

Hepatitis B Virus Sero-Prevalence among Pregnant Females in Northern Nigeria

¹J.A. Ndako, ¹G.O.N. Echeonwu, ²O.O. Nwankiti, ¹E.M. Onovoh,

¹A. Ujah, ³P.A. Ikani and ¹G.A. Paul

¹Department of Virology,

Federal College of Veterinary and Medical Laboratory Technology, Vom, Nigeria

²National Veterinary Research Institute, Vom, Nigeria

³Department of Laboratory Services, Family Health International, Bauchi, Nigeria

Abstract: Hepatitis B Virus (HBV) continues to cause serious health problems in developing countries. Neonatal infection with HBV which is often acquired during delivery, carries a high risk resulting in persistent infection. This research aims to detect the prevalence of Hepatitis B surface Antigen (HBsAg) among pregnant women in the location of study. About 180 sera samples were screened among pregnant women aged 13-49 using Standard ELISA Method. Structured questionnaire were administered to the subjects to obtain demographic and other relevant data. Overall result showed that 31 (17.2%) were found to be positive for HBsAg among the total subjects screened. The highest prevalence was found among those aged 20-29 with 11(6.1%) seropositivity ($\chi^2 = 7.902$; p-value = 0.048). Considering occupational distribution of volunteer subjects, a high prevalence of 12 (6.7%), p<0.05 was recorded among house wives which shows a measure of significance compared to other women screened. Furthermore, based on various risk factors subjects with history of surgery and use of unsterilized sharp instruments recorded 15 (8.3%) prevalence (p-value 0.233; p>0.05). However, women in their second trimester of pregnancy recorded a higher prevalence of 23 (12.8%: (p-value 0.080; p<0.05)). This study therefore emphasizes the public health importance of HBV among pregnant women and equally suggests that children born to women with Hepatitis B virus be closely monitored for infection beyond the one and the half years of age this also calls for a proper enlightenment on the dangers posed by the virus while a well designed vaccination schedule is advocated among the general populace.

Key words: Pregnant women, HBsAg, seroprevalence, vaccination, Hepatitis B virus

INTRODUCTION

Hepatitis B Virus (HBV) occurs worldwide and constitutes a serious public health problem. Globally, it is estimated that >2 billion people have been infected with HBV of these, about 350 million develop chronic infection and become carriers of the virus while about 1.5 million deaths occur from HBV related liver diseases including end stage cirrhosis and hepatocellular carcinoma each year (Ferriara, 2000; Cheesbrough, 2000).

Three major routes spread HBV are perinatal, horizontal and sexual transmission (Edmunds *et al.*, 1996). In developing countries, the main routes of transmission are: neonatal with HBV carrier mother infecting her infant usually during birth or soon after birth following close contact, transfer of HBV via cuts, sexual transmission, transfusion of infected blood or blood products, needle stick injury, re-use of HBV contaminated needles, syringes, lancets and instruments including those used in

tribal ceremonies (Cheesbrough, 2000). Neonates who contract hepatitis will have an almost 90% risk of developing chronic HBsAg carriage and chronic liver disease. Infants may also spread the disease to siblings and to a community (Sriprakash and Anil, 1997). About 80-90% of chronic infection have been found amongst infected neonate born to HBsAg positive carrier mothers (30%) followed by children uninfected before 6 months of age Nigeria is classified among the group of countries endemic for HBV infection. Currently about 18 million Nigerians are infected. Many of these people may not be aware of the infection and hence fail to seek appropriate medical attention.

There is common belief that transmission of Hepatitis B virus from carrier mothers to their babies can occur during the prenatal period. Vertical transmission from infected mother to infant is thought to be partially responsible for high prevalent of infection in certain high risk group (Arevalo, 1989).

This research work is aimed to ascertain the prevalence of Hepatitis B surface antigen among pregnant women in Bayara-Bauchi Metropolis and to determine the risk reduction for foetus at birth, as this will help the identification of newborns who will require prophylaxis against perinatal infection since, infants born to mothers positive for Hepatitis B virus antibodies have a 70-90% chance of acquiring perinatal HBV infection. Hence, the in-utero transmission of HBV from infected mother to their off spring has been well documented.

It is therefore recommended that high risk pregnant women should be tested for Hepatitis B surface Antigen (HBsAg) early in each pregnancy (Corrarino *et al.*, 1999).

