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Assessment of the Predisposing Factors on Hepatitis B Virus (HBV) Preventive Practices among Pregnant Women in Southwest Nigeria: An Insight into SDG 3 Attainment

Adegbore, A. K., Olabode, A. T.*, Lawal, M. A., & Bello, B. O.

Department of Public Health, College of Basic Medical and Health Sciences, Fountain University, Osogbo, Osun State, Nigeria

**Corresponding author: temitayoaderemi98@gmail.com; +2347049228448*

Abstract

Background: Sustainable Development Goal (SDG) 3 mandates aimed at ensuring healthy lives and promoting well-being for all ages. Therefore, this study aimed to document the knowledge, attitudes, and preventive practices (KAP) regarding hepatitis B virus (HBV) and their associated socio-demographic variables as the predisposing factors, which align with the SDG goal. **Methodology:** A facility-based, cross-sectional study was conducted among 200 pregnant women in Osogbo, Osun State, Nigeria. Data were collected using a semi-structured and interviewer-administered questionnaire among the respondents on knowledge, attitude and preventive practices of HBV. Knowledge about Hepatitis B was measured on a 9-point scale, with scores categorised as poor (≤4) and good knowledge (>4 to 9). Attitudes were measured on a 32-point scale and categorised as negative (≤15) and positive (≥16 to 32). Descriptive statistics and ANOVA were used for data analysis, with statistical significance set at $p \leq 0.05$ using SPSS version 30. **Results:** The respondents' mean age is 26.8±3.8. The mean knowledge score is 2.88±0.47, with 32% having good knowledge of HBV. The respondents' number of pregnancy ($F(4,195=8.202, P=0.000$); educational level ($F(3,196=4.023, P=0.008$); and ages ($F(14,185=1.876, P=0.031$) were significant with the HBV knowledge. The weighted mean score of the respondents' attitudinal disposition towards HBV is 6.72±0.41, with 21% having positive attitudes. Only the respondents' ages are significantly associated with their attitudes ($F(14,185=2.376$, $P=0.005$). Lastly, the preventive practice of HBV has a weighted mean of 2.24±0.45, giving 28% of the respondents good practice. The respondents' educational level ($F(3,196=5.913$, $P=0.001$) and occupation ($F(3,196=3.850$, $P=0.010$) were significant with the HBV preventive practices. **Conclusion/Recommendation:** The study revealed a poor outcome on the predisposing factors (KAP of HBV). Interventions targeting pregnant women, with considerations for the associated socio-demographic variables, are necessary to improve the deficits to achieve SDG 3 by the year 2030.

Keywords: cross-sectional study, attitudinal disposition, predisposing factors, prenatal care

Introduction

In the Public Health world, maternal health-seeking behaviour for the prevention of communicable diseases like malaria, Tuberculosis (TB), and Hepatitis B Virus (HBV) remains the primary key to safe pregnancy outcomes. Specifically, HBV infection has been linked with the manifestation of diseases like preeclampsia, gestational diabetes, pre-term birth, and infant mortality among pregnant women (Sirilert & Tongsong, 2021; Afraie et al., 2023). In low and middle-income countries, the burden of these outcome-related diseases is predominantly high, with 1 in 10 pregnancies resulting in adverse birth outcomes (Bierhoff et al., 2019; Asaye et al., 2021). In Nigeria, 1 out of every 10 pregnancies also leads to infant

death, while two out of every 10 women die from pregnancy complications (Olamijulo et al., 2022; Nwanze et al., 2023). Hepatitis B virus (HBV) remains a significant burden in sub-Saharan Africa, where it is highly endemic, despite the introduction of universal hepatitis B vaccination programs and effective antiviral therapies (Spearman et al., 2017; Amponsah-Dacosta, 2021). HBV alone has been reported to cause close to 1·4 million fatalities yearly in comparison with HIV/AIDS (1·3 million), malaria (0·9 million), and TB (1·3 million) (Singh et al., 2017; WHO, 2024). The seroprevalence of hepatitis B surface antigen (HBsAg) remains notably higher than 6% in sub-Saharan Africa, thereby leading to more than 60% mortality. In Nigeria, approximately 7% prevalence of HBV has been reported among pregnant women, and the burden is more pronounced in the southwestern states with a prevalence of 11%; this reported burden of HBV has been linked to unequal access to healthcare, low knowledge level, and poor health-seeking behaviour (Zampino et al., 2015; Gnyawali et al., 2022; Egbe et al., 2023), which are inhibitors of good health and well-being [i.e., the sustainable development goal (SDG) 3].

