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Seroprevalence of Hepatitis B Surface Antigen among Out Patients Attending a Tertiary Hospital in Kaduna State, Nigeria

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Abstract

A survey was conducted amongst 100 randomly selected out-patients attending Nigerian Reference Hospital (44), Kaduna State, Nigeria, in order to ascertain the prevalence of Hepatitis B infection and the general knowledge of people about this highly infectious disease. Sera collected were tested for the presence of Hepatitis B surface antigen (HBsAg) using Wondfo Diagnostic rapid test Kit (Biotech co. Ltd., China). Questionnaires were also distributed to the subjects in order to ascertain their perception about the disease, and to obtain useful socio demographic information. Chi square test was used to ascertain statistical associations between important characteristics in the study population. A total of 12 out of the 100 patients tested positive to HBsAg, giving a prevalence of 12%. There was significant association between seropositivity of HBsAg and blood donation (p= 0.018, df= 1), and also immunization status (p= 0.0183, df= 1). The knowledge of HBV infection in the study population was generally poor and this may have accounted for the prevalence of 12% in the study population.

Key Words: HBsAg, Seroprevalence, Patients, Kaduna, Nigeria

INTRODUCTION

Hepatitis B virus (HBV) is a double stranded circular DNA virus, belonging to the family *Hepadnaviridae* (Prescott *et al*., 2008). Hepatitis B virus has a complex structure and can cause one of the most infectious diseases of the world (Blattacharya *et al*., 2007), resulting in fatal, chronic liver diseases. It is in fact reported to be the most common cause of liver disease in Nigeria (Musa *et al*., 2015). Hepatitis B virus is easily transmitted to non-immune persons, via contact with infected blood or body fluids such as saliva, hence it is acquired through blood transfusion with infected blood, intimate sexual contact; particularly during unprotected sex, sharing of contaminated sharp objects such as needles, and close personal contact in over-crowded households. It could also be transmitted from an infected mother to her un-born child through the placenta. HBV is capable of producing viral particles having a complex surface antigen termed Hepatitis B surface antigen (HBsAg), widely circulated in the blood of infected persons. This, has made it possible for immunological diagnosis involving antigen detection in infective sera. Hepatitis B infection, being a public health concern, is said to be more prevalent in developing countries including Nigeria (Emechebe *et al*., 2009). Emechebe *et al.* (2009) reported that over two billion people are said to be infected with HBV in the world, with about 280 million of such cases harboring the virus in their liver as chronic carriers (Emechebe *et al*., 2009). Recently though, The World health organization (WHO, 2016) estimated that 240 million people have chronic hepatitis B (WHO, 2016).

Chronic hepatitis is characterized by the presence of HBsAg in the blood for a period above six months. Although chronic hepatitis B carriers may remain asymptomatic as the infection remains inactive, this could actually progress to liver fibrosis, cirrhosis and hepatocellular carcinoma (HCC). Yang *et al.* (2011) reported that cirrhosis is present in majority of hepatitis B patients and chronic viral hepatitis is said to play a major role in activating liver fibrosis (Budhu and Wang, 2006). Hepatocellular carcinoma is reported to be the "third leading cause of cancer-related death in the world", with about 78% of HCC being attributed to viral hepatitis (Yang *et al.*, 2011). In recent times, HBV infection has drawn a lot of interest among Nigerians, and this is evident in the publication of prevalence figures from various surveys in different parts of the country. In line with increased awareness of the disease, subsequent decline in prevalence is anticipated among Nigerians. However, increased knowledge may not necessarily translate to a decline in HBV prevalence. Therefore, despite the availability of information on HBV prevalence in Nigeria (Ezegbudo *et al.*, 2008; Luka *et al.*, 2008; Idioha *et al.*, 2010; Ugwuja *et al.*, 2010; Musa *et al.*, 2015), prevalence studies are still important in order to inform concerned health authorities on evaluation of existing intervention strategies, and strategizing of newer effective prevention and control policies. The long-term health complications of chronic hepatitis B as outlined above, is an indication of the importance of continuous monitoring of hepatitis B prevalence over time in endemic areas. This study was therefore conducted amongst a cross section of apparently healthy, asymptomatic, general out-patients attending a tertiary hospital in Kaduna metropolis, to determine HBV prevalence and ascertain their perception about HBV, its transmission, prevention and control. It would therefore be informative to prospective intervention studies intended to assess the roles of tertiary hospitals in reducing the burden of hepatitis B in the populace.

