

Seroprevalence of Hepatitis B and Human Immunodeficiency Virus among Pregnant Women Attending Antenatal Clinic in Dutse General Hospital

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Abstract

A study to determine the seroprevalence of hepatitis B and Human immunodeficiency virus among pregnant women attending Dutse General Hospital was conducted. Blood samples were collected from two hundred and eighty-four (284) pregnant women tested for hepatitis B infection (HBsAg) and human immunodeficiency virus (HIV) using standard immune-chromatographic assay. A structured questionnaire was also administered to collect demographic information of the study population. Result showed overall prevalence of 6 (2.11%) and 3 (1.1%) for hepatitis B (HBsAg) and human immunodeficiency virus (HIV) infections respectively. Age group 20 – 29 years recorded highest prevalence rate of 1.1% and 0.7% for hepatitis B and HIV infection respectively. In relation to occupation the artisan and full time house wives recorded highest percentage of 3(1.06%) for HBV and 1(0.35%) for HIV. Highest percentage of HBV infection was reported among pregnant women without formal education 4(1.4%) and the HIV prevalence was highest among pregnant women with primary level of education 2(0.7%).It was observed that prevalence of 1.1% for HIV and 2.11% for HBsAg respectively were lower compared to majority of previous studies conducted in Nigeria. This reduction in the prevalence might be due to efforts of the Nigeria government as well as international donor agencies, religious leaders and non - governmental organizations to reduce the prevalence of the disease in the country. Public enlightenment, screening of asymptomatic individuals are some of the important factors that mitigate the impact of HBV and HIV infections. Therefore, efforts should be made to promptly diagnose and provide intervention to infected individuals especially pregnant women with a view to preventing the unborn child.

Keywords: Human immunodeficiency virus, Hepatitis B, prevalence, Dutse, Infection.

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INTRODUCTION

Hepatitis B virus (HBV) and Human immunodeficiency virus (HIV) are the two most important infectious diseases throughout the world particularly in developing countries like Nigeria. Both HBV and HIV share common means of transmission in humans, which is responsible for the high frequency of HIV-HBV co-infections. HIV and HBV have common risk factors like injectable drug use and blood transfusion (Bergera *et al.*, 1998).

Both HIV and HBV are transmitted via sexual intercourse and mothers to off-springs. Thus, the prevalence of HIV and HBV infection in pregnant women can represent the majorities of the population in the communities because pregnant women are the interface for their sexual partners and infants. Nigeria still has the largest HIV prevalence among pregnant women, ranging from as low as 1.6% in the North-West, to 8% in the South-South, 6.5% in the South-East and 10% in the North-Central (Osotimehin, 2008).

Co-infection with hepatitis B virus and HIV leads to increased morbidity and mortality as compared to independent HIV and HBV infections (Thio, 2009). In areas where HBV infection is either low endemic or intermediate to high, the prevalence rate of HIV/HBV co-infection is recorded as high as 10–20 %. The prevalence rate can be as high as 20–25 % in countries where the viruses are highly endemic (Kew, 2012). Hepatitis B virus (HBV)-associated infection is one of the leading causes of liver diseases causing serious public health problem worldwide. These Viral infections also cause maternal complication after vertical transmission. This can cause fetal and neonatal hepatitis which may have serious effects on the neonate, leading to impaired mental and physical health later in life (Sookoian, 2006). Hepatitis B virus infection is associated with significant morbidity and mortality in patients with HIV infection. Transmission of HBV/HIV results from exposure to infectious blood or body fluids, unprotected sexual contact, blood transfusion, reuse of contaminated needles and syringes, and vertical transmission from mother to child (Christy *et al.*, 2004). The study therefore tried to determine the prevalence of HBV and HIV infections and to see whether there is association between the two infections in relation to age, level of education and occupation of the studied population.

MATERIALS AND METHODS

Study area

Jigawa State is one of the thirty-six states in Nigeria comprising of twenty seven Local Government areas. It is located in North Western Nigeria within the Sudan savannah. It shares boundaries with Niger republic to the north, Kano state to the west and Bauchi State to the east and south east. The state has a population of 3,702,676 million (FRN Official Gazette, 2009).

Procedure

A total of two hundred and eighty-four pregnant women attending antenatal clinic of the General Hospital Dutse from the month of May to September, 2016 were enrolled for this study after obtaining their informed consent. The questionnaire was administered to study population to capture their demographic profile (age, gestational age, occupation, and educational level) and awareness of existence of HBV/HIV. Five milliliters (5ml) venous blood was collected from each of the pregnant women and was poured in the plain container where it was allowed to stand for 30 minutes before the subject serum was separated and stored in the freezer for

subsequent testing. The specimen was brought to room temperature before they were tested for both HBV and HIV. The HBV test kit was used for testing the blood sample of the consented clients. The strip of the testing device was removed from sealed foil pouch and immersed with the arrows pointing vertically into the serum. The strip was then placed on a non-absorbent flat surface and allowed for 10minutes for color change.

