



## ORIGINAL RESEARCH ARTICLE

# High Prevalence of Hepatitis B Virus Infection among Pregnant Women Attending Antenatal Care in Central Nigeria

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## Abstract

**Introduction:** A total of 200 pregnant women subjects were selected for this study to determine the sero-prevalence of hepatitis B virus (HBV) infection and assess the risk factors among pregnant women attending ante natal care at FMC, Keffi, Nigeria.

**Methods:** A structured questionnaire was used for the data collection. Sera were collected and tested for hepatitis B surface antigen (HBsAg) and hepatitis B e antigen (HBeAg).

**Results:** A highest proportion of HBsAg seropositive women were found among those at or above 45 years of age (33.3%)  $P$  value = 0.542. On sociodemographic characteristics, there was no statistical significance difference between the women with HBsAg positive sera and those without the infection, with respect to marital status ( $P$ -value = 0.899) and Occupation ( $P$  value = 0.863). However, there was statistical significant difference among those women of different Religion ( $P$  value = 0.326), Education ( $P$  value = 0.350), blood transfusion(s). 29.8% positive were recorded for HBsAg while (15.3%) with no history of prior blood transfusion were negative. Women in the 3<sup>rd</sup> trimester of their gestational period (39.2%) were positive for HBsAg compared to those in 1<sup>st</sup> trimester (18.2%) and 2<sup>nd</sup> trimester (15.3%).

**Conclusion:** The sero-prevalence of HBV infection and its infectivity is high in Central Nigeria. This research article suggest the need for improved maternal health, routine immunization HBV screening among pregnant women in central Nigeria.

## Keywords

Hepatitis B virus, Sero-prevalence, Hepatitis B surface antigen (HBsAg), Central Nigeria

## Introduction

Viral hepatitis causes both acute and chronic infection with significant complications and sequelae. More than 2 billion people worldwide are estimated to have had hepatitis B virus (HBV) infection, with 350-400 million being chronic carriers of the virus [1-5] HBV accounts annually for an estimated 1 million deaths worldwide [6,7] and causes acute and chronic liver disease. Its prevalence varies throughout the world, but is highest in tropical regions [8-11] It is estimated that 5-15% of adults in sub-Saharan Africa are chronically infected with HBV [6]. There is a 15-25% risk of dying prematurely in adulthood from HBV-related cirrhosis and hepatocellular carcinoma, while a small proportion of those with acute infections may also succumb to fulminant liver failure [1]. In areas of high endemicity where at least 8% of the population are chronic HBV carriers [9]. HBV is mainly contracted at birth and early childhood [9,12-14]. Perinatal transmission from an infected mother to her baby is common [2]. About 90% of those infected during the prenatal period, 30% of those infected in early childhood, and 6% of those infected after 5 years of age develop chronic infection [2].

In Nigeria, 11.6% prevalence has been reported from Maiduguri among blood donors and pregnant women [15], 4.3% from Port-Harcourt among pregnant women [16-18], 5.7% from Ilorin in mothers and their preschool children [4], 8.3% from Zaria among pregnant women [17], 17.1% from female sex workers in Nassarawa [19],

14.9% from healthy blood donors in Yola [18] and 25.7% among surgeons in Lagos [20]. Health-care workers have a 3- to 5-fold higher prevalence of HBV than the general population, with surgeons and dentists having higher reported cases [5,10]. HBV infection is a vaccine-preventable disease. Vaccination with the monovalent HBV vaccine was introduced in Nigeria in 2004 as part of the National Program on Immunization (NPI), to be given at 6, 10, and 14 weeks of age [21]. However, in 2012, a pentavalent vaccine comprising diphtheria, tetanus, pertussis, HBV, and Haemophilus influenzae type B was introduced [11]. The prevalence of this disease in Nigeria as a whole is not known although the country has long been considered to be among the highly endemic countries of sub-Saharan Africa [6,22]. Data for chronic viral hepatitis are not routinely collected by the Integrated Disease Surveillance and Response system, which collects only acute viral hepatitis cases; therefore, hepatitis infection remains largely underreported [23]. In view of the advantage of decreasing the chronic carrier rate of HBV within the population, this study was carried out to determine the prevalence of hepatitis B infection among pregnant women attending antenatal care in Central Nigeria Federal Medical Centre, Keffi in relation to age, marital status, occupation, religion, previous history of blood transfusion, level of education and gestational age, identify subpopulations at risk who would benefit from vaccination, and explore factors associated with infection while providing baseline data for future assessment of the impact of HBV infection and vaccination in Central Nigeria.

