

## Research Article

# Hepatitis B Surface Antigen Among Low-Risk Obstetric Population Attending Specialist Hospital Sokoto, North Western Nigeria

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### Abstract

**Background:** Hepatitis B infection is a global public health problem and accounts for 400 million chronic infections worldwide. The aim of this study was to determine the seroprevalence of Hepatitis B surface antigen (HBsAg) amongst low risk pregnant women in Sokoto Specialist Hospital, Nigeria.

**Method:** This case study investigated the prevalence of HBsAg among consecutively-recruited pregnant women attending antenatal clinic in Sokoto Specialist Hospital, Nigeria.

**Result:** Out of 117 pregnant women tested, 15 were positive for HBsAg (12.8%). There were no statistically significant differences in the prevalence of HBsAg, among the obstetric subjects studied based on age, ethnicity, educational status, previous history of transfusion, employment status and previous history of still births ( $p > 0.05$ ).

**Conclusion:** There is need for routine screening of all pregnant women and infants born to hepatitis B positive mothers. Government and non-governmental organizations should intensify efforts to enlighten the general population on the public health importance of the disease and the importance of hepatitis screening. There is also need for the development of a treatment protocol for the management of pregnant women positive for hepatitis B to prevent mother to child transmission. There is an urgent need for the implementation of evidenced-based best practice of providing universal vaccination against hepatitis B for all hepatitis B negative women of child bearing age in particular and all Nigerians in general. Mass vaccination of all infants, irrespective of maternal HBV carriage status, may be the most effective approach to HBV prevention and control in Sokoto in particular and Nigeria in general.

**Keywords:** Hepatitis B Surface Antigen; Obstetric Population; Specialist Hospital Sokoto; North Western Nigeria

### Introduction

Hepatitis B Virus (HBV) is a major blood-borne and sexually transmitted infectious agent, and represents a serious global public health problem. HBV is approximately 100 times more contagious than Human Immunodeficiency Virus (HIV) and is found in diverse populations and subpopulations [1]. Globally, about 350 million people are chronic carriers with a significant one million

likely to suffer from a serious illness and death from cirrhosis and Hepatocellular Carcinoma (HCC) [2]. Sub Saharan Africa has the second largest number of chronic carriers after Asia, and is considered a region of high endemicity ( $\geq 8\%$ ) [2].

HBV is transmitted through parenteral or mucosal exposure to infected blood and body fluids, usually either by a vertical or horizontal route early in life in highly endemic areas, resulting in a high rate of chronic infections [3]. HBV infection during pregnancy is also associated with a high risk of maternal complications and has effects on both the mother and child [4]. It has been reported

that 10% to 20% of HBsAg-positive pregnant women transmit the virus to their babies and that those who are positive for both HBsAg and HBV antigen have a nearly 100% chance of transmitting HBV to their newborns [5].

Preventing mother-to-child transmission of HBV is fundamental for reducing the burden of the disease in sub-Saharan Africa, where it is endemic. An effective strategy for reducing the incidence of chronic infections is maternal screening combined with post-exposure prophylaxis consisting of HBV vaccination immediately after delivery in all infants born to HBsAg-positive mothers, jointly with immunoglobulin prophylaxis [6]. Hepatitis B is caused by Hepatitis B Virus (HBV) resulting from exposure to infectious blood transfusion, reuse of contaminated needle and syringes and vertical transmission (from mother to offspring) during child birth [7]. Hepatitis B can be transmitted between family members within household possibly by contact of non-intact skin or mucous membrane with secretion or saliva containing hepatitis B virus. In countries where HBV is highly endemic, the Hepatitis B Surface Antigen (HBsAg) prevalence rate is 8% or higher with most infection occurring during infancy and early childhood. Infection occurs commonly in all age groups although the high rate of chronic infection is primarily maintained by transmission during infancy and early childhood where endemicity is low (HBsAg prevalence rate of below 2%). Infection occurs in young adult, especially those belonging to known risk group. In area with HBV endemicity, perinatal route is the main route of transmission. Perinatal transmission is common especially when HBV infected mothers are also HBeAg positive. HBeAg positive mother are more than 70% likely to transmit HBV while from HBsAg positive, HBeAg negative mother; it is less than 10% [8].

