

Research Article**Screening Rate, Prevalence and Complications of Hepatitis B Virus Infection among Women at Delivery in UCTH Calabar, Nigeria**Njoku C.O^{1*}, Dr. Emechebe C.I², Iklaki C.U³, Maduekwe K⁴

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Abstract: Hepatitis B virus infection remains a public health problem in Nigeria. It is a major cause of morbidity and consequent mortality, especially in developing countries. Routine universal vaccination of all persons has been established in several countries of high and intermediate endemicity. There is neither a screening policy in our environment nor routine vaccination or measures to protect the at risk population. The objectives of this study were to determine the sero-prevalence of hepatitis B infection, rate of screening for HBsAg in pregnancy and the complications of hepatitis B infection in pregnancy at UCTH, Calabar. This prospective cross-sectional study of 300 women admitted for delivery was conducted at UCTH, Calabar. A pretested questionnaire was used to the data on socio-demographic profile, previous vaccination, screening for HBsAg during the antenatal clinic and complications of hepatitis B in pregnancy. Blood sample was collected from each consented woman and the serum tested for the presence of HBsAg using rapid ELISA test Kits in the laboratory of the hospital. After delivery, other information on birth weight, Apgar scores and postpartum haemorrhage were obtained. All the data were analyzed using microsoft SPSS version 17 statistical program. Out of the 300 women studied, HBsAg was detected in 14 women, giving a sero-prevalence rate of 4.7%. Among the participants, only 60.56% were screened for HBsAg during the antenatal period, while 39.44% were not screened for HBsAg. A total of 17(5.7%) of the women had low birth weight; of these 1 was sero-positive to HbsAg and was not statistically significant ($p=0.7576$). All the complications of hepatitis B infection in pregnancy studied were not significantly higher among HBV positive women. An intermediate prevalence of hepatitis B virus infection was identified and routine screening for HBsAg in pregnancy is not well established in this centre. There is need for routine screening for HBsAg in pregnancy in order to identify the infection and reduce the risk of vertical transmission of the virus.

Keywords: Hepatitis B infection (HBV), Prevalence, Screening, Pregnancy.

INTRODUCTION

Hepatitis B infection (HBV) is a serious health problem worldwide and a major cause of chronic hepatitis, cirrhosis and hepatocellular carcinoma [1]. Hepatitis B virus is present world-wide with an estimated 300 million carriers around the world [2]. Annually, up to 1 million of these infected population die due to the consequences of the infection such as liver cirrhosis and hepatocellular carcinoma [2]. The incidence, morbidity and mortality associated with this disease are high in developing countries with ruinous effect on reproductive health of women in Nigeria and children survival [3]. The prevalence of HBsAg positivity in various populations varies from close to 0.5% to rates in excess of 17% [2, 4]. Hepatitis B infection is endemic in Nigeria with an estimated 3-12% of the total Nigerian population being chronic carriers [4, 5]. The prevalence varies geographically, from high (>7%), intermediate (2-7%), to low (<2%)

prevalence [4]. The majority of the countries in the Middle East have intermediate (2-7%) or high (>7%) endemicity of HBV infection [6]. United Kingdom and the United States of America have a low carrier rate 0.5% but it rises to 10-15% in parts of Africa and Far East [7, 8]. Its annual incidence decreased in the United States by approximately 80 percent since vaccination was introduced in the 1980s (Centers for Disease Control and Prevention, 2008) [9]. Various studies have shown that the vertical transmission rate varies between 10 to 50% in high prevalence areas [7, 8, 10]. A study in Benin showed vertical transmission rate of 42.9% [11] while that from Nnewi was 51.6% [3]. Viral hepatitis during pregnancy is associated with a high risk of maternal complications, has a high rate of vertical transmission causing foetal and neonatal hepatitis [12]. Without intervention, the risk of peri-natal HBV transmission is greatest for infants born to HBeAg-positive mothers, with infectivity rate of 70% to 90% at

6 months of age, and about 90% of these children remain chronically infected [13].