Hepatitis B virus (HBV) infection represents a significant public health challenge in Nigeria and is characterised by a significant burden on health systems and population health (Schweitzer et al., 2015). Nigeria is located in sub-Saharan Africa and is classified by the World Health Organization (WHO) as an area of high mean endemicity for Hepatitis B virus, with prevalence rates in the general population estimated at 11 to 20% (WHO, 2020). Hepatitis B virus infection is a significant cause of liver disease in Nigeria, with an estimated 3,000 deaths attributed to Hepatitis B virus-related liver cirrhosis and liver cancer each year (WHO, 2023). The prevalence of Hepatitis B virus infection in Nigeria varies across regions and age groups. A national survey conducted in 2013 estimated an overall prevalence of 10% among adults, with higher rates observed in some regions (Ogunmola et al., 2021). The prevalence is significant among infants born to Hepatitis B virus-infected mothers, reaching up to 90% in some studies (Adebiyi et al., 2019). The incidence of new Hepatitis B virus infections in Nigeria is estimated to be around 10,000 cases per year (WHO, 2023). This high incidence contributes to the ongoing burden of HBV infection in the country. Hepatitis B virus infection also contributes significantly to years lived with disability (YLD) due to its long-term consequences (Plass et al., 2014; James et al., 2019). To address this alarming burden of HBV, aggressive attention must be paid to improving maternal health through the prevention of mother-to-child transmission (MTCT) of HBV (Matthews et al., 2023), as most of the severe global burden of HBV is associated with MTCT either at birth, shortly after birth, and early childhood (WHO, 2017). With two-thirds of these cases recorded in the African region (Hyacinte et al., 2023), only four African countries (Rwanda, Sierra Leone, Uganda, and Zambia) have achieved HBV control (<2% HBsAg seroprevalence) as of 2021. No African countries achieved the elimination of MTCT (Kabore et al., 2023).

The elimination of HBV is also identified as one of the global goals, and its inclusion is one of the mandates of SDG 3. SDG 3.3 targets combating hepatitis by the year 2030, with indicator 3.3.4 specifically aimed at reducing hepatitis B incidence per 100,000 population by the year 2030 (WHO, 2024). The WHO framework for monitoring and evaluating the progress towards the SDG for combatting HBV is categorised into four parts consisting of prevention (HBV childhood vaccination coverage), incidence (Incidence Number of new HBV infections (acute) per year per 100 000), Continuum of care (diagnosis and awareness, treatment, and viral suppression), and lastly mortality (Death from liver disease attributable to HBV and HCV infection) (ECDPC, 2021). Currently, the estimate of the global progress revealed that only 10-30% of people living with HBV had been diagnosed, 15-30% only of those requiring treatment were being treated, and only 42% coverage of birth-

dose vaccination has been recorded (Polaris Observatory Collaborators, 2018; WHO, 2019). The case of Sub-Saharan Africa is worrisome, with an extremely low birth dosage of 10% (WHO, 2019). The objective of this study was to assess pregnant women's knowledge and HBV preventive practices for the realisation of the global goals by the year 2030 and the achievement of significant changes from the present Prevalence of HBV morbidity and mortality associated with mother-to-child transmission.

Materials and Methods

Study population

The study population comprises pregnant women attending the antenatal clinic in the Primary Health Care (PHC) centre in Osun State.

Study area

The study was conducted at some primary health centres (PHCs) in Osogbo local government areas (LGAs). There are 33 PHCs in Osogbo, and nine belong to the government (FMOH). The study adopted a cross-sectional descriptive design. A multistage sampling technique was used: First Stage – Osun State was purposively selected as the main study area. Second Stage – A purposive selection of Osun Central out of the three senatorial districts in Osun State. Third Stage –A purposive selection of two LGAs: Osogbo and Olorunda LGAs. Fourth Stage- A selection of wards in each LGA. The Fifth Stage –Five PHCs from each ward were selected through simple random sampling using balloting. Sixth Stage – Selection of pregnant women.

Study instrument

The primary data collection technique was a structured questionnaire for pregnant women attending the selected PHCs. The questionnaire included sections on demographics, knowledge, attitudes, and practices related to HBV**.**

Sample size

The Leslie Kish formula was used to estimate the sample size for this study. The formula is as illustrated below:

$$n\ Z^2\ p\ q\ /\ d^2$$

Z= the standard deviation, set at (1.96), which corresponds to a 95% confidence interval p= Being the prevalence of HPV from a previous study = 10% = 0.1 (Adebiyi et al., 2021)

$$q = 1-p$$

$$q = 1- 0.1 = 0.9$$

d= degree of accuracy desired, usually set at 0.05. Using the formula and the values,

$$n = 1.96x1.96x0.1x0.9/0.05x0.05 = 138.29$$

The sample size was increased by 13.8 to 152.1 respondents, but approximately 160 copies of the questionnaire were used to give allowance for an anticipated non-response and attrition rate of 10% (about 13.8 respondents). For easy analysis and cross-tabulation and to increase the statistical power, the sample size was rounded to 200, and 200 copies of the questionnaire were distributed and administered to the respondents. The study measured several variables to assess the KAP of pregnant women regarding HBV comprehensively.