Despite the existence of a safe and effective vaccine, Nigeria has remained a hyper endemic area for hepatitis B virus infection, with an estimated 12% of the total population being chronic carriers (Ugwuja, 2010). Hepatitis virus infection continues to be a substantial and devastating health problem, with new cases still being reported annually [9]. The Prevalence of HBV infection among antenatal population may be a reliable indicator of hepatitis B virus prevalence rate in general population. Hence, screening antenatal women for HBsAg can give a reliable prevalence of the disease in the population and provide an avenue for preventing mother to child transmission of the virus. A demographic Health Survey (DHS) by the World Health Organization [10] showed that in developing countries in Africa, 68% of women report for antenatal care while at least 70% of women reported for antenatal care in Nigeria. Seroprevalence study on HBsAg in Nigeria have shown that the prevalence of the infection in pregnant women range from 2-15% [11]. A previous report that investigated the prevalence of hepatitis B among pregnant women in Nnewi Nigeria obtained a prevalence of 6% [12]. The screening for HBsAg is routine in pregnancy in most developed countries of the

world. It is a recommendation of Royal College of Obstetrician and Gynaecologist (RCOG) of the United Kingdom that pregnant women be routinely screened for HBsAg [13].

Preventing of vertical transmission is extremely important because HBV infection in early life can result in chronic carrier state. Passive-active immunoprophylaxis with hepatitis B immunoglobulin (HBIG) and hepatitis B vaccine in the infants of HBV carriers give high level of protection against vertical transmission [14]. The aim of this study was to determine the prevalence of HBsAg among pregnant women attending antenatal clinic in Sokoto Specialist Hospital, Nigeria.

## Materials and Methods

### Study Site

This study was conducted in the Department of Haematology and Blood Transfusion Science of the Faculty of Medical Laboratory Science, Usmanu Danfodiyo University Sokoto in collaboration with Department of Obstetrics and Gynaecology (O&G) and Specialist Hospital Sokoto, Nigeria.

### Study Area

Sokoto State is located in the extreme North-Western part of Nigeria near to the confluence of the Sokoto and Rima river with an annual average temperature of 28.3°C (82.9°F). Sokoto is on the whole of a very hot area. However maximum day time temperature for most of the year is generally under 40°C (104°F). The warmest months are February to May when daytime temperature can exceed 45°C (113°F). The raining season is from June to October during which showers is a daily occurrence. There are two major seasons, wet and dry seasons. Report from 2007, national population commission indicated that the state had a population of 3.6 million [15]. Sokoto State, shares border with the Republic of Niger to the North. It also shares boundaries with Kebbi State to the West and South and Zamfara to the South and East. The majority of people are farmers. The major language is Hausa and Fulani with minority of other Nigeria language (Igbo, Yoruba, and so on) [15].

### Study Design

This case study was designed to investigate the prevalence of hepatitis B viral markers among 117 consecutively- recruited pregnant women attending antenatal care in Specialist Hospital Sokoto, Nigeria.

### Inclusion Criteria

The inclusion criteria include; age ( $\geq 18$  years), confirmed pregnancy status by a qualified Obstetrician, and willingness to give a written informed consent to participate in the study after counseling.

### Exclusion Criteria

The following were excluded for the study; non-pregnant women, pregnant women < 18 years, and refusal to give a written

informed consent after counseling.

### Sample Size

In this case study, a total of 117 pregnant women attending antenatal clinic at Specialist Hospital Sokoto was screened. Number was calculated using the formula below.

$$n = Z^2pq/d^2$$

Where,

n = Minimum required sample size

Z = Standard Normal deviation (1.96)

p = Population of success or prevalence (8.3%) [22]  
= 1 – p

d = Precision tolerance margin of error (0.05)

Therefore:

$$n = (1.96)^2 \times 0.083 \times (1-0.083) = 117$$

$$(0.05)^2$$

### Specimen Collection

Three milliliters of venous blood sample was taken from each pregnant woman into a non-anticoagulated sample tube. Blood samples will be allowed to stand at room temperature for clotting and retraction. Thereafter, the samples were centrifuged to give a clear serum. The serum will be separated and stored at -20°C prior to testing.

### Methods of Detection HBV Markers

The hepatitis testing will be carried out using the Skytec-Rapid Diagnostic HBV rapid kit (Skytec-Rapid Diagnostic USA). The kit is based on lateral flow chromatographic immunoassay for the qualitative detection of HBsAg in human serum or plasma. The product uses the colloidal gold and membrane chromatography technology, and measures HBsAg.

