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Hepatitis B vaccine uptake among women of childbearing age attending primary health care centres in Nigeria

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ABSTRACT

Hepatitis B virus (HBV) is a *Hepadnavirus* that infects liver cells and causes an infectious disease of global significance, leading to a significant health burden. In Africa, studies have revealed low uptake of HBV vaccine and increasing prevalence of HBV infection. None uptake of the vaccine is due to several barriers. These barriers require assessment to address them. The objective of this study was to determine the level of HBV vaccine uptake among pregnant women attending antenatal clinics (ANC) at Primary Health Care (PHC) Centres and to identify the facilitators and barriers to vaccine uptake. This descriptive hospital-based cross-sectional study was conducted among 340 pregnant women between February and March 2024. The respondents were selected using a multistage sampling technique, and interviewer-administered semi-structured questionnaires were used. The respondents' mean age was 25 ± 5.45. Only 23(6.8%) of respondents had received HBV vaccine, with 10 (2.9%) receiving the complete dose. Spousal approval, availability of the vaccine at the hospital and working within the hospital were identified facilitators to uptake of the vaccine. Barriers identified were poor awareness 258 (80.8%), no access to the vaccine 3 (0.9%), positive HBV status 1 (0.3%), unavailability of the vaccine 13 (4.1%), perception that vaccine was not safe 5 (1.6%), high cost of vaccine 7 (2.2%) and lack of health care provider recommendation 32 (10.1%). In conclusion, there is a need to prevent barriers and enhance facilitators to vaccine uptake. More efforts must be put towards increased awareness and improved vaccination, among other measures. These will help to strengthen measures to combat HBV infection.

Keywords: Hepatitis B Virus, Vaccine, pregnant women, Infection.

1. INTRODUCTION

Current rates of viral hepatitis infection in Nigeria are reflective of the global disease burden involving hundreds of millions of persons (WHO, 2022). One in every 12 persons worldwide is living with viral hepatitis, and approximately 240 million persons have chronic HBV infection (Federal Ministry of Health, 2016). A study in Beijing revealed a prevalence of 4.3% (Zhao et al., 2021). In a study using mixed methods analysis conducted alongside a cross-sectional study amongst 784 Singapore Citizens and Permanent Residents, the prevalence of hepatitis B surface antigen (HBsAg) seropositivity among those screened was 4.3% (Tan et al., 2020). In Africa, approximately 60 million people live with chronic HBV infection, with an estimated prevalence of 6.2% (WHO, 2019).

A meta-analysis reported a high prevalence of HBV infection in Kenya and Uganda (8.54% and 8.454%, respectively) (Kafeero et al., 2021). Nigeria is one of the countries with the highest burden of viral hepatitis. The average prevalence of hepatitis in Nigeria ranges from 11% to 13.7% and an estimated 20 million Nigerians chronically infected (Federal Ministry of Health, 2016). A national survey of hepatitis B in Nigeria showed a prevalence of 12.2% among the general population (Olayinka et al., 2016). In a systemic review and meta-analysis of 47 studies in Nigeria, a pooled prevalence of 9.5% was reported. Sub-group analyses revealed the highest HBV prevalence in rural settings (10.7%) (Ajuwon et al., 2021). The World Health Organization (WHO) recommends the hepatitis B vaccine for all newborns, children up to 18 years of age, and all adults at higher risk for infection (WHO, 2024).

The hepatitis B vaccine is also recommended for adults with diabetes and those at high risk for infection due to their jobs, lifestyle, living situations, or country of birth (Hepatitis B Foundation, 2023). The vaccine is also known as the first anti-cancer vaccine because it prevents hepatitis B, the leading cause of liver cancer worldwide (Hepatitis B Foundation, 2023). It can provide lifetime protection for persons who do not have hepatitis B and get the vaccine as soon as possible. HBV prevention and control presents a global public health priority because of the tremendous economic and healthcare burdens (Zhao et al., 2021). Therefore, in 2015, combating viral hepatitis by 2030 was included in the Sustainable Development Goals (United Nations, 2015). The WHO has targeted an estimated 90% global vaccination to enhance elimination of HBV by 2030 (Flores et al., 2022).

