
FULL LENGTH RESEARCH ARTICLE

**EPIDEMIOLOGY OF HEPATITIS B INFECTION AMONG
PREGNANT WOMEN IN MINNA, NIGERIA**

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ABSTRACT

A descriptive cross sectional study was conducted amongst 261 pregnant women attending ante natal clinic at General hospital, Minna, Nigeria to determine the social characteristics and seroprevalence of Hepatitis B Virus (HBV). The mean age of the respondents was 25years. Thirty two (12.3%) of the 261 blood samples tested positive for HBV. Of the the +ve cases, 13.6% were in the second trimester of their pregnancy and 60% within the age brackets of 21-30 years. Illiterate women constituted 15.9% of those sampled while civil servants were 13.6%. Testing for HBsAg is recommended for all pregnant women at first prenatal visit so that positive mothers receive prompt intervention.

Key words: HBV, epidemiology, pregnant women, antenatal clinic, Minna, Nigeria

INTRODUCTION

Hepatitis B virus is a blood borne and sexually transmitted pathogen that is spread through percutaneous and mucosal exposure to infected blood and body fluids. Major modes of acquiring the infection included intravenous drug use, sexual intercourse with infected partners, and perinatal transmission from mother to child among others. The virus has caused severe epidemic in parts of Africa and Asia (Ryan & Ray, 2004) and approximately 350 million persons worldwide are infected with the virus (Ferriara,2000; Droston *et al.*, 2004; Cheesbrough, 2006), resulting in 2 million deaths annually.

Nigeria is classified among the countries highly endemic for viral hepatitis (Sirisena, 2000). The prevalence of HBsAg in normal population in Nigeria ranges from 2.7 to 13.3 % (Kulkarimi *et al.*, 1986; Muula, 2000). Like in the case of HIV, the highest incidence of the acute infection is among the young adults of 20-30years. HBV spot surveys amongst pregnant women in the country revealed 4.3% prevalence in Port Harcourt (Akani *et al.*, 2005), 15.1% in Jos (Egah *et al.*, 2007) and 8.3% in Zaria (Luka *et al.*, 2008). Generally, pregnant women have depressed immunity, thus infection of HBV is of clinical importance. Oguntola (2008) observed that hepatitis is one of the diseases in pregnancy that causes jaundice in women and if left untreated may lead to babies with low intelligent quotient. A hepatitis B positive pregnant mother also confers a 20% risk of passing the infection to her offspring. Siriprakash & Anil (1997) reported that neonates who contact HB infection will almost have 90% risk of developing chronic hepatitis and chronic liver disease.

The aim of this investigation is to study the epidemiology of HBV infection among pregnant women attending ante natal clinic at General hospital Minna, Nigeria State, Nigeria. This will generate information that could be used to monitor the trend of the disease in the area. It is recommended that HBV should be incorporated into the screening routine tests for pregnant women to enable early detection and prompt intervention.

MATERIALS AND METHODS
Study area

The study was carried out at the General Hospital in Minna, Niger State, Nigeria. Minna located on latitude 9°37'N and longitude 6°33'E. The climate of Minna is within a region described as tropical climate which is characterised by tropical dry and wet seasons. The region is characterized by double rainfall maxima in the months of April and August. The rainy season commences in April and lasts till October. Temperature is uniformly high throughout the year except from July to August when the clouding of the sky prevents direct isolation (Kowal & Knabe, 1972).

Study design

The study was a hospital based descriptive cross sectional survey conducted between 1st October and 30th November, 2007 at the antenatal clinic of the General Hospital, Minna, Niger State Nigeria. On every antenatal day, the pregnant women were given health talk on HIV/AIDS and hepatitis infections and were advised on the need to know their status. Only consenting attendees were recruited and included in the study.

Administration of questionnaire/ interview

Pre-structured questionnaires were administered to two hundred and sixty one (261) consenting pregnant women. Respondents who could not read or write were interviewed in Hausa language by the researcher assisted by nurses and matrons. Each questionnaire was designed to obtain demographic data such as age, occupation, educational status. Risk factor information were also obtained and these included stage of pregnancy, history of blood transfusion, and history of jaundice, whether or not respondents share sharp objects like razors and toothbrushes and types of marriage.

Collection of blood samples/ serum preparation

Blood samples were collected aseptically by venepuncture using 5 ml sterile disposable hypodermic syringes and needles on antenatal clinic

days-Mondays, Tuesdays and Thursdays and dispensed into pre-labelled specimen bottles and transferred to the immunology laboratory of the hospital. The samples were allowed to clot and centrifuged at 3,000 rpm for 5mins to separate the serum. The sera were extracted using micropipette into 1.25 ml screw cap tubes and stored, at -20° C until required.