Study variables

Items assessing knowledge included questions on HBV transmission routes, symptoms, prevention methods, and treatment options. Responses were measured on a binary scale (Yes/No) and a Likert scale (from Strongly Agree to Strongly Disagree). The attitude variables were determined with questions on Attitudes towards HBV vaccination, screening, and preventive measures, which were measured using a Likert scale to gauge the degree of agreement or disagreement with various statements. The question items for the practice include Practices related to HBV prevention, such as vaccination status, screening behaviour, and adherence to preventive guidelines, which were measured using dichotomous (Yes/No) and frequency (Never, Sometimes, Often, Always) scales.

Data collection process

The data collection was done between June and July 2024. Data collection assistants were recruited based on their qualifications and experience in conducting health surveys. Preference was given to individuals with a background in public health or social sciences. A comprehensive training session was conducted for the assistants to familiarise them with the study objectives, data collection techniques, and ethical considerations. The training included role-playing and mock interviews to ensure they were well-prepared for the fieldwork**.** The primary data collection technique was a structured questionnaire administered to pregnant women attending antenatal clinics in the selected institutions. The questionnaire included sections on demographics, knowledge, attitudes, and practices related to HBV**.**

Data analysis and management

The Statistical Package for Social Sciences (SPSS) version 30 was used for the data analysis. The data were analysed through descriptive statistics (mean, standard deviations, and frequencies) and inferential statistical measures such as Chi-square to establish the relationship between significant variables at $p<0.05$.

Results

Socio-demographic characteristics of the respondents

Table 1 shows the socio-demographic characteristics of the study respondents. The mean age of the pregnant women is 26.8$\pm$3.8. The majority of the respondents have a tertiary level of education (40%), are engaged in unskilled labour (37%), and have a monthly income falling between 20,001 and 35,000 (48%). Most were carrying either their first or second pregnancy (52%). *Knowledge of respondents regarding hepatitis B virus (HBV)*

Table 2a reveals the knowledge of pregnant women about HBV. While the majority were aware of HBV (67%) through a healthcare professional (33%), their awareness does not translate into actual knowledge of the disease. Only 10% of the respondents knew that HBV is preventable; 12% knew vaccination was the primary preventive measure; and 44% knew that HBV can be transmitted from the mother to the newborn. The mean knowledge score of the respondents gives a value of 2.88 out of the total obtainable knowledge score of 9, an SD of 0.47; this implies that only 32% of the respondents have good knowledge of HBV. According to the Table 2, there was a significant difference between the knowledge level of HBV and the number of pregnancies of the respondents ($F(4, 195) = 8.202$, $P = 0.000$) with a large effect size at 0.144; knowledge level of HBV and the educational level of the respondents ($F(3, 196) = 4.023$, $P = 0.008$) with a medium effect size at 0.058; and knowledge of HBV and the ages as at last birth of the respondents ($F(14, 185) = 1.876$, $P = 0.031$) with a medium effect size at 0.124. However, the occupation of the respondents is not significant ($F(3, 196) = 2.081$, $P = 0.104$) with the knowledge of HBV preventive practices.

Attitude toward hepatitis B virus (HBV)

Only 36% of the respondents agreed that HBV has a significant impact on the health of both the mothers and their babies, with over half (53%) not feeling susceptible to the disease and 43% feeling indifferent to getting tested. The weighted mean of 6.72, SD of 0.41, revealed that only 21% of the respondents have a positive attitude towards HBV preventive practices, as shown in Figure 2 below. The relationship between the respondents' attitudes towards HBV and their socio-demographic variables of age, level of education, occupation, and number of pregnancies were presented in Table 3b.

Table 1: Socio-demographic characteristics of the respondents

Variable	Frequency (N)	Percentage (%)
Age		
19-24 years	50	25.0
25-34 years	150	75.0
Mean Age= 26.8+ 3.8		
Marital status		
Single	16	8.0
Married	184	92.0
Religion		
Christianity	82	41.0
Islam	100	50.0
Traditional	18	9.0
Husbands' Religion		
Christianity	84	42.0
Islam	102	51.0
Traditional	14	7.0
Educational Level		
No formal education	28	14.0
Primary school	18	9.0
Secondary school	74	37.0
Tertiary	80	40.0
Husbands' Educational Level		
No formal education	26	13.0
Primary school	6	3.0
Secondary school	86	43.0
Tertiary	82	41.0
Occupation		
Unemployed	8	4.0
Unskilled Labour	74	37.0
Skilled Labour	48	24.0
Professional (n=200)	70	35.0
Husbands' Occupation		
Unemployed	2	1.0
Unskilled Labour	44	22.0
Skilled Labour	72	36.0
Professional	82	41.0
Monthly Income		
< 10,000	24	12.0
10001 – 20,000	80	40.0
20,001 – 35,000	96	48.0
Number of Pregnancy		
1 -2	104	52.0
3 and more	96	48.0