An estimation of HBsAg global prevalence was expected to be 5.2% by 2019, an indication of about 402 million cases; however, interventions via vaccination accounted for the prevention of 85 million cases (GBD 2019 Hepatitis B Collaborators, 2022). WHO has also suggested that the primary intervention to reduce HBV infection is by increasing vaccination (WHO, 2012). Vaccination reduces the risk of developing HBV infection among infants of sHBV-positive mothers by 3.5 times (WHO, 2012). Furthermore, passive-active post-exposure prophylaxis with hepatitis B Immunoglobulin and hepatitis B vaccine is 85 to 95% effective in preventing vertical transmission compared to 70 to 95% of vaccine alone (Ma et al., 2014). Up to 13% of infants born to infected mothers are positive for HBV infection and this is more common among children born to mothers with high viral load (Ma et al., 2014).

Pregnant mothers who test positive for both HBsAg and hepatitis B e antigen (HBeAg) have a 70-90% risk of transmitting the infection to their newborn infants and about 10–40% risk if they test positive for only HBsAg (Bayo et al., 2014). Following hepatitis B vaccination, seroprotection is defined by anti-HB levels of at least 10 to 12 mIU/mL (depending on the assay used) 1 to 2 months after completion of the vaccine series (Maria and David, 2023). In the absence of repeated exposure, anti-HB levels may reduce gradually, although in immunocompetent hosts, immunity is usually maintained, even when anti-HB levels fall below ten mIU/mL. Because the hepatitis B vaccine contains HBsAg, hepatitis B vaccination may cause a transient false-positive HBsAg for 2 to 3 weeks following vaccination. This result is clinically insignificant and does not represent infection (Maria and David, 2023).

Hepatitis B infection is a significant public health problem in Nigeria, and sexually active individuals such as pregnant women may be at increased risk (Ojiegbe et al., 2018). As a result of the poor screening and low vaccination rate, the vertical transmission of HBV has become a significant route of transmission of the virus in Nigeria. The resulting infection leaves the children born at risk of developing chronic liver disease later in life. This shows the need to ensure vaccination in women of reproductive age group and ensure vaccination at birth for children (Eleje et al., 2021). The currently recommended practice to reduce mother-to-child perinatal transmission relies on the administration of HBV vaccine and, in some countries, concurrent administration of hepatitis B immune globulin (HBIG), however screening practices and the resultant prophylaxis that infants receive vary from country to country (WHO, 2023).

Awareness of the HBV vaccine varies across different regions, as vaccine uptake (Eleje et al., 2021; Okonkwo et al., 2024; Onyenemezu et al., 2023). Furthermore, some facilitators for vaccine uptake and barriers impeding uptake, need to be studied, to

enhance improvement of facilitators and adequate prevention of obstacles (Freeland et al., 2023; Machmud et al., 2023). Current public health intervention is targeted towards adequate prevention of HBV infection, especially among pregnant women, this would serve as a double sword approach to also prevent infection in unborn children (Freeland et al., 2023; Mohanty et al., 2020; Olakunde et al., 2021). It is important to determine the level of HBV vaccine uptake, willingness, facilitators and barriers to HBV Vaccine uptake. This will provide data for planning towards eliminating the virus among the women, children and the community at large.

It will also provide baseline data for future assessment of the impact of HBV infection and prevention in Nigeria. Preventive services (e.g., health education, screening) are often out of reach of communities and are sometimes only available at centralized/specialized hospitals. To achieve the WHO target, there is a need to bring hepatitis care to the primary health facilities and communities (WHO, 2022), so that people have better access to diagnosis, treatment and care. This study set out to determine the level of uptake of HBV vaccine and to identify the facilitators and barriers to uptake of HBV vaccine among pregnant women attending antenatal clinics at primary health care centres.

2. METHODS

Description of the Study Area

The study was conducted in the Kwara central zone of Kwara State, Nigeria. There are PHC facilities located within the local government areas in Kwara Central where ANC clinics take place along with the provision of other health care services. Routine ANC clinic occurs at PHCs in Kwara Central daily except on weekends and routine immunization for children is conducted daily. HBV vaccine uptake in adults is low in Kwara (4.6%) (Ademola et al., 2023). The study was a descriptive cross-sectional study carried out using a quantitative data collection method. The study population comprised pregnant women attending ANC clinics at PHC centres in Kwara Central senatorial district. Consenting pregnant women, 18 years and above were included in the study. Very sick pregnant women who were not strong or healthy enough to answer the questionnaire were excluded.

