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Prevalence of Hepatitis B Viral Infection Among Pregnant Women Attending Antenatal Care in General Hospital Talata Mafara

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Hepatitis B virus (HBV) is a major public health challenge in sub-Saharan Africa, where vertical transmission is common. This study investigated the prevalence and risk factors of HBV infection among pregnant women attending antenatal care at General Hospital Talata Mafara, Zamfara State, Nigeria. Using a cross-sectional design, data were collected from 40 participants through structured questionnaires and serological testing for HBsAg, and analyzed using chi-square tests. The prevalence of HBV was 11.4% (95% CI: 4.95–23.98), indicating a hyperendemic setting. Age, ethnicity, and education were not significantly associated with infection, whereas occupation and a history of blood transfusion showed strong associations with HBV positivity. Importantly, none of the vaccinated women tested positive, underscoring the protective role of immunization. These findings highlight the need for routine HBV screening in pregnancy, improved blood safety protocols, expanded vaccination coverage, and targeted public health education, particularly for rural and informally employed populations

Keywords: Hepatitis B, pregnant women, risk factors, vertical transmission, vaccination, blood transfusion, antenatal care Nigeria.

1. Introduction

Hepatitis B virus (HBV) infection remains a significant global health challenge, with an estimated 3.8% of the world's population chronically infected and approximately 820,000 annual deaths resulting from complications such as cirrhosis and hepatocellular carcinoma (CDC, 2024). The burden is disproportionately high in low- and middle-income countries, where vertical and horizontal transmission contribute substantially to the disease's persistence.

Sub-Saharan Africa is one of the most affected regions, harbouring over 60 million chronic HBV cases (Ajuwon *et al.,* 2021). Transmission in this region is often driven by perinatal infection, unsafe medical practices, and exposure to infected blood and body fluids.

Nigeria is classified as hyperendemic, with a national HBV prevalence of over 8%, among the highest globally (WHO, 2024). Alarmingly, nearly 90% of infected Nigerians remain undiagnosed, sustaining transmission and limiting the effectiveness of control measures. Pregnant women are of particular concern because of the high risk of mother-to-child transmission, which contributes significantly to chronic HBV infections in adulthood (Shuaib *et al.,* 2024).

Despite the global and national evidence, there is a paucity of region-specific data on HBV burden among pregnant women in Talata Mafara, Zamfara State. This knowledge gap limits the ability to design targeted interventions for the prevention, screening, and management of HBV in pregnancy.

This study aims to determine the prevalence of hepatitis B virus (HBV) infection among pregnant women attending antenatal care at General Hospital Talata Mafara, Zamfara State, Nigeria, and to examine associated socio-demographic and clinical factors.

2. Material and Methods

2.1 Study Area

The study was conducted in Talata Mafara, a Local Government Area (LGA) in Zamfara State, Nigeria. Geographically located at 12°21′00″N and 6°04′00″E, Talata Mafara covers an area of 1,430 km² and had a population of 215,178 according to the 2006 census. The area records an average annual rainfall of 798 mm, with the rainy season spanning from mid-March to the end of October. Average temperatures range from 31°C to 35°C. The natural vegetation is largely Sudan savanna, characterized by woodlands mixed with grasses and

shrubs that are lush during the wet season and dry during the harmattan.

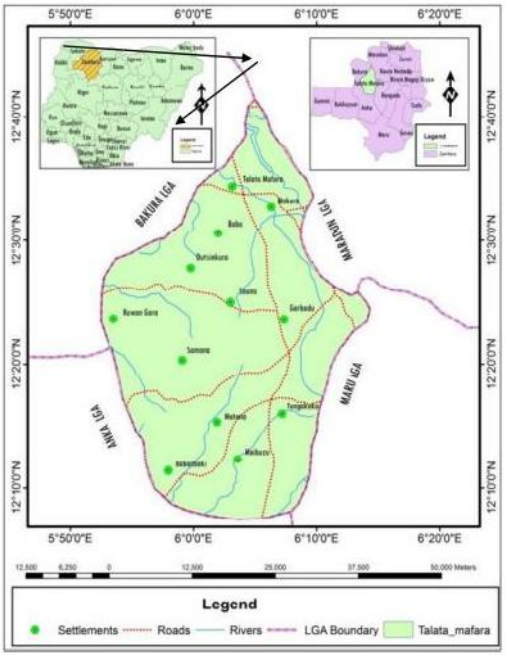

Figure 1: Map of the Study Area (Talata Mafara Local Government Area, Zamfara State, Nigeria) Source: GIS Laboratory, Department of Geology, Ahmadu Bello University (ABU), Zaria.

