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Original Article **Open Access**

Prevalence and predictors of hepatitis B screening among pregnant women attending antenatal clinics in three primary health centres in Abeokuta, Nigeria: A cross-sectional study

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Abstract:

Background: Hepatitis B virus (HBV) infection remains a major public-health concern. Antenatal screening identifies maternal infection and enables interventions to prevent mother-to-child transmission. We assessed the prevalence and predictors of prior HBV screening among pregnant women attending three primary health centres in southwest Nigeria.
Methodology: This was a cross-sectional survey of 289 pregnant women consecutively enrolled at the antenatal clinics of the three selected health centres. A standardized questionnaire was interviewer-administered to each participant to collect information on socio-demographic characteristics, previous HBV screening and behavioral and healthcare- factors related to HBV screening. Data were analysed using SPSS. Associations of factors with prior HBV screening were determined using Chi-square and multivariable logistic regression estimated adjusted Odd ratio (AOR) with 95% confidence interval (CI).
Results: Overall, 31.0% of participants reported previous HBV screening. Prevalence of previous HBV screening was significantly associated with age, with highest in the 35–39-year age group (AOR≈6.40, p<0.001), previous hospitalization (AOR≈2.3, p=0.010) and receipt of clotting factors (AOR≈7.6, p=0.028). Education, occupation, marital status and trimester of pregnancy were not significant predictors.
Conclusion: Antenatal HBV screening coverage was suboptimal in the study. Healthcare touchpoints especially prior admissions and late-pregnancy visits offer opportunities to scale screening. Programs should target women with hospitalization history or coagulation treatment to strengthen HBV prevention of mother to child transmission (PMTCT).

Keywords: Hepatitis B; pregnancy; antenatal care; screening; southwest Nigeria

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Prévalence et facteurs prédictifs du dépistage de l'hépatite B chez les femmes enceintes fréquentant les consultations prénatales de trois centres de santé primaires à Abeokuta, au Nigéria: une étude transversale

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Résumé:

Contexte: L'infection par le virus de l'hépatite B (VHB) demeure un problème majeur de santé publique. Le dépistage prénatal permet d'identifier l'infection maternelle et de mettre en œuvre des interventions visant à prévenir la transmission mère-enfant. Nous avons évalué la prévalence et les facteurs prédictifs d'un dépistage antérieur du VHB chez les femmes enceintes fréquentant trois centres de santé primaires du sud-ouest du Nigéria.
Méthodologie: Il s'agit d'une enquête transversale menée auprès de 289 femmes enceintes inscrites consécutivement dans les consultations prénatales des trois centres de santé sélectionnés. Un questionnaire standardisé a été administré par un enquêteur à chaque participant afin de recueillir des informations sur leurs caractéristiques sociodémographiques, leurs antécédents de dépistage de l'hépatite B et les facteurs

comportementaux et liés aux soins de santé associés à ce dépistage. Les données ont été analysées à l'aide du logiciel SPSS. Les associations entre les facteurs et les antécédents de dépistage de l'hépatite B ont été déterminées par le test du χ^2 et une régression logistique multivariée a permis d'estimer les Odd ratio ajustés (ORa) avec leur intervalle de confiance (IC) à 95%.
Résultats: Au total, 31,0% des participants ont déclaré avoir déjà subi un dépistage de l'hépatite B. La prévalence de ces antécédents était significativement associée à l'âge, avec un taux maximal dans la tranche d'âge des 35-39 ans (ORa≈6,40, p<0,001), aux antécédents d'hospitalisation (ORa≈2,3, p=0,010) et à l'administration de facteurs de coagulation (ORa≈7,6, p=0,028). Le niveau d'études, la profession, la situation matrimoniale et le trimestre de grossesse n'étaient pas des facteurs prédictifs significatifs.
Conclusion: La couverture du dépistage prénatal de l'hépatite B était insuffisante dans cette étude. Les interactions avec les professionnels de santé, notamment les hospitalisations antérieures et les consultations de fin de grossesse, offrent des opportunités d'étendre le dépistage. Les programmes devraient cibler les femmes ayant des antécédents d'hospitalisation ou de traitement anticoagulant afin de renforcer la prévention de la transmission mère-enfant de l'hépatite B (PTME).