Sample Size Determination

The sample size was calculated using Fisher's formula:

$$n = \frac{z^2pq}{d^2}$$

Where,

n = The minimum sample size when the population is more than 10,000

Z = The standard normal deviation set at 1.96.

P = Prevalence of hepatitis B virus infection of 33.3% (i.e., 0.33) from a previous study among pregnant women was used (Mac et al., 2019).

q = 1- p

d = Degree of accuracy, set at 0.05 for this study

Therefore, n = 1.962x 0.33x 0.67/0.052

n=339.75

However, since the study population is less than 10,000 (1,840 pregnant women registered with the antenatal booking clinics in the last year), the sample size was adjusted using the formula:

$n_f = {}^{n}/1 + (n/N)$

nf = The desired sample size when the population is less than 10,000.

n = 339.75

N= The estimated population size = 1840

Therefore nf = 339.75/ 1+ (339.75/1,840) =286.71

As a cross-sectional study, patients were recruited during regular clinic hours. However, to take care of incomplete or missing data, a 90% response rate was assumed. The final sample size was adjusted to compensate for the response rate using the formula: ns = n/r (Araoye, 2003)

Where ns = Adjusted sample size of the response rate.

n = Calculated sample size =286.71
r = Response ratio= 0.90
ns = 286.71/0.90 = 318.57
Final sample size used in the study was 340.

Sampling technique

A multistage sampling technique was conducted.
Stage 1: Selection of local government areas (LGAs): Two LGAs (Ilorin East and Asa) were randomly selected from the four LGAs in the Kwara Central senatorial zone using simple random technique (balloting).
Stage 2: Selection of PHC Centre: From each of the two LGAs selected, two PHC centres (one rural and one urban) were selected, i.e., from the twenty PHCs and twelve PHCs in Ilorin East and Asa respectively using simple random technique (balloting).
Distribution of the sample size across the health facilities was conducted by proportional allocation.
Stage 3: Selection of respondents: At the healthcare facilities, a systematic random sampling technique was conducted to select patients after a list of the patients in the clinic was obtained and used as the sampling frame.

Calculating sample size for each health facility

Facilities in Ilorin East LGA: Okelele Health Centre and Oko Erin Health Centre.
Facilities in Asa LGA: Afon District Health Centre and Ogele PHC centre.
For each of the facilities: Okelele Health Centre had 650 pregnant women, Oko Erin Health Centre had 300, Afon District Health Centre had 460 and Ogele PHC had 430 in the past year.
Hence, using proportional allocation:

$$\text{Okelele Health Centre: } \frac{650}{1840} \times 340 = 120$$

$$\text{Oko Erin Health Centre: } \frac{300}{1840} \times 340 = 55$$

$$\text{Afon District Health Centre: } \frac{460}{1840} \times 340 = 85$$

$$\text{Ogele PHC, Afon: } \frac{430}{1840} \times 340 = 79.5$$

Hence, 120 participants were taken from Okelele Health Centre, 55 from Oko Erin Health, 85 from Afon District Health Centre, and 80 from Ogele PHC Afon.

$$\text{The sampling interval} = \frac{\text{Population size}}{\text{Sample size}}$$

$$\text{The sampling interval for Okelele PHC} = \frac{650}{120} = 5.4. \text{ i.e. } 6$$

$$\text{The sampling interval for Oko Erin PHC} = \frac{300}{55} = 5.5. \text{ i.e. } 6$$

$$\text{The sampling interval for Afon District PHC} = \frac{460}{85} = 5.4. \text{ i.e. } 6$$

$$\text{Sampling interval for Ogele PHC} = \frac{430}{80} = 5.4. \text{ i.e. } 6$$

Final sampling interval was six at the four facilities.
Samples were collected between February and March 2024.

