International Journal of Advanced Research in Biological Sciences
ISSN : 2348-8069
www.ijarbs.com

Research Article

Prevalence of hepatitis B Virus among students attending University of Maiduguri clinic, Borno, Nigeria

[1]M. A. Isa[1], [1]H. S. Bello, [1]A. Mustapha, [1]H. K. Mangga, [2]I. A. Gulani, and [3]M A. Aisha

[1]Department of Microbiology University of Maiduguri, P.M.B. 1069, Borno State, Nigeria
[2]Department of Veterinary Medicine University of Maiduguri, P.M.B. 1069, Borno State, Nigeria
[3]Deparment of Medicine and surgery, College of Medical Science University of Maiduguri, Borno State, Nigeria
*Corresponding author: *mustafaalhajiisa@gmail.com*

Abstract

Hepatitis B virus (HBV) is a major cause of liver disease worldwide. Both acute and chronic HBV infections continue to represent important health problems in most developing countries. Therefore, this study was aimed to determine the prevalence of HBV infection among students at University of Maiduguri Clinic. Out of 70 serum samples tested, only 8 (11.4%) were positive for HBV. This include 7 (19.4%) among male students while 1 (2.9%) was among their female counterpart. Also, higher prevalence of HBV was recorded among students between age group 23-28 years 5(16.7%), followed by age 17-22 years 2(5.7%), > 34year and 29-34 years with the prevalence of 1(450.0%) and 0(0.0%) respectively. This shows that Hepatitis B virus is an endemic among students and indicating high risk of horizontal transmission.

Keywords: Prevalence, Clinic, Students and HBV

Introduction

Hepatitis B virus is a partially double-stranded circular DNA virus and is a member of the *Hepadnaviridae family* (Ahad and Alim, 2006). The virus consists of a core capsid which contains viral DNA and this is surrounded by an envelope containing surface antigen (HBsAg). The HBsAg particles vary greatly in morphology and are found in high concentrations in early acute infection and continue to be produced in chronic disease. Hepatitis B virus (HBV) is a major cause of liver disease worldwide. Both acute and chronic HBV infections continue to represent important health problems in most developing countries (Alam *et al.,* 2006). Socio-economical factors and poorly developed healthcare delivery system mainly contribute to ineffective control of HBV in developing countries. The prevalence of HBV infection varies from country to country and within countries, having a close association with behavioural, environmental host factors (Chowdhury *et al.,* 1991). It is estimated globally that 350-400 million people are chronically infected with Hepatitis B Virus. In developing countries of Africa, and Asia, the prevalence is greater than 8% and 2 billion have markers of current or past infection and 350 million have chronic infection. HBV can be transmitted by sexual contact, through the skin, by inoculation with contaminated blood or blood products, by transplantation of organs from infected donors. The risk of transmission from infected individuals, however, is unpredictable because of the substantial variability in HBV replicative activity that occurs during the various phase of chronic HBV infection (Keefe *et al.,* 2004).

Hepatitis B virus (HBV) has been described as major public health problems, occurring endemically, in all

areas of the world (Maddrey, 2000). Hepatitis B virus (HBV) is a DNA virus which belongs to the family of Hepadnaviridae, and is the causative agent of hepatitis B infection (Pennap *et al.,* 2010). Hepatitis B virus (HBV) is a small double - stranded DNA virus composed of an outer envelope containing hepatitis B surface antigen (HBsAg) and an inner nucleocapsid consisting of hepatitis B envelope antigen (HBeAg) and hepatitis B core antigen (HBcAg). Hepatitis B virus is a hepatotropic virus that replicates in the liver and causes hepatic dysfunction (Loguerci *et al.,* 1997; Lai *et al.,* 2003). During hepatitis B infection, many virus particles are released from infected liver cells, resulting in large amount of viral antigen entering the blood. Hepatitis B surface antigen (HBsAg) is present in about two weeks before the onset of symptoms and persists throughout the course of the disease (Cheesbrough, 2002). At the recovery, it declines and is no longer detectable after 4 – 5 months. Persistence of HBsAg beyond six months indicates chronic infection or carrier state (Lok and McMahon, 2001: Cheesbrough, 2002). Detectable antigens of hepatitis B virus also include; hepatitis B envelope antigen (HBeAg) a secreted product of the nucleocapsid gene of hepatitis B virus during chronic hepatitis B virus infection and its presence indicates that the virus is replicating and the infected individual has a high level of hepatitis B virus. Therefore the aim of this study is to determine the prevalence of HBV among students attending University of Maiduguri clinic, Borno State, Nigeria.