Procedure for detecting HBsAg

Hepatitis B surface antigen (HBsAg) detection was done using the in vitro diagnostic kit manufactured by Wondfo Biotech Co., Ltd, USA. The test kit (dipsticks) is a rapid immunochromatographic assay designed for qualitative determination of HBsAg in human serum or plasma. Assays were carried out at room temperature. The sera samples were removed from the freezer and left at room temperature to thaw. The test strips were removed from their foil pouches and immersed into serum samples with arrows pointing towards the samples. The strips were taken out after about 10secs and placed on a clean, dry, non-absorbent surface. This is to allow time for the reaction to take place. It was observed that the specimen was absorbed into the test strips and moved by capillary action upward towards the control line. Results were read after 10mins post immersion. Positive samples generated a colour band in the test region of the strips and another in the control region while negative samples had a colour band in the control regions only.

Data Analysis

Data from questionnaire were analyzed using SPSS version 15.0. Chi-square was used to compare significant differences between HBV prevalence, the odds ratio was used to determine association between infection and risk factors. Significance was determined at $P < 0.05$ at 95% Confidence Interval.

Informed consent

Informed consent was obtained from the hospital management board through the Medical Director of the hospital and from the antenatal clinic attendees with assurance that all information obtained would be treated as confidential, and would be used for the purpose of this study only.

RESULTS

The results of the seroprevalence study are presented in Table 1. It showed that out of the 261 pregnant women tested, 32 were positive for HBsAg giving an overall seroprevalence of 12.3%. With respect to age, the results show that there is increase in HBsAg titres with increase in age up to 30 years followed by a decline. Statistically, however, there was no significant association ($X^2=3.19$; $P=0.784$) between age and seroprevalence of Hepatitis B infection.

TABLE 1. SEROPREVALENCE OF HEPATITIS B VIRUS AMONG THE AGE GROUPS

	No examined	No +ve (%)
11-15	7	2 (6.3)
15-20	70	7 (21.9)
21-25	79	10 (31.3)
26-30	71	10 (31.3)
31-35	28	3 (9.4)
36-40	5	0 (0.0)
41-45	1	0 (0.0)
	261	32(12.3)

$X^2=3.196$ $df=6$ $p=0.784$

The level of educational attainment and occupation and seroprevalence of the pregnant women are presented in Table 2. It revealed that there is inverse relationship between educational attainment of the women and seroprevalence of Hepatitis infection. Details show that women with high prevalence of the infection are illiterates (15.90%) while those with some levels of education had lower prevalences even though there was no significant association ($X^2=1.981$; $P=0.576$). Similarly, the result revealed that housewives had higher prevalence (13.60%) than the other women considered in the study. Despite this observation, no significant association ($X^2=1.145$; $P=0.766$) between infection and the occupation of the women. There was no significant association ($X^2=1.429$; $P=0.651$) between infection and pregnancy stages of the women (Table 3).

TABLE 2. SOCIAL CHARACTERISTICS AND HBV SEROPOSITIVITY

Social Characteristics	No examined (n=261)	No +ve (%) (n=32)
Education		
Illiterate	88	14 (15.9)
Primary	53	6(11.3)
Secondary	29	7(8.9)
Tertiary	41	5(12.2)
Occupation		
C/servant	24	3(12.5)
House wife	177	24(13.6)
Student	13	1(7.7)
Business	47	4(8.5)

Education $X^2= 1.981$ $df= 3$ $p= 0.576$
Occupation $X^2= 1.145$ $df= 3$ $p= 0.766$

TABLE 3. HBV SEROPOSITIVITY AND STAGE OF PREGNANCY

Trimester	No examined	No +ve (%)	Odds Ratio (OR)	95% Confidence Interval (CI)
First Trimester (1-3 months)	27	5 (18.5)	0.55	0.19
Second Trimester (4-6 months)	157	21 (13.4)	0.77	0.35
Third Trimester (7-9 months)	77	6 (7.8)	1.95	0.77
Total	261	32 (12.3)	1.95	0.77

DISCUSSION

Viral hepatitis infection remains a public health problem in developing countries. The 12.3% overall prevalence for HBsAg in pregnant women attending antenatal clinic at General Hospital Minna falls within figures reported for other African countries. This also corroborates the World Health Organisation (WHO, 1990) report for Nigeria as highly endemic area with a prevalence greater than 8%. In related studies in different parts of Nigeria, higher prevalence rates of 11.6% were reported among pregnant women in Maiduguri (Harry *et al.*, 1994), 13.8% in Lagos (Nasidi *et al.*, 1993) and 8.3% in Zaria (Luka *et al.*, 2008).