Table 2A: Knowledge of respondents regarding hepatitis B virus

Variable	Frequency (N)	Percentage (%)
Have you heard about Hepatitis B		
Yes	134	67.0
No	66	33.0
Source of information (n = 134)		
Healthcare Professional	66	33.0
Internet	60	30.0
Family and Friends	20	10.0
Television/Radio	54	27.0
Which of the following causes the Hepatitis B virus?		
Getting vaccinated against Hepatitis B during pregnancy	62	31.0
Sharing needles with an infected person	128	64.0
I don't know	10	5.0
What are the methods of Hepatitis B transmission?		
Shaking hands	12	6.0
Sharing needles and syringes	54	27.0
Sharing used sharp objects	88	44.0
Mother to baby	12	6.0
Unsafe sex	24	12
Contact with contaminated blood	10	5.0
Is the Hepatitis B virus preventable?		
Yes	20	10.0
No	170	85.0
Not sure	10	5.0
What primary preventive measures do you know about Hepatitis B Vaccination		
Safe sex practices	24	12.0
Avoid sharing personal items	52	26.0
Screening and testing	116	58.0
	8	4.0
Pregnant women with Hepatitis B can transmit the virus to their newborns		
Yes	88	44.0
No	98	49.0
Not sure	14	7.0
Does Hepatitis B cause liver cancer?		
Yes	76	38.0
No	108	54.0
I don't know	16	8.0
Is Hepatitis B a curable disease		
Yes	112	56.0
No	58	29.0
I don't know	30	15.0

Table 2B: The association between knowledge and the number of pregnancies, educational level, age and occupation of the respondents

			Sum of Squares	df	Mean Square	F	Sig.	Eta squared
Total Knowledge score * Q10 Numbers of Pregnancy	Between Groups	(Combined)	6.268	4	1.567	8.202	.000	0.144
	Within Groups		37.252	195	.191			
	Total		43.520	199				
Total Knowledge score * Q5 Educational Level	Between Groups	(Combined)	2.524	3	.841	4.023	.008	0.058
	Within Groups		40.996	196	.209			
	Total		43.520	199				
Total Knowledge score * Q1 Age as at last birthday	Between Groups	(Combined)	5.411	14	.387	1.876	.031	0.124
	Within Groups		38.109	185	.206			
	Total		43.520	199				
Total Knowledge score * Q7 Occupation	Between Groups	(Combined)	1.343	3	.448	2.081	.104	-
	Within Groups		42.177	196	.215			
	Total		43.520	199				

