



Seroprevalence of Hepatitis B (HBsAg) Infection among Pregnant Women Attending Specialist Hospital Yola, Adamawa State, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Infection due to Hepatitis B virus is a serious public health problem worldwide, in spite of productive vaccine. Pregnant women infected with hepatitis B virus can transmit the infection to their fetuses and newborns. The aim of the study was to determine the seroprevalence of Hepatitis B infection among pregnant women attending antenatal care at Specialist Hospital Yola. A total of three hundred and thirteen (313) pregnant women were randomly selected for this study. Hepatitis B status was determined by the presence of Hepatitis B surface antigen (HBsAg). A structured questionnaire was used for the data collection. Sera from volunteers were collected and tested for hepatitis B surface antigen. Seroprevalence was determined based on age group, educational level, occupation, marital status, religion and history of blood transfusion. The seroprevalence of HBsAg among consented antenatal attendees was 17(5.43%). The study found highest seroprevalence of HBsAg among the pregnant women in the age bracket 26-35 years 52.94%, 52.94% in women with primary school education, 41.18% among the unemployed, 94.12% among the married women, 70.59% among Muslim women, and 76.47% among women that had blood transfusion. The study also revealed that there is a significant relationship between HBsAg and

(educational level, marital status) of the study participants ($P < 0.05$). The Seroprevalence of HBsAg among antenatal attendees at Specialist Hospital Yola, Nigeria, is on the high side. Therefore, early screening of pregnant women for hepatitis at antenatal clinic, would contribute greatly to the timely management of the disease and will prevent possible transmission to their neonates.

Keywords: *Pregnant women; seroprevalence; hepatitis B surface antigen (HBsAg); hepatocellular cancer; vertical transmission; preterm delivery.*

1. INTRODUCTION

Infection due to Hepatitis B virus is a serious public health problem worldwide, in spite of the availability of a highly potent vaccine and upgrade in antiviral therapy [1].

Hepatitis is an infection of the liver characterized by the presence of inflammatory cells in the tissue of the organ [2]. Viral hepatitis is a family of viral infections that affect the liver caused by at least five distinct viruses namely: Hepatitis A, B, C, D, and E [3]. Hepatitis B is one of the major and common infectious diseases of the liver, it is caused by a small enveloped DNA virus, the hepatitis B virus (HBV), the virus was first discovered as "Australia antigen", later named Hepatitis B surface antigen (HBsAg), in patient blood [4]. Hepatitis B virus is a rugged virus that can survive almost on any surface for a month, the virus remains infective for days in dry blood and for months when stored in serum at normal room temperature [5]. About two billion people worldwide have been infected with HBV, an estimated 360 million remain chronically infected of who almost one million people die annually of HBV-related liver disease [6]. HBV prevalence varies throughout the world, but is highest in tropical regions, regional studies in Nigeria have shown varied sero-prevalence rates, ranging from 4.7% to 15.8% [7]. It is estimated that 5-15% of adults in sub-Saharan Africa are chronically infected with HBV. 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 [8]. Hepatitis B infection has been reported in all populations though the incidence and risks are more among people that are engaged in unprotected sexual activities, drugs addicts and persons in medical professions who get involve in blood or blood products [5]. Despite the arrival of anti-viral therapies that can conquer HBV and delay advancement of liver disease, most people with chronic HBV infection live in developing countries where these drugs are neither cheap nor accessible, the incidence

of HBV-related HCC cases is projected to increase for at least two decades due to the high prevalence of chronic HBV infection throughout the world [9]. HBV is mostly contracted at birth and early childhood [8], it is transmitted vertically from infected mother to child during delivery and horizontally through sexual intercourse [1]. Vertical transmission from an infected mother to her baby is common through the placenta, about 90% get infected during the prenatal period [10]. Hepatitis B can also be transmitted parentally through transfusion of unscreened or improperly screened blood and blood products, tattooing, organ donation, sharing contaminated sharp objects such as needles and razors and also unprotected sexual intercourse [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 [7] [9], and many authors have reported on the prevalence of Hepatitis B infection among various communities in Nigeria with varying rates depending on the people studied and test methods used. However, there is limited data on the prevalence of Hepatitis B infection among pregnant women. In view of the upshot of chronic carrier rate of HBV within the population and insufficient data on pregnant women, this study was set out to determine the prevalence of hepatitis B infection among pregnant women attending antenatal care in Specialist Hospital, Yola in relation to age group, educational level, occupation, marital status, religion and history of blood transfusion. Identify groups at risk who would benefit from vaccination programs and brings to light the prevalence of hepatitis infection thereby providing guideline data for future assessment of the effect of hepatitis B infection among pregnant women.

2. MATERIALS AND METHODS

2.1 Study Area

The study was carried out in Yola-North Local Government area of Adamawa state Nigeria which has population of 336,648 [12]. It is

located in central zone of Adamawa State which lies between latitudes 9^o. 11^oN to 9^oN and longitude 12^o 20^oN to 12^o 39^oN covering a tropical climate marked by dry and rainy season. Yola-North was particularly chosen because the region records more antenatal attendees compared to other regions. Yola has an annual rainfall which usually commences around April and ends in October, and a dry season from the month of November to March. Yola North is an administrative Centre and also agrarian community. The main occupations of resident are civil servants, Artisans, farmers and traders.

