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Research Article



Prevalence of Hepatitis B virus infection among children attending mohammed shuwa memorial hospital Maiduguri, Borno state, Nigeria

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Abstract

Hepatitis B virus is a serious public health problem worldwide and major cause of chronic hepatitis, cirrhosis, and hepatocellular carcinoma (HCC). This study was aimed to determined Hepatitis B virus infection among children attending Mohammed Shuwa Memorial Hospital Maiduguri. Out of one hundred serum samples tested, only 8 (8.0%) were positive to HBV. The distribution of hepatitis B virus based on age showed that those between 3- 5years had higher prevalence of 3(6.7%), followed by 0 - 2years (12.5%), 6- 8 years (6.7%) and 9- 12years (6.3%). Male were more prevalent with hepatitis B virus infection 4 (10%) than their counterpart females 4(6.7%). A direct relationship between the educational status of the patients and the seroprevalence of HBV was observed, higher prevalence was recorded 5 (7.2%) among those that have undergone formal education than non-formal education. However, none of this variables were found to be risk factor of acquiring HBV infection ($P>0.05$). Therefore, Hepatitis B virus vaccine should be recommended in all hospitals in Borno State to enable early detection and appropriate management of patients.

Keywords: HBV, Children, Hospital and Prevalence

Introduction

Hepatitis B virus (HBV) is a member of the family *hepadnaviridae*. The virus particle consists of an outer lipid envelope and icosahedra nucleocapsid core that composed of protein. These virions are 30-42nm in diameter. The outer envelope contains embedded proteins that are involved in viral binding of, and entry into, susceptible cells. The nucleocapsid encloses the Viral DNA and a DNA polymerase that has reverse transcriptase activity. (Nassal, 2007). Hepatitis B virus is a circular genome of partially double-stranded DNA. The virus replicate through an RNA intermediate form by reverse transcription which in practice relates them to retroviruses. Although replication takes place in the liver, the virus spreads to the blood where viral protein and antibodies against

them are found in infected people. The hepatitis B virus is 50 to 100 times more infectious than Human Immune Deficiency virus (HIV) (Dienstag, 2008). Hepatitis B virus is originally known as “serum hepatitis,” the disease has case epidemics in parts of Asia and Africa, and it is now only endemic in china. Hepatitis B virus primarily interferes with the functions of the liver by replicating in liver cells called the hepatocytes (Kramvis *et al.*, 2004). Hepatitis B virus is a non-cytopathic virus; this means that the virus its self does not cause direct damage to liver cells. Instead, it is the immune system’s aggressively response to the virus that usually leads to inflammation and damage to the liver. However, it can cause damage to the genetic material inside liver cells. This can lead to liver cancer which, like hepatitis, can also be fatal (Kramris *et al.*, 2004).

Hepatitis B virus is present in blood, semen, and vaginal fluids and is transmitted primarily through sexual activity. Another major transmission route is sharing injection drug equipment (needles, cookers, tourniquets) and, to a lesser extent, non-injection drugs (cocaine straws and crack pipes) due to the possibility of exposure to blood. Pregnant women who have hepatitis B virus can transmit the virus to their fetus, most likely during birth. Babies infected with hepatitis B virus (HBV) go on to experience chronic hepatitis B virus (HBV) infection. Babies infected with hepatitis B virus around the time of birth go on to experience chronic HBV infection approximately 90% of the time, which is important that pregnant women know whether or not they are infected with the virus before giving birth. Medication can be given to the baby after birth to help prevent hepatitis B. Young children who are infected with hepatitis B virus (HBV) have a 25 percent to 50 percent risk of developing chronic hepatitis B. With adults, the risk of developing chronic hepatitis B virus infection depends on the health of the immune system (Kidd- Ljunggren *et al.*, 2002). Therefore, the aim of this study is to determine prevalence of hepatitis B virus infection among children attending Mohammed Shuwa Memorial Hospital Maiduguri.