Materials and Methods

Study Area and Population

The study was conducted at the General Out-Patient Department of 44 Nigerian Army Reference Hospital in Kaduna metropolis, Nigeria where blood samples were collected. The laboratory work was done at the Department of Microbiology, Ahmadu Bello University, Zaria, Kaduna, Nigeria. Kaduna metropolis is characterized by a high population density, and an estimated population of 6, 066, 562 (Obioha, 2009). Kaduna Metropolis is considered cosmopolitan with people from diverse tribes and religion. The 44 Army reference Hospital is located in northern part of Kaduna metropolis and serves the general populace. Ethical clearance was granted by the Hospital Management and consent was sought from the participants. The study population comprised of apparently healthy male and female patients at the general outpatient department in the hospital.

Questionnaire Administration

Structured questionnaires were used to obtain sociodemographic data such as age, sex and other relevant information on HBV awareness of the respondents. Prior to questionnaire distribution, participants were well informed about the study and its relevance, and their consent to participate in the study was sought. Consent forms were signed and samples were collected.

Sample Collection and Processing

One hundred participants were selected randomly by balloting from 253 patients at the outpatient Department of the selected hospital. Three millilitres of blood samples were collected intravenously from the selected persons Medical Laboratory Officer, using a 5ml syringe, and immediately transferred to plain blood bottles. Serum was separated by centrifuging at 1000 rpm for 5minutes and screened for HBsAg using a one-step Wondfo Diagnostic test strip (Guangzhou Wondfo Biotech co. Ltd, China). The test strip was dipped into each tube containing serum for 10 minutes,

before checking for and interpreting results. Positive results were indicated by the presence of visible bands in both the control and the test regions, while the presence of visible red coloured bands at only the control region, indicated a negative result.

Data Analysis

Data generated from the questionnaire were analysed using SPSS, 2010 package. Chi square analysis was used to express bivariate associations between variables in the study population. Likert's scale was used to rate the knowledge of HB infection in the study population.

Results

Twelve out of 100 persons screened for HBsAg tested positive, giving a seroprevalence of 12%. The bivariate analysis done indicated no statistically significant association between seropositivity of HBsAg and age and gender; however, prevalence rate appeared higher in female than in male (Table 1). Similarly, the prevalence (14%) was higher in patients within the age group 25-34years, followed by 13% prevalence in age group 16-24 years. The HBsAg was not detected in patients within the age group 45 years and above. There was a higher prevalence (13%) of the disease among single than married people (9.7%). Based on the Likert's scale used to assess the knowledge of HBV infection, 8% had a very good knowledge of HBV disease and its associated risk factors, 60% had a fair knowledge, while the remaining 32% were not well informed about the disease, hence exhibiting a poor knowledge of the disease. The HBsAg was not detected among persons with very good knowledge of the disease, however, 11.7 and 15.7% HBV prevalence was reported among persons with fair and poor HBV knowledge respectively. There was no statistically significant association between knowledge of HBV infection and seropositivity (Table 2). Twenty (20) percent of the respondents affirmed taking HBV immunization prior to this study, of which none tested positive to HbsAg.

Eighty seven percent (87%) of the respondents had never been screened for HB prior to this study, while the remaining 13% admitted that they had been screened for HB before this study. There were 2 positive cases observed among 29% of the study population which had participated in voluntary blood donation prior to this study. The remaining 10 positive cases reported in this study, were from 71% of the people who had never donated blood in their life time. Six percent of the study population had received blood transfusion at some point in their lifetime, however, no HBV prevalence was reported among them. Ninety four percent (94%) of the study population had never received blood transfusion prior to the study, of which 12 tested positive to HBsAg, giving a prevalence of 12.8%. There was a statistically significant association between blood donation and seropositivity ($p=0.018$, $df= 1$) and between seropositivity and HB immunization status ($p= 0.0183$, $df= 1$).