Mots-clés: Hépatite B; grossesse; soins prénatals; dépistage; sud-ouest du Nigéria

Introduction:

Hepatitis B virus (HBV) infection remains a significant global public-health concern, responsible for chronic liver disease, cirrhosis, and hepatocellular carcinoma. According to the World Health Organization (WHO), an estimated 296 million individuals are chronically infected worldwide, with sub-Saharan Africa representing a major burden region (1). Nigeria is hyperendemic, with national seroprevalence estimates ranging between 8–12% (2).

Perinatal transmission contributes substantially to the burden of chronic HBV infection, particularly in high-prevalence regions (3). Screening pregnant women during antenatal care (ANC) is crucial for identifying infections, initiating appropriate evaluation such as viral load testing, and administering antiviral prophylaxis to high-risk mothers to prevent mother-to-child transmission (PMTCT) (4).

Despite recommendations for routine antenatal HBV screening, implementation remains inconsistent in primary healthcare facilities across Nigeria. Reports indicate wide variations in HBV screening uptake among pregnant women, with many studies also highlighting structural, socio-demographic, and health-system barriers (5–8). This study aimed to assess the prevalence of prior HBV screening among pregnant women attending primary healthcare centres in Abeokuta and identify the key determinants influencing previous screening behaviors.

Materials and method:

Study design and setting:

We conducted a cross-sectional study in three primary health centers located in Abeokuta (Oba Ademola Hospital, Obantoko Hospital, and Osise Hospital), Ogun state, southwest Nigeria from June 2021 to June 2022.

Ethical consideration:

Ethical approval was obtained from the Ogun state Health Research Committee (SHREC), with approval number HPRS/381/242 and written informed consent was obtained from all participants, in accordance with the Declaration of Helsinki.

Study participants:

Pregnant women 15–49 years of age attending antenatal clinics, resident in the catchment areas and providing informed consent were eligible. Participants were consecutively enrolled to yield the sample size for the study.

Sample size determination:

The minimum required sample size for the study was determined using the Cochran formula for single-proportion population surveys appropriate for estimating prevalence in a defined population attending the three selected primary health centers; $n_o = Z^2 p(1-p)/d^2$, where n_0=minimum sample size, Z=standard normal deviate corresponding to 95% confidence (1.96), p=expected prevalence of hepatitis B infection of 9% (p=0.09) reported for national HBV prevalence by Olayinka et al., (2), and d=margin of error (precision) set at 5% (0.05). This gave a calculated sample size of 126, which was first adjusted for 15% attrition (non-response) to 148, and then adjusted for design effect (*Deff* of 1.9) of multi-center design, to give the adjusted sample size of 281, which was increased to 289.

Method of sampling:

The selection of the 289 study participants was done by proportional allocation using the average monthly patient load of each center to prevent sampling bias as shown in Table 1

Table 1: Proportional allocation for sampling of the study participants in the three health centers

Health Center	Proportion of Monthly Attendance (%)	No of allocated participants
Oba Ademola Hospital	40	116
Obantoko Hospital	35	101
Osise Hospital	25	72
Total	**100**	**289**

Data collection:

Data were collected using a standardized interviewer-administered questionnaire designed for the study. The instrument captured socio-demographic information (age, education, occupation, religion, marital status, family type); obstetric characteristics (trimester and parity); behavioral and clinical exposures (scarification practices, previous surgery, blood transfusion, clotting factor administration, HIV status, and prior hospitalization); and prior HBV screening history.

The questionnaire was pilot tested among 20 antenatal clinic attendees at Obantoko Primary Health Center to assess clarity and feasibility. Internal consistency and reliability of the multi-item exposure domain yielded a Cronbach alpha score of 0.81, indicating good reliability of the instrument for field use.