## Method

### Study design

A cross-sectional study in which pregnant women subjects, attending Ante natal care at Federal Medical Centre (FMC) Keffi, Central Nigeria were recruited between June 2017 and August 2017 and their blood samples taken for analysis. A structured questionnaire was used to obtain socio-demographic characteristics and risk factors for HBV infections.

### Study population

These were pregnant women attending antenatal

care at Federal Medical Centre, Keffi, Central Nigeria from different parts of the country, which largely comprised indigenes of Keffi, Makurdi and Abuja Federal Capital Territory, Nigeria. Sample size was calculated to give a 95% confidence level, a margin of error of +/- 5%, using a previous survey of HBV seroprevalence found among pregnant women attending antenatal clinic in a central hospital in Warri, Delta State, southern Nigeria [24] which was taken as 12%.

A total of two hundred pregnant women ages ranging from 16-55 years were recruited and screened in this study. Women with prior history of vaccination, those unwilling to consent for the blood test and women diagnosed with Hepatitis B virus infection were excluded from the study. A written informed consent was obtained after careful explanation, in a clear languages (English and Hausa), of the study concept to each pregnant woman before inclusion in the study. Ethical clearance obtained from the Joint Ethical committee of Nasarawa State University of and Federal Medical Centre, Keffi before the commencement of the study.

### Specimen collection and detection of HBsAg and HBeAg

About 3 mls of venous blood was collected by venepuncture from each participant in labeled plain universal specimen bottle at FMC, Keffi laboratory, each clotted sample was centrifuged at 3000 rpm for 5 min. The sera collected was tested for HBsAg and HBeAg using **Anti-Hepatitis B Surface Antigen (Anti-HBsAg)** test Stripe manufactured by MyBioSource, Inc. Diagnostic USA. Reactive samples for HBsAg and HBeAg were further confirmed with the use of the enzyme-related immunosorbent assay (Bio Rad, France).

### Statistical Analysis

Microsoft Excel® software (Microsoft Corporation, Redmond, WA, USA) was used to enter data and generate all. Graphs and tables. Statistical analysis was performed using SPSS® 17.0 statistical software (IBM Corporation, Armonk, NY, USA), and a 5% significance level was used in cross-tabulation chi-square analysis.

**Table 1:** Seroprevalence of HBsAg by Age & Marital status among women attending antenatal care at FMC, Central Nigeria.

Age Group	Number Tested (%)	HBsAg/HBeAg Positive (%)	$\chi^2$ value	P value
16-26	77 (38.5)	16 (20.7) 6 [7.8]*	14.44	0.542
26-35	88 (44.0)	15 (17.0) 11 [12.5]*		
36-45	29 (14.5)	6 (20.6) 2 [6.89]*		
46-55	6 (3.0)	2 (33.3) 1 [16.7]*		
<b>Total</b>	<b>200 (100)</b>	<b>39 (91.6) 20 [43.9]*</b>		
Marital Status	Number Tested (%)	HBsAg Positive (%)	$\chi^2$ value	P value
Single	8 (4.0)	2 (25.0)	66.62	0.899
Married	190 (95.0)	37 (19.4)		
Divorced	2 (1.0)	0 (0.0)		
<b>Total</b>	<b>200 (100)</b>	<b>39 (44.4)</b>		

\*[HBeAg/HBsAg] Positive Subjects.

## Result

Out of the 200 pregnant women screened during the study with age range of 16-55 years and mean age of 27.5 years, 39 (19.5%) were seropositive for HBsAg. 20 women of the 39 (43.9%) were also positive for HBeAg.