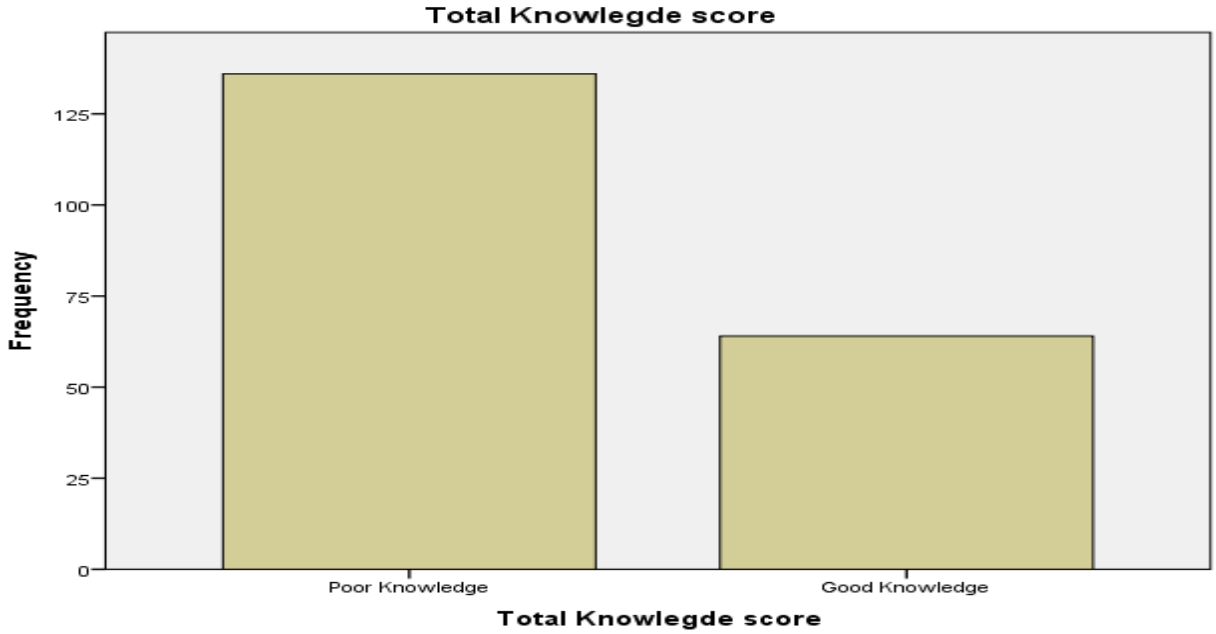

Figure 1: A bar chart showing the knowledge categorisation of the respondents

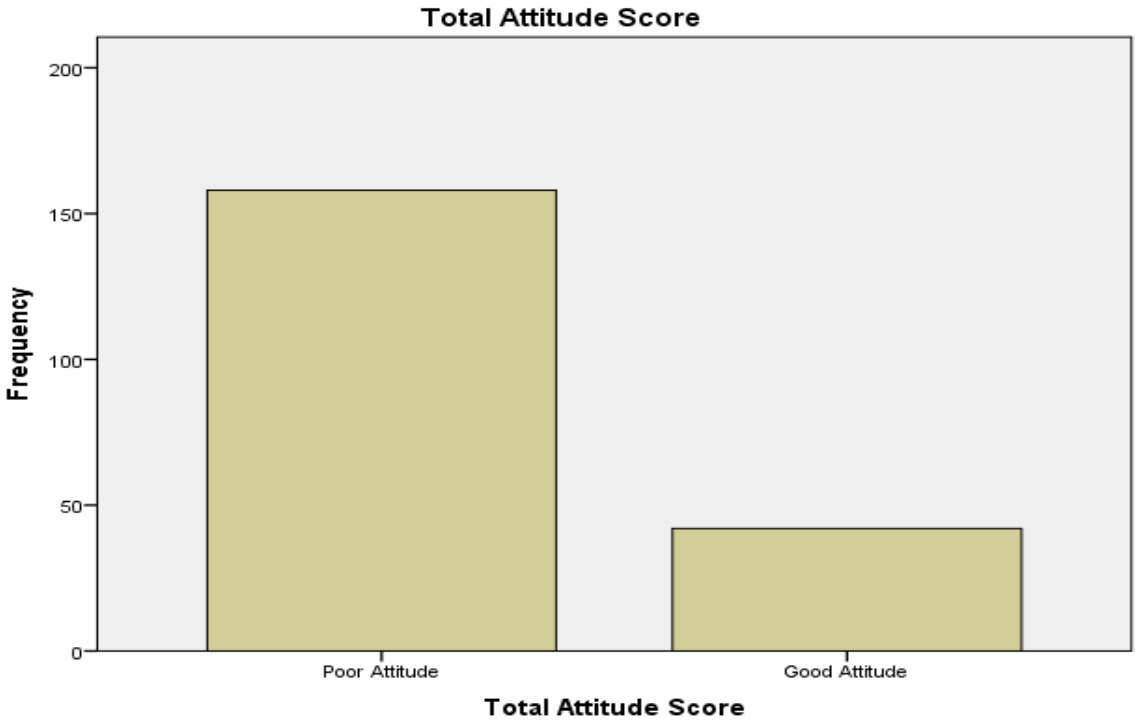

Figure 2: A bar chart showing the attitudinal disposition of the respondents towards HBV

Table 3A: Attitude towards hepatitis B virus (HBV)

Variable	Frequency (N)	Percentage (%)
I believe that Hepatitis B can significantly impact the health of pregnant women and their babies.		
Strongly Disagree	14	7.0
Disagree	44	22.0
Neutral	52	26.0
Agree	72	36.0
Strongly Agree	18	9.0
I feel that I am at risk of contracting Hepatitis B during my pregnancy.		
Disagree	106	53.0
Neutral	20	10.0
Agree	62	31.0
Strongly Agree	12	6.0
I think it is important for pregnant women to get tested for Hepatitis B.		
Strongly Disagree	2	1.0
Disagree	24	12.0
Neutral	86	43.0
Agree	48	24.0
Strongly Agree	40	20.0
I support the Hepatitis B vaccination for newborns		
Strongly Disagree	14	7.0
Disagree	30	15.0
Neutral	48	24.0
Agree	72	36.0
Strongly Agree	36	18.0
I believe the Hepatitis B vaccine is safe for my baby		
Strongly Disagree	28	14.0
Disagree	32	16.0
Neutral	38	19.0
Agree	52	26.0
Strongly Agree	50	25.0
I think pregnant women diagnosed with Hepatitis B should receive special counselling and support.		
Strongly Disagree	26	13.0
Disagree	22	11.0
Neutral	48	24.0
Agree	50	25.0
Strongly Agree	54	27.0
I believe there is a stigma associated with having Hepatitis B		
Strongly Disagree	54	27.0
Disagree	12	6.0
Neutral	40	20.0
Agree	56	24.0
Strongly Agree	38	19.0
I would be comfortable discussing my Hepatitis B status with my healthcare provider.		
Strongly Disagree		
Disagree	6	3.0
Neutral	30	15.0
Agree	50	25.0
Strongly Agree	48	24.0
	66	33.0

Table 3B: The association between attitude and the number of pregnancies, educational level, age and occupation of the respondents

			Sum of Squares	df	Mean Square	F	Sig.	Eta squared
Total Attitude Score * Q1 Age as at last birthday	Between Groups	(Combined)	5.056	14	.361	2.376	.005	0.152
	Within Groups		28.124	185	.152			
	Total		33.180	199				
Total Attitude Score * Q5 Educational Level	Between Groups	(Combined)	1.286	3	.429	2.633	.051	-
	Within Groups		31.894	196	.163			
	Total		33.180	199				
Total attitude Score * Q7 Occupation	Between Groups	(Combined)	1.188	3	.396	2.427	.067	-
	Within Groups		31.992	196	.163			
	Total		33.180	199				
Total Attitude Score * Q10 Numbers of Pregnancy	Between Groups	(Combined)	.403	4	.101	.599	.664	-
	Within Groups		32.777	195	.168			
	Total		33.180	199				

While only the age of the respondents is significant (F (14, 185) = 2.376, P =0.005) with a large effect size of 0.152; there was no significant relationship between the respondents' attitudes towards HBV and their level of education, occupation, and number of pregnancies at P<0.05.