Several pregnant women do not screen for hepatitis B before labour in Nigeria even where antenatal screening is established [1]. In developed countries, pregnant women are routinely screened for HBV infection. Routine universal vaccination of all persons has also been established in several countries of high and intermediate endemicity [14]. There is neither a screening policy in our environment nor routine vaccination or measures to protect the at risk population [1].

The World Health Organization considers hepatitis B to be second only to tobacco among human carcinogens [3, 4]. The younger a person is when infected with Hepatitis B virus, the greater his or her chance of developing chronic Hepatitis B. Approximately about 90% of infected infants infected at birth will develop chronic infection. The risk goes down as a child gets older. Approximately 25–50% of children infected between the ages of 1 and 5 years will develop chronic hepatitis. The risk drops to 5–10% when a person is infected over 5 years of age. About 25% of adults who become chronically infected during childhood die from hepatitis B-related liver cancer or cirrhosis while 90% of healthy adults who are infected with the hepatitis B virus will recover and be completely rid of the virus within 6 months [15].

Modes of transmission are the same as those for human immunodeficiency virus (HIV), but the hepatitis B virus is 50 to 100 times more infectious [3,7]. Most people with chronic Hepatitis B in Nigeria were infected at birth or during early childhood and through sexual contact [3]. According to the American College of Obstetricians and Gynecologists (2006), maternal-fetal transmission is the principal mode of transmission throughout the world [16]. Other groups at high risk for hepatitis B infection are intravenous drug abusers, tattooists or acupuncturists, spouses of acutely infected individuals, multiple sexual partners, homosexual men, healthcare personnel, ear-piercing clients and patients who frequently receive blood products [17].

The pathogenesis and clinical manifestations of hepatitis B are due to the interaction of the virus and the host immune system. The immune system attacks HBV infected liver cells and causes liver injuries. Activated CD4⁺ and CD8⁺ lymphocytes recognize various HBV-derived peptides located on the surface of the hepatocytes, and an immunologic reaction occurs [18, 19]. Impaired immune reactions or a relatively tolerant immune status results in chronic hepatitis. In particular, a restricted T cell-mediated lymphocytic response occurs against the HBV-infected hepatocytes. Most cases of chronic hepatitis in pregnancy are asymptomatic and unknown to the patients and

pregnancy is usually uncomplicated [3, 7, 8]. However, with fulminant hepatic disease as in cirrhosis and acute hepatitis, maternal and foetal complications may develop. Acute hepatitis may present with anorexia, malaise, nausea and vomiting and often fever during pregnancy [20]. After about 3-10 days, dark urine occurs and jaundice may follow. Other symptoms may include itching and pale stools. Symptoms then subside and the period of illness normally lasts between 4 to 8 weeks [20]. Consequences of HBV infection in pregnancy has been shown to include premature labour and prematurity with attendant effect [3, 20]. Studies have shown an increase in the incidence of low birth weight and prematurity over that seen in the general population [3]. The apgar scores were also shown to be lower in newborn of HBsAg carrier, and there was a higher risk of intraventricular haemorrhage as well, which may be related to higher incidence of preterm delivery [3]. Intrapartum and post partum haemorrhage may occur from coagulation failure due to lack of production of vitamine k-dependent clotting factors. The prothrombin time may be prolonged as seen in fulminant hepatic failure from chronic hepatitis B viral infection [3].

The aim of this study is to determine the prevalence, screening rate of Hepatitis B viral infection among pregnant women in this centre and complications of hepatitis B in pregnancy. This will help to identify and reduce these conditions, scale-up care, improve survival and quality of life. This study will also, help to increase the awareness of this serious disease, add more weight to the clarion call for routine screening and vaccination to the at risk population and contribute to the achievement of the sixth Millennium Development Goal.