Data analysis:

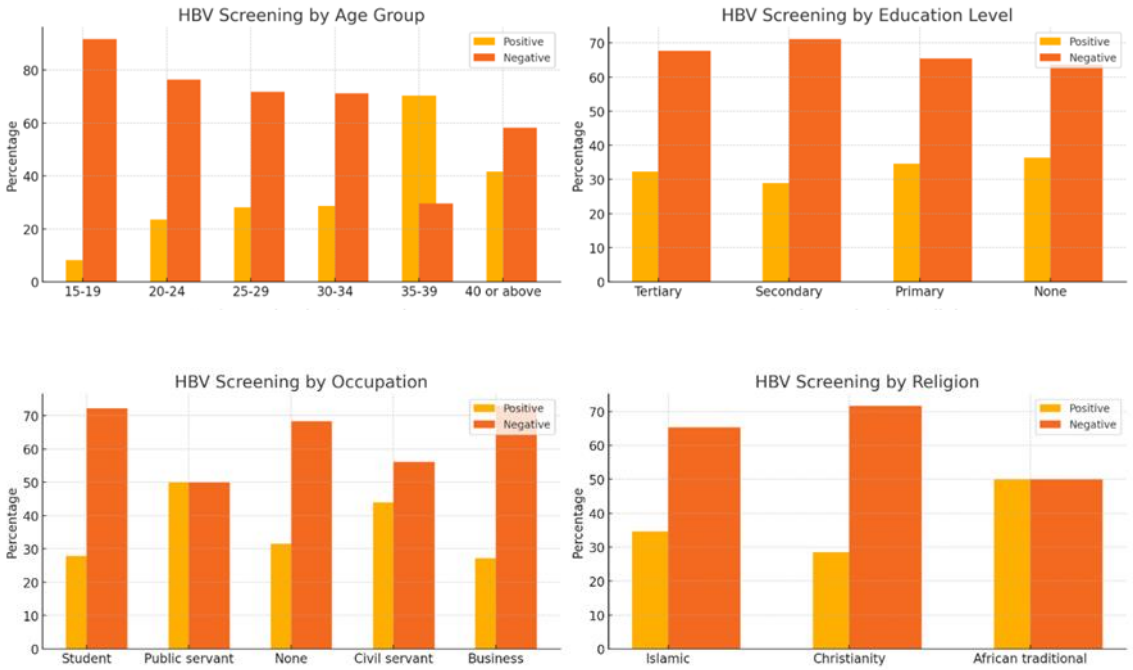
The primary outcome was self-reported prior HBV screening. Explanatory variables included age group, trimester of pregnancy, prior hospitalization, receipt of clotting factors, HIV diagnosis, and other relevant sociodemographic and clinical exposures.

Data were summarized using frequencies and percentages. Statistical analyses were performed using IBM SPSS Statistics version 25. The Chi square test was used to assess bivariate associations. Multivariable logistic regression was applied to estimate adjusted odds ratios (AORs) and corresponding 95% confidence intervals (CIs), adjusting for covariates selected a priori or those with $p<0.20$ in bivariate analysis. A two-sided $p<0.05$ was considered statistically significant.

Results:

Of the 289 pregnant women enrolled into the study, 90 (31.0%) reported previous HBV screening. The frequency distribution of the women with and without previous HBV screening with respect to socio-demographic characteristics is shown in Fig 1.

Analysis of socio-demographic characteristics shows that prevalence of previous HBV screening differed significantly by age ($\chi^2=24.994$, $p<0.001$) with highest prevalence (70.4%, n=19/27) in women aged 35–39 years. However, education, occupation, religion, marital status and family type were not significantly associated with prevalence of HBV screening among the participants (Table 2).



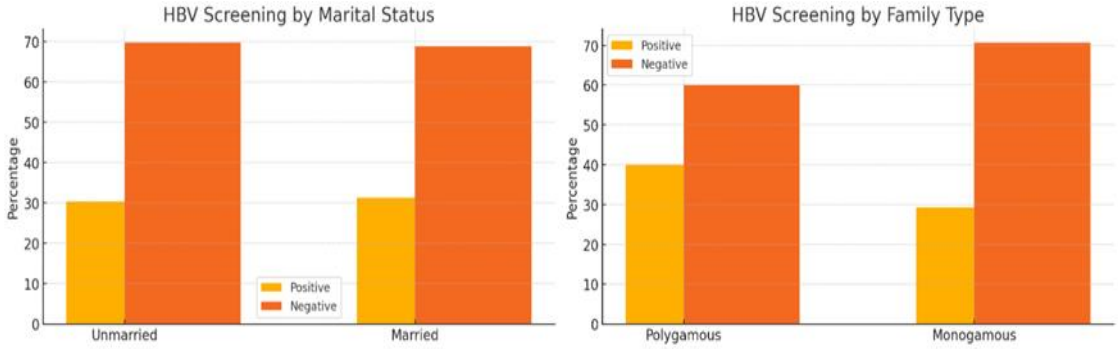


Fig 1: Frequency of hepatitis B virus screening among pregnant women by socio-demographic characteristics