The highest proportion of HBsAg seropositive women was recorded among those 46 years of age (33.3%), there was a significant differences (Table 1) in the mean ages of participants who were seropositive for HBsAg and those who were negative for the virus ( $P$  value = 0.542). Examination of other sociodemographic characteristics (Table 1, Table 2 and Table 3), there were no significant difference found between the women with HBsAg positivity and those without the infection with respect to marital status ( $P$  value = 0.899) and Occupation ( $P$  value = 0.863), but a significant differences was demonstrated among women of different Religion ( $P$  value = 0.326) and Education ( $P$  value = 0.350).

Of the pregnant women participants (Table 3) who had previously had blood transfusion(s), 29.8% were positive for HBsAg while (15.3%) with no history of prior blood transfusion were negative. There was a significant differences in the seroprevalence of HBsAg among blood transfusion pregnant women participants ( $P$  value = 0.016). In Table 3, Women in the 3<sup>rd</sup> trimester of their gestational period (39.2%) were positive for HBsAg compared to those in 1<sup>st</sup> trimester (18.2%)

and 2<sup>nd</sup> trimester (15.3%). There was also a significant differences in the seroprevalence among these group.

## Discussion

The national survey on seroprevalence of hepatitis B infection confirms that HBV infection is highly endemic in Nigeria providing a prevalence within the estimated prevalence in sub-Saharan Africa [8].

In this study a high prevalence of HBV infection (19.8%) among pregnant women attending ante natal care at FMC, Keffi, Central Nigeria was recorded, this is in contrast to similar research studies carried out in other part of Nigeria, Southern Nigeria (7.3%), Northern Nigeria (7.9%, 8.2% and 8.3%) [1,22] respectively. Furthermore, our study revealed that illiteracy is responsible for the high prevalence of HBsAg in Central Nigeria. This is similar to a recent study conducted at Ibadan (16.3%) by Adeyemi, et al. [4,19]. In spite of the fact that this surpasses rates notwithstanding for concentrates from the North, Adeyemi's study found a pervasiveness of 6.4% in tertiary health facilities and 30.9% in the non-tertiary health facilities. These studies were directed in tertiary health care facilities like our own where there was prominent number of women with larger amounts of training and edification concerning hepatitis B and its hazard factors. Deviation in sexual behaviour and cultural practices, geographical variant, trial run/studies methods employed for HBV detection

**Table 2:** Sero-prevalence of HBsAg by Religion & Education among women attending antenatal care at FMC, Central Nigeria.

Religion	Number Tested (%)	HBsAg Positive (%)	$\chi^2$ value	$P$ value
Christians	110 (55.0)	19 (17.2)	19.54	0.326
Muslims	90 (45.0)	20 (22.2)		
Traditionalist	0 (0.0)	0(0.0)		
<b>Total</b>	<b>200 (100)</b>	<b>39 (39.4)</b>		
Educ. Level	Number Tested (%)	HBsAg Positive (%)	$\chi^2$ value	$P$ value
Primary	25 (12.5)	5 (20.0)	27.03	0.35
Secondary	76 (38.0)	19 (25.0)		
Tertiary	72 (36.0)	11 (15.2)		
Qur`anic	21 (10.5)	2 (9.5)		
Illiterate	6 (3.0)	2 (33.3)		
<b>Total</b>	<b>200 (100)</b>	<b>39 (103.0)</b>		

**Table 3:** Sero-prevalence of HBsAg by Occupation, Blood Transfusion & Gestational age among women attending antenatal care at FMC, Central Nigeria.

Occupation	Number Tested (%)	HBsAg Positive (%)	$\chi^2$ value	$P$ value
Civil servant	50 (25.0)	7 (14.0)	6.62	0.863
Housewife	88 (44.0)	20 (22.7)		
Student	62 (31.0)	12 (19.3)		
<b>Total</b>	<b>200 (100)</b>	<b>39 (56.0)</b>		
Hist. of blood transf	Number Tested (%)	HBsAg Positive (%)	$\chi^2$ value	$P$ value
Yes	57 (25.0)	17 (29.8)	0.64	0.016
No	143 (71.5)	22 (15.3)		
<b>Total</b>	<b>200 (100)</b>	<b>39 (45.1)</b>		
Gestation Age	Number Tested (%)	HBsAg Positive (%)	$\chi^2$ value	$P$ value <sup>^</sup>
1 <sup>st</sup> Trimester	77 (38.5)	14 (18.2)	5.73	0.010
2 <sup>nd</sup> Trimester	100 (50.0)	22 (15.3)		
3 <sup>rd</sup> Trimester	23 (11.5)	9 (39.2)		
<b>Total</b>	<b>200 (100)</b>	<b>39 (45.1)</b>		

and the horizontal floor of education on prevention of HBsAg infection, might also all play significant role in the variations of HBsAg prevalence noted in this studies. Hepatitis B envelope antigen seroprevalence of 51.2% was recorded among pregnant women who tested positive for HBsAg. This implies a high risk of chronic infection and vertical transmission of HBV from mother to child. This is significantly higher than the figure detailed by Mbaawuaga, et al. in Makurdi Nigeria (30.3%) [25], Adegbesan-Omilabu, et al. (36.4%) [2] and Harry, et al. in Maiduguri, Nigeria (39%) [23]. In spite of the fact that the figure from our investigation is much lower than the seroprevalence rate of 62.5% recorded among pregnant women going to the antenatal facility at Aminu Kano Teaching Hospital, Kano, Nigeria [1,26], the issue of perinatal transmission of HBV disease is extremely basic and must not be disregarded. The participants who were at or over the age of 46 years had the most elevated predominance of 33.3% in the investigated group while those within the age range of 26-35 years had the lowest prevalence of 17%. From the forgoing, improved education, awareness and acceptance of childhood immunization among parents should be encouraged. This prevalence, however, is at variance with that of other studies where the highest prevalent rates were reported among those in the active younger sexual age group.

Unmarried single women exhibited a significant risk of HBV infection in our study; this finding suggests that acquisition of HBV infection which may be related to sexual lifestyle, influenced by education as well as unprotected sexual intercourse cuts across all categories of participants irrespective of status. Yakasai [1] and Rabiou [27]. This likewise indicates the less probability of getting the disease dependent on marital status as found in this study. Despite the fact that, this was at variance to the discoveries from comparative works by Adegbesan-omilabu [2], where a significantly high prevalence of HBsAg were reported among the married, pregnant women compared to their single counter parts.

However, the high risk of infection among women with, past blood transfusion(s) additionally underlined the presence of non-safe blood transfusion screening administration rehearses among our tertiary health facilities in Nigeria. In spite of the fact that screening for normal blood-borne infection are drilled in Nigeria tertiary hospital, more consideration should be paid on hardware, personnel and kits used in HBV screening.

The study is hospital-based and the findings may not be illustrative of the general picture of Hepatitis B endemicity or the variations between regions in Nigeria. There was additionally determination inclination in the enrolment of participants. In perspective of the high rates of HBV infection in Nigeria, it is basic for future community-based concentrates to be attempted in

the country using larger sample sizes and advanced molecular/immunological biological assays.

This study is the only known signature in Central Nigeria to include HBV eAntigen (HBeAg) (which is a correlation of higher levels of HBV DNA resulting in high levels of viral load and increasing the risk of cirrhosis or chronic liver failure and hepatocellular disease in pregnant women). These most times leads to increase maternal and childbirth morbidity and mortality as observed in Central Nigeria from various literatures. This study further elucidate the need for viral load as a good biomarker to be included in routine antenatal care for pregnant women. This could be a useful prognosis and monitoring tool for good treatment outcomes in antenatal women.

## Conclusion

The seroprevalence of HBV infection and its infectivity is high in central Nigeria. The study findings guide the want for routine HBV screening among pregnant women at some stage in antenatal care within the region and Nigeria It also form a base for continual immunization campaign amongst rural/Urban pregnant mothers/women and food vendors in central and other parts of Nigeria. Those efforts will guarantee top of the line and better outcome and extra excellent health care delivery for the expecting mothers and other health care providers.

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## Statement of Contribution

All authors contribute equally to this work.

## Conflict of Interest

No conflict of interest.

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