### Data Collection and Analysis

Data were collected into excel spread sheet and transferred into the data editor of Statistical Package for Social Sciences (SPSS, Version 20) software. Data were expressed as percentages and mean and standard deviation. Statistical significance was compared using Chi-square test. A p-value of  $\leq 0.05$  was considered statistically significant.

### Result

Out of 117 pregnant women (aged 18-40 years) tested, 15 were positive for HBsAg (12.8%). The prevalence of HBsAg was compared based on age. Infection by the hepatitis B virus markers was higher among young adult and middle age groups.

The difference was however not statistically significant ( $p > 0.05$ ). There were no statistically significant differences in the prevalence of Hepatitis B virus markers based on the educational status of the pregnant subjects ( $p > 0.05$ ). The prevalence of HBsAg was compared based on previous history of blood transfusion. There were no statistically significant differences in the prevalence of HBsAg based on history of previous blood transfusion among the pregnant subjects ( $p > 0.05$ ). The prevalence of HBsAg based on previous history of jaundice among the pregnant subjects. There were no statistically significant differences in the prevalence of HBsAg based on previous history of jaundice among the pregnant subjects ( $p > 0.05$ ). The prevalence of HBsAg was compared based on employment status of the pregnant subjects. There were no statistically significant differences in the prevalence of Hepatitis B virus markers based on the employment status of the pregnant subjects ( $p > 0.05$ ). The prevalence of HBsAg was compared based on previous history of still births among the pregnant subjects. There were no statistically significant differences in the prevalence of HBsAg based on previous history of still births among the pregnant subjects ( $p > 0.05$ ). Table 1 show the prevalence of HBsAg based on ethnicity, age, level of educational attainment, history of previous blood transfusion, employment status and history of jaundiced baby, History of previous still birth.

Variable	No. of people tested Negative (%)	No. of people tested Positive (%)	X <sup>2</sup>	p-value
<b>HBsAg Status</b>	102 (87.2%)	15 (12.8%)		
<b>Ethnic Group</b>				
Hausa	90	15	1.966	0.579
Fulani	2	0		
Yoruba	8	0		
Igbo	0	0		
Others	2	0		
<b>Age Groups</b>				
15-20	20	4	1.976	0.74
21 – 25	29	4		
26-30	36	4		
31 – 35	15	2		
36 – above	6	2		
<b>Level of Educational Attainment</b>				
Tertiary	1	0	0.752	0.861
Secondary	47	6		
Primary	52	9		
None	2	0		
<b>History of Blood transfusion</b>				

Yes	5	1	0.84	0.569
No	97	14		
<b>History of Jaundiced baby</b>				
Yes	7	2	0.771	0.324
No	95	13		
<b>Employment Status</b>				
Yes	6	0	0.055	0.949
No	96	15		
<b>History of Still Birth</b>	102	15	1.608	0.448

**Table 1:** Prevalence of Hepatitis B markers among the Pregnant Subjects.

## Discussion

Hepatitis B virus (HBV) is a major blood-borne and sexually transmitted disease and a significant global public health problem. The aim of this study was to determine the seroprevalence and risk factors of HBV among pregnant women attending the antenatal clinic in Sokoto Specialist Hospital in Sokoto State, North Western Nigeria. In this present study, we observed a HBsAg prevalence of 12.8% among our cohort of pregnant women in Sokoto, North Western Nigeria. The prevalence of hepatitis B infection varies in different parts of the world from country to country, and from one region to another and from one population group to another in a country [16]. The result of this study is consistent with previous report which indicated a prevalence of 12.8% in General Hospital Minna [17]. Finding from this study is also consistent with previous report from different parts of Nigeria; 15.8% in Maiduguri [18], 13.8% in Lagos [19], 11.6% reported in Maiduguri [20] and 11% in Makurdi [21] and 8.3% in Zaria [22]. Lower prevalence was however observed in other parts of Nigeria; 2.19 % in Benin City [23], 4.3 % and 2.89 % observed in Port Harcourt [24-25] respectively and 5.7 % in Ilorin [26]. A cross-sectional study was done at the ante-natal clinic of the University College Hospital Ibadan involving one hundred and eighty pregnant women indicated HBsAg prevalence of 8.3% [27]. Similarly, the prevalence of HBV infection among pregnant women in this study is consistent with findings from a study in Nigeria which indicated a prevalence of 11% [28]. Out of the 231 pregnant women tested, nineteen of them were seropositive for Hepatitis B virus infection giving an infection rate of 8.2%. [29]. Out of 800 pregnant women visiting antenatal care unit of four hospitals within Kaduna Metropolis screened, 31 (3.9%) tested positive for HBsAg [30].