Table 2: Prevalence of previous hepatitis B virus screening by socio-demographic characteristics of the pregnant women

Characteristics	Previous HBV screened		X^2	*p*-value
	Yes (n=90, 31.1%)	No (n=199, 68.9%)		
Age group (years)				
15-19	1 (8.3)	11 (91.7)	24.994	<0.001
20-24	13 (23.6)	42 (76.4)		
25-29	29 (28.2)	74 (71.8)		
30-34	23 (28.7)	57 (71.3)		
35-39	19 (70.4)	8 (29.6)		
≥ 40	5 (41.7)	7 (58.3)		
Educational level				
Tertiary	40 (32.3)	84 (67.7)	0.657	0.883
Secondary	37 (28.9)	91 (71.1)		
Primary	9 (34.6)	17 (65.4)		
None	4 (36.4)	7 (63.6)		
Occupation				
Student	12 (27.9)	31 (72.1)	7.300	0.121
Public servant	8 (50.0)	8 (50.0)		
Civil servant	18 (43.9)	23 (56.1)		
Business	46 (27.1)	124 (72.9)		
Unemployed	6 (31.6)	13 (68.4)		
Religion				
Islamic	41 (34.7)	77 (65.3)	1.638	0.441
Christianity	48 (28.4)	121 (71.6)		
African traditional	1 (50.0)	1 (50.0)		
Marital status				
Unmarried	10 (30.3)	23 (69.7)	0.012	0.912
Married	80 (31.3)	176 (68.8)		
Family type				
Polygamous	20 (40.0)	30 (60.0)	2.212	0.137
Monogamous	70 (29.3)	169 (70.7)		

The frequency distribution of the women with and without previous HBV screening with respect to behavioral and healthcare factors is shown in Fig 2 and Table 3. On bivariate analysis of behavioral/healthcare correlates, the prevalence of previous HBV screening was significantly higher among women reporting scarification (45.5%, χ^2=4.958, p=0.026), in third trimester of pregnancy (42.7%, χ^2= 19.912, p<0.001), with previous hospitalization (47.2%, χ^2=11.563, p=0.001), with HIV diagnosis (60.0%, χ^2=6.144, p=0.013), and who had received clotting factors (77.8%, χ^2=9.422, p=0.002) (Table 3).

However, in bivariate analysis, age was significantly associated with prior HBV screening (χ^2=24.994, p<0.001), with the highest prevalence observed among women aged 35–39 years (70.4%). After adjusting for covariates, only 35–39 years age group remained independently associated with prior HBV screening (AOR 6.40, 95% CI 2.70–15.20, p< 0.001). Independent predictors also included receipt of clotting factors (AOR 7.58, p=0.028) and prior hospitalization (AOR 2.29, p=0.010). Trimester of pregnancy, scarification, and HIV diagnosis were not significant in the final model (Table 4, Fig 3).