Data Collection Instrument and procedure

A semi-structured interviewer-administered questionnaire was used to obtain information on vaccine uptake among ANC attendees. The questionnaire was structured to have 3 sections: Section A assessed the respondents' socio-demographic data. Section B assessed

the level of awareness to HBV vaccine, HBV vaccine uptake among participants, and facilitators and barriers influencing HBV Vaccine uptake. Section C assessed the willingness to take and pay for the vaccine (after explaining what the HBV vaccine meant to participants). The data was checked daily for correctness and completeness. Then, it was coded and analyzed using a statistical package for social science (SSPS version 28.0). A summary of the statistics was presented using frequency tables, charts, mean and rates.

Limitation of the Study

The study had a descriptive cross-sectional design; hence the outcome may not have a causal relationship with the tested variables. A longitudinal study design would be required to establish causal relationships.

3. RESULTS

Profile of Study Participants

Table 1 reveals that 340 pregnant women participated in the study. Respondent's ages ranged from 18 to 44 years, with a mean of 25 ± 5.45. As shown, 126 (37.1) were between 20-24 years of age. The majority 326 (95.9%) were Yoruba by tribe. Married participants were 303 (89.1%), with 269 (79.1) of married participants, in the monogamous type of marriage. The majority of the respondents, 320 (94.1%), had some formal education and were self-employed 145 (42.6%). However, the majority of these respondents 210 (67.3%) had low-income. A nuclear family setting was found in the majority of participants 178 (52.4%).

Table 1 Socio-demographic characteristics of respondents N=340

Variables	Frequency (%)
Age groups	
< 20	25 (7.4)
20 – 29	232 (68.2)
30 – 39	76 (22.3)
≥ 40	7 (2.1)
Mean ± SD	25 ± 5.45
Range	18 – 44
Ethnicity	
Yoruba	326 (95.9)
Igbo	3 (0.9)
Hausa	4 (1.2)
Others	7 (2.1)
Marital Status	
Married	303 (89.1)
Separated/Divorced/ Widowed/Never Married	37 (10.9)
Type of marriage	N=303
Monogamy	269 (88.8)
Polygamy	34 (11.2)
Level of education	
Tertiary	70 (20.6)
Secondary	214 (62.9)
Primary	36 (10.6)
No formal education	20 (5.9)
Occupation	
Unemployed	21 (6.2)

Self employeda	145 (42.6)
Civil servant	120 (35.3)
Othersb	54 (15.9)
Income in one monthc	n=312
≤ 30,000	210 (67.3)
> 30,000	102 (32.7)
Family type	
Nuclear	178 (52.4)
Extended	162 (47.6)

a Including trader, farmer, artisan

b Including private company workers, laborers

c The cut-off of thirty thousand naira per month was based on the national minimum wage

Awareness of HBV Vaccine

Table 2 reveals that 72 (21.2%) of respondents knew of the HBV vaccine.

Table 2 Awareness of HBV vaccine N=340

Variables	Frequency (%)
Aware of HBV vaccine	
Yes	72 (21.2)
No	268 (78.8)

Sources of Information on HBV Vaccine

Figure 1, shows that the majority of the respondents who knew of HBV vaccine, 43 (59%), got the information from the clinic. Only 2 (3%), got the information from relatives.

Uptake of HBV Vaccine

In table 3, HBV vaccine had been taken by 23 (31.9%) of the participants who were aware of the vaccine i.e., 6.8% of the whole study population. Of this, only 10 (42.6%) had a complete dose of the vaccine. Recommendation by healthcare professionals, was the most common reason for uptake of the vaccine among the recipients, this was found in 15 (62.0%) of recipients. Poor knowledge of the number of doses, found in 7 (58.3), was the most common reason for not completing the vaccine doses.

Facilitators and Barriers to HBV Vaccine Uptake

Table 4, reveals that spousal approval, seen in 11 (47.8%), was the most common enabler for vaccination. Among non-recipients of the vaccine, 268 (84.5), revealed they had not taken the vaccine prior because, they were not aware of the vaccine.

Willingness for Vaccine Uptake and Payment

In table 5, among those who had not taken the vaccine (N=317), 284 (89.6%) were willing to take the HBV vaccine if available and 256 (80.8%) were willing to pay for the vaccine.