2.2 Ethical Considerations

Ethical approval was obtained from Planning and Research Department of the Talata Mafara Local Government (Monitored by The State Ethical Research Team) with Approval Reference Number (TMLG/21a/ADM/R/345/Vol1). Informed written consent was secured from all participants before sample collection and questionnaire administration. Participants were informed about the study's purpose, procedures, benefits, and risks. Confidentiality was maintained through anonymization, and data access was restricted to authorized personnel only.

2.3 Study Design and Population

This study employed a descriptive cross-sectional design and was conducted at the General Hospital, Talata Mafara, to determine the prevalence of HBV infection among pregnant women attending antenatal care (ANC). Rapid diagnostic test kits were used for the detection of HBsAg, while structured questionnaires captured socio-demographic and clinical data from participants. The study population included all consenting pregnant women attending ANC at the hospital. Those who declined participation, had incomplete medical records, or provided insufficient blood samples were excluded. The sample size was calculated using the Kish and Leslie formula for cross-sectional studies, based on a previously reported HBV prevalence of 3% (Ajuwon et al., 2021). Using a 95% confidence level (Z = 1.96) and a 5% margin of error (d = 0.05), the minimum sample size was determined to be approximately 40 participants.

2.4 Sample Collection and Data Collection

Data collection involved both biological sampling and questionnaire administration. Approximately 2 mL of venous blood was aseptically collected from each consenting pregnant woman during her ANC visit using sterile collection tubes. The blood samples were then tested for the presence of HBsAg using commercially available rapid diagnostic kits, strictly following the manufacturer's guidelines to ensure the accuracy and reliability of results. In addition to laboratory testing, structured interviewer-administered questionnaires were used to collect socio-demographic and clinical information from participants. The questionnaire captured data on age, marital status, education level, occupation, parity, vaccination history, and known risk factors associated with HBV infection (WHO, 2019).

2.5 Statistical Analyses

Socio-demographic and clinical data were collected using structured questionnaires, while HBV status was determined through HBsAg testing. The prevalence of HBV was calculated as a percentage of positive cases, and chi-square tests were used to assess associations with risk factors. Data were analyzed using SPSS version 25, with results presented through descriptive statistics and tables.

3. Results and Discussion

3.1 Results

3.1.1 Descriptive Statistics

This study involved 44 pregnant women attending antenatal care (ANC) at Talata Mafara General Hospital. The analysis focused on the prevalence of hepatitis B virus (HBV) infection and its association with various socio-demographic and clinical factors. Out of the 44 participants, 5 (11.4%) tested positive for HBV, while 39 (88.6%) tested negative. The age distribution revealed that the majority of participants (65.1%) were between 18–24 years, followed by 20.5% in the 25–34 age group. Smaller proportions were found in the under-18 (6.8%), 35–44 (4.5%), and 45+ (2.3%) age groups. Regarding education, 45.5% had secondary education, 36.4% had "other" forms of education (likely informal or adult education), 9.1% had primary education, and another 9.1% had tertiary education. The vast majority of participants were of Hausa ethnicity (97.7%). Occupationally, 88.6% were involved in non-professional or undefined work categories. Most participants (77.3%) had no prior history of hepatitis infection, and only 7.8% had received an HBV vaccine. More than half (54.5%) of the participants reported being under stress, and 18.2% had a history of blood transfusion.

3.1.2 Prevalence of HBV Infection

Among the 44 participants screened, 5 were confirmed to be positive for HBV, representing a prevalence rate of 11.4%, while 39 participants (88.6%) tested negative.