Preventive practice towards hepatitis B

Table 4a presents the preventive practices of the respondents on HBV. A larger percentage (67%) have not tested for HBV; have not received HBV vaccine (73%) solely due to personal choices (33.5%), and have also not received counseling for HBV (70%). The mean score for the respondents' level of preventive practices for HBV is 2.24, with an SD of 0.45 and 28% having good preventive practices for HBV, as shown in Figure 3. The predictive power of the respondents' ages, level of education, occupation, and number of pregnancies was tested with the preventive practices of HBV as an outcome shown in Table 4b. The respondents' educational level and occupation are significant with the preventive practices of HBV at (F (3, 196) = 5.913, P =0.001) and (F (3, 196) = 3.850, P =0.010), respectively. With a turkey post hoc test, there is a significant difference in the preventive practices of HBV among the pregnant women with no formal and primary education (P=0.001); among those with secondary and primary education (P= 0.001); and those with tertiary and primary education (P=0.000) at a medium effect size of 0.083. Also, respondents' occupation was significant with preventive practices (F (3, 196) = 3.850, P =0.010 with a small effect size at 0.056. The multiple comparisons from the post hoc test showed a significant difference between the unemployed pregnant women and the professional at 0.001, similar to those in the skilled labour categories and the unemployed at 0.001. However, age and number of pregnancies do not have any impact on the outcome variable of HBV preventive practices at P=0.107 and 0.165, respectively.

Table 4A: Preventive practice towards hepatitis B

Variable	Frequency (N)	Percentage (%)
Have you received the Hepatitis B vaccine during this pregnancy		
Yes	54	27.0
No	146	73.0
Reasons for not receiving the Hepatitis B vaccine		
Lack of awareness	46	23.0
Concerns about vaccine safety	63	31.5
Personal choice	67	33.5
The healthcare provider did not recommend	24	12.0
Have you been tested with Hepatitis B		
Yes	60	30.0
No	134	67.0
Not sure	6	3.0
If yes, have you received any treatment or counselling for your Hepatitis B status		
Yes	60	30.0
No	140	70.0
Do you share personal items?		
Yes	12	6.0
No	180	90.0
Not sure	8	4.0
Would you ask if the blood has been screened for Hepatitis B before receiving a transfusion?		
Yes	100	50.0
No	94	47.0
I don't know	6	3.0

Have you or your partner ever been diagnosed with Hepatitis B Yes No	 54 146	 27.0 73.0
Are you currently taking any medication or undergoing any treatments for Hepatitis B or any related conditions? Yes No	 46 154	 23.0 77.0
Do you have any family members who have been diagnosed with Hepatitis B Yes No Not sure	 58 98 44	 29.0 49.0 22.0

Table 4B: The association between preventive practice and the number of pregnancies, educational level, age and occupation of the respondents

			Sum of Squares	df	Mean Square	F	Sig.	Eta squared
Total Practice Score * Q5 Education Level	Between Groups	(Combined)	3.346	3	1.115	5.913	.001	0.083
	Within Groups		36.974	196	.189			
Total			40.320	199				
Total Practice Score * Q7 Occupation	Between Groups	(Combined)	2.244	3	.748	3.850	.010	0.056
	Within Groups		38.076	196	.194			
Total			40.320	199				
Total Practice Score * Q1 Age as at last birthday	Between Groups	(Combined)	4.164	14	.297	1.522	.107	
	Within Groups		36.156	185	.195		-	
	Total		40.320	199				
Total Practice Score * Q10 Numbers of Pregnancy	Between Groups	(Combined)	1.314	4	.329	1.643	.165	-
	Within Groups		39.006	195	.200			
	Total		40.320	199				

