	13	4	
Arts	9	4	0	
Business	131	82	17	
Service Industry	23	13	2	
Unemployment	13	6	0	

From Table 4. Logistic regression analysis revealed that knowledge level was not a significant predictor of Hepatitis B vaccination status ($\chi^2 = 4.49$, df = 2, p = 0.106). The model had poor explanatory power (Nagelkerke $R^2 = 0.018$), with predictive accuracy (79.6%) no better than the baseline vaccination rate. Odds ratios for knowledge categories were not statistically significant, indicating that knowledge level does not meaningfully affect vaccination likelihood in this population.

Table 4: Logistics Regression

Chi-square	4.49
df	2
p	0.106
Nagelkerke	0.018
odd ratio	0.581

Discussion

The Paradox of High Vaccination Despite Low Knowledge

The most striking finding of this study is the coexistence of low knowledge (82%) and high vaccination uptake (79.6%) among HIV-positive patients. This directly contradicts the conventional KAP model, which assumes that knowledge must precede practice (Andrade et al., 2020; Schluter., 2020). Similar paradoxical findings have been reported in other vaccine contexts, including COVID-19 and influenza, where individuals accept vaccines without deep understanding (Dubé et al., 2021; MacDonald et al., 2015). However, this is one of the few studies to document our findings for HBV vaccination among PLHIV in Nigeria.

Hospitals were the primary source of information suggests that NIMR may have integrated HBV vaccination into routine HIV care as an opt-out or routinely recommended service. When a trusted provider offers a vaccine conveniently and repeatedly, patients may accept regardless of their personal knowledge or attitudes. This aligns with the "nudge theory" and system-level behavioral economics (Thaler & Sunstein, 2021).

Gender and Knowledge

The significant association between gender and knowledge (p = 0.010), with males showing higher knowledge than females, mirrors findings from Ladi-Akinyemi et al (2026) in Lagos and contradicts, Zwawu et al (2025) in northern Nigeria. This gender gap may reflect differential health-seeking behavior, literacy levels, or exposure to health information. Female patients may have less time for health education due to caregiving roles. Targeted interventions for women are urgently needed.

Education and Vaccination: A Nuanced Relationship

Although education level was associated with vaccination status (p = 0.025), the logistic regression showed that knowledge (the cognitive product of education) did not predict vaccination. This suggests that the education-vaccination link may be mediated by access to care, health literacy, or socioeconomic status rather than HBV-specific knowledge (Shoyemi et al 2025). Educated individuals may have better access to NIMR services, not necessarily better HBV knowledge.

Occupation Does Not Influence Attitude

The lack of association between occupation and attitude (p=0.466) indicates that negative perceptions about HBV vaccination are evenly distributed across all occupational groups. This finding contradicts Godono et al (2024) .

Poor Predictive Power of Knowledge

The logistic regression model was essentially useless (Nagelkerke $R^2 = 0.018$). This is a powerful negative finding: knowledge is not the driver of HBV vaccination in this population. Continuing to fund awareness-only campaigns may be inefficient and wasteful. Instead, resources should support vaccine availability, provider training, and routine offer of vaccination during every HIV clinic visit (John Ruedy 2009., Shauna et al., 2026).

Comparison with Previous Nigerian Studies

Earlier Nigerian studies reported low vaccination uptake: Osagiede et al (2022) found 50% uptake in South-South Nigeria, and Shoyemi et al (2026) reported 45.4% in Lagos. Our 79.6% uptake is substantially higher, likely reflecting NIMR's status as a research institute with stronger vaccine integration. However, our low knowledge finding (82%) aligns with Musa et al. (2020), indicating that awareness gaps persist nationally despite high uptake at this facility.

Implications for the KAP Model

This study challenges the universal applicability of the KAP model for HBV vaccination among PLHIV. In settings with strong health systems, practice can outpace knowledge. Therefore, behavior change theories that incorporate structural factors (e.g., Socio-Ecological Model, Health Belief Model with system-level constructs) may be more appropriate (Dubé et al., 2021; MacDonald et al., 2015).

Limitations

A cross-sectional design cannot establish causality, and Self-reported vaccination status (potential recall and social desirability bias), and Single-site study (limits generalizability to other Nigerian HIV clinics)

CONCLUSION

Among HIV-positive patients at NIMR, Lagos, high hepatitis B vaccination uptake (79.6%) occurs despite widespread low knowledge (82%) and negative attitudes (58%). Knowledge is not a significant predictor of vaccination behavior. This paradox strongly suggests that institutional factors, not individual awareness, drive vaccine acceptance in this setting. Integrate HBV vaccination as an opt-out routine service within all HIV care packages in Nigeria. Shift funding from standalone awareness

campaigns to vaccine procurement and health system strengthening. Train healthcare workers to recommend vaccination confidently, as their advice may be more influential than patient knowledge. Implement targeted health talks and peer education for female patients to close the knowledge gap.

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