

Sero-Prevalence of Hepatitis B Surface Antigen (HBsAg) in Pregnant Women in Owerri, Imo State of Nigeria

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Abstract: Hepatitis B Virus (HBV) infection is a global public health problem and is endemic in Africa, including Nigeria. Vertical transmission of HBV infection is thought to be a major mode of transmission in these endemic areas. The study was therefore undertaken to determine sero-prevalence of Hepatitis B surface Antigen (HBsAg) in pregnant women in Owerri, Imo State of Nigeria. The study aimed to obtain baseline information on disease burden in the locality, Vis a Vis instituting public health measures to reduce transmission. Serial recruitment of 300 pregnant women attending the ante-natal clinic at the Federal Medical Centre, Owerri in Imo State. HbsAg screening was done using rapid ELISA kit. The results showed that 31 (10.3%) of the 300 subjects tested positive to HBsAg. Blood transmission, circumcision, sharing of toothbrush and sharing of razor were found not to be significant modes of transmission of HBV infection in Owerri. Based on the findings, the study concluded that there is high prevalence (10.3%) of HBV infection in pregnant women in Owerri, Imo State of Nigeria. Therefore, the need to institute public health measures to reduce disease burden and transmission, including routine screening of all pregnant mothers for HBV infection and early passive-active immunization of babies born to HBSAg-positive mothers are advocated.

Key words: Prevalence, hepatitis B surface antigen, pregnant women

INTRODUCTION

One of the public health problems confronting the world today is Hepatitis B Virus (HBV) infection. According to (Carter and Walsh, 1992), the virus is very common in Asia, China, Philippine, Middle East and Africa. In Europe and America, the incidence of known carriers is about 1 in a 1000 people (West and Margolis, 1992). It is estimated that there are over 350 million Hepatitis B Carriers, which represents 5% of the world's population (Marynard, 1990). Researchers have shown that 10 to 30 million people become infected with the virus each year (Xu *et al.*, 2002; Shapiro *et al.*, 1992). Hepatitis B virus infection is a leading cause of acute and chronic liver disease, which may lead to the development of liver cirrhosis and hepatocellular carcinoma. The infection is endemic in Asia, Africa and Mediterranean (Steven *et al.*, 1975).

Hepatitis B virus infections are highly endemic in Nigeria and it is estimated that about 12% of the total population of Nigerians are chronic carriers of Hepatitis B surface Antigen (HBsAg) (Olubuijide *et al.*, 1997). Another study by Akani *et al.* (2005) in Port-Harcourt revealed that 14.5% of all blood sample sent to the chemical pathology laboratory for routine investigation were sero-positive for HBsAg.

Hepatitis B can be a serious infection that can cause liver damage, which may result in cancer. HBV infection is an important cause of liver disease in pregnancy, though it is not pregnancy associated (Rustgi and Hoofnagle, 1987; Tassapoulos *et al.*, 1987). Liver disease is a rare complication of pregnancy, but when it occurs, it may do so in dramatic and tragic fashion for both mother and infant. HBV infection during pregnancy could cause acute viral hepatitis, which could lead to several complications including cholestasis, acute fatty liver of pregnancy, abortion, stillbirth, premature delivery, fulminate hepatitis failure to mention but a few. Viral hepatitis is the commonest cause of jaundice in pregnancy, contributor to 50-70% of all cause (Gerberding, 1996).

It has been estimated that an unvaccinated baby whose mother is a hepatitis B carrier has up to 40% chance of becoming infected with the virus during the first 10 months of their life (Goh, 1997). Ninety percent of these infants become chronic carriers of HBV and are at increased risk of chronic liver disease and hepatocellular carcinoma later in life (Magriples, 1998). It is estimated that 15.25% of chronically infected individuals die from chronic liver disease (Tassapoulos *et al.*, 1987).