The presence of the two bands lines on both test(T) and control (C) region implies positive result while the negative result was identified by no band in the test region, with only one band appearing in the control region (C).

HIV 1&2 testing Procedure

HIV testing was performed using the Nigerian established national rapid testing algorithm (Serial algorithm) using HIV1/2 Determine, HIV1/2 Unigold, and HIV1/2 Stat Pak HIV test kits. The Nigeria National HIV testing serial algorithm recommends Determine test kit (Screening test kit), Unigold (Confirmatory testing kit) and Stat Pak (Tiebreaker). If the Unigold and determine results are discordant, the STAT-PAK HIV test kit was used as a tiebreaker to determine the final HIV status of the patient. Incomplete questionnaires and inconclusive test results were discarded.

STATISTICAL ANALYSIS

Data were entered, processed and analyzed using Pearson Chi-square with the aid of Statistical Package for Social Sciences (SPSS) version 15.0 software. The Student *t*-test was used to test for a significant difference between means and the Chi square test was used for testing of significance of association. *AP*-value of less than 0.05 was considered statistically significant.

RESULTS

The results obtained from this study showed overall prevalence of hepatitis B (HBsAg) and human immunodeficiency virus (HIV) infections among the 284 sampled pregnant women attending the General Hospital Dutse between October to December, 2016 to be 6 (2.11%) and 3 (1.1%) respectively. The hepatitis B infection was highest among the age group 20 – 29 years with 3(1.1%) while the least 0% was found in the 40 – 49 age group.

Similarly, the highest prevalence of HIV infection among the pregnant women was found in the 20 – 29 year age group with prevalence of 2(0.7%) followed by 1 (0.4) in the age group 30 – 39year age group. The statistical analysis shows significant association between age and hepatitis B infection and HIV infection (*P*<0.005). This is detailed in the Table 1 below.

Table 1: The frequency and percentage of HBV and HIV infection in relation to age

Age Group	No. examined	No. of HBV Infection	No. of HIV infection
10 – 19	77	1(0.35%)	0(0%)
20 – 29	146	3 (1.06)	2(0.70%)
30 – 39	50	2(0.70%)	1(0.35%)
40 – 49	11	0(0%)	0(0%)
Total	284	6(2.1%)	3(1.06%)

P=0.044(HBV) P=0.043(HIV)

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The percentages based on occupation of the pregnant women sampled for the study were 145(51%), 136(48%), 1(0.35%) and 2(0.7%) for the artisans, house wives, civil servants and students respectively. The hepatitis B infection was reported only among artisan and house wife with prevalence rate of 3(1.05%) and 3(1.05%) respectively. The HIV infection was recorded among the civil servants 1(0.35%), house wives 1(0.35%) and artisan1 (0.35%) respectively. The statistical analysis showed no significant association between occupation and HBV infection ($P>0.05$) and between occupation and HIV infection among the study group ($P>0.005$).

Table 2: The frequency and percentage of HBV and HIV infections in relation to occupation

Occupation	Number examined	Number of HBV Infected	Number of HIV Infected
Civil servant s	1(0.35%)	0(0%)	1(0%)
House wife	136 (48%)	3(1.06%)	1(0.35%)
Artisan	145 (51%)	3(1.06%)	1(0.35%)
Student	2 (0.7%)	0(0%)	0(0%)
Total	284 (100%)	6(2.11%)	3(1.06%)

P=0.087(HBV)

P=0.088(HIV)

The Table 3 below showed the percentages distribution of educational levels of the pregnant women in the study in relation to HIV and HBV infections. Two hundred and six (72%), 48(16%), 28(9.9%) and 2(0.7%) were pregnant women with non-western education, primary, secondary and tertiary level of education respectively. The highest percentages of HBV infection were reported among pregnant women who did not had western education 4(1.4%) and lowest among pregnant women with tertiary level of education (0%). The HIV infection was reported to be highest among the pregnant women with primary level of education 2(0.7%) and lowest among pregnant women who did not attend western education. The statistical analysis showed no relationship between the infections and level of education ($P>0.005$).