2.2 Sample Collection Site

The samples were collected in antenatal care unit of Specialist Hospital Yola, located at hospital road, Yola-North Local Government Area. The pregnant women were recruited at random, regardless of the periods they register for antenatal services. Samples were collected between the months of July to September 2019, from three hundred and thirteen (313) pregnant women who consented to participate in the study.

2.3 Sample Collection

Five milliliters of blood sample was collected by venipuncture from the cubical vein of three hundred and thirteen participants, poured into specimen bottles for Hepatitis B test. The specimens were properly labeled with participant's number [13].

2.4 One Step Strip Hepatitis Virus Serum Test for Hepatitis B

Already collected patient's blood samples were centrifuged for five minutes to obtain serum sample. The strips containing coated antigen and antibody to hepatitis B virus (HBV) were removed from the foil and immerse into the test tubes with serum samples with the arrow end pointing towards the container. The strips were not immersed to past the MAX (maximum) line. The test was allowed to run across the absorbent pad, after which results were read at 10 minutes. Distinct colour bands (pink) appear on the control and regions test. Both test line and control line indicate that the specimen is positive. Only one colour band appears on the control region, no apparent band on the test region indicates negative specimen. This indicates that there is no detectable hepatitis antigen in the serum. And no band at all or only one colored band

appears on test region indicates an invalid result; this is an indication of possible error in performing the test [14].

2.5 Statistical Analysis

Results obtained were subjected to statistical analysis using Statistical Package for Social Sciences (SPSS) version 23. Comparism of the proportion was carried out using Chi-square test. P-values less than 0.05 were considered to be significant.

3. RESULTS

Table 1 shows the occurrence of HBsAg by age among the study participants. HBsAg infection among the pregnant women was highest in the age bracket 26-35 years 9 (52.94%) and least among 16-25 years 3 (17.65%). Table 2 shows the seroprevalence of HBsAg in relation to educational level of the study participants in the study area. HBsAg seroprevalence was recorded highest among women with primary education 9 (52.94%) and least among women with non-formal education 1 (5.88%). Seroprevalence of HBsAg by occupation among the study participants is given on table 3. HBsAg seroprevalence was recorded highest among the unemployed 7 (41.18%) and least among student 1 (5.88%). Table 4 shows the occurrence of HBsAg in relation to marital status of the study participants. The rate of HBsAg seropositivity was recorded highest among married women 16 (94.12%) and least among widows 1(5.88%). Seroprevalence of HBsAg in relation to religion of the study participants in the study area is given on table 5. The rate of HBsAg seroprevalence was recorded highest among the Muslim women 12 (70.59%) and the least was found among the Christian women 5 (29.41%). Table 6 shows the seroprevalence of HBsAg by history of blood transfusion of the study participants. The highest rate of HBsAg seroprevalence was observed among women that had blood transfusion 13 (76.47%), while the least was recorded among those who did not had blood transfusion 4 (23.53%).

4. DISCUSSION

The seroprevalence of HBsAg by age among pregnant women show that age bracket 26-35 year old recorded the highest seroprevalence of HBsAg. The result of this study is higher than the result obtained among pregnant women in North Eastern Nigeria within the age bracket 25-34

years [15] and the findings reported among pregnant women between age brackets 26-35 years in FMC Keffi, Central Nigeria [8]. However, this finding is similar to the result obtained among pregnant women within the age bracket 25-29 years in Abuja [16], and the result reported among pregnant women between age brackets 29-35 years in Ibadan [9]. The result of this study may be associated to higher sexual activities of

individuals within this age group. This age bracket falls within the sexually active age group and thus is more at risk of having a sexual contact with infected persons [16]. On the other hand, this study disagrees with the observation of [8] who reported highest prevalence of HBsAg infection in participants who were at or over the age of 45 years.

Table 1. Seroprevalence of HBsAg by Age among pregnant women attending antenatal care at Specialist Hospital Yola, Adamawa state

Variable	No. Examined (%)	HBsAg No. +ve	Prevalence (%)	X ² - value	P-value
Age Group (years)				0.069,	0.966
16-25	59 (18.85)	3	17.65		
26-35	156 (49.84)	9	52.94		
36-45	98 (31.31)	5	29.41		

Table 2. Seroprevalence of HBsAg in relation to Educational level of the study participants

Variable	No. Examined (%)	HBsAg No. +ve	Prevalence (%)	X ² - value	P-value
Educational level				28.070	0.000
Primary	42 (13.42)	9	52.94		
Secondary	169 (53.99)	4	23.53		
Tertiary	98 (31.31)	3	17.65		
Non-Formal	4 (1.28)	1	5.88		