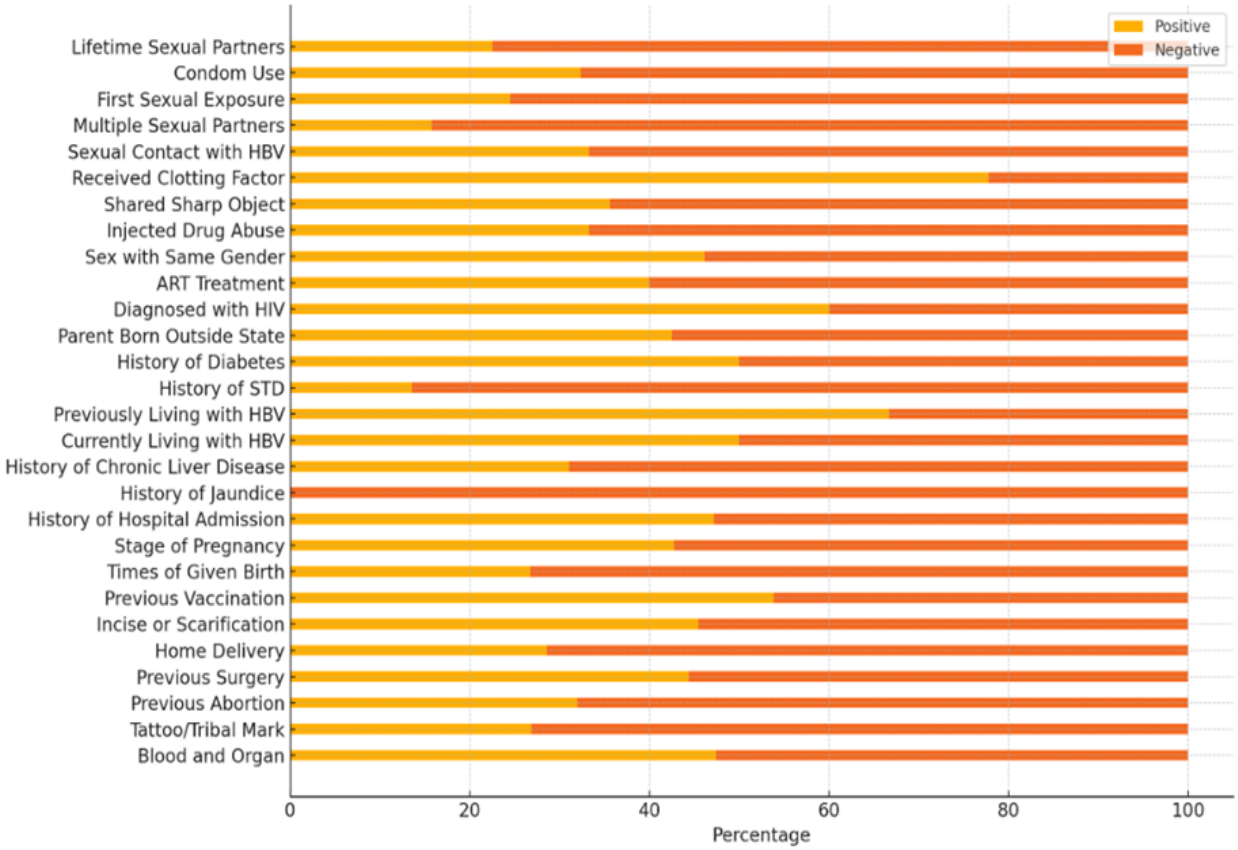


Fig 2: Frequency of hepatitis B virus screening among pregnant women by behavioral/healthcare factors

Table 3: Bivariate analysis of behavioral and health-care factors associated with prior HBV screening

Factors	Previous HBV screening		x^2	*p*-value
	Yes (n=90, 31.1%)	No (n=199, 68.9%)		
Blood and organ				
Yes	9 (47.4)	10 (52.6)	2.497	0.114
No	81 (30.0)	189 (70.0)		
Tattoo/tribal mark on the body				
Yes	25 (26.9)	68 (73.1)	1.161	0.281
No	65 (33.2)	131 (66.8)		
Previous abortion				
Yes	24 (32.0)	51 (68.0)	0.035	0.852
No	66 (30.8)	148 (69.2)		
Previous surgery				
Yes	12 (44.4)	15 (55.6)	2.458	0.117
No	78 (29.8)	184 (70.2)		
Home delivery				
Yes	6 (28.6)	15 (71.4)	0.070	0.792
No	84 (31.3)	184 (68.7)		
Incision or scarification				
Yes	20 (45.5)	24 (54.5)	4.958	0.026*
No	70 (28.6)	175 (71.4)		
Previous vaccination				
Yes	7 (53.8)	6 (46.2)	3.272	0.070
No	83 (30.1)	193 (69.9)		
No of previous child birth				
Primparous	27 (26.7)	74 (73.3)	2.627	0.453
1	25 (30.1)	58 (69.9)		
2	18 (33.3)	36 (66.7)		
>2	20 (39.2)	31 (60.8)		
Trimester of pregnancy				
First trimester	5 (26.3)	14 (73.7)	19.912	<0.001*
Second trimester	21 (17.5)	99 (82.5)		
Third trimester	64 (42.7)	86 (57.3)		
History of hospital admission				
Yes	34 (47.2)	38 (52.8)	11.563	0.001*
No	56 (25.8)	161(74.2)		
Currently living with positive HBV patients				
Yes	3 (50.0)	3 (50.0)	1.016	0.313
No	87 (30.7)	196 (69.3)		