Table 3: The frequency and percentage of HBV and HIV infection in relation to level of education

Level of Education	No. Examined	No. of HBV	No. of HIV
Non-western education	206(72.5%)	4(1.4%)	0(0%)
Primary	48(16.9%)	1(0.35%)	2(0.70%)
Secondary	28(9.9%)	1(0.35%)	1(0.35%)
Tertiary	2(0.7%)	0(0%)	0(0%)
Total	284 (100%)	6(2.11%)	3(1.06%)

P=0.110(HBV)

P=0.112(HIV)

Majority of the pregnant women enrolled for this study were in their second trimester 211(74.3%) followed by those in their third trimester 67(23.6%). The prevalence of 4(1.4%) of HBV infection was found among pregnant women in their second trimester while only one case was recorded in the women in their first and third trimester respectively. Similarly, 2(0.7%) HIV infection was reported among women in their second trimester, 1 (0.35%) in the third trimester.

The statistical analysis shows no relationship between the infections and gestational age ($P>0.005$).

Table 4: The frequency and percentage of HBV and HIV infection in relation to gestational age

Gestational age	No. examined	No. of HBV Infection	No. of HIV infection
First trimester	6(2.1%)	1(0.35%)	0(0%)
Second trimester	211(74.3%)	4(1.4%)	2(0.7%)
Third trimester	67(23.6%)	1(0.35%)	1(0.35%)
Total	284(100%)	6(2.11%)	3(1.06%)

P=0.199(HBV)

P=0.130(HIV)

DISCUSSION

Viral hepatitis and HIV infections remain a public health problem in developing countries. In Asia and sub-Saharan Africa, HBV and HIV infection is endemic and responsible for over 75% of the chronic diseases including liver disease (Agbede *et al.*, 2007). Screening asymptomatic people is an important instrument in disease detection, prompt diagnosis and intervention, particularly at an early stage of the disease. This may improve the health outcome as well as better understanding of the transmission pattern of the disease (Akani *et al.*, 2005).

The results obtained from this study showed overall prevalence 6(2.11%) and 3 (1.1%) for hepatitis B (HBsAg) and human immunodeficiency virus (HIV) infections respectively among the 284 pregnant women studied among the pregnant women attending the General Hospital Dutse between October to December, 2016. The hepatitis B and HIV infection were equally highest among the age group 20 - 29 year age group with 3(1.1%) and 2(0.7%) respectively. This age bracket falls within the sexually active age which is one of the factors responsible for transmission of sexually transmitted diseases including HIV and HBV, this finding is similar to the work of Alegbeleye (2013) who reported higher prevalence of HBV and Sagay *et al.*, (2005) of HIV among women between the ages of 20 to 24 years. This study also revealed higher prevalence of hepatitis B infection among artisan and house wives with prevalence rate of 3(1.05%) and 3(1.05%) respectively, and HIV infection among civil servants 1(0.35%), house wives 1(0.35%) and artisans 1(0.35%). The economic dependence could be a factor for sexually transmitted diseases as those living at or near poverty level have limited access to health care delivery.

The highest percentages of HBV infection were reported among pregnant women who did not had western education 4(1.4%) and the HIV infection was reported highest among the pregnant women with primary level of education 2(0.7%). Education and public enlightenment/awareness on the HIV an HBV infection rates can also be responsible for the prevalence in the study area. Also, the prevalence of 1.4% of HBV infection was found among pregnant women in their second trimester and 2(0.7%) HIV infection was reported among women in their second trimester is lower than the work of Ndams *et al.*, (2008) and Ndako *et al.*, (2012) who report 13.4% and 12,8% respectively for HIV and HBV infection respectively.

The HIV prevalence of 1.1% is lower than what was reported by Osotimehin (2008) that HIV prevalence among pregnant women were 1.6% in the Northwest, to 8% in the South-South,

6.5% in the South-East and 10% in the North-Central (Osoimehin, 2008). This reduction in the prevalence might be as result of the efforts of the Nigeria and international government organization to reduce the prevalence of the disease in the country by ensuring testing, counseling and start that is commencement on ART regimen and Preventive Mother To Child Transmission exercise.

This prevalence rate of 2.11% is low compared to report in previous studies in different regions of Nigeria. Prevalence of 4.3% was reported in Port Harcourt, 5.5% in Bayelsa (Akani *et al.*, 2005), 2.19 % in Benin City (Onakewhor, 2011) and 6.67% in Awka and 16.5% in Osogbo (Rabiu, 2007), all in southern Nigeria. The result is also lower than the prevalence rates of 3.8% in Abuja (Akani *et al.*, 2005), 5.7% in Ilorin (Agbede *et al.*, 2007), 6.51% in Sokoto (Saidu *et al.*, 2015), 6.57% in Minna (Ndams *et al.*, 2008) and 8.3% in Zaria (Luka *et al.*, 2008), all in Northern Nigeria. However, this prevalence is higher when it is compared with 0.14% to 0.97% in the US (excluding Asian-Americans), 1.65% in Mexico, and 1.6% in Saudi Arabia among pregnant women (Yeshe *et al.*, 2016). This low prevalence of HBV and HIV among the studied group could be attributed to the religious believes which forbid adultery and fornication, cultural and behavioral believes.

