Sero-survey of Hepatitis B surface antigen amongst pregnant women attending Infectious Disease Hospital Bayara, Bauchi State, Nigeria

James A. Ndako,¹Georgebest ON. Echeonwu,¹Obinna O Nwankiti,²Emamuzou M. Onovoh,¹Alloysius U. Jah,¹Nathaniel N. Shidali,⁴ Patrick A. Ikani³

¹Department of Virology, Federal College of Veterinary and Medical Laboratory Technology, Vom; ²National Veterinary Research Institute, Vom; ³Department of Laboratory Services, Family Health International, Bauchi; ⁴Department of Medical Laboratory Sciences, University of Maiduguri, 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 our location of study. One hundred and eighty (180) sera samples were screened among pregnant women aged 13-49, using standard enzyme-linked immunosorbent assay (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 ($\chi^2=7.902$; $P=0.048$). 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 ($P=0.233$; $P>0.05$). However, women in their second trimester of pregnancy recorded a higher prevalence of 23 (12.8%); ($P=0.080$; $P<0.05$). 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 population.

Introduction

Hepatitis B virus (HBV) occurs worldwide and constitutes a serious public health problem. Globally, it is estimated that more than 2 billion people have been infected with HBV; of these, about 350 million developed chronic infection and became carriers of the virus, while about 1.5 million deaths occurred from HBV related liver diseases, including end stage cirrhosis and hepatocellular carcinoma each year.^{1,2} HBV infection is spread through three major routes: perinatal, horizontal, and sexual transmission.³ 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, transmission of HBV via cuts, from reuse of unsterile sharp objects, 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 body markings.² Neonates who contract Hepatitis will have almost the a 90% risk of

Correspondence: James A. Ndako, Federal College of Veterinary and Medical Laboratory Technology, PMB 01, Vom Plateau State, Nigeria. Tel: +2347038540403. E-mail: ndakoj@yahoo.co.uk

Key words: Hepatitis B, pregnant women, antenatal.

Received for publication: 14 October 2011.

Accepted for publication: 23 December 2012.

This work is licensed under a Creative Commons Attribution NonCommercial 3.0 License (CC BY-NC 3.0).

©Copyright J.A. Ndako et al., 2012
Licensee PAGEPress, Italy
Microbiology Research 2012; 3:e10
doi:10.4081/mr.2012.e10

developing chronic HBsAg carriage and chronic liver disease. Infants may also spread the disease to siblings and to a community⁴ about 80-90% of chronic infections have been found amongst infected neonates born to HBsAg positive carrier mothers, followed by children uninfected before 6-months of age (30%).

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

Table 1. Distribution of hepatitis B surface antigen within the population screened.

Location	Positive (%)	Negative (%)	Total (%)
Infectious Disease Hospital Bayara	31 (17.2)	149 (82.8)	180 (100)

Table 2. Distribution based on age group hepatitis B surface antigen status.

Age group	Positive (%)	Negative (%)	Total tested
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

$\chi^2=7.902$; $df=3$; $P=0.048$

Table 3. Distribution of Hepatitis B virus 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)	

$P<0.05$.

aware of the infection and hence fail to seek appropriate medical attention.

There is a 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 among high risk group individuals.⁵ Hence it is recommended that high risk pregnant women should be tested for hepatitis B surface antigen (HBsAg) early in each pregnancy.⁶

The aim of this paper is to ascertain the prevalence of Hepatitis B surface Antigen among pregnant women in Bayara-Bauchi metropolis and to determine the possible risk it poses to foetus at birth, as this will help the identification of newborns who will require prophylaxis against perinatal infection (infants born to mothers positive for hepatitis B surface antigen 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.

Materials and Methods

This study was carried out at the Infectious

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 trimesters.

Gestational age in weeks	Trimester No Tested	Positive (%)	Negative (%)	Total P value
First trimester	36	3 (1.7)	33 (18.3)	0.080
Second trimester	109	23 (12.8)	86 (14.8)	0.080
Third trimester	35	5 (2.8)	30 (16.7)	0.057

P <0.05 is significant

Figure 1. Overall distribution of hepatitis B surface antigen among pregnant women.

Figure 2. Age distribution as seroprevalence of hepatitis B surface antigen among pregnant women.

Disease Hospital, Bayara, in Bauchi state, Nigeria. Women attending antenatal clinic at Infectious Disease Hospital, Bayara, were recruited for this study. A well structured questionnaire was issued to these subjects to obtain demographic and other relevant data (Tables 1-5, Figures 1-4). Moreover, 3-5 mL of venous blood were collected, duly labelled and allowed to clot and sera carefully separated into cryovials and stored at -20°C prior use. The materials used include serum, container, hypodermic syringe, cotton wool, micro pipette centrifuge, Hepatitis B surface Antigen ELISA plate, test tube, plate sealer and marker. The reagent used were: Hepatitis B antigen ELISA kit (Kinghawk Beijing Pharmaceutical Co. Ltd) and the Methylated spirit (70% alcohol). The HBsAg ELISA kit is a double antibody sandwiched ELISA designed to detect HBsAg in human serum or plasma. The anti-HBsAg (monoclonal antibodies) was coated on the solid phase of polystyrene microtitre Elisa wells. Serum sample and the multiclinal anti-HBs (conjugated) coated wells were incubated with Tetramethylbenzidine (TMB) to form a colored product or not to indicate the presence or absence of HBsAg. Ethical clearance was sought for and obtained before the study commenced.