MATERIALS AND METHODS

Study area: The study was carried out at the Infectious Disease Hospital, Bayara in Bauchi State, Nigeria.

Study population: Women attending antenatal clinic at Infectious Disease Hospital, Bayara in Bauchi State were recruited for this study.

Questionnaire: A well structured questionnaire was issued to the subjects to obtain demographic and other relevant data.

Sample collection sample collection and processing: About 3-5 mL of blood was collected from each diabetic patient aseptically. Blood samples were allowed to clot at room temperature undisturbed, thereafter sera obtained were dispensed into a clean, dry cryovial and stored at -20°C prior use. The sera were screened for HBsAg using ELISA Method.

Ethical clearance: Ethical clearance was sought and obtained from Infectious Disease Hospital, Bayara in Bauchi State.

Data analysis: Filled questionnaires were crosschecked manually for correct data entry. Data were analyzed using the SPSS Software package while the critical level for statistical significance was set at $p = 5\%$ using the Chi-square analysis.

RESULTS AND DISCUSSION

Table 1 shows the distribution of HBsAg infection among the one hundred and eighty pregnant women screened, 31 of them tested positive representing 17.2% while 149 of the women representing 82.8% were negative to HBsAg infection (Fig. 1). Table 2 shows the

Table 1: Distribution of HBsAg within the population screened

Location	Positive (%)	Negative (%)	Total (%)
IDH Bayara	31 (17.2)	149 (82.8)	180 (100)

Table 2: Distribution based on age group

Age group	Hbs Ag status		Total tested
	Positive (%)	Negative (%)	
10-19	7 (3.9)	25 (13.9)	32
20-29	11 (6.1)	75 (41.7)	86
30-39	8 (4.4)	43 (23.9)	51
40-49	5 (2.8)	6 (3.3)	11
Total	31 (17.2)	149 (82.8)	180

$\chi^2 = 7.902$; $df = 3$; $p\text{-value} = 0.048$

Table 3: Distribution of HBV based on demographic factors

Occupation	No. tested	Positive (%)	Negative (%)	p-value
Housewives	106	12 (6.7)	94 (52.2)	0.004
Traders	23	8 (4.4)	15 (8.3)	0.004
Civil servants	14	9 (5.0)	5 (2.8)	0.004
Farmers	37	2 (1.1)	35 (19.4)	0.371
Total	180	31 (17.2)	149 (82.8)	-

$p < 0.05$

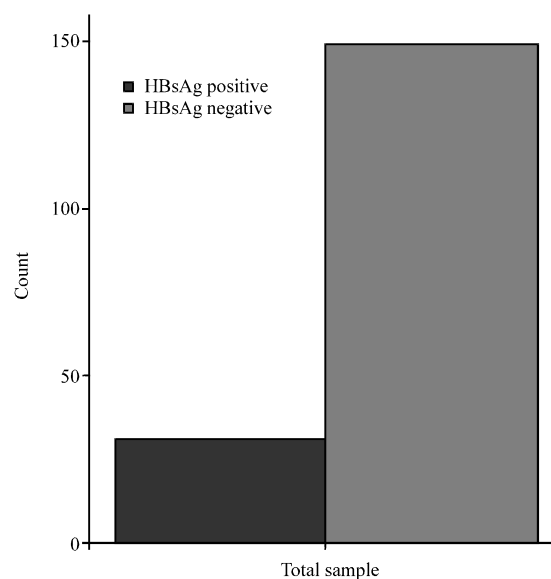


Fig. 1: Overall distribution of HbsAg among pregnant women

distribution of HbsAg based on age it subjects aged (20-29 years) recorded a higher prevalence of 6.1% (Fig. 2).

Table 3 shows distribution of pregnant women screened based on occupational distribution, housewives recorded the highest prevalence of 6.7% while civil servants recorded a prevalence of 5.0% followed by traders 23 (4.4%) and farmers 37 (1.1%), respectively (Fig. 3).