METHODOLOGY

This prospective cross-sectional study was carried out at the Obstetrics and Gynaecology Department of the University of Calabar Teaching Hospital (UCTH), Calabar, Cross River state. UCTH is a tertiary health facility located in Calabar, south-south geopolitical area of Nigeria and provides tertiary health care services for about 3 million people in Cross River State. It is also a referral centre for both government and private hospitals within and outside the state. The subjects included who booked for antenatal care in our hospital and presented in the hospital for delivery. An exclusion criterion was refusal to participate in the study. The study was performed over a 6 months period. An ethical clearance for this study was obtained from the Research and ethics committee of the hospital. The participants selected were counseled and after consenting were included in the study. Information on age, parity last menstrual period, gestational age, occupation, marital status, educational status and screening for HBV during the antenatal clinic were obtained from participants. Participants then completed the questionnaire on complications of hepatitis B in

pregnancy such as jaundice in pregnancy, pruritus in pregnancy, primary postpartum haemorrhage and preterm delivery. Thorough evaluation of the patients clinical records regarding their antenatal complications of pregnancy was done.

About 4 ml of venous blood was collected from each woman with a 5ml syringe into ethylene di-amine tetra-acetic acid (EDTA) containing tube. Parallel testing for HBsAg was used for the testing. Parallel testing involved the use of two rapid Enzyme Linked Immuno-Sorbent Assay (ELISA) test kits simultaneously on each woman blood sample for HBsAg. The two rapid test kits used in the study were hepatitis B surface antigen ELISA kits produced by Abbott Laboratories (USA) and hepatitis B surface antigen rapid test kit by Zhengzhou Gem Medic Electric & Technology, China. The HBsAg screening was done by applying the plasma onto the kits and observed after 15 minutes. Two simultaneously positive test results were interpreted as positive. When one result was positive and one negative, a third kit was used as a tie breaker to resolve this difference (enzyme immunoassay rapid test kit from Green Cross Life Science Corp, Kyonggi-do, Korea). The screening tests were performed by a laboratory scientist and the researcher in the hospital laboratory using the procedure as recommended by the manufacturers of the test kit.

After delivery, other information on birth weight, Apgar scores and postpartum haemorrhage were obtained.

DATA ANALYSIS

The data on demographic characteristics, complications of hepatitis B in pregnancy and result of HBsAg screening were analyzed using Spss version 17 windows. Statistical comparison was done using Chi - square (X^2) test at 95 confidence and level of significance less than 0.05.

RESULTS

Three hundred pregnant women were enrolled into the study during the six month period from 5th November, 2013 to 4th May, 2014. Of these, 14 tested positive to HBsAg, giving a sero-prevalence rate of 4.7% of the study population. The age of the participants ranged from 16 to 45 years with a mean of 28.1±4.7 years.

Table 1 shows the socio-demographic characteristics of the pregnant women. Majority of the participant are married (88.7%). Most of the women were at age group of 26-30 years (41%), primigravida (48.3%), with secondary school education (46%), and are traders (26%).

Table 1: The socio-demographic profile of the pregnant women

| Characteristics | Number | Percentage |
|---------------------------|--------|------------|
| Age (Years) | | |
| 16-20 | 14 | 4.7 |
| 21-25 | 83 | 27.6 |
| 26-30 | 123 | 41.0 |
| 31-35 | 69 | 23.0 |
| 36-40 | 9 | 3.0 |
| >40 | 2 | 0.7 |
| Parity | | |
| 0 | 145 | 48.3 |
| 1-2 | 115 | 38.4 |
| 3-4 | 21 | 7.0 |
| 5 and above | 19 | 6.3 |
| Occupation | | |
| Civil servant | 57 | 19.0 |
| Hair dresser | 23 | 7.7 |
| Seamstress | 11 | 3.7 |
| Health worker | 9 | 3.0 |
| Trader | 78 | 26.0 |
| Public servant | 23 | 7.7 |
| Housewife | 66 | 22.0 |
| Student | 33 | 11.0 |
| Educational status | | |
| No formal education | 7 | 2.3 |
| Primary | 48 | 16.0 |
| Secondary | 138 | 46.0 |
| Tertiary | 107 | 35.7 |
| Marital status | | |
| Single | 34 | 11.3 |
| Married | 266 | 88.7 |