Hepatitis B causes both acute and chronic hepatitis in some patients who are unable to eliminate the virus. Identified methods of transmission include blood fluids

(blood semen, vaginal fluid and saliva) of an infected person; vertical transmission (from mother to her unborn child) or through breast-feeding. Blood contact can occur by sharing of injection, needles or drug; Sharing accessories such as razor blades, touching wound of infected person, sharing of toothbrushes, use of unsterile equipment for tattooing or body piercing, using unsterile materials for circumcision and through sexual contact.

In Nigeria, 80% of patients clear their infection and develop antibodies against hepatitis B virus. Twenty percent of patients do not clear their infection and are likely to develop chronic infection (Akani *et al.*, 2005). Only these people are at risk of long-term complications of Hepatitis B. People with chronic hepatitis B have antibodies against Hepatitis B but these antibodies are not enough to clear the infection that establishes itself in the DNA of the affected liver cells (Carman *et al.*, 1989). The continued production of virus combined with antibodies is a likely cause of immune complex disease seen in these patients.

In some developed countries, Hepatitis B virus infection is a modifiable disease and there is routine vaccination of all persons from 0-18 years of age (Krahn and Detsky, 1993). Pregnant women are also routinely screened for this infection. This helps in the identification of infected pregnant women so that preventive measures could be instituted for their sexual partners, their unborn babies and other close contacts. Study has shown that babies born to HBV-positive women routinely receive Hepatitis B immunoglobulin within 12 h of delivery and before first breast-feed, as well as Hepatitis B vaccination within 7 days of delivery (Zhu *et al.*, 1992).

In Imo State (South-Eastern Nigeria), there is neither routine screening of pregnant women of Hepatitis B virus infection nor routine vaccination of newborn babies. Hence, no preventive measures are taken to protect babies born to Hepatitis B virus infected women or their sexual and close contacts. This contributes to the continued rapid increase in the spread of Hepatitis B virus infection in this locality. Therefore, this study aimed to provide some baseline information on Hepatitis B virus sero-prevalence on pregnant women attending the ante-natal clinic at the Federal Medical Centre, Owerri in Imo State.

MATERIALS AND METHODS

Three hundred participants attending the ante-natal clinic at the Federal Medical Centre Owerri, Imo State were serially recruited into the study between the months of September and November, 2006. Each patient's

demographic and obstetric data and previous medical history were obtained from the case-note and personal interview. Two milliliter of blood was then collected from each participant by vein puncture from the ante-cubital vein by the laboratory technicians.

For each participant, a study sheet bearing a study number was completed to maintain confidentiality. Use of names for identification of study subjects was avoided. Informed consent was obtained from the participants prior to recruitment.

Hepatitis B surface Antigen (HBsAg) screening was done using a rapid ELISA kit. Positive and negative control serums were included in each batch of analyses. The results are reported as percentages of the total study population. Differences between groups were compared with the Chi-Square test. $p < 0.05$ is regarded as statistically significant.

RESULTS

Table 1 shows sero-positively rate and age distribution of participants. Out of the three hundred (300) study participants recruited into the study, 31(10.3%) tested positive to HBsAg, while 269(89.7%) were sero negative.

Eighty point seven percent of the study participants were within the age bracket of 26-45 years. 47 (15.7%) of the participants were less than 25 years of age while 11(3.6%) were aged 46 years and above. Similarly, 80.7% of all sero-positive cases were within 26-45 years age group (26-35 years = 45%, 36-45 = 35.7%), while 47 (5.7%) participants was less than 25 years of age and 3.6% (11) participants was above 46 years of age.

Table 2 showed the gestational age of participants. Majority of the participants were in the 2nd trimester 122 (46.0%), 3rd trimester 91 (34.3%) of pregnancy; while 52 (19.6%) were in the 1st trimester; of pregnancy.

For the sero-positive cases, (18.5%) were in the 1st trimester, 46.2% were in the 2nd trimester while 33.3% were in the 3rd trimester.

These results merely reflect the booking pattern in Owerri. Most pregnant woman comes to book at the antenatal clinic when their pregnancies have advanced beyond the first trimester.