Materials and Methods

Study area

This study was carried out in Mohammed Shuwa Memorial Hospital Maiduguri, Borno State, Nigeria. Borno state is situated in the Northeastern part of Nigeria which lies in latitude 10° N and 13°E. It shares international boundaries with the Republic of Niger to the north, Chad to the Northeast and Cameroon to the east. Within the country, it shares National boundaries with Adamawa State to the South, Yobe State to the West and Gombe State to the South-West. The State has an area of 69,435 square kilometers, about 7.69% of the total land area of the country. Based on the 2006 census figure, the state has a population of 4,151,193 with the population density of approximately 60 inhabitants per square kilometer (NPC, 2006). The state is presently structured into 27 Local Government Areas.

Study population

The population consists of children who attended the hospital within the period of the study after seeking the

consent of their parent to participate in the study. The subjects who were not willing to participate in the study were excluded.

Questionnaire Administration

Questionnaires were used in this study to obtain data from each patient. All the patients willing to participate in this were interviewed in detail and the data was recorded on a prescribed questionnaire. The data consisted of participant's demographic variables considered as risk factors for contracting both hepatitis B virus, these included Age, sex, and educational status.

Sample collections

About 5 ml of whole blood were collected through vein puncture and transferred into sterile plain bottles and the blood was allowed to clot. The blood was then centrifuged at 1500 rpm for 5 minutes to obtain the serum. The serum was extracted with a sterile pipette tip into a clear vial and stored at -20° C until tested (www.life technologies.com/af/en/home)

Determination of HBsAg

The HbsAg was detected using HbsAg device (Healgen Scientific Limited Liability Company). This is a rapid test used to determine hepatitis B virus which is a quantitative solid phase and two site sandwich immunoassay for the detection of HBsAg in whole blood, serum or plasma. The membrane is pre-coated with Anti-HBsAg antibodies on the test line region of the test strip. During testing the whole blood serum or plasma reacts with anti-HBsAg antibodies conjugated particles, the mixture migrates upward on the membrane and generates a colored line.

Statistical analysis

The data generated in this study was analyzed using (R version 2.13.1) chi-square to determine the relationship between the hepatitis B virus infection and socio-demographic variables such as age, sex and educational status.

Results

The results of the prevalence of hepatitis B virus among children attending Mohammed Shuwa

Memorial Hospital Maiduguri, Borno, Nigeria showed that out of one hundred serum samples tested, only 8 (8.0%) were positive to HBV. The distribution of hepatitis B virus based on age showed that those between 3- 5years had higher prevalence of 3(6.7%), followed by 0 - 2years (12.5%), 6- 8 years (6.7%) and 9- 12years (6.3%). However, there was no statistically significant relationship between age and the viral infections (X-squared = 0.5798, df = 3, p-value = 0.901) as shown on Table 1.

Table 1: Distribution of hepatitis B virus among children attending Mohammed Shuwa Memorial Hospital Maiduguri based on age

AGE	TOTAL (%)	POSITIVE	POSITIVE (%)
0 - 2	16 (16.0)	2	12.5
3 - 5	38 (38.0)	3	7.9
6 - 8	30 (30.0)	2	6.7
9 - 12	16 (16.0)	1	6.3
TOTAL	100 (100)	8	8.0

(X-squared = 0.5798, df = 3, p-value = 0.901)

Distribution of hepatitis B virus with respect to gender showed that, males were more prevalent with hepatitis B virus infection with 4 (10%) than their counterpart females with 4(6.7%), although, no statistically

significant relationship between age and the viral infections (X-squared = 0.5798, df = 3, p-value = 0.901) as shown in Table 2.