Table 1: Prevalence of HBV infection in relation to some sociodemographic factors in the study population

Sociodemographic factors	Number screened (n=100)	No. positive (%)
Age (years)		
15-24	30	4 (13.3)
25-34	49	7 (14.0)
35-44	11	1 (9.1)
45 and above	10	0
Gender		
Male	64	5 (7.8)
Female	36	7 (19.4)
Marital status		
Married	31	3 (9.7)
Single	69	9 (13)

Table 2: Prevalence of HBV infection in relation to knowledge and risk factors among study population

Factors	Number screened	No. positive (%)	p value
Knowledge of HBV transmission and prevention			0.473
Very Good	8	0	
Fair	60	7 (11.7)	
Poor	32	5 (15.7)	
Screened for HBV before the study			0.116
Yes	13	1 (7.7)	
No	87	11 (12.7)	
Ever received HBV immunization			0.018*
Yes	20	0	
No	80	12 (15.0)	
Ever donated blood			0.018*
Yes	29	2 (6.9%)	
No	71	10 (14.1)	
Ever had blood transfusion			0.351
Yes	6	0	
No	94	12 (12.8)	

*p<0.05

Discussion

This survey has revealed a 12% prevalence of HBsAg among randomly selected general out patients attending a hospital in Kaduna State, Nigeria, indicating the occurrence of HBV among asymptomatic individuals. This further indicates that HBV infection is endemic in the study area, and this may be attributable to poor knowledge about the disease and its mode of transmission, individual behavior and practices in the study population. The prevalence reported in this study is higher than 8.3% prevalence reported in a previous study conducted by Luka *et al.* (2008) at Ahmadu Bello University Teaching Hospital, Zaria, Kaduna State. The prevalence of 12% reported in this study is also higher than, 7.6%, 9.3% and 3.9% prevalence reported by Chukwuka *et al.* (2004), Ezegbudo *et al.* (2008) and Ugwuja *et al.* (2010) in Nnewi, Awka and Abakiliki, Nigeria respectively.

The HBV prevalence in this study corroborates the prevalence of 12.4% among children in a tertiary hospital in Niger Delta, Nigeria reported by Alikor and Erhabor (2007). Studies in Nigeria have also reported higher prevalence of 15.8% (Baba *et al.*, 1999), 13.4% (Idioha *et al.*, 2010) 13.6% (Musa *et al.*, 2015). This present study revealed a high prevalence of HBsAg among the young and middle aged, and this could be attributed to their lifestyle, social identities and youthful exuberance (although not established in this study), which increases their risk of exposure, such as sexual activities, sharing of contaminated sharp objects for fashionable expressions such as ear and nose piercings, etc. Such high prevalence has also been reported in studies conducted by Eke *et al.* (2011) in Nnewi, Nigeria. This study is in agreement with some of the studies conducted in Nigeria over time, which have shown no significant difference in the occurrence of HBV infection between male and female (Kaine and Okafor, 1983; Abiodun *et al.*, 1990; Emechebe *et al.*, 2009). This therefore suggests, that gender is not a predisposing factor, but that both male and female are equally predisposed to HBV infection. The lower HBV infection observed among married individuals could be attributed to the fact that married people may be more careful, particularly with regards to being faithful to their spouses and keeping away from having multiple sexual partners.

The absence of HBV infection among persons well informed about the disease could be as a result of the fact that, the knowledge acquired about prevention and control of the disease was translated into practice by this group of people. Likewise, persons with poor knowledge about HBV infection, transmission, prevention and control, had no prior knowledge and this probably increased their chances of exposure to the virus.

The low number of people going for voluntary screening for HBV only reiterates the rate of poor knowledge about HBV infection in the study population. Knowledge of one's status is key to adopting adequate measures which could avert negative consequences in the future. Immunization is regarded as the most effective control measure for HBV; the vaccine is said to be safe and effective in prevention of chronic carrier state development (WHO, 1998). The statistically significant association between HB immunization status and seropositivity of HBsAg in this study corroborates the above statement, as none of the respondents who had been immunized prior to this survey had HBV infection.

Blood donation and transfusion are important risk factors of HBV infection. Although there was no HBV infection recorded among transfused respondents in this survey, in view of the recorded prevalence observed among blood donors in this survey, transfusion with infected blood is a major risk factor. This observation is in agreement with studies by Multimer *et al.* (1994), Ali *et al.* (2006) and Sarwar *et al.* (2010), which rank blood transfusion of blood products as the most common risk factor for HBV transmission. In addition, a high reported prevalence or endemicity of HBV in a community is worrisome, because every individual is a potential blood donor, either voluntarily or involuntarily. These reasons may likely be responsible for the statistically significant association between blood donation and HBV seropositivity in the study population.

Conclusion

The prevalence of HBsAg among a cross section of outpatients in Nigerian Army Reference Hospital (44), Kaduna state was 12%. The knowledge of the virus and its mode of transmission, prevention and control was generally poorly perceived