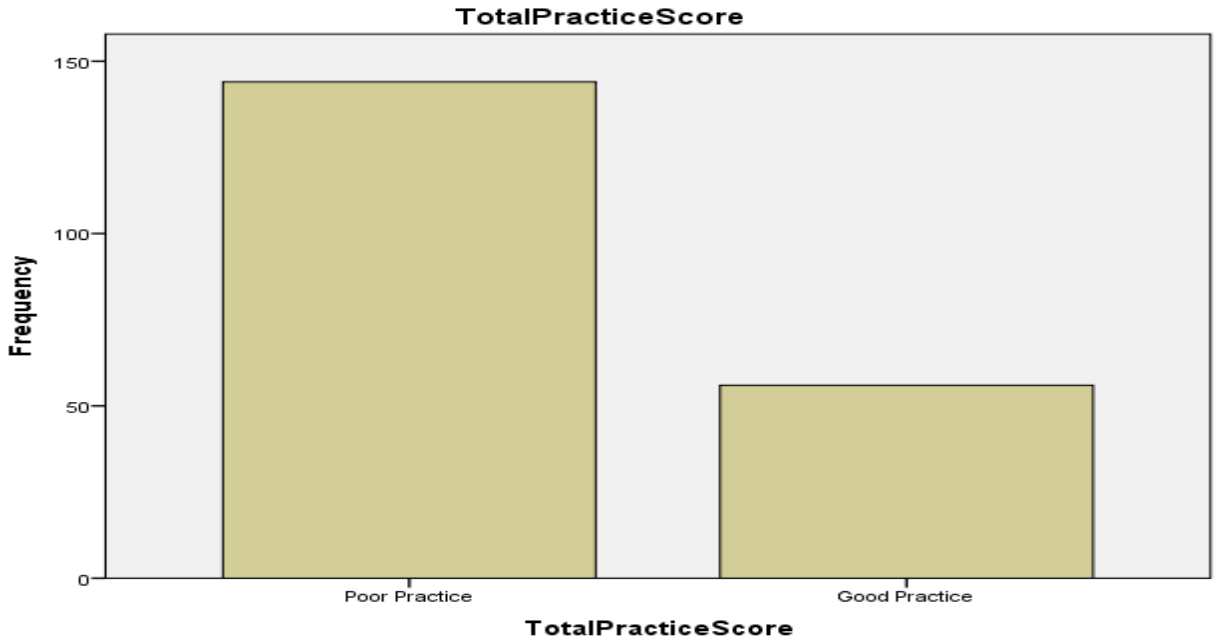

Figure 3: A bar chart showing the level of the respondents' prevention practice of hepatitis B

Discussion

The study assessed the knowledge, attitudes, and preventive practices regarding hepatitis B virus (HBV) among pregnant women attending antenatal care in selected primary health care centres in Osogbo, Nigeria, and the respondents' socio-demographic characteristics associated with these variables. The low mean knowledge score of 2.88±0.47 indicated that over half of the respondents (68%) had poor knowledge of HBV. Invariably, this poor knowledge influenced the pregnant women's attitudes and preventive practices of HBV. The multivariate analysis also revealed that the respondents' educational level, number of pregnancies, and ages were equally statistically associated with their knowledge level. The findings of Gebrecherkos et al. (2020) are similar to this study, where 73.4% of the respondents had poor knowledge, and their educational level was significantly associated with the mean knowledge score. An observational study on the prevalence, knowledge of, and attitude towards HBV among pregnant females in Jordan revealed limited knowledge (9.1%-41.3%, $P < .05$) despite having a prevalence of 5% hepatitis B surface antigen (HBsAg) among the pregnant women. However, in contrast to this study, no significant correlation was found between age, socioeconomic status and educational level of the respondents. The introduction of new interventions to increase HBV awareness among pregnant women was reported by Othman et al. (2020) to address the knowledge gaps. The findings of low knowledge were reported by Nlinwe et al. (2021), with over half of the respondents unaware of HBV despite the alarming infection rate. A higher knowledge was associated with pregnant women in urban residences with higher educational status and monthly income. Tochukwu et al. (2024) also reported poor knowledge, as only 26.6% of the respondents had good knowledge of HBV.

The socio-demographic variables of educational level and occupation of the respondents were reported to be significantly associated with overall knowledge of hepatitis B in consonance

with this study. Unlike the findings in this study, over three-quarters (86.7%) of the respondents in the study of Nsiah et al., 2020 had adequate knowledge of HBV even though it does not translate into practice. The educational level of the pregnant women was significantly associated with their knowledge, as those respondents with no formal education were less likely to have adequate knowledge of HBV infection (OR (95% CI): 0.27 (0.11-0.65)), whereas pregnant women with tertiary education were 5.8 times more likely to have adequate knowledge on HBV (p-value <0.05). Likewise, this study revealed a weighted mean score of 6.72±0.41 for the attitudinal disposition of pregnant women towards HBV. This low value implied that the majority of the respondents had negative attitudes towards HBV preventive practices. Although, with an initial poor knowledge level, getting a positive attitudinal disposition is close to impossibility as the journey to behavioural change begins with knowledge change. In consonance with this study, the study of Akor et al. (2024) reported over half (59.3%) of pregnant women had negative attitudes towards HBV.