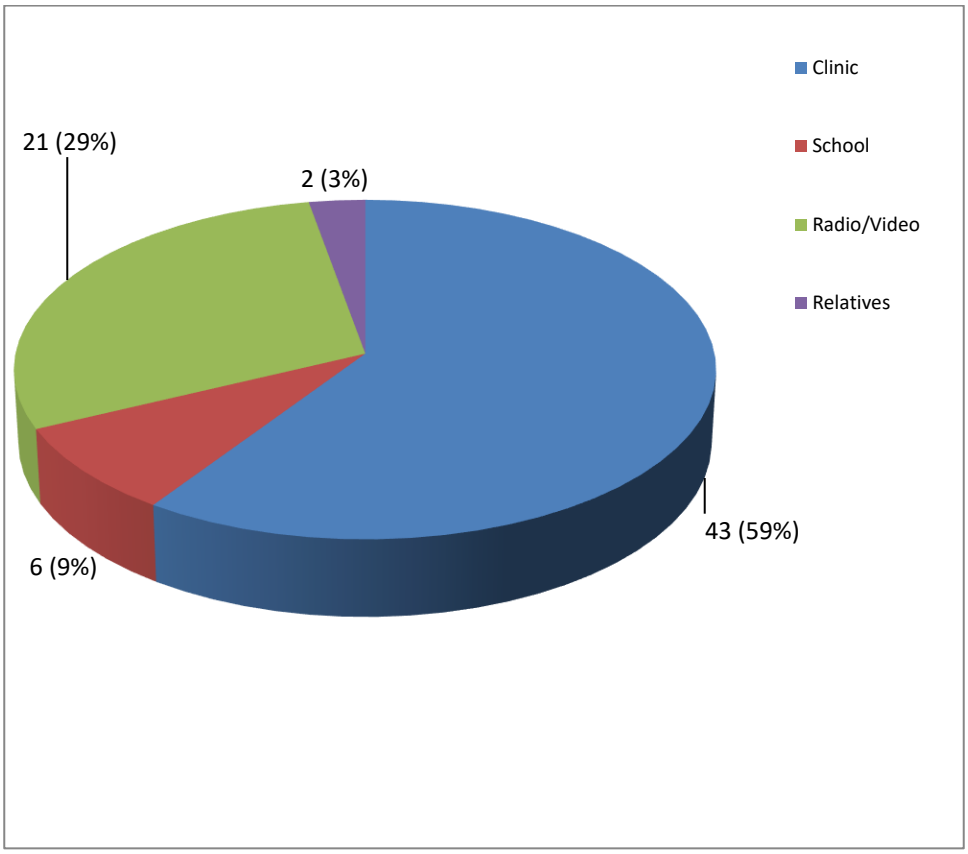

Figure 1 Sources of information on HBV vaccine

Table 3 Uptake of HBV Vaccine N=72

Variables	Frequency (%)
Received HBV vaccine before	
Yes	23 (31.9)
No	49 (68.1)
Number of doses of HBV received	
One	5 (23.9)
Two	8 (33.5)
Three	10 (42.6)
Reasons for taking the vaccine N=23	
Being a healthcare worker	3 (14.2)
Husband Positive	5 (23.8)
Recommendation by healthcare professional	15 (62.0)
Reasons for not completing vaccine doses	n=12
Poor knowledge of the number of doses	7 (58.3)
Poor availability of vaccine	2 (16.7)
I Forgot to complete the dose	3 (25.0)

Table 4 Facilitators and Barriers to HBV Vaccine Uptake

Variables	Frequency (%)
Facilitators /enablers for hepatitis B vaccination	N=23
Working in the hospital	3 (13.0)
Availability of vaccine at the hospital	7 (30.4)
Spousal Approval	11 (47.8)
Prior awareness	2 (8.8)
Barriers to uptake of vaccine	N= 317
Unaware of vaccine	268 (84.5)
No access to vaccine	3 (0.9)
Known positive HBV status	1 (0.3)
The perception that vaccine is not safe	5 (1.6)
Unavailability of vaccine	13 (4.1)
High cost of vaccine	7 (2.2)
Lack of healthcare provider recommendation	20 (6.3)

Table 5 Willingness for vaccine uptake and payment N=317

Variables	Yes (%)	No (%)	Don't know (%)
Willing to take the vaccine	284 (89.6)	31 (9.8)	2 (0.6)
Willing to pay for the vaccine	256 (80.8)	61 (19.2)	0 (0.0)

