

## Sero-epidemiology of Hepatitis B Virus Infection among Pregnant Women in Abeokuta, Ogun State, Nigeria

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Received August 30, 2019; Revised October 25, 2019; Accepted October 29, 2019

### ABSTRACT

Hepatitis B Virus (HBV) infection is one of the leading causes of liver diseases with an estimated mortality of 686 000 deaths annually. Nigeria is endemic with 18 million (10%) infected among the population. This study examines the prevalence of HBV infection and risk factors among pregnant women attending three Antenatal Care (ANC) Clinics in Abeokuta, Nigeria. After Ethical Clearance, blood samples collected from 280 consenting pregnant women have their sera samples tested for Hepatitis Surface Antigen (HBsAg) using Bioline Strip (Rapid test kit, Nantong Egens Biotechnology Co., Ltd) and confirmed with enzyme-linked immunosorbent assay, ELISA (ELISA kits, Bio-rad France). Other HBV serological markers - Envelop antigen (HBeAg), Envelop Antibodies (HBeAb) and Core Antibodies (HBcAb) from 26-HBsAg positive patients were tested using ELISA. Bio-data such as age, education, religion, occupation, family structure and risk factors such as tribal marks, tattoos, previous surgical intervention, genital mutilation, drug abuse including intravenous addiction, parity, un-protective sexual behavior, history of abortion, traditional birth, hospitalization, blood transfusion, chronic liver disease, diabetes, HIV-AIDS, sexually transmitted diseases, jaundice, etc., were obtained and statistically analysed using SPSS version 20. Chi-square, Odds ratio with 95% Confidence Interval (CI) was used as a measure of strength of association and  $p \leq 0.05$  was considered as statistically significant. HBsAg sero-prevalence was 9.3% and of the 26 HBsAg positive women, 26 (100%) were positive HBcAB, 23 (88.5%) had HBeAb, four (15.4%) had HBeAg and one (3.8%) had both HBeAg and HBeAb. Highest HBsAg prevalence (12.2%,  $p=0.478$ ) was recorded among women in age group 30-34 on HBV transmission years old and 11.5% or 35-39 years. Divorced/single mothers (20.0%,  $p=0.826$ ), women in their first trimester of pregnancy (15.4%,  $p=0.868$ ), women whose husbands have multiple sexual partners (9.8%,  $p=0.888$ ), body tattooing ( $p=0.682$ ), illiterate women (18.2%,  $p=0.470$ ), history of blood transfusion ( $p=0.249$ ). High HBV endemicity in Nigeria requires highly Health Education programs, risk factors and need of awareness at ANC Centres to limit the spread of infection.

**Keywords:** Hepatitis B virus, Infections, Serological markers, Pregnant women, Bio-data, Risk factors

### INTRODUCTION

Hepatitis B Virus (HBV) infection remains a global health problem with 2 billion people being infected, 350 million with chronic infections, therefore serving as carriers and 1.0 million deaths each year worldwide [1]. Nigeria has over 18 million infected Umego et al. [2] and 2 to 15.8% sero-prevalence on HBsAg among pregnant women. Vertical transmission of hepatitis B virus infection is thought to be one of the major routes of transmission in developing countries. Identification of infected pregnant women in Abeokuta, Ogun State, will not only help to detect neonates that would require post exposure prophylaxis, but also know those women who might require treatment and their sexual and household contacts who will benefit from testing and

treatment Awoleke et al. [3]. The aim of this study is to investigate the serological pattern and associated risk factors for markers of HBV among pregnant women attending Ante-Natal Clinics (ANC) of some Ogun State primary and

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**Citation:** Bamidele RA, Olufemi FO, Odedara OO, Omoruyi CE & Ojoda. (2021) Sero-epidemiology of Hepatitis B Virus Infection among Pregnant Women in Abeokuta, Ogun State, Nigeria. *J Microbiol Microb Infect*, 3(1): 71-76.

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secondary health facilities with a view to provide baseline information for further large scale study.

**MATERIALS AND METHODOLOGY**

**Study area and population**

The study was carried out among 280 pregnant women at various trimesters of pregnancy attending the ANC in some health facilities in Abeokuta, Ogun State. Ethical approval was obtained from the Joint Ethical committee of Ogun State Ministry of Health and Local Government Service Commission.

**Sample size determination**

The calculated sample size was 280 using the equation by  $N = Z^2 [P (1-P)/D^2]$  described by Naing et al. [4] and a prevalence rate of 18.2% obtained in a previous study [5].

**Laboratory investigation**

All samples were screened for Hepatitis B surface antigen (HBsAg) using rapid HBV kit (Nantong Egens Biotechnology Co., Ltd) and third generation Enzyme-Linked Immunosorbent Assay (ELISA) for HBsAg (BIORAD FRANCE) was done for all samples for confirmation. In addition, positive samples were further tested for Hepatitis B envelope antigen (HBeAg), Hepatitis B envelope antibody (HBeAb) and Hepatitis B core antibody

(HBcAb), using the ELISA kits. The optical density of the ELISA screens were read using the E-max endpoint ELISA microplate reader and interpreted according to the manufacturer’s instructions.