A total of 7 out of 83 women in age group of 21-25 years were sero-positive to HBsAg while 76 were sero-negative (Fig. 1). Of the 123 women in the 26-30 years age group, 5 were sero-positive to HBsAg while 118 were sero-negative. None of the women in the age group of 36-40 years and above 40 years tested positive to HBsAg.

The prevalence of hepatitis B viral infection increased from age group of 16-20 years (7.1%) to the age group of 21-25 years (8.4%) where it peaked and then decreased afterwards (Fig. 2).

The prevalence of hepatitis B viral infection increased from para 0(4.1%) to para 1-2(5.2%), peaked at para 3-4(9.5%) and then decreased (Fig. 3).

Among the women studied, only 60.56% were screened for HBsAg during the antenatal period in this centre while 39.44% were not screened for HBsAg.

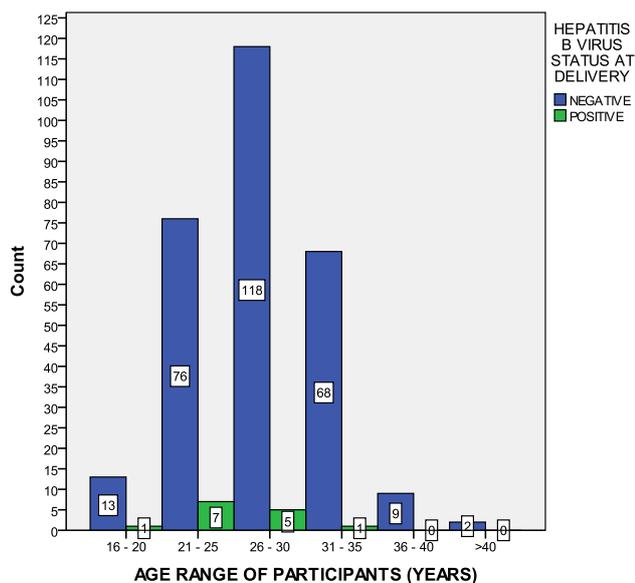


Fig. 1: Sero-prevalence of HBsAg status according to age group

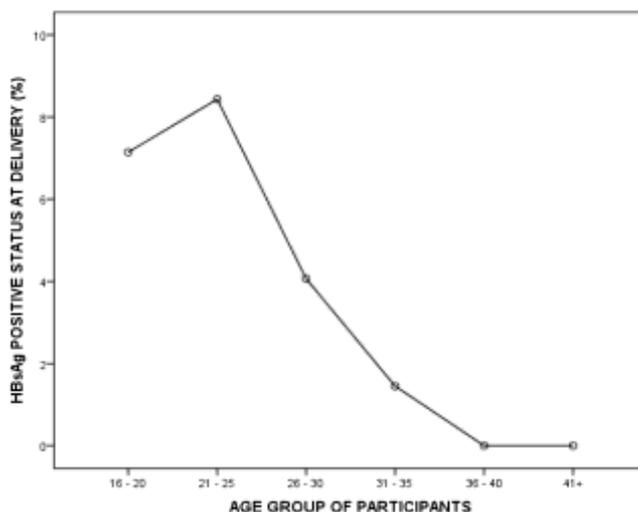


Fig. 2: Shows the relationship between the prevalence of HBsAg at delivery and age group of the women