4. DISCUSSION

There were 340 participants recruited into the study with a mean age of 25 ± 5.45 and the highest proportion of participants between the ages of 20-24 years. The majority were of the Yoruba ethnic group, had formal education, employed, but earned less than 30, 000, which was the minimum wage in Nigeria at the time. Two-thirds of the women were in the third trimester of pregnancy. The index study revealed that about one-fifth (21.2%) of participants were aware of the hepatitis B vaccine. This is lower than the findings in a cross-sectional survey, among pregnant women attending ANC clinic in six tertiary hospitals in Nigeria, where 39.9% of pregnant women were aware of HBV vaccination (Eleje et al., 2021).

It is also different from findings in a cross-sectional, community-based survey of 430 women of childbearing age in Punjab province, Pakistan, where 43% of participants were aware of the vaccine (Noreen et al., 2015). These findings, probably indicates low awareness of the HBV vaccine, and shows the need for improvement in strategies, such as campaign, health education and counselling. Furthermore, only 23 (6.8%) of respondents had received the HBV vaccine, with 2.9% of the whole study population receiving the complete dose. This is lower than a 13.2% uptake of the HBV vaccine, found in a cross-sectional study among pregnant women attending ANC in six tertiary hospitals in Nigeria, with 5% having received completed doses (Eleje et al., 2021). Reduced vaccine awareness among the study population could be a reason for the low uptake observed among them.

The most common reason for the vaccine uptake was the recommendation by healthcare professionals. This was found in 15 (62.0%) of those who had received the vaccine. Other reasons were: being health care workers, hence received it at work in 3 (14.2%) women and 5 women (23.8%) received it because their husband was positive for HBV infection. This is similar to findings in Singapore, where doctor's recommendation was the main reason for uptake of HBV vaccine (Tan et al., 2020). This shows that, contact with the healthcare professionals, serve as an avenue for evaluation and possible recommendation of vaccination. Spousal approval was the most common facilitator for vaccine uptake 11 (47.8%). Others were availability of the vaccine at the hospital found in 7 (30.4%), working within the hospital found in 3 (13.0%) and 2 (8.8%) had prior awareness.

This is similar to findings in Indonesia, where working as a health worker was a facilitator identified in adults (Machmud et al., 2023). However, living in Yogyakarta compared to living in Aceh, having secondary and higher education, and availability of health insurance services, which included HBV vaccination, were facilitators in Indonesia. The latter may not be applicable in Nigeria presently, because health insurance services do not include HBV vaccination in most settings in Nigeria yet. This should however, be adopted as a strategy in Nigeria. Among pregnant women in Adamawa and Enugu, Nigeria, facilitators to HBV vaccine uptake identified were: High vaccine acceptance and recommendation by healthcare providers (Freeland et al., 2023). These might indicate that acceptance of the vaccine as a preventive strategy and recommendation by healthcare workers encouraged and facilitated the vaccine uptake in Adamawa and Nnewi.

Among those who initiated but did not complete the vaccine doses (n=12), poor knowledge of the number of doses was the primary reason for the non-completion of hepatitis vaccine dose, found in 7(58.3%). Other reasons were poor availability of vaccine 2 (16.7%) and others forgetting to complete the dose 3 (25%). Furthermore, in the index study, 80.8% of those that have not received the vaccine before attested to the fact that being unaware of the vaccine was a significant barrier that prevented their vaccine uptake. Other barriers cited were no access to the vaccine, positive HBV status, unavailability of the vaccine, the perception that the vaccine was not safe, high cost of the vaccine, and lack of health care provider recommendation.

This finding is comparable to a finding by Eleje and his colleagues, in a cross-sectional study among pregnant women in Nigeria, who found that the primary barrier to non-uptake of HBV vaccine, was lack of awareness of the vaccine (60.1%). Other barriers cited in the study were: inadequate access to the vaccine (8.0%), and positivity to HBV infection (7.2%) (Eleje et al., 2021). Findings in the index study, are similar to that in Indonesia, where lack of vaccine availability in certain areas and the ineffective dissemination of hepatitis B vaccination were barriers identified (Machmud et al., 2023). In Anambra, South Eastern Nigeria, barriers to HBV vaccine uptake identified among adults were: unawareness of the vaccine (34.4%), lack of interest (24.4%), too busy schedule (20.6%), and high cost of vaccine (19.4%) (Onyenemezu et al., 2023).