Table 3. Seroprevalence of HBsAg based on Occupation of the study participants

Variable	No. Examined (%)	HBsAg No. +ve	Prevalence (%)	X ² - value	P-value
Occupation				6.228	0.183
Employed (Govt./private)	101 (32.27)	2	11.76		
Business	84 (26.84)	4	23.53		
Student	20 (6.39)	1	5.88		
Farming	43 (13.74)	3	17.65		
Unemployed	65 (20.77)	7	41.18		

Table 4. Seroprevalence of HBsAg in relation to marital status of the study participants

Variable	No. Examined (%)	HBsAg No. +ve	Prevalence (%)	X ² - value	P-value
Marital status				4.591	0.032
Married	310 (99.04)	16	94.12		
Widowed	3 (0.96)	1	5.88		

Table 5. Seroprevalence of HBsAg in relation to religion among the study participants

Variable	No. Examined (%)	HBsAg No. +ve	Prevalence (%)	X ² - value	P-value
Religion				0.013	0.908
Christians	96 (30.67)	5	29.41		
Muslims	217 (69.33)	12	70.59		

Table 6. Seroprevalence of HBsAg based on Blood transfusion of the study participants

Variable	No. Examined (%)	HBsAg No. +ve	Prevalence (%)	X ² - value	P-value
Blood Transfusion				0.362	0.548
Yes	219 (69.97)	13	76.47		
No	94 (30.03)	4	23.53		

In relation to educational level, highest HBsAg seroprevalence was recorded among women with primary education, this is higher than the result observed among pregnant women with primary school qualification in Keffi, central Nigeria [8]. This high seroprevalence of HBsAg found among pregnant women with primary education may be associated to the fact that women with low educational level subscribe to local herbs for the treatment of diseases, which may be due to poverty and cultural belief [17]. Previous study has also observed that those with low educational level are at a higher risk of hepatitis infection [18]. Evidence has also revealed that high socioeconomic status (Formal education/good financial status) was associated with lower risks of hepatitis infection among pregnant women [19].

Seroprevalence of HBsAg by occupation among the study subjects revealed that highest HBsAg seroprevalence was found among the unemployed. This study is similar to the findings of [20] who conducted a study among pregnant women in the Gambia where the highest seroprevalence of hepatitis B was reported among the unemployed. The outcome of this study is also similar to the result for hepatitis B infection reported among unemployed pregnant women in Lagos [21]. This high seroprevalence of HBsAg among the unemployed in the study area may be associated to poverty, poor environmental condition and inability to access health care services [17]. Therefore, raising awareness of hepatitis in all socioeconomic facets could help reduce the burden of the disease.

In relation to marital status, the seroprevalence of HBsAg was observed highest among married women. The result of this study is higher than the result of HBsAg seroprevalence obtained among married women in Lagos [10] and the result reported among married women in FMC Keffi, Central Nigeria [8]. In this study, a significantly high prevalence of HBsAg was reported among the married women. This indicates the more probability of getting the disease dependent on marital status as found in this study, married

couples can easily get infected by either infected spouse. Despite the fact that, this study was at variance to the discovery of [8], where a significantly high prevalence of HBsAg were reported among the unmarried single women compared to their married counterparts.

Seroprevalence of HBsAg in relation to religion among the study participants shows that HBsAg seroprevalence was recorded highest among the Muslim women and the least was observed among the Christian women. The result of this study is similar to the work of [8] where the highest seroprevalence of HBsAg among pregnant women was recorded among the Muslim women. This could be attributed to the fact that most Muslim women are from polygamous homes where their husbands have other sexual partners. Previous study reported that women with multiple sexual partners were four times more likely to acquire hepatitis infection [9]. This might have contributed to the higher percentage of HBsAg observed among the Muslim women.

In relation to blood transfusion, the highest HBsAg seroprevalence was observed among women that had blood transfusion. This high infection rate obtained in this study is higher than the result of HBsAg seropositivity reported among pregnant women who have been transfused in Kaduna [22]. This study agrees with [23] who identified blood transfusion as a major risk factor for co-infection with viruses. This study also disagrees with the work of [18] who found a higher number of seropositive women among those that have not been exposed to blood transfusion. This high rate of HBsAg observed in this study, may be due to transfusion of unscreened or improperly screened blood after blood transfusion, sharing contaminated sharp objects such as needles, razors and also due to unprotected sexual intercourse.

5. CONCLUSION

This study has provided information on the prevalence of hepatitis infection among pregnant

women in Yola, Adamawa State. Pregnant women should be seriously educated to avoid being infected. Routine screening of pregnant women for hepatitis B surface antigen should be offered during their first antenatal visit to the hospital in order to identify and manage those with chronic hepatitis infection who may serve as a reservoir for person-to-person transmission as well as vertical transmission to their foetus. Malaria co-infections is recommended for later studies.

CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

Introductory letter was obtained from the department of Zoology, Mautech Yola. The letter was taken to hospital management of Specialist Hospital Yola to inform them on the proposed study and also to seek for permission before the commencement of the research work. Approval for the study was obtained from the hospital management. The approval was on the agreement that good laboratory practice must be ensured, and that every patient's finding would be treated with utmost confidentiality and for the purpose of the research only. The purpose and benefits of the study was carefully explained to the subjects after whom their consent was sought before sample collection.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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