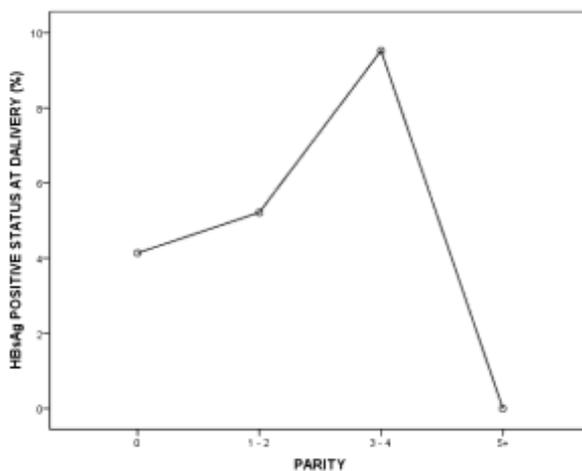


Fig. 3: Shows the relationship between the prevalence of HBsAg at delivery and parity in the study

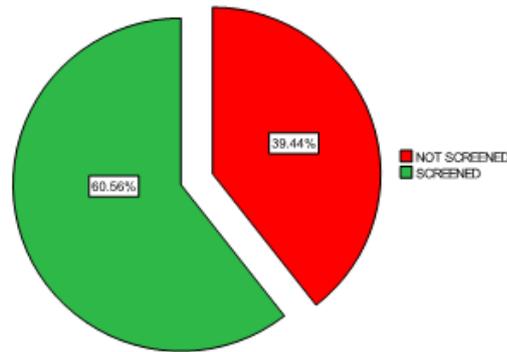


Fig. 4: Shows the screening for HBsAg during the antenatal period among booked participants

Of the 18(6.0%) of the women who gave history of pruritus during pregnancy, 2 were sero-positive to HbsAg. This was not statistically significant (p=0.1812)

(Table 2). All the complications of pregnancy studied were not statistically significant among hepatitis B viral positive women.

Table 2: Shows the complications of hbv infection in pregnancy

| Characteristics | Number (%) | HBsAg (+) | HBsAg (-) | X ² | p-value |
|--|------------|-----------|-----------|----------------|---------|
| Pruritus in pregnancy | | | | | |
| Yes | 18(6.0) | 2 | 16 | 1.79 | 0.1812 |
| No | 282(94.0) | 12 | 270 | | |
| Postpartum haemorrhage | | | | | |
| Yes | 25(9.0) | 2 | 27 | 1.45 | 0.2281 |
| No | 273(91.0) | 12 | 261 | | |
| Preterm delivery | | | | | |
| Yes | 16(5.3) | 1 | 15 | 0.10 | 0.7576 |
| No | 284(94.7) | 13 | 271 | | |
| History of jaundice | | | | | |
| Yes | 1(0.3) | 0 | 1 | 0.05 | 0.8246 |
| No | 299(99.7) | 14 | 285 | | |
| 5th minutes APGER score < 7 | | | | | |
| Yes | 19(6.3) | 2 | 17 | 1.57 | 0.2108 |
| No | 281(93.7) | 12 | 269 | | |
| Low birth weight < 2.5kg | | | | | |
| Yes | 17(5.7) | 1 | 18 | 0.88 | 0.3476 |
| No | 283(94.3) | 13 | 268 | | |

DISCUSSION

HBV infection affecting pregnant women may result in severe disease to mother and chronic infection to the newborn. The results of this study showed that the prevalence of HBsAg among pregnant women admitted for delivery was 4.7%. This is comparable to 4.6% in Enugu [8] and 3.9% in Ado Ekiti [1], Southwest Nigeria. But lower than 8.3% in Zaria [21], Nigeria, 8.3% in Nnewi [3], 10.5% in Ghana [22] and 8.0% in Mali [23]. This difference may be as a result of the type of population studied, different geographical regions, socioeconomic status, differences in educational level, seeking of health-care assistance, and utilization of health-care facilities [1].