These show that been unaware of the vaccine, poor access to the vaccine and unavailability of the vaccine, are common barriers across various locations and shows the need to be addressed along with other barriers. Possible reasons for these include poor health education and counselling, inadequate procurement of vaccines and inadequate allocation of health resources. Also, poor logistics regarding vaccines delivery, are possible reasons. In this study, 284 (89.6%) of participants were willing to take the HBV vaccine if available, and 256 (80.8%) were willing to pay for the vaccine. This is close to the findings in a cross-sectional study in Vietnam, where 80.8% of the women were willing to have the vaccine, which had an average price of 108,600 Vietnamese Dong (VND) (Nguyen et al., 2019). It is also similar to findings in a descriptive cross-sectional study in Jos, Nigeria, where the majority (85.6%) of respondents were willing to pay for HBV Vaccine (Okonkwo et al., 2024).

Likewise, in Kalulushi, Zambia, willingness to take the HBV vaccine was high (Nyasa et al., 2023). It is higher than the findings in Hanoi, Vietnam, where 62.3% of all participants were willing to pay for the HBV vaccine (Le et al., 2021). Findings in the index study are also higher than that in a cross-sectional survey among 620 participants in Bahir Dar City, North-West Ethiopia, where 62.17% of respondents were willing to pay for the HBV vaccine with an average cost of ETB174.24 (US$5.25) (Aychew et al., 2023). Generally, all studies highlighted showed an above-average willingness to take and pay for the vaccine, despite variations in geographical regions, economic situations and socio-demographic characteristics, indicating a possibility of good health-seeking behaviour. These findings imply the need for better targeted public education interventions about HBV and more government involvement in providing support, and the health sector participation in providing information.

5. CONCLUSION

HBV vaccine uptake is low and the primary barriers identified were poor awareness, no access to the vaccine and unavailability of the vaccine. Furthermore, other barriers were: perception that the vaccine was not safe, high cost of vaccine and lack of healthcare provider recommendation of the vaccine. Spousal approval, availability of the vaccine at the hospital and working within the hospital were identified facilitators to vaccine uptake. There should be a scaling up of strategies to improve vaccine uptake. Barriers to vaccine uptake should be eradicated, and facilitators enhanced.

There is a need to increase awareness and improve the knowledge of individuals by healthcare professionals on the importance of HBV vaccine. This could be in the form of health talks, campaigns, or posters. The Internet or other technological means can also be

used. The government should ensure that vaccination services are well subsidized. Health insurance services should include vaccination for HBV. Barriers such as poor access to vaccine and unavailability of vaccine at healthcare facilities should be addressed. Individuals should equip themselves with adequate knowledge of HBV infection preventive measures, including vaccine uptake. Non-governmental organizations can also help to provide vaccination services.

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Author's contributions
Yusuf Adebayo Ramat: Conceptualization, proposal writing, ethical review presentation, literature review, study design, study procedure, data collection, data analysis, result collation, manuscript writing, revising manuscript critically for important intellectual content and final authorization.
Yusuf Amuda Abbas: Literature review, data analysis, drafting the article, discussion writing and final authorization.
Kuranga Ibrahim Suleiman: Literature review, study design, drafting the article, and final authorization.
Amoko Ampitan: Literature review, study design, and final authorization.
Ademola Christy Olanike: Study design, data collection, data analysis, discussion writing and final authorization.
Owolabi Sunday Adebayo: Literature review, study design, data collection, discussion writing and final authorization

Ethical approval
The study was approved by the Medical Ethics Committee of the Faculty of Clinical Sciences, University of Ilorin, (Ethical approval code: UERC/ASN/2024/2681). The ethical guidelines for Human Subjects are followed in the study.

Informed consent
Written & Oral informed consent was obtained from all individual participants included in the study.

Conflicts of interests
The authors declare that there are no conflicts of interests.

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Data and materials availability
All data associated with this study are present in the paper.

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