Previously living with positive HBV patients			3.606	0.058
Yes	4 (66.7)	2 (33.3)		
No	86 (30.4)	197 (69.6)		
History of STD				
Yes	3 (13.6)	19 (86.4)	3.403	0.065
No	87 (32.6)	180 (67.4)		
History of diabetes				
Yes	3 (50.0)	3 (50.0)	1.016	0.313
No	87 (30.7)	196 (69.3)		
Parent born outside Ogun state				
Yes	17 (42.5)	23 (57.5)	2.793	0.095
No	73 (29.3)	176 (70.7)		
Diagnosed with HIV				
Yes	9 (60.0)	6 (40.0)	6.144	0.013*
No	81 (29.6)	193 (70.4)		
ART treatment				
Yes	1 (40.0)	4 (80.0)	0.295	0.587
No	89 (31.3)	195 (68.7)		
Sex with same gender				
Yes	6 (46.2)	7 (53.8)	1.431	0.232
No	84 (30.4)	192 (69.6)		
Injected (IV) drug abuse				
Yes	2 (33.3)	4 (66.7)	0.014	0.907
No	88 (31.1)	195 (68.9)		
Shared sharp object				
Yes	32 (35.6)	58 (64.4)	1.187	0.276
No	58 (29.1)	141 (70.9)		
Received clotting factor				
Yes	7 (77.8)	2 (22.2)	9.422	0.002*
No	83 (29.6)	197 (70.4)		
Sexual contact with HBV patients				
Yes	1 (33.3)	2 (66.7)	0.007	0.934
No	89 (31.1)	197 (68.9)		
History of jaundice				
Yes	0	5 (100.0)	2.301	0.129
No	90 (31.7)	194 (68.3)		
History of chronic liver disease				
Yes	0	0	-	-
No	90 (31.1)	199 (68.9)		
Multiple sexual partner				
Yes	3 (15.8)	16 (84.2)	2.235	0.135
No	87 (32.2)	183 (67.8)		
First sexual exposure				
≤15 years	12 (24.5)	37 (75.5)	1.373	0.241
>15 years	77 (33.0)	156 (67.0)		
Condom use				
Yes	24 (32.4)	50 (67.6)	0.077	0.781
No	66 (30.7)	149 (69.3)		
Lifetime sexual partner				
1	83 (32.2)	175 (67.8)	1.187	0.276
> 1	7 (22.6)	24 (77.4)		

Table 4: Multivariable logistic regression of predictors of prior HBV screening

Factor	**AOR**	**95% CI**	***p*-value**
Age group (vs ≥40 years)			
15–19 years	2.5	0.49–12.72	0.275
20–24 years	2.8	0.95–8.20	0.062
25–29 years	3.1	1.15–8.50	0.026*
30–34 years	0.9	0.48–1.70	0.72
35–39 years	6.4	2.70–15.20	<0.001*
Reference: ≥40 years	—	—	—
Scarification (Yes)	1.85	0.97–3.52	0.061
Clotting factor received (Yes)	7.58	1.25–45.80	0.028*
History of hospital admission (Yes)	229%	1.22–4.28	0.010*
Diagnosed with HIV (Yes)	247%	0.77–7.94	0.133
Trimester (3rd vs 1st)	188%	0.72–4.89	0.308
Trimester (2nd vs 1st)	57%	0.17–1.92	0.38

*Significant at $p < 0.05$; AOR=Adjusted Odd Ratio' CI = Confidence Interval.