Table 4 shows the distribution with respect to the risk factors. Risks associated with the use of unsterilized

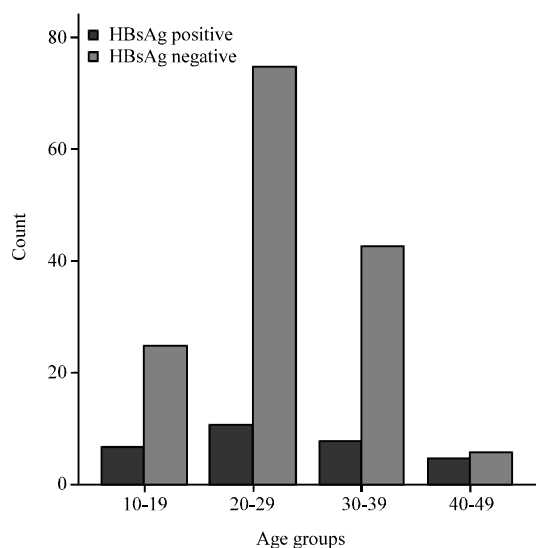


Fig. 2: Age distribution of seroprevalence of HbsAg among pregnant women

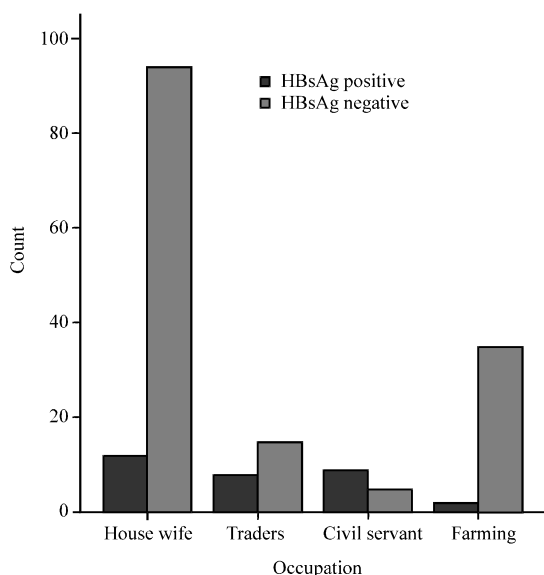


Fig. 3: Occupation distribution of HbsAg among pregnant women

sharps instrument recorded and subjects with history of surgery recorded 15 (8.3%) prevalence while those with history of blood transfusion had 7 (3.9%). Use of hard drugs recorded 4 (2.2%) while those with history of circumcision recorded the least 2 (1.1%) prevalence. Table 5 shows distribution based on trimester.

In this study, 17.2% prevalence was recorded. The result obtained is significant when compared with a related study in Maiduguri which showed that prevalence increased from 11.6% in 1994 to 15.8% in 1999

Table 4: Distribution based on risk factors

Risk factor	No. tested	Positive	Negative	p-value
Use of unsterilized sharps instruments				
Yes	70	15 (8.3)	55 (30.6)	0.233
No	110	16 (8.9)	94 (52.2)	-
Transfusion				
Yes	15	8 (4.4)	7 (3.9)	0.000
No	165	23 (8.9)	142 (78.9)	-
Surgery				
Yes	70	15 (8.3)	55 (30.6)	0.233
No	110	16 (8.9)	94 (52.2)	-
Circumcision				
Yes	3	1 (0.6)	2 (1.1)	0.435
No	177	30 (16.6)	147 (81.7)	-
Use of hard drug				
Yes	5	1 (0.6)	4 (2.2)	0.839
No	175	30 (16.6)	145 (80.6)	-
Alcohol consumption				
Yes	6	4 (4.2)	2 (1.1)	0.001
No	174	27 (15.0)	147 (81.7)	-
Multiple partners				
Yes	20	11 (6.1)	9 (5.0)	0.000
No	160	21 (11.7)	139 (77.2)	-

Table 5: Distribution based on trimester

Gestational age in weeks	Trimester no tested	Positive (%)	Negative (%)	Total p-value
FT	36	3 (1.7)	33 (18.3)	0.080
ST	109	23 (12.8)	86 (14.8)	0.080
TT	35	5 (2.8)	30 (16.7)	0.057

p<0.05 is significant; FT = First Trimester; ST = Second; Trimester; TT = Third Trimester

(Harry *et al.*, 1994; Baba *et al.*, 1999), further more the result obtained in this study is equally higher than those obtained by Pennap *et al.* (2011) who recorded a prevalent rate of 6.67% among pregnant women attending antenatal clinic in Federal Medical Center Keffi and those of Ndams *et al.* (2008) who reported 12.3% prevalence in a study conducted among pregnant women in Minna and that carried out by Onwuliri *et al.* (2008) where a prevalence of 16.6% was recorded in a study among pregnant women in Vom.