Table 1: Socio-demographic and Clinical Characteristics of Participants (N = 44)

Characteristic	n	%
Age_Group: 18-24	25	56.8
Age_Group: 25-34	10	22.7
Age_Group: 35-44	5	11.4
Age_Group: <18	3	6.8
Age_Group: 45+	1	2.3
Education: Secondary	23	52.3
Education: Informal	18	40.9
Education: Primary	2	4.5
Education: Tertiary	1	2.3
Occupation: Informal	38	86.4
Occupation: Professiona	l6	13.6
Ethnicity: Hausa	44	100.0
Vaccinated: No 42	95.5	
Vaccinated: Yes	2	4.5
History_HBV: No	36	81.8
History_HBV: Yes	8	18.2
Blood_Transfusion: No	33	75.0
Blood_Transfusion: Yes	11	25.0
Stress: Yes 24	54.5	
Stress: No 20	45.5	

Note. Percentages are based on total sample (N = 44). HBV Prevalence

3.1.3 HBV Infection in Relation to Socio-Demographic Characteristics

The distribution of HBV infection varied across age groups. Infection rates were highest in the 18–24 and 25–34 age groups (40% each), while 20% of infections occurred in the under-18 category. No infections were recorded in the 35–44 or 45+ age groups. However, the Chi-square test ($x^2 = 3.450$, $p = 0.485$) indicated no statistically significant association between age group and HBV infection. All five infected individuals were of Hausa ethnicity; no cases were found among other ethnic groups ($x^2 = 0.131$, $p = 0.717$). Infection was more common among those with secondary (40%) and “other” forms of education (60%), with no infections in individuals with primary or tertiary education. Again, no significant association was found ($x^2 = 1.929$, $p = 0.587$).

Occupation, however, showed a significant association with HBV infection. Among those infected, 40% were farmers and 60% were from other occupations, while no infections were recorded among civil servants or military/paramilitary personnel. This association was statistically significant ($x^2 = 16.507$, $p = 0.000$) (Musa et al., 2024).

as presented in Table 2.

Table 2: Distribution of HBV Infection by Socio-Demographic Characteristics

Variable	Category	Examined	Infected (%)	X^2	*p*-value
Age (yrs)	<18	3	1 (20%)	3.450	0.485
	18–24	29	2 (40%)		
	25–34	9	2 (40%)		
	35–44	2	0 (0%)		
	≥45	1	0 (0%)		
Ethnicity	Hausa	43	5 (100%)	0.131	0.717
	Others	1	0 (0%)		
Education	Primary	4	0 (0%)	1.929	0.587
	Secondary	20	2 (40%)		
	Tertiary	4	0 (0%)		
	Other	16	3 (60%)		
Occupation	Civil servant	3	0 (0%)	16.507	0.000*
	Farmer	2	2 (40%)		
	Others	39	3 (60%)		

3.1.4 HBV Infection in Relation to Clinical Factors

Among the 10 participants with a prior history of hepatitis infection, none tested positive for HBV, while all five positive cases were among those with no known history. This difference was not statistically significant ($X^2 = 1.659$, $p = 0.198$). Only 3 participants reported having received the HBV vaccine, and none were infected, whereas all 5 positive cases were among the unvaccinated group. Despite this trend, the association between vaccination and HBV infection was not statistically significant ($X^2 = 0.413$, $p = 0.521$).

Regarding lifestyle, participants who reported high stress levels accounted for 80% of HBV-positive cases. Only 20% of infected individuals reported maintaining a healthy diet, and none of the participants who had adequate sleep tested positive. However, lifestyle factors overall showed no significant association with HBV infection ($X^2 = 2.081$, $p = 0.353$).

A notable and statistically significant association was found between a history of blood transfusion and HBV infection. Of the 8 participants with such a history, 3 (60%) tested positive, compared to just 2 out of 36 (40%) without this history ($X^2 = 6.631$, $p = 0.010$) (Oladipo et al., 2022).as shown in Table 3.

Table 3: Distribution of HBV Infection by Clinical Factors

Variable	Category	Examined	Infected (%)	X^2	*p*-value
Hepatitis History	Yes	10	0 (0%)	1.659	0.198
	No	34	5 (100%)		
HBV Vaccination	Yes	3	0 (0%)	0.413	0.521
	No	41	5 (100%)		
Lifestyle Factors	High stress, poor diet, etc.	—	5 (100%)	2.081	0.353
Blood Transfusion	Yes	8	3 (60%)	6.631	0.010*
	No	36	2 (40%)		

3.2 Discussion

This study found a high prevalence of hepatitis B virus (HBV) infection among pregnant women attending antenatal care at General Hospital Talata Mafara, Zamfara State, with 11.4% of participants testing positive for HBsAg. According to World Health Organization (WHO, 2024) criteria, this prevalence places the study area within the hyperendemic range and signals a substantial public health concern. The rate observed also exceeds the pooled national prevalence for pregnant women in Nigeria, which has been estimated at approximately 6–8% in recent reviews (Abutu, 2018; Berinyuy et al., 2019), as well as many pooled estimates from sub-Saharan Africa (Umego et al., 2018). This finding highlights Talata Mafara as a possible hotspot for HBV transmission requiring urgent intervention.