Materials and Methods

Study area

The study was carried in University of Maiduguri Clinic, Maiduguri Borno Sate, Nigeria. Borno State is located in the North-Eastern part of Nigeria lies in latitude 10^{o} N and 13^{o}E. The state occupies the greater part of the Chad Basin in the North-Eastern part of the country and shares international borders with the Republic of Niger to the North, Chad to the North-East and Cameroun to the East. Most important to the country is the state's strategic location as a gate way to East and Central Africa. Internally, the state share borders with the neighboring states of Adamawa to the South, Yobe to the West and Kano to the north-west and Gombe 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. Base on the 2006 census figure, the population density of approximately 60 inhabitants per square kilometer (NPC, 2006).

Questionaire

Questionaire was used in this study to obtained information socio-demographic variable which considered as risk factors of acquiring HBV infection. The information include age and gender.

Collection of sample

Five (5ml) millilitre of blood samples was collected from each student using venupunture. The blood samples were left to clot, after which serum samples were separated from the clot by centrifuging at 2000rpm for 10minutes. Serum samples were then be separated from the clots, and stored at room temperature in labelled bottles until assay

Determination of HBsAg

HBsAg diagnostic rapid test strip was used to check the presence of hepatitis B in the blood. This is a one step qualitative solid phase, two-site sandwich immunoassay for the detection of HbsAg in serum. The membrane is pre-coated with anti-HbsAg antibodies on the test line region of the strip. During testing the serum specimen reacts with Anti- HbsAg antibodies conjugated particles. The mixtures migrate upward on the membrane and generate a coloured line. The presence of this coloured line in the test region indicates a positive result, while its absence indicates a negative result. To serve as a procedural control, a coloured line will always appear in the control line region indicating that proper volume of specimen has been added and membrane wicking has occurred.

Statistical analysis

The data was subjected to statistical analysis (the $\chi 2$-test, with the level of significance set at $p < 0.05$) using statistical package (R version 2.13.1) to determine any significant relationship between infection rate, age and gender.

Results

The results of the seroprevalence of hepatitis B virus (HBV) infection among patients attending University of Maiduguri Clinic showed that out of 70 serum

samples tested, only 8 (11.4%) were positive for HBV. This include 7 (19.4%) among male students while 1 (2.9%) were among their female counterpart, although, no statistical significant difference was observed (X-squared = 3.2156, df = 1, p-value = 0.07294) (Table 1).

Table 1: Distribution of HBV infection among students attending University of Maiduguri Clinic based on sex

Gender	Total (%)	HBsAg Positive	HBsAg Positive (%)
Male	36 (51.4)	7.0	19.4
Female	34 (48.6)	1.0	2.9
TOTAL	70 (100)	8.0	11.4

(X-squared = 3.2156, df = 1, p-value = 0.07294)

Distribution of HBV infection among students attending University of Maiduguri Clinic based on age showed that out of the 70 students that were screened for HBV, only 8 (11.4%) were positive while 62 (88.6%) were negative for hepatitis B virus infection. Higher prevalence of HBV was recorded among students between age group 23-28 years 5(16.7%), followed by age 17-22 years 2(5.7%), > 34year and 29-34 years with the prevalence of 1(450.0%) and 0(0.0%) respectively, although, no statistical significant difference was observed(X-squared = 5.2688, df = 3, p-value = 0.1531) (Table 2).