Lower reports included 2.19% in Benin city (Onakewhor *et al.*, 2001) 4.3% in Port Harcourt in 2005 (Akani *et al.*, 2005) and 2.89% in 2006 (Obi *et al.*, 2006) and 5.7% in Ilorin (Agbede *et al.*, 2007). Though within the same continent, the result of this study is higher than the 6.3% reported in pregnant women in Tanzania and 3.7% in Ethiopia (Awole and Gebre-Selassie, 2005).

The reported prevalence in this study is a cause for alarm because it is high enough to warrant the initiation of routine antenatal screening for HBV infection. This is because HBV positive pregnant women represent a major reservoir of the virus in a community and this can be passed on to the children either vertically or even horizontally (Onwuliri *et al.*, 2008).

In this study women aged 20-29 recorded 6.1% prevalence compared to other age group with the lowest

prevalence of 2.8% recorded among subjects aged 40-49 this is however, contrary to the report by Pennap *et al.* (2011) who recorded a high prevalence of 12.5% among pregnant women aged 40-44. The resultant high prevalence among this age group in this study is attributed to the fact that these women fall within the sexually active age bracket according to Poorolajal *et al.* (1996). Age is an important factor in epidemiology studies hence, the age of acquiring infection was found to be a major determinant of the incidence of HBV.

Most of the women studied were in the 2nd trimester of gestation, this group also had the highest HBsAg seropositivity of 12.8%, the result obtained in this study is lower than those of Ndams *et al.* (2008) who obtained a prevalence of 13.4% at the 2nd trimester of pregnancy (Fig. 4).

Analysis showed that out of the 106 respondents 58.8% were housewives out of which about 12 (6.7%) tested positive for HBsAg as compared to civil servants who recorded 5.0% positivity. Although, HBV infection is considered one of the most important occupational infectious hazards in developed countries (Abdool-Karim *et al.*, 1989), results from this study did reveal statistical but not clinical significance between HBV seropositivity and the different occupations of the pregnant women studied.

Women with a history of blood transfusions recorded a prevalence of 4.4% while those with history of surgery recorded 8.3% similarly those with history of use of unsterilized/sharp instruments also recorded 8.3% prevalence which was statistically higher than other

groups. This implies that the infections in this class of women possibly resulted from possible wounds obtained from exchange or re-use of sharp instruments.

Although, WHO recommended that Hepatitis B vaccine be incorporated into routine infant and childhood immunization program for all countries by 1997, only 130 of 216 countries introduced Hepatitis B immunization into their national infant and childhood immunization programme by the beginning of 2001. The major hurdle to universal Hepatitis B immunization is the cost of Hepatitis B vaccine, especially for developing countries the cost of three doses of Hepatitis B vaccine remains higher than the cost of other vaccines included in routine infant immunization programmes (Kao and Chen, 2002).

CONCLUSION

This study reported a relatively high prevalence of HBsAg in the study area despite the high prevalence all the risk factors studied were not statistically significant as predisposing factors to HBV infection. Thus, screening of all pregnant women should be made part of the antenatal care irrespective of risk factors. Likewise the administration of prophylaxis for babies of HBsAg positive mothers will greatly assist in reducing maternal transmission of HBV.

REFERENCES

- Abdool-Karim, S.S., R. Thejpal and B. Singh, 1989. High prevalence of hepatitis B infection in rural black adults in Mseleni, South Africa. *Am. J. Publ. Health*, 79: 893-894.
- Agbede, O.O., J.O. Iseniyi, M.O. Kolawole and A. Ojuowa, 2007. Risk factors and seroprevalence of hepatitis B surface antigenemia in mothers and their preschool age children in Ilorin, Nigeria. *Therapy*, 4: 67-72.
- Akani, C.I., A.C. Ojule, H.C. Oporum and A.A. Ejilemele, 2005. Seroprevalence of HBsAg in pregnant women in Port Harcourt. Nigeria. *Nigeria Postgraduate Med. J.*, 12: 266-270.
- Arevalo, J.A., 1989. Hepatitis B virus in pregnancy. *W. J. Med.*, 150: 668-678.
- Awole, M. and S. Gebre-Selassie, 2005. Seroprevalence of hepatitis B surface antigen and its risk factors among pregnant women in Jimma, Southwest Ethiopia. *Ethiopian J. Health Dev.*, 19: 45-50.
- Baba, M.M., I.S. Onwuka and S.S. Baba, 1999. Hepatitis B and C virus infection among pregnant women in Maiduguri Nigeria. *Cenr. Enr. D. Publ. HLTH*, 7: 60-62.