Lower reports included 2.19 % in Benin City (Onakewhor *et al.*, 2008), 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 (Mendez, 1999) and 3.7% in Ethiopia (Awole & Gebre-Selassie, 2005).

Similar studies in other parts of the world were 10% in Hong Kong 10% (Kong *et al.*, 1997), 10% in India (Sharma *et al.*, 1995), 11% in Papua New Guinea (Clegg, 1991), 12% in Taiwan (Lin *et al.*, 2003), 14.3% and 17.3% in Burkino Faso (Collenberg *et al.*, 2003 or 2006?), agreeing with Juszyk (2000) that the global prevalence of chronic HBV infection varies, highest in Africa, Asia and the Western pacific (>8%) to intermediate (2-7%) in Southern and Eastern Europe and lowest (< 2%) in Western Europe, North America and Australia.

Age is an important factor in epidemiology studies. The age of acquiring infection was found to be the major determinant of the incidence of HBV (Zali *et al.*, 1996).

Analysis showed that out of the 261 respondents, (33.7%) were illiterates out of which 43.8% tested positive for HBsAg. There is inverse association between educational status and HBsAg positivity with less less educated women showing the highest positivity, indicating the positive influence of education and public enlightenment/awareness on the carrier rate of HBV infection. Although HB infection is considered one of the most important occupational infectious hazards in developed countries (Abdoo-Karim *et al.*, 1989), results from this study did not reveal statistical significance between HB seropositivity and the different occupations of the pregnant women studied.

Most of the studied women (157, 60.2%) were in the 2nd trimester of gestation. This group also had the highest HBsAg seropositivity 13.4% (21/157), followed by those in the 3rd trimester of gestation. Result from the study also revealed that those in the 3rd trimester were more likely to be infected (OR=1.947) than those in the 1st and 2nd trimesters.

CONCLUSION

Since the virus can be transmitted from infected mother to the offspring especially at birth, the presence of hepatitis B infection in women in general and pregnant women in particular calls for concern. There is need for screening of all pregnant women and infants born to hepatitis B positive mothers. Government and Non-governmental organisations should intensify efforts to enlighten the general population on the public health importance of the disease, and hepatitis screening should be incorporated into the routine antenatal screening. Further study to follow up cases of HBsAg positive pregnant women and effect of the positivity on their babies is also important.

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REFERENCES

Abdool-Karim, S.S., Thejpal, R., Singh, B. (1989). High prevalence of hepatitis B infection in rural black adults in Mseleni, South Africa. *American Journal of Public Health*, 79: 893-894.

Awole, M. & Gebre-Selassie, S. (2005). Seroprevalence of hepatitis B surface antigen and its risk factors among pregnant women in Jimma, Southwest Ethiopia. *Ethiopian Journal of Health and Development*, 19(1):45-50

Akani, C. I., Ojule, A. C., Oporum, H. C., Ejilemele, A. A. (2005). Seroprevalence of HBsAg in pregnant women in Port Harcourt. Nigeria. *Nigeria Postgraduate Medical Journal*, 12(4): 266-270.

Agbede, O. O., Iseniyi, J. O., Kolawole, M.O., Ojuowa, A. (2007). Risk factors and seroprevalence of hepatitis B surface antigenemia in mothers and their preschool age children in Ilorin, Nigeria. *Therapy*, 4(1):67-72.

Cheesbrough, M. (2006). *District Laboratory Practice in Tropical Countries*. 2nd ed. Cambridge University Press, UK. Pp 250-252.

Clegg, T. (1991). Hepatitis B surface and e antigen seropositivity in mothers and cord blood at Port Moresby General Hospital: implication for a control program. *Papua New Guinea Medical Journal*, 34:234-237.

Collenberg, E., Ouedraogo, T., Ganame, J., Fickenscher, H., Kynast-Wolf, G., Becher, H., Kouyate, B., Krausslich, H.G., Sangare, L., Tebit, D.M. (2006). Seroprevalence of six different viruses among pregnant women and blood donors in rural and urban Burkina Faso: A comparative analysis. *Journal of Medical Virology*, 78(5): 683-692.

Drosten, C., Nipparaschk, T., Manegold, C., Meisel, H., Brixner, V., Roth, W. K., Adedjhou, A., Gunther, S. (2004). Prevalence of hepatitis B virus DNA in anti-HBV positive/HBsAg-negative sera correlates with HCV but not HIV serostatus. *Journal of Clinical Virology*, 29:59-68.