Table 3 showed parity status of the participants, 104 (34.7%) of the participants were parae 1 while para 2 were 65.3%. The number of subjects increased with parity.

The proportion of sero-positive cases followed the same pattern with 24.7% of the participants being primiparae, while only 8.0% and 16.7% were para 1 and para 2, respectively.

Table 1: Age distribution of participants

Age	Number	Hbs Ag Positive	Status Negative
> 25 years	47(15.6)	4(1.3)	43(14.3)
26-35 years	135(45.1)	15(5.0)	120(40.0)
36-45 years	107(35.7)	10(3.3)	97(32.3)
46 yrs and above	11(3.6)	2(0.7)	9(3.1)
Total	300(100.0)	31(10.3)	269(89.7)

Table 2: Gestational age of participants

Gestational age (Trimester)	Number	HBs Ag Positive	Status Negative
1st (13 weeks)	52 (19.3)	5(1.8)	47(17.3)
2nd (14-26 weeks)	122(46.0)	13(4.9)	109(41.1)
3rd (= 27 weeks)	91(34.3)	9(3.3%)	82(30.9)
Total	300(100.0)	27(10.2)	238(89.8)

Table 3: Parity of participants

Parity (Primiparae)	Number	HbsAg Positive	Status Negative
(para 1)	104 (34.7)	241 (8.0)	80 (26.7)
Para 2	196 (65.3)	50 (16.7)	146 (48.6)
Total	300 (100.0)	74(24.7)	226 (75.3)

Table 4: Predisposing factors for HBsAg transmission

S/N	Factor	No	Positive history HbsAg sero-positive	No	Negative history HbsAg Sero-positive	Sig*
1	Blood transfusion	30	1(3.3)	241	12(4.9)	0.00
2	Circumcision	210	6(2.8)	72	3(4.2)	0.00
3	Sharing of toothbrush	95	3(3.2)	184	9(3.2)	0.00
4	Sharing of razor	111	4(3.6)	180	7(3.8)	0.00

Table 4 showed the predisposing factors for HBsAg transmission. Previous history regarding blood transfusion was obtained from 271 study participants, from among whom only 30 (10.2%) had had a blood transfusion in the past. While 241 (82.3%) had had no transfusion. Only 1 (3.3%) out of the 30 participants with previous history of blood transfusion was HBsAg positive. Of the 241 participants with no previous history of blood transfusion 12 (4.9%) were sero-positive for HBsAg. Using chi-square computation, the difference in the sero-positivity rates between the two groups was not statistically significant ($p>0.05$). These findings suggest that blood transfusion may not be an important means of transmission of HBV infection in Owerri.

History regarding circumcision was obtained from 283 study participants. Two hundred and ten (74.2%) were uncircumcised while 72 (25.4%) were circumcised. Of the 210 participants that were circumcised, 6 (2.8%) were sero-positive for HBsAg, while of the 72 uncircumcised participants, 3 (3.3%) were sero-positive for HBsAg. Using chi-square testing, the difference in sero-positivity rate between the two groups was not statistically significant ($p>0.005$). This result similarly, suggests that circumcision may not be a significant means of HBV transmission in Owerri, Imo State.

Information regarding sharing of razor was obtained from 279 study participants. 95 (34.1%) had involved in sharing a razor in the past. Of the 95 participants that had a history of sharing razor, 3 (3.2%) were sero-positive for HBsAg. Of the 184 study participants with no previous history of sharing razor, 9 (3.2%) were sero-positive for HBsAg. Using chi-square testing, the difference in the sero-positivity rates between the two groups was not statistically significant ($p>0.05$). This result suggests that the practice of sharing razor may not be a significant mode of transmission of HBV in this community.

Information regarding sharing of toothbrush was obtained from 291 study participants. Of the 111 study participants that had had a history of sharing toothbrush 4 (3.6%) were sero-positive for HBsAg. Of the 180 study participants with no previous history of sharing toothbrush 7(3.8%) were sero-positive for HBsAg.