Table 2: Distribution of HBV infection among students attending University of Maiduguri Clinic based on age

Age	Total (%)	Positive HBsAg	Positive HBsAg (%)
17–22	35 (50.0)	2	5.7
23 –28	30 (42.9)	5	16.7
29 – 34	3 (4.3)	0	0.0
>34	2 (2.5)	1	50.0
TOTAL	70 (100)	8	11.4

(X-squared = 5.2688, df = 3, p-value = 0.1531)

Discussion

The result of this study showed that the prevalence of HbsAg among students attending University of Maiduguri Clinic, Borno State, Nigeria was 8.0%. This result is contrary to several previous results reported in different geographical zones of Nigeria (Okonko *et al.,* 2010; Pennap *et al.,* 2010; Eke *et al.,* 2011; Olaitan and Zamani, 2010; Olokoba *et al.,* 2009; Atina *et al.,* 2004). The frequency of occurrence of HbsAg among different subject in Nigeria varies from one location to another with age, sex, occupation and history of blood transfusion as important risk factors. The prevalence of 8.0% recorded in this study was relatively lower than 13.3% reported by Pennap *et al.* (2010) among people of a local community in Keffi, Nigeria. It also lower than 12.4% reported by Alikor and Erhabor (2007) in children attending tertiary health institution in Niger Delta of Nigeria, 10.3% reported in by Sirisena *et al.,* (2002) in Jos, 9.5% reported by Olaitan and Zamani (2010) among ante-natal patients in Gwagwalada, Abuja, Nigeria and 8.3% reported by Eke *et al.* (2011) among low resource setting, 26.2% reported by Atina *et al.* (2004) among patients with acute Icteric hepatitis, 21.3% reported in Ibadan (Otegbayo *et al.,* 2003), 20.0% found by Alao *et al*. (2009) in Otukpo, an urban area of Benue State, 14.5% overall HbsAg seroprevalence reported by Lawal *et al*. (2009) in Ibadan, 18.6% reported by Buseri *et al*. (2009) in Osogbo, Nigeria. In contrast it is less than the value is also higher than 2.5% in Maiduguri (Baba *et al*., 1999), 4.0% reported by Okonko *et al.* (2010) among patients in Abeokuta, South-Western, Nigeria. The figure reported in this study is also higher than the 4.9% reported by Ejele and Ojule (2004) in Port Harcourt.

The results of the seroprevalence of hepatitis B virus (HBV) infection among patients attending University of Maiduguri Clinic based on sex showed that out of 70 serum samples tested, only 8 (11.4%) were positive for HBV. This include 7 (19.4%) among male students

while 1 (2.9%) were among their female counterpart, although, no statistical significant difference was observed (X-squared = 3.2156, df = 1, p-value = 0.07294) (Table 1).

Distribution of HBV infection among students attending University of Maiduguri Clinic based on age showed that out of the 70 students that were screened for HBV, only 8 (11.4%) were positive while 62 (88.6%) were negative for hepatitis B virus infection. Higher prevalence of HBV was recorded among students between age group 23-28 years 5(16.7%), followed by age 17-22 years 2(5.7%), > 34year and 29-34 years with the prevalence of 1(450.0%) and 0(0.0%) respectively, although, no statistical significant difference was observed(X-squared = 5.2688, df = 3, p-value = 0.1531) (Table 2).

Conclusion

The results of the seroprevalence of hepatitis B virus (HBV) infection among students attending University of Maiduguri Clinic showed that out of 70 serum samples tested, only 8 (11.4%) were positive for HBV. This shows that Hepatitis B virus is an endemic among students and indicating high risk of horizontal transmission.

References

Ahad M A, Alim M A. Current challenges in hepatitis B TAJ (The Journal of teachers association RMC, Rajshahi) 2006; 19 (1): 38-44.

Alao, O, Okwori E, Egwu C, Audu F. (2009). Seroprevalence of Hepatitis B Surface Antigen among Prospective Blood Donors in an Urban Area of Benue State. *The Internet Journal of Hematology*; 5(2)

Alikor, E. A. and Erhabor O. N. (2007).Seroprevalence of hepatitis B surface antigenaemia in children in a tertiary health institution in the Niger delta of Nigeria. *Nigerian Journal of Medicine*; 16(3): 250-251.

Atina J. O., Ogutu E. O., Hardison W. G. and Mumo J. (2004). Prevalence of hepatitis a, b, c and human immunodeficiency virus seropositivity among patients with acute icteric hepatitis at the kenyatta national hospital, Nairobi. *East African Medical Journal:* 183-187.