The age distribution of HBV-positive participants clustered within the reproductive age group (18–34 years), but no significant association was observed between age and infection status. Similar patterns have been reported in other Nigerian and African studies, where high endemicity contexts often see HBV acquired in early childhood through horizontal or perinatal transmission, reducing the utility of age as a discriminating factor among adults (Anaedobe et al., 2015; Olayinka et al., 2016). Thus, the lack of an age effect in this study is consistent with the epidemiology of HBV in high-burden settings.

Although all infected participants were of Hausa ethnicity, this finding should be interpreted with caution, as it merely reflects the demographic composition of Talata Mafara rather than an ethnic predisposition. A similar caution applies to educational status: while women with little or no formal education appeared more likely to be infected, the association was not statistically significant. Nonetheless, the trend is noteworthy given that lower education levels are often linked to reduced awareness of HBV prevention, less access to vaccination, and greater reliance on traditional practices (Olayinka et al., 2016; Okagbue et al., 2019).

A significant association was, however, observed with occupation. All HBV-positive women were engaged in farming or informal sector work, while none were drawn from civil service or professional occupations. This echoes findings from other Nigerian studies where lower socioeconomic status and rural livelihoods were associated with increased HBV prevalence (Okonkwo et al., 2017; Abutu, 2018). Women in these groups often have limited access to preventive health services and are more likely to encounter high-risk exposures, such as traditional scarification, unsterile medical procedures, or reliance on traditional birth attendants.

One of the most concerning findings of this study was the significant association between HBV infection and prior blood transfusion. Although transfusion services in Nigeria are meant to adhere to standard screening protocols, several studies have documented lapses in blood safety, particularly in rural or resource-constrained facilities (Okagbue et al., 2019; Salu et al., 2024). Our results suggest that transfusion-transmissible HBV remains a challenge in Zamfara State, underscoring the need for stricter quality assurance and routine audits of blood banking and transfusion practices.

Vaccination emerged as a protective factor in this study, as none of the vaccinated participants were HBsAg-positive. Although the vaccinated subgroup was small and the association did not achieve statistical significance, the pattern aligns with well-established evidence of the vaccine's efficacy (Forbi et al., 2008; WHO, 2024). This reinforces the importance of expanding hepatitis B vaccination among women of reproductive age and strengthening the implementation of the birth-dose vaccine, which remains suboptimal in many parts of Nigeria (Ajuwon et al., 2021). Integrating vaccination into routine antenatal care services could help to close existing gaps and substantially reduce the risk of vertical transmission.

The study has several limitations that warrant consideration. First, the relatively small sample size, drawn from a single facility, limits the generalizability of the findings to the wider population of Zamfara State or Northern Nigeria. Second, reliance on HBsAg testing alone precludes the identification of

occult HBV infection, and the absence of HBeAg or HBV DNA testing means the actual risk of vertical transmission could not be quantified. Third, some variables, such as vaccination status or transfusion history, were based on self-report and therefore susceptible to recall bias. Finally, unmeasured confounders such as partner HBV status or specific traditional practices may have influenced infection risk but were not captured.

Despite these limitations, the findings carry important public health implications. The high prevalence among pregnant women indicates an urgent need to strengthen routine HBV screening in antenatal clinics, improve access to maternal antiviral therapy for women with high viral load, and ensure timely administration of the birth-dose vaccine and subsequent doses for all newborns. In addition, blood transfusion services must be rigorously monitored to prevent transfusion-transmissible infections. Community-based health education, targeted especially at women in rural and informal occupations, could also enhance awareness and uptake of preventive services.

4. Conclusion

In conclusion, HBV infection remains highly prevalent among pregnant women in Talata Mafara, with significant associations identified for occupational status and blood transfusion history, and a protective effect observed for vaccination. Addressing these challenges through strengthened screening, vaccination, safe transfusion practices, and targeted community education is critical to reducing maternal and neonatal HBV burden in Northern Nigeria.

Conflict of Interest

The authors declare no conflict of interest.

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