Discussion

In this study a prevalence of 17.2% was recorded. The result obtained is significant if compared with a related study in Maiduguri which showed that prevalence increased from 11.6% in 1994 to 15.8% in 1999.^{7,8} Furthermore, the results obtained in this study are equally higher than those obtained by Pennap *et al.*,⁹ who recorded a prevalence of 6.67% among pregnant women attending antenatal clinic in Federal Medical Center Keffi, the works by Ndams *et al.*,¹⁰ recorded 12.3% prevalence in a study conducted among pregnant women in Minna, and the ones carried out by Onwuliri *et al.*¹¹ where a prevalence of 16.6% was recorded in a study among pregnant women in Vom.

Lower reports include 2.19% in Benin City,¹² 4.3% in Port Harcourt in 2005,¹³ 2.89% in 2006,¹⁴ and 5.7% in Ilorin.¹⁵ 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.¹⁶

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.*¹¹

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 of Pennap *et al.*,⁹ who recorded a high prevalence of 12.5% among pregnant women aged 40-44. The resultant high prevalence among this age group in our study is attributed to the fact that these women fall within the sexually active age bracket according to Zali *et al.*¹⁷ 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.*¹⁰ who obtained a prevalence of 13.4% at the 2nd trimester of pregnancy. 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

Figure 3. Occupational distribution of hepatitis B surface antigen among pregnant women.

Figure 4. Distribution of hepatitis B surface antigen among pregnant women with respect to trimester.

infection is considered one of the most important occupational infectious hazards in developed countries¹⁸ 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 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.¹⁹

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

1. Ferriara MS. Diagnosis and treatment of hepatitis B. *Rev Soc Bras Med Trop* 2000;33:389-400.
2. Cheesbrough M. *District laboratory practice in tropical countries*, 3rd ed. Cambridge, UK: Cambridge University press; 2000. pp. 250-252
3. Edmunds WJ, Medley GF, Nokes DJ. The transmission dynamics and control of hepatitis B virus in The Gambia. *Stat Med* 1996;30:2215-33.
4. Sriprakash I, Anil TP. Routine prenatal screening of Indian women for HBsAg: benefits derived versus cost. *Trop Doc* 1997;27:176-7.
5. Arevalo JA. Hepatitis B virus in pregnancy. *WJ Med* 1989;150:668-78.
6. Corrarino JE, Walsh PJ, Anselmo D. A program to educate women who test positive for hepatitis B virus during the prenatal period. *MCN Am J Matern Child Nurs* 1999;24:73-7.
7. Harry TO, BaJani MD, Moses AE. Hepatitis B virus infection among blood donors and pregnant woman in Maiduguri Nigeria. *East Afr Med J* 1994;17:32-3.
8. Baba MM, Onwuka IS, Baba SS. Hepatitis B and C virus infection among pregnant women in Maiduguri Nigeria. *Certr Eur J Publ Hlth* 1999;2:60-2.
9. Pennap GR, Osanga ET, Ubam A. Seroprevalence of Hepatitis B surface antigen among pregnant women attending antenatal clinic in Federal Medical Center Keffi, Nigeria. *Res J Med Sci* 2011;5:80-2.
10. Ndams IS, Joshua IA, Luka SA, Sadiq HO. Epidemiology of Hepatitis B infection among pregnant women in Minna, Nigeria. *Sci World J* 2008;3:5-8.
11. Onwuliri FC, Ndako JA, Olabode AO, et al. Seroprevalence of Hepatitis B surface antigen (HBsAg) among pregnant women in Vwang District Plateau State Nigeria. *Nigerian J Biotechnol* Vol.19: pp.60-65 ISSN 0189-1731
12. Onakewhor JUE, Offor E, Okonofua FE. Maternal and neonatal seroprevalence of Hepatitis B surface antigen (HBsAg) in Benin City. *J Obstet Gynaecol* 2001;21:583-6.
13. Akani CI, Ojule AC, Oporum HC, Ejilemele AA. Seroprevalence of HBsAg in pregnant women in Port Harcourt. Nigeria. *Niger Postgrad Med J* 2005;12:266-70.
14. Obi RK, Umeh SC, Okurede OH. Prevalence of hepatitis B virus infection among Pregnant women in an antenatal clinic in Port Harcourt, Nigeria. *Afr J Clin Exp Micro* 2006;7:78-82.
15. Agbede OO, Iseniyi JO, Kolawole MO, Ojuowa A. Risk factors and seroprevalence of hepatitis B surface antigenemia in mothers and their preschool age children in Ilorin, Nigeria. *Therapy* 2007;4:67-72.
16. Awole M, Gebre-Selassie S. Seroprevalence of hepatitis B surface antigen and its risk factors among pregnant women in Jimma, Southwest Ethiopia. *Ethiop J Health Develop* 2005;19:45-50.
17. Zali MR, Mohammed K, Farhadi A, et al. Epidemiology of hepatitis B in the Islamic Republic of Iran. *East Mediterr Health J* 1996;2:290-9.
18. Abdool-Karim SS, Thejpal R, Singh B. High prevalence of hepatitis B infection in rural black adults in Mseleni, South Africa. *Am J Publ Health* 1989;79:893-4.
19. Kao, J.H and Chen, D.S Global control of Hepatitis B Virus infection *Lancet* 2002;2:395-403.