Using chi-square analysis, the difference in the sero-positivity rate between the two groups was not statistically significant ($p>0.05$). This result suggests that sharing of toothbrush may not be a significant mode of transmission of HBV in Owerri, Imo State.

DISCUSSION

The results of this study indicate an HBsAg sero-prevalence rate of 10.3% in pregnant women attending the ante-natal clinic of the Federal Medical Center, Owerri, Nigeria. The rate is much higher than the sero-prevalence rate of 4.3% found among pregnant women attending ante-natal clinic of the University of Port Harcourt Teaching Hospital, Port Harcourt, Nigeria (Akani *et al.*, 2005). This result suggests higher prevalence of HBV infection in pregnant women at Owerri as compared to pregnant women in Port Harcourt, Nigeria. The reasons for this difference remain speculative and need further study.

A sero-prevalence rate of 10.3% in pregnant women suggests high prevalence of HBV infection in Owerri, Imo State, Nigeria. This assertion is corroborated by the results of two studies which revealed a high HBsAg sero-positivity rate of 9.2 and 9.8% respectively among patient blood sample sent to the Haematology laboratory at the Federal Medical Center, Owerri for HBsAg screening on account of high index of suspicion of HBV related illness (Oguerri and Onuzulike, 2006).

Vertical transmission of HBV infection from mother to child is a major mode of HBV transmission in endemic area (Coursaget *et al.*, 1986), with majority of cases of transmission occurring during birth and shortly afterwards. The overall risk of prenatal transmission in all HBsAg positive mothers is estimated to be about 40% (Goh, 1997).

The current recommendation to prevent mother-to-child transmission of HBV infection is to provide passive-active immunization to all new-born of Hepatitis B immune Globulin (HBIG) soon after birth (within 2 h) and before their first breast-feed, as well as their first Hepatitis B vaccination within 7 days of birth.

Also, it has been found that the mode of transmission of HBV varies in part with the prevalence of infection with prenatal infection being the predominant mode of transmission in high prevalence areas (IP *et al.*, 1989). Horizontal transmission, particularly in early childhood account for most cases of chronic HBV infection in intermediate prevalence areas, coupled with unprotected sexual intercourse and intravenous drug use in adults being major routes of spread in low prevalence areas (Coursaget *et al.*, 1986). The results of these findings suggest that Nigeria has a moderate prevalence of HBV infection.

The result of this study suggests that blood transfusion, circumcision, sharing of razor and sharing of toothbrush may not be important modes of transmission of HBV infection in Owerri. Possible common routes of transmission may therefore include unsafe or unprotected sexual intercourse, nosocomial and vertical transmission.

The issue of nosocomial transmission of HBV infection constitutes a special problem in the third world setting that is characterized by lack of basic equipment, infrastructure and resources to maintain standard levels of hygiene, disinfections and sterilization of re-useable hospital equipment. In most hospitals in developing countries, including Nigeria, safety regulations and enforcement are often neglected because of lack of resources in the face of other more important competing demands.

Also, as a result of high fertility and reproductive rates in developing countries, our labour rooms are usually very busy and under intense pressure to take several deliveries within limited time periods. Due to lack of personnel, infrastructure and resources, delivery instruments may be recycled in the labour room without adequate disinfections and sterilization. Pregnant women are not routinely screened for their HBV status and no special precautions are instituted while taking their delivery. This could potentially constitute an important means of transmission of HBV infection.

CONCLUSION

Based on the findings, it was concluded that there is urgent need to institute public health policy measures to reduce the transmission of HBV infection in Nigeria and other developing countries. It is suggested that these

measures should include routine screening of all pregnant women for HBV infection, with early passive-active immunization for children born to HBV infected mothers. Furthermore, where the resources are available, a policy of universal immunization of children against HBV infection should be instituted urgently and be included in the National Programme on Immunization (NPI) schedule in Nigeria. This would assist in reducing the disease burden of HBV infection with its sequel, including acute and chronic hepatitis, liver cirrhosis, liver cancer, liver failure and death in the developing countries.

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