The age of acquiring the infection is one of the major determinants of the prevalence rates of HBsAg [3]. In this study, HBsAg was highest among the 21-25

years age group and lowest among women of 36 years and above. A similar finding was noted in the study in Port Harcourt who observed that the age range of women infected with the Hepatitis B virus was 20-24 years [24]. These could be explained by the relationship between hepatitis infection and high risk sexual practices which is noted to be higher amongst the younger age group [24]. This may also be due to the fact that majority of women after 36 years would have completed their families by the end of the third decade, hence the observed decrease in hepatitis B infection rate after the third decade. This finding did not tally with the findings from the study in Ado-Ekiti [1] and in Kano, Nigeria [25], where majority of those that tested positive to HBsAg were in the age range of 25-30 years. This difference may be multi-factorial such as different geographical regions, cultural factors and socioeconomic status which influences the age of

marriage, antenatal attendance, screening coverage and utilization of health-care facilities [1].

The prevalence of HBV infection in this study increased from para 0 to para 1-2 and peaked at para 3-4 and then decreased after para 4. However, there was no statistically significant difference in parity of the women. This is similar to the findings in some studies [1, 3]. However, the finding is contrary to the study by Dwivedi *et al* [26] and Pennap *et al* [27] who found increased prevalence rate of hepatitis B infection with increasing parity which may be because of repeated risk of exposure to contaminated surfaces and instruments during delivery and number of sexual partners.

Among the participants that attended antenatal care in our centre, 60.56% were screened for HBsAg during the antenatal period, while 39.44% were not screened for HBsAg. This study also noted that out of 14 participants who were screened positive to hepatitis B surface antigen (HBsAg) at delivery, 5 of the hepatitis B positive women were not screened during their antenatal care period. This coverage rate among antenatal women in a tertiary centre is very low as many women were not aware of their hepatitis B status before labour. These women will deliver without knowledge of their hepatitis B infection status or intrapartum and postpartum preventive intervention. Screening for HBsAg in pregnancy should be routine, however, in Nigeria, screening of antenatal women for hepatitis B virus is not a routine practice as seen in this study [3]. Screening for HBsAg is routine in pregnancy in most developed countries of the world. It is a recommendation of the Royal College of Obstetricians and Gynaecologists (RCOG) of the United Kingdom [28], the American College of Obstetrics and Gynecology (ACOG) [29], and most of the other 122 Colleges of Obstetrics and Gynecology all over the world to screen pregnant women for hepatitis B surface antigen routinely in pregnancy [3].

All the complications of pregnancy related to HBV infection studied were not statistically significant among HBsAg positive women. The possible reason may be because; the 14 hepatitis B positive women encountered in this study were asymptomatic carriers during pregnancy. The states of liver disease during pregnancy among women with HBsAg positive have an influence on the complications of hepatitis B infection in pregnancy [20]. It has been shown that the course of chronic hepatitis B infection is usually mild in pregnant women and that there is no association between maternal hepatitis B infection and adverse foetal or maternal outcome in an otherwise healthy mother because of normal liver function [3, 20]. However, fulminant hepatic disease following acute hepatitis in pregnancy or chronic liver disease will worsen pregnancy outcome [3, 7, 20].

CONCLUSION

In conclusion, this study shows an intermediate endemicity of HBV infection according to World Health Organization criteria among pregnant women in UCTH, Calabar, South-south Nigeria. The screening coverage rate among booked women in this study was low as many 39.44% of women that attended antenatal care were not screened and so were not aware of their hepatitis B status before labour. Based on this, there is need for routine screening for hepatitis B infection during antenatal period and in labour for appropriate management. With increased campaign for testing, it is believed that more success will be made in this area. Thus, it is imperative that women be properly educated on the need for screening for HBsAg in pregnancy. Also, administration of Hepatitis B Immunoglobulin (HBIG) in combination with hepatitis B vaccine as post exposure prophylaxis for such newborns is of paramount importance.

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