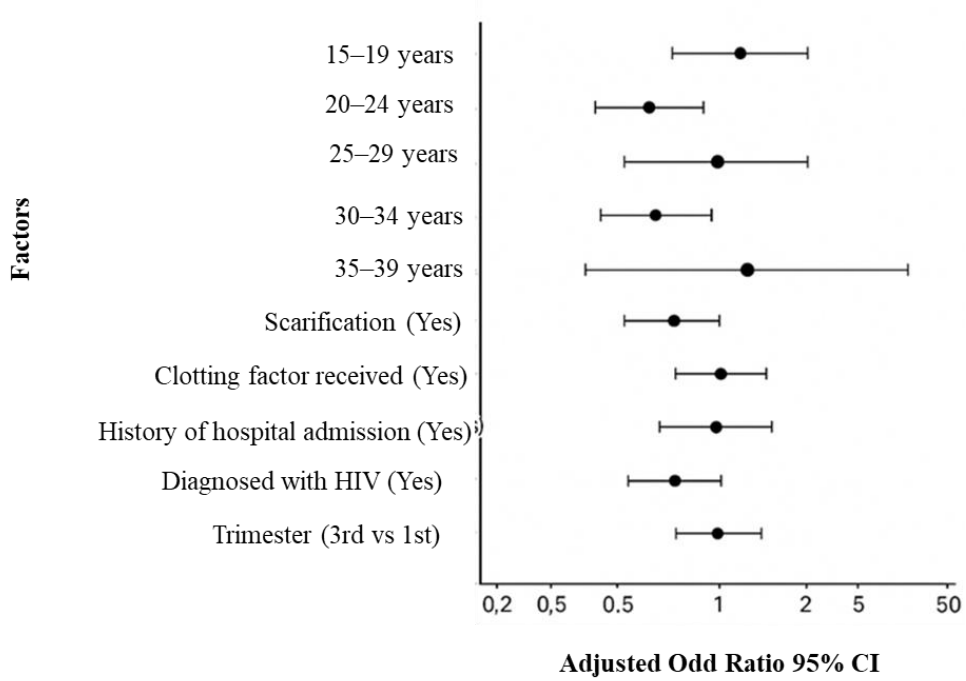


Fig 3: Forest plot of adjusted odds ratios (AORs) for predictors of prior hepatitis B virus screening among pregnant women

Discussion:

This study found that fewer than one-third of pregnant women in primary-care facilities had ever undergone HBV screening. Despite the high endemicity of HBV in Nigeria, this low uptake aligns with similar research from sub-Saharan Africa reporting persistent gaps in antenatal HBV screening coverage (5–7). Age demonstrated a strong association with screening likelihood. Women aged 35–39 years were significantly more likely to have been screened, consistent with previous studies showing older maternal age correlates with higher health-care engagement (8). Younger women, particularly adolescents, remain an underserved demographic in HBV screening programs.

Clinical factors including prior hospitalization and receipt of clotting factors were strongly predicted screening. These findings may suggest that HBV testing in these facilities is often event-triggered such as during hospital admission or use of blood products, rather than routinely integrated into ANC protocols. Strengthening provider-initiated testing and adopting a universal screening strategy could improve coverage substantially.

Despite strong bivariate associations, HIV diagnosis and trimesters were not significant in multivariable models, likely due to confounding by hospitalization or other clinical exposures. Nonetheless, integrating HBV screening with HIV PMTCT programs remains a high-yield strategy. A key implication is the urgent need to institutionalize first-trimester, universal HBV screening across all ANC facilities. Early identification enables timely viral load assessment and potential antiviral prophylaxis to prevent vertical transmission.

HBV screening uptake among pregnant women in primary health centres remains low. Age, hospitalization history, and clotting factor exposure were the main predictors of previous screening. Strengthening universal antenatal HBV screening, particularly at first trimester is essential to reduce undetected maternal infections and prevent perinatal transmission.

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Contributions of authors:

FA designed and supervised the research; AO analysed the data and wrote the manuscript; and OEC collected the data. All authors read and approved the manuscript submitted for publication

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No conflict of interest is declared.

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