Table 2: Distribution of hepatitis B virus among children attending Mohammed Shuwa Memorial Hospital Maiduguri based on sex

SEX	TOTAL (%)	POSITIVE	POSITIVE (%)
MALE	40(40.0)	4	10
FEMALE	60(60.0)	4	6.7
TOTAL	100(100)	8	8.0

(X-squared = 0.051, df = 1, p-value = 0.8214)

The social characteristics of the studied children (educational attainment) were presented on Table 3. Of the 100 children population studied, 69(69.0%) were undergone formal education while the remaining and 31 (31.0%) have not attained formal education. A direct relationship between the educational status of the patients and the seroprevalence of HBV was

observed. Higher prevalence was recorded 5 (7.2%) among those that have undergone formal education than non-formal education, although, no statistically significant relationship between age and the viral infections (X-squared = 3e-04, df = 1, p-value = 0.9873) as shown on Table 3.

Table 3: Distribution of hepatitis B virus among children attending Mohammed Shuwa Memorial Hospital Maiduguri based on education

EDUCATION	TOTAL (%)	POSITIVE	POSITIVE (%)
FORMAL	69(69.0)	5	7.2
NON-FORMAL	31(31.0)	3	9.7
TOTAL	100(100)	8	8.0

(X-squared = 3e-04, df = 1, p-value = 0.9873)

Discussion

In this study, one hundred (100) children were recruited and examined for the presence of serological marker for HBV infections. The results showed that the prevalence rate of hepatitis B virus infection among children attending Mohammed Shuwa Memorial Hospital Maiduguri was 8.0% (Table 1). This figure (8%) is classified as endemicity of hepatitis B virus infection (2- 8%) (Lavanya *et al.*, 2012). Higher prevalence of hepatitis B virus infection in the studied area might be due to lack of vaccination among the pregnant women which enhance the transmission of the virus parenterally among the studied population. The implication of this finding is that most of the children carrying hepatitis B virus are asymptomatic and might serve as a source of transmission of the virus and may even become chronic carriers, which develop to chronic hepatic inflammation that can slowly progress to severe liver diseases such as cirrhosis and hepatocellular carcinomas. The finding of this study is less than the 13.9% report by Donbraye *et al.* (2014) among children at Ilesha, Osun State, South-Western, Nigeria. It is also less than 10.3% reported by Nasidi and co-workers (1986) among children in Lagos and Bauchi State, while Akenami *et al.* (1997), in Calabar detected HbsAg prevalence of 20 to 26% in healthy and malnourished children, respectively. Bukbuk and co-workers (2005) found HbsAg prevalence of 44.7% among pupils in primary school in rural Borno State.

The distribution of hepatitis B virus based on age showed that those between 3- 5years had higher

prevalence of 3(6.7%), followed by 0 - 2years (12.5%), 6- 8 years (6.7%) and 9- 12years (6.3%). However, there was no statistically significant relationship between age and the viral infections (X-squared = 0.5798, df = 3, p-value = 0.901). Similarly, distribution of hepatitis B virus with respect to gender showed that, males were more prevalent with hepatitis B virus infection with (10%) than their counterpart females with (6.7%). This result disagrees with the result of Donbraye *et al.* (2014) who reported that the female prevalence (15.4%) is greater than their counterpart male (12.7%). It also disagree with result of Harry *et al.* (1994) who reported the prevalence of 22% and 11.6% respectively, for female and male in Northern Nigeria. However, no statistically significant relationship between age and the viral infections (X-squared = 0.5798, df = 3, p-value = 0.901)

Conclusion

The result of this study pinpointed the prevalence of hepatitis B virus among children attending Mohammed Shuwa Memorial Hospital Maiduguri, Borno, Nigeria. Out of one hundred serum samples tested, only 8 (8.0%) were positive to HBV. Distribution of HBV based on age, educational status and sex were considered in this study, but none of this variable was found to be risk factor of acquiring HBV infection ($P>0.05$). Therefore, Hepatitis B virus vaccine should be recommended in all hospitals in Borno State to enable early detection and appropriate management of patients.

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