Contrary to the findings in this study, a vast majority (65.2%) of pregnant women have positive attitudes towards HBV (Nsiah et al., 2020). Also, educational level (χ^2 = 22.04, p-value <0.0001), occupation (χ^2 = 23.13, p-value <0.001) and marital status (χ^2 = 6.64, p-value =0.036) were significantly associated with pregnant women's attitude towards HBV infection as against only the respondents' ages which were significant in this study. Similarly, Nlinwe, et al. (2021) reported an overall positive attitudinal disposition toward HBV; some of the pregnant women still display a significantly negative attitude in the expression of their feelings as some opined that they will not communicate to a physician about their illness, while 44.8% (99/221) do not know the cost of diagnosing and treating HBV. The findings of Gebrecherkos et al. (2019) also contrasted the outcome of this study. While a little over half (54%) were reported to have a positive attitude, the overall assessment of the pregnant women's attitudinal disposition to HBV was said to be limiting. Unlike the significant age in this study, residence, income, and educational level were associated with mean score attitude. The observational study of Othman et al. (2020) on the prevalence, knowledge and attitude of pregnant females towards hepatitis B infection, in Jordan, reported a high level of positive attitudes among the majority, in contrast with the outcome of this current study. Despite this, new intervention for the continuous overall improvement of pregnant women's attitude towards HBV was highly recommended. Dagnew et al. (2020) joined the list of contrasting studies. With over half of the respondents having positive attitudes towards HBV, independent factors, including education, gravida, and vaccination history, were significantly associated with favourable attitudes against only age in this current study.

In a similar vein, the HBV preventive practice of pregnant women in this study has a low mean score of 2.24±0.45, with the majority having poor HBV prevention practices. In principles, only adequate knowledge can translate into good practice, behavioural change, and, by extension, preventing diseases, promoting health, and prolonging lives. With the trend/pattern of the results in this study, achieving the eradication of HBV as one of the global goals will look almost impossible if urgent public health attention is not directed at it. Also, the multivariate analysis showed that the respondents' educational level and occupation were significant with HBV practice.

Despite having about half (51.2%) of their study respondents screened for HBV as against 33% in this study, the practice of HBV was concluded to be limited, the low level of vaccination (23%) in this study was equally in conformity (36%) with (Akol et al., 2024). Contrary to this study, Ayamolowo et al., 2023 and Hang Pham et al. (2019) reported that the majority (73.5%) and (62.4%) of their respondents had been screened for HBV respectively. However, only 30% had received a complete dose of the HBV vaccine (Ayamolowo et al., 2023). The study, however, recommended the development of a preventive intervention among expectant mothers to prevent

MTCT of HBV. Respondents in the cross-sectional study of Afolabi et al. (2022) also displayed good behavioural skills for the prevention of HBV. According to the study, the respondents' average acceptable level of prevention practices was measured on a rating scale of 30 ($\bar{X} = 15.03 \pm 16.20$).

Conclusion and recommendations

The study observed significant gaps in pregnant women's knowledge, attitudes, and preventive practices regarding the Hepatitis B Virus (HBV).

- The findings reveal that the overall knowledge of HBV among pregnant women is inadequate, with limiting attitudes and practices for prevention.
- While the age of respondents is significantly associated with their attitudes toward HBV, factors such as educational level, number of pregnancies, and age are significantly associated with knowledge.
- Additionally, educational level and occupation are closely linked to preventive practices; these associations emphasise the need for targeted interventions to address these gaps. Recognising the high odds of negative attitudes among women with poor knowledge of HBV, the study underscores the importance of prioritising education as a cornerstone to driving significant behavioural changes.
- The study strongly advocates for structured health education interventions tailored for pregnant women attending antenatal care (ANC) to achieve the goals outlined in Sustainable Development Goal (SDG) 3, particularly indicator 3.
- It calls for the prompt implementation of personalised health education during ANC visits and health campaigns to enhance preventive practices and mitigate the risks of HBV transmission.
- The study further recommends reevaluating and expanding educational programs for pregnant women to bridge the identified knowledge gaps. Comprehensive and continuous health education campaigns are crucial for improving awareness and adherence to preventive measures; such campaigns should focus on raising awareness and translating knowledge into actionable and sustained practices.
- Integrating personalised education during ANC visits with public health campaigns can effectively empower pregnant women with the necessary information and tools to prevent HBV transmission.

Therefore, future public health initiatives should prioritise pregnant women's education to ensure long-term improvements in HBV prevention knowledge, attitudes, and practices.

Limitations to the study

The study's relatively small sample size of 200 pregnant women makes it hard to generalise the findings to the population of pregnant women in Southwest Nigeria. The cross-sectional design offers only a snapshot in time, so we can't say how knowledge, attitudes, and preventive practices regarding HBV might change or influence one another in the long run. Additionally, the fact that the study leans heavily on self-reported data means there's always the risk of respondents giving answers they think are more acceptable or simply forgetting key details, which might skew the results. Plus, the study doesn't dig into deeper factors, like access to healthcare or cultural beliefs, which could also play a massive role in shaping these preventive practices.

Ethical consideration

Ethical approval to carry out the study was sought and obtained from the Health Research and Ethics Committee at the Osun State Ministry of Health, Abere, Osogbo—the approval with Reference No.: OSHREC/PRS/569T/596, and the letter of introduction from the department was presented to the Community Health Officer. Participation of respondents in the study was completely voluntary. A written informed consent was obtained from each of the study respondents.

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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