CONCLUSION

It was observed that pregnant women with non-formal education had higher prevalence than those with at least a secondary and primary-school education. Neither the level of education, occupation nor gestational age was significantly associated with HBV and HIV infection.

Pregnant women should be routinely screened for both HBV and HIV as part of their antenatal care services and effective vaccination against hepatitis B virus. Government and non-governmental organizations should intensify efforts on enlightenment campaigns on the routes of transmission, modes of transmission, prevention and as well as control measures of both infections in our communities and the country at large.

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REFERENCES

- Agbede O.O., Iseniyi J.O., Kolawale O.M., Ojuawo A., (2007). Risk Factors and Seroprevalence of Hepatitis B Surface Antigenemia in Mother and Preschool Children in Ilorin, *Therapy*; 4(1): 67-72
- Akani C.I., Ojule A.C., Oporum H.C., Ejilemele A.A., (2005). Seroprevalence of Hepatitis B surface Antigen among pregnant women in Port Harcourt, Nigeria *Nigerian Postgraduate Medical Journal*; 12 (4): 266-270.
- Alegbeleye J O, Nyengidiki T K, Ikimalo J (I2013). Maternal and neonatal seroprevalence of hepatitis B surface antigen in a hospital based population in South-South, Nigeria. *Int J Med Sci*;5:241-246.
- Bergera A, Doerra HW, Webera B: Human immunodeficiency virus and hepatitis B virus infection in pregnancy: diagnostic potential of viral genome detection. *Intervirology* 1998, 41:201-207.
- Christy N E, Denis E.A, Gilbert O.N, ChidiU I, Matthias I. A Herbert O. O, Chidiebere I. I (2004), The sero prevalence of hepatitis B surface antigen and human immune deficiency virus among pregnant women in Anambra state, Nigeria. *Shiraz E-Medical Journal* Vol. 5.
- Kew MC. (2012). Hepatitis B virus/human immunodeficiency virus co-infection and its hepatocarcinogenic potential in sub-saharanblack Africans. *Hepat Mon.*;12(10): 7876. [PMC free article] [PubMed]
- Luka S.A., Ibrahim M.B., Illiya S.N. (2008). Seroprevalence of Hepatitis B surface Antigen among pregnant women attending Ahmadu Bello University Teaching Hospital, Zaria, Nigeria". *Journal of Parasitology*; 29(1): 38-41
- Ndako J.A., (2012). Hepatitis B virus Seroprevalence among pregnant females in Northern Nigeria" *Nigeria Journal of Medical Sciences*; 6: 129- 133
- Ndams, I.S., Joshua, I.A., Luka S.A., Sadiq HO (2008). Epidemiology of Hepatitis B Virus among pregnant women attending ANC General Hospital, Minna, Nigeria. 10(3): 434-8.
- Onakewhor J.U.E, Offor E., Okonofua F.E. (2011). Maternal and Neonatal Seroprevalence of Hepatitis B Surface Antigen in Benin City. *Journal of Obstetrics and Gynaecology*; 21(1): 583- 586.
- Osoimehin B (2008). Director General, National Action Committee for the control of AIDS (NACA), Federal Ministry of Health, Nigeria. *NACA Bulletin*.
- Rabiu, K.A., Akinola OI, Adewunmi AA, Omololu OM, Ojo TO (2007)" Risk Factors for HBV Infection among Pregnant Women in Lagos, Nigeria". *Science World Journal* 2: 34-47.
- Sagay A.S, Kapiga S.H, Imade GE, Sankale JL, Idoko J, Kanki P (2005). HIV infection among pregnant women in Nigeria. *Int J GynaecolObstet*; 90:61-7. Volume:38, Article ID: e2016027, pages
- Saidu, A.Y., Salihu, Y., Umar, A.A., Muhammad, B. S., Abdullahi, I (2015). Seroprevalence of Hepatitis B Surface Antigen among Pregnant Women Attending Ante-Natal Clinics in SokotoMetropolis *Journal of Nursing and Health Science*, Vol 4, pp. 46-50.
- Sookoian S. Liver disease during pregnancy: acute viral hepatitis. *Ann Hepatol.* (2006). 5(3):231.
- Thio CHepatitis B and human immunodeficiency virus co-infection., *Hepatology* 2009, 49(5):138-145.
- World Health Organization(2016). *Emergencies preparedness, response: hepatitis: frequently asked Questions* [cited,2016 ,Jul5]. Available from: http://www.who.int/csr/disease/hepatitis/world_hepatitis_day/question_answer/en/. Vol11, no. 2, pp. 125-127.

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