Baba, M.M., Onwuka, I.S. and Baba, S.S. (1999).Hepatitis B and C virus infections among pregnant women in Maiduguri, Nigeria.*Central European Journal of Public Health;*ISSN1210-7778. 7(2): 60-62.

Buseri, F. I., Muhibi, M. A. and Jeremiah, Z. A. (2009).Sero-epidemiology of transfusion transmissible infectious diseases among blood donors in Osogbo, South-West Nigeria.*BloodTransfusion* 7(4): 293–299.

Cheesbrough.M. (2002). *District Laboratory practice in Tropical Countries* Part 2. Cambridge Low Price edition; 252 – 264.

Chowdhury S G M, Ahmed Q, Islam M N. (1991). HBsAg in unscreened operated patients. Bangledash medical research council bull. 17:11-16.

Ejele, O. A. and Ojule, A. C. (2004). The Prevalence of Hepatitis B Surface Antigen (HBsAg) among prospective blood donors and patients in Port Harcourt, Nigeria. *Nigerian Journal ofMedicine;* 13:336-338 (s).

Eke, C. A., Eke, A. U., Ifeanyichukwu O. C., Ezebialu U. and Ogbuagu, U. (2011). Prevalence, correlates and pattern of hepatitis B surface antigen in a low resource setting. *Virology Journal*.8:12 http://www.virologyj.com/content/8/1/12.

Lai, C. L., Ratziu, V., Yuen, M. F., Poyard. (2003). Viral hepatitis B. *Lancet*, 362: (940).

Lawal, O. A., Bakarey, A. S., Uche, L. N., Udeze, A. O. and Okonko, I. O. (2009). Hepatitis B Virus Infection among Prospective Human Immunodeficiency Virus Positive Blood Donors at Two Designated Blood Banks in Ibadan, Nigeria. *World Applied Science Journal 7(10):1269-1274*.

Loguercio, C., DeGirlamo, V., Federico, A., Feng, S. L., Cataldi, V., Del Vecchio, Blanco, C. and Gialanel la. G. (1997). Trace elements and chronic liver diseases *J. Trace Element Biological*, 11(3); 158-161.

Lok AS, McMahon BJ, (2001). "practice guidelines committee, American association for the study of liver disease". Hepatology. 34 (6): 1225-4.

Maddrey, W. C. (2000). Hepatitis B: an important public health issue. *Journal of Medical Virology*; 61:362-366.

National Population Commission, Nigeria. (2006). Report of the final nationalcensus results. Abuja

Okonko , Soleye F. A., Alli J. A., Ojezele M. O., Udeze A. O., Nwanze J. C., Adewale O. (2010). Seroprevalence of Hbsag Antigenaemia among Patients in Abeokuta, South Western Nigeria.10 (2). 40- 46.

Olaitan O. A. and Zamani G. L. (2010). Prevalence of hepatitis B virus and hepatitis C virus in ante-natal patients in Gwagwalada- Abuja, Nigeria. Report and Opinion. 2(7). http://www.sciencepub.net/report

Olokoba, A. B., Salawu, F. K., Danburam, A., Desalu, O. O., Olokoba, L. B., Wahab, K. W., Badung, L. H., Tidi, S. K., Midala, J., Aderibigbe, S., Abdulrahman, M. B., Babalola, O. M. and Abdukkarim, A. (2009). Viral Hepatitides in Voluntary Blood Donors in Yola, Nigeria. *European Journal of Scientific Research 31(3)*:329-334

Pennap G. R., Yakubu A., Oyige O., Forbi J. (2010). Prevalence of hepatitis B and C virus infection among people of a local community in Keffi, Nigeria. *African Journal of Microbiology Research*, 4 (4): 274-278.

Salam M N. Viral hepatitis – past and present. Hepatitis B virus infection at Dhaka. Bangledash medical research council bull. 1984; 13: 16-26.

Sirisena, N. D., Njoku, M. O., Idoko, J. A., Isamade, E., Barau, C., Jelpe, D., Zamani, A. and Otawa, S. (2002). Carriage rate of HBsAg in an urban community in Jos, Plateau State Nigeria.Nig. *Postgrauate Medical Journal*. 9: 7–10.