Egah, D.Z., Banwat, E.B., Audu, E.S., Iya, D., Mandong, B.M., Annele, A.A., Gomwalk, N.E. (2007). Hepatitis B surface antigen, hepatitis C and HIV antibodies in a low-risk blood donor group, Nigeria. *Eastern Mediterranean Health Journal*, 13 (4): 71-73.

Ferriara, M.S. (2000). Diagnosis and treatment of hepatitis. *Revista da Sociedade Brasileira de Medicina Tropical*. 33:389-400

Harry, T.O., Bajani, M.D., Moses, A.E. (1994). Hepatitis B virus infection among blood donors and pregnant women in Maiduguri, Nigeria. *East Africa Medical Journal*, 70: 596-597.

Juszyk, J. (2000). Clinical Course and consequence of Hepatitis B infection. *Vaccine*, 18:23-25.

Kong, K.L., Cho, Y., Lee, S.S. (1997). The declining HbsAg carriage rate in pregnant women in Hong Kong. *Epidemiology and Infections*, 199: 281-283.

Kowal, J.T. & Knabe, D.T (1972). *An Agroclimatical Atlas of the Northern States of Nigeria, with Explanatory Notes*. Ahmadu Bello University Press, 16 – 26.

Kulkarimi, S., Alowola, F.O., Wayo, G.G. (1986). Prevalence of hepatitis B surface antigen in Northern Nigerian blood donors. *Vox Sanguinis*, 50: 151-153.

Lin, H.H., Kao, J.H., Chang, T.C., Hsu, H.Y., Chen, D.S. (2003). Secular trend of age-specific Prevalence of hepatitis B surface and e antigenemia in pregnant women in Taiwan. *Journal of Medical Virology*, 69:466-470.

Luka, S.A., Ibrahim, M.B., Iliya, S.N. (2008). Seroprevalence of hepatitis B surface antigen among pregnant women attending Ahmadu Bello University Teaching hospital, Zaria, Nigeria. *Nigerian Journal of Parasitology*, 29(1): 38-41.

- Muula, A.S. (2000). Tackling HIV/AIDS in Africa-another perspective. *African Health*, 23 (1): 5-6
- Nasidi, A., Harry, T.O., Vyazor, S.O., Numumbe, G.M.R., Azzan, B.B., Ancinlev, V.A. (1983). Prevalence of Hepatitis B infection marker in two different geographical areas of Nigeria. *Proceedings of the first international conference, 12-15 December 1983, Lagos, Nigeria*.
- Obi, R.K., Umeh, S.C., Okurede, O.H. (2006). Prevalence of hepatitis B virus infection among Pregnant women in an antenatal clinic in Port Harcourt, Nigeria. *African Journal of Clinical and Experimental Microbiology* 7(2): 78-82.
- Oguntola, S. (2008). Hepatitis: Reason some women have babies with low IQ. *Nigerian Tribune*, Jan. 7, p. 1.
- Onakewhor, J.U.E., Offor, E., Okonofua, F.E. (2001). Maternal and neonatal seroprevalence of Hepatitis B surface antigen (HBsAg) in Benin City. *Journal of Obstetrics and Gynaecology*, 21(6): 583-586.
- Ryan, K. J. & Ray, C. G. (2004). *Sherris Medical Microbiology* (Eds.). 4th ed., McGraw Hill. ISBN 0-8385-8529-9.
- Sharma, R., Malik, A., Rattan, A., Iraqi, A., Maheshwari, V., Dhawan, R. (1995). Hepatitis B Virus Infection in Pregnant Women and its Transmission to Infants. *European Journal of Public Health*, 5(3): 223-225.
- Sirisena, N.D., Njoku, M.O., Idoko, J.A. (2002). HBsAg in patients with human immunodeficiency Virus1 (HIV-1) infection in Jos, Nigeria. *Nigerian Medical Practitioner*, 41:18-20.
- Sriprakash, I. & Anil, T.P. (1997). Routine prenatal screening of Indian women for HBsAg: benefits derived versus cost. *Tropical Doctor*, 107:10-15.
- WHO / EPI Protocol for assessing prevalence of hepatitis B infection in antenatal patients WHO/EPI/GEN / 90.6 1990.
- Zali, M.R., Mohammed, K., Farhadi, A., Masjedi, M.R., Zargar, A. & Nowroozi, A. (1996). Epidemiology of hepatitis B in the Islamic Republic of Iran. *Eastern Mediterranean Health Journal*, 2(2): 290-29.