Finding from this study is also higher than that reported in other parts of Africa; 3.7 % in Ethiopia [31]. Among 205 pregnant women tested in Kenya, the prevalence of HbsAg was 9.3% [32]. In Ethiopia, studies among pregnant women have shown moderate endemicity, with the prevalence of HBsAg positivity ranging from

3% to 6.1% [33-34]. Of 397 pregnant women aged 13-43 years attending ANC in two hospitals in post-conflict Northern Uganda, 47 (11.8%) tested positive for HbsAg [35]. A group of 1224 pregnant women, admitted to Gazi University Medical Center, Ankara, Turkey indicated a prevalence of 4.33% for HBV [36]. Routine serologic testing of pregnant women in a predominantly Hispanic population at the Los Angeles County Medical Center revealed that 0.1% were positive for Hepatitis B Surface Antigen (HBSAg) [37]. All pregnant women from the Istrian and Rijeka districts Croatia were routinely screened for Hepatitis B Surface Antigen (HBsAg). Among 10,627 Pregnant Women, 107 (1%) HBsAg prevalence was observed [38].

Our study investigated the prevalence of chronic hepatitis B carriers among our low-risk obstetric population and seems to re-emphasise the need for routine screening of pregnant women. Screening of all pregnant women is necessary to identify those HBSAg-positive women capable of transmitting the hepatitis B virus to their infants. There is need to screen obstetric patients and to provide immunoprophylaxis for infants at risk of perinatal infection. This policy is necessary to prevent perinatal transmission of hepatitis B virus and is cost effective. Screening for hepatitis B virus (HBV) infection in pregnant women to identify newborns who will require prophylaxis against perinatal infection is a well-established, evidence-based standard of current best medical practice in the developed world that will need to be implemented in Nigeria and other developing countries [39].

Screening pregnant women for hepatitis B regardless of risk factors and improving awareness of the transmission routes of HBV seems the way forward and may reduce the risk of HBV infections. In this study, we observed that there were no statistically significant differences in the prevalence of HBsAg, among the obstetric subjects studied based on age, ethnicity, educational status, previous history of transfusion, still birth and jaundice, employment status and previous history of still births. Our finding is consistent with a previous report to determine the prevalence of hepatitis B virus (HBV) carrier and infectivity status among pregnant women delivering at Harare Maternity Hospital, Zimbabwe. Overall 25% women were identified as carriers of HBV. The frequency of HBV carriers did not vary with maternal age, parity or marital status [40]. A high prevalence of HBV infection was detected in a previous study among pregnant women in Ethiopia. However, neither the type of risk factors nor exposure to multiple risk factors was significantly associated with HBV infection [41]. Although HBV infection is considered one of the most important occupation infectious hazards in developed counties [42]. The result of this study did not reveal statistical significance between HBV Markers and seropositivity and the different occupation of the pregnant women studied. It is however advocated that women who are occupationally exposed to the hepatitis B should be vaccinated against Hepatitis B virus.

In this present study, we observed a high HBsAg prevalence of 12.8% among our cohort of pregnant women in Sokoto. There is the urgent need for renewed intensification of prevention programmes aimed at changing high-risk behaviors among pregnant women. Population in Sokoto is predominantly Muslim. There may be need to build capacity among Islamic Clerics in the area to facilitate their awareness about mode of transmission and way to prevent Hepatitis B infection. Given proper information and training, religious leaders can become strong allies in hepatitis B infection prevention and control in view of their influence and acceptance among the people they lead. Also, religious organizations can also serve as useful channels for disseminating messages about hepatitis B since congregations do have reverence for places of worship and for religious leaders.

## Conclusion and Recommendations

The study observed a high prevalence of hepatitis B among pregnant women attending antenatal care in Specialist Hospital Sokoto. Since the virus can be transmitted from infected mother to the offspring especially at birth, the presence of hepatitis B infection in women in general and pregnant women in particular calls for concern. There is need for routine screening of all pregnant women and infants born to hepatitis B positive mothers. Government and non-governmental organizations should intensify efforts to enlighten the general population on the public health importance of the disease and the importance of hepatitis screening. There is also need for the development of a treatment protocol for the management of pregnant women positive for hepatitis B to prevent mother to child transmission. There is an urgent need for the implementation of evidenced- based best practice of providing universal vaccination against hepatitis B for all hepatitis B negative women of child bearing age in particular and all Nigerians in general.

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