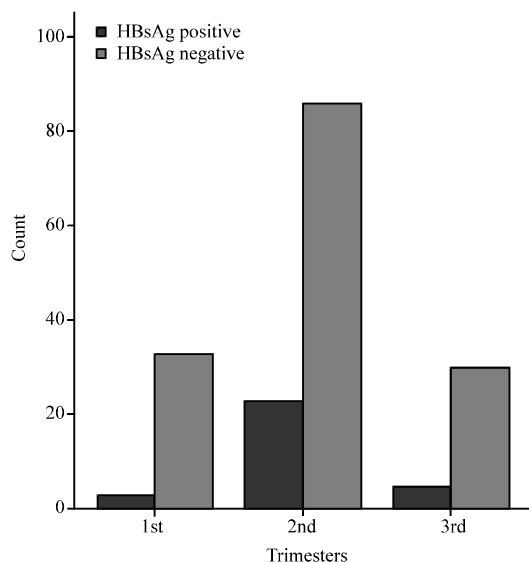


Fig. 4: Distribution of HbsAg among pregnant women with respect to trimester

- Cheesbrough, M., 2000. District laboratory practice in tropical countries. 3rd Edn., Cambridge University press, UK, pp: 250-252.
- Corrarino, J.E., P.J. Walsh and D. Anselmo, 1999. A programme to educate women who test positive for hepatitis B virus during the prenatal period. *Am. J. Maternal Child Nursing*, 24: 73-77.
- Edmunds, W.J., G.F. Medley and D.J. Nokes, 1996. The transmission dynamics and control of hepatitis B virus in the Gambia. *Stat. Med.*, 30: 2215-2233.
- Ferriara, M.S., 2000. Diagnosis and treatment of hepatitis B. *Rev. Soc. Bras. Med. Trop.*, 33: 389-400.
- Harry, T.O., M.D. BaJani and A.E. Moses, 1994. Hepatitis B virus infection among blood donors and pregnant woman in Maiduguri Nigeria. *Ease Afr. Med. J.*, 17: 32-33.
- Kao, J.H. and D.S. Chen, 2002. Global control of hepatitis B virus infection. *Lancet*, 2: 395-403.
- Ndams, I.S., I.A. Joshua, S.A. Luka and H.O. Sadiq, 2008. Epidemiology of Hepatitis B infection among pregnant women in Minna, Nigeria. *Sci. World J.*, 3: 5-8.
- Obi, R.K., S.C. Umeh and O.H. Okurede, 2006. Prevalence of hepatitis B virus infection among Pregnant women in an antenatal clinic in Port Harcourt, Nigeria. *Afr. J. Clin. Exp. Microbiol.*, 7: 78-82.
- Onakewhor, J.U.E., E. Offor and F.E. Okonofua, 2001. Maternal and neonatal seroprevalence of Hepatitis B surface antigen (HbsAg) in Benin City, Nigeria. *J. Obstetrics Gynaecol.*, 21: 583-586.
- Onwuliri, F.C., J.A. Ndako, A.O. Olabode, E.A. Onwuliri, G.O.N. Echeonwu, I.O. Okeke and M. Maliki, 2008. Seroprevalence of Hepatitis B surface antigen (HBsAg) among pregnant women in vwang district plateau state Nigeria Publication of the Nigerian. *J. Biotechnol.*, 19: 60-65.
- Pennap, G.R., E.T. Osanga and A. Ubam, 2011. Seroprevalence of hepatitis B surface antigen among pregnant women attending antenatal clinic in federal medical center Keffi, Nigeria. *Res. J. Med. Sci.*, 5: 80-82.
- Poorolajal, J., M.R. Zali, K. Mohammad, A. Farhadi and M.R. Masjedi *et al.*, 1996. Epidemiology of Hepatitis B in the Islamic Republic of Iran. *East Mediterr Health J.*, 2: 290-298.
- Sriprakash, I. and T.P. Anil, 1997. Routine prenatal screening of Indian women for HBsAg: Benefits derived versus cost. *Trop. Doc.*, 27: 176-177.