**Analysis**

Data collected were subjected to descriptive and inferential statistical analysis using SPSS version 20 (SPSS Inc., Illinios, USA). Test of association using logistic regression was carried out to describe the relationship between the predictor variables (risk factors for HBV infection found to be statistically significant) and the outcome variable (HBsAg). P values ≤ 0.05 is consider significant.

**RESULTS**

Prevalence of HBV among the pregnant women screened showed 26 (9.3%) seropositivity. The highest prevalence of 10.6% (5/47) and least of 8.6% (8/93) were recorded among women attending Osiele and Obantoko Clinics respectively (**Table 1**). Prevalence of HBV Markers among positive subjects showed that the HBeAg, HBeAb, HbcAb are 4 (15.4 %,) 23 (88.6%) and 26 (100%), respectively (**Table 2**). Subjects at the first trimester of pregnancy recorded a higher prevalence of 15.4% (**Table 3**).

**Table 1.** Percentage distribution of HBsAg according to the health.

Facility (n=280)			
Hospital	Number Tested	HBsAg positive (%)	HBsAg negative (%)
<b>Abeokuta south LGA</b>			
Oba Ademola Hospital	140	13(9.3)	127 (90.7)
<b>Odeda LGA</b>			
Obantoko Health Centre	93	8(8.6)	85(91.4)
Osiele Health Centre	47	5(10.6)	42 (89.4)
<b>Total</b>	280	26 (9.3)	254(90.7)

HBsAg: Hepatitis B surface Antigen; LGA: Local Government Area

**Table 2.** Distribution of HBV markers in HBsAg reactive pregnant women.

HBV marker	HBsAg positives samples; n=26	
	Positive (%)	Negative (%)
Hepatitis B envelope antigen	4 (15.4)	22 (84.6)
Hepatitis B envelope antibody	23 (88.5)	3 (11.5)
Hepatitis B core antibody	26 (100)	0 (0)
Both HBeAg and HBeAb	1 (3.8)	19 (96.2)

HBV: Hepatitis B Virus; HBsAg: Hepatitis B surface Antigen

**Table 3.** Gestation and parity distribution of the study population (n=280).

Parameter value	Number Tested	No HBsAg positive	No HBsAg negative	Prevalence rate %	*P
<b>Gestation Age</b>					<b>0.868</b>
1 <sup>st</sup> trimester	13	2	11	15.4	
2 <sup>nd</sup> trimester	115	10	105	8.7	
3 <sup>rd</sup> trimester	152	14	138	9.2	
<b>Parity</b>					<b>0.659</b>
PRIMP	99	9	90	9.10	
Once	79	9	70	11.4	
2 times	53	6	47	11.3	
3 times	42	2	40	4.8	
>3 times	7	0	7	0	

CI: Confidence Interval; OR: Odd Ratio; HBsAg: Hepatitis B surface Antigen  
\*P<0.05

Based on age, subjects aged 30-34 recorded the highest prevalence of 12.2% (9/74), those aged 35-39 has a prevalence of 11.5% (3/26). The subjects with no formal education recorded highest prevalence of 18.2%. Marital status: distribution of HBsAg highest among pregnant but divorced (20%), women from polygamous homes 9.8% (Table 4). Other risk factors: Tattoos, Shared sharp objects

with history of scarification, multiple sex partners and those engaged with multiple sexual partners have prevalence of 10.3% (9/87), 12.5% (11/88), 12.2% (5/44), 15.9% (3/19) and 10.5% (22/209) were recorded among women with tattoo, shared sharp objects, with history of scarification, have multiple sexual partners/unprotective sex respectively (Table 5).

**Table 4.** Socio-demographic characteristics of the study population (n=280).

Parameter value	Number Tested	No HBsAg positive	No HBsAg negative	Prevalence rate %	*P
<b>Age</b>					
15-19	12	1	11	8.3	
20-24	55	2	53	3.6	
25-29	101	11	90	10.9	
30-34	74	9	65	12.2	
35-39	26	3	23	11.5	
>40	12	0	12	0.0	
<b>Religion</b>					<b>0.566</b>
Christianity	161	13	148	8.1	
Islamic	115	13	102	11.3	
African Traditional	3	0	3	0.0	
<b>Educational status</b>					<b>0.470</b>
Primary	25	1	24	4.0	
Secondary	129	14	115	10.9	
Tertiary	115	9	106	7.8	

None	11	2	91	18.2	
<b>Marital Status</b>					<b>0.826</b>
Single	27	2	25	7.4	
Married	247	23	224	9.3	
Divorced	5	1	4	20.0	
Separated	1	0	1	0.0	
<b>Family Type</b>					<b>0.888</b>
Monogamous	229	21	208	9.2	
Polygamous	51	5	46	9.8	

CI: Confidence Interval; OR: Odd Ratio; HBsAg: Hepatitis B surface Antigen

\*P<0.05

**Table 5.** Seroprevalence of hepatitis B surface antigen in relation to associated risk factors among pregnant women (n=280).

Characteristics	Number Tested	HBsAg positive (%)	HBsAg negative (%)	Crude OR	95% CI
<b>Blood Transfusion</b>					
No	263	25 (9.5)	238 (90.5)	0.619	0.089-4.296
Yes	17	1 (5.9)	16 (94.1)	1.040	0.918-1.179
*P value	0.249				
<b>Tattoo and Tribal Mark</b>					
No	193	17 (8.8)	176 (91.2)	0.983	0.904-1.069
Yes	87	9 (10.3)	78 (89.7)	1.174	0.545-2.530
*P value	0.682				
<b>Sharing of sharp objects</b>					
No	192	15 (7.8)	177 (92.9)	0.949	0.868-1.038
Yes	88	11 (12.5)	77 (87.5)	1.600	0.766-3.340
*P value	0.210				
<b>History of incisions or scarification</b>					
No	239	21 (8.8)	218 (91.2)	0.963	0.853-1.086
Yes	41	5 (12.2)	36 (87.8)	1.388	0.555-3.473
*P value	0.487				
<b>History of sexual practice</b>					
One	261	23 (8.8)	238 (91.2)	1.083	0.888-1.320
>One	19	3 (15.8)	16 (84.2)	0.558	0.184-1.692
*P value	0.312				
<b>History of hospital admission</b>					
No	208	20 (9.6)	188 (90.4)	1.014	0.934-1.101

Yes	72	6 (8.3)	66 (91.7)	0.867	0.362-2.073
*P value	0.747				
<b>Number of lifetime sexual partner(s)</b>					
One	250	23 (9.2)	227 (90.8)	1.009	0.890-1.144
>One	30	3 (10.0)	27 (90.0)	0.920	0.294-2.882
*P value	0.887				
<b>History of Condom Use</b>					
No	209	22 (10.5)	187 (89.5)	1.055	0.980-1.135
Yes	71	4 (5.6)	67 (94.4)	0.535	0.191-1.500
*P value	0.220				
<b>History of previous surgery</b>					
No	254	26 (10.2)	228 (89.8)	1.114	1.069-1.161
Yes	26	0 (0)	26 (100)		
*P value	0.087				
<b>Home delivery</b>					
No	261	25 (9.6)	236 (90.4)	1.048	0.936-1.173
Yes	19	1 (5.2)	18 (94.8)	0.549	0.079-3.838
*P value	0.531				
<b>History of HBV Vaccination</b>					
No	267	25 (9.4)	242 (90.6)	1.018	0.866-1.197
Yes	13	1 (7.7)	12 (92.3)	0.822	0.120-5.602
*P value	0.839				

CI: Confidence Interval; OR: Odd Ratio; HBsAg: Hepatitis B surface Antigen

\*P<0.05

### DISCUSSION AND CONCLUSION

The 9.3% seroprevalence rate of HBV among the pregnant women in Abeokuta, Ogun State tested in this study is similar to the 9.3% obtained in Anambra State Agbonlahor et al. [6] but slightly higher than 8.3% prevalence found among pregnant women in South West Anaedobe et al. [7] South East Okonko and Udeze [8] and north east Maureen [9] as well as 7.9% in north central Nigeria Olokoba et al. [10] 15.4% of the reactive women had HBeAg while 84.6% did not have the envelop antigen. This might imply a highly infectious replicative phase, a high risk of infection and vertical transmission of HBV from mother to child Ezegbudo et al. [11] 100% of the HBsAg sero-positive pregnant women tested positive for HBcAb, suggestive of chronic Hepatitis B Aba and Aminu [12]. In the absence of early detection and treatment in pregnant women, the risk of transmitting HBV to their newborns at birth is nearly 100%. Socio-demographic factors such as age, religion, marital

status, education level, parity, family type and gestation age have been found not to be statistically significant factors associated with infection of HBV in this study group. Similar findings were noted in the study carried out in other parts of Nigeria Aba and Aminu [12] and Rabiou et al. [13]. HBsAg was the highest among the 30-34 (12.2%) age groups and closely followed by 35-39 (11.5%), although, HBsAg infection was not statistically significantly associated with age (P=0.478) and this is similar to the work of Ali and Memon that recorded the highest prevalence rates among women in age groups 25–35 years and in women older than 29 years [7]. A high HBsAg prevalence (11.4%) was related to parity among the miniparous followed by biparous women while multiparous women had the least prevalence rate (P>0.05) and was similar to results of Pennap et al. [14]. This might be due to high sexual activity and contamination during delivery. In this study, HBV prevalence is higher in women within polygamous family

setting and in those whose husbands had other sexual partners, thus agreeing with HBV reports in Afghanistan Ola et al. [15] Nigeria Anaedobe et al. and Maureen and Jonas [7,9]. Sexually active women have a higher chance of getting the infection especially those with history of multiple sexual partners. Umare et al. [16] Further study covering multi-sector, larger population and other HBV markers such as HBsAg, HBsAb, HBcAb and HBV DNA detection should be conducted in Nigeria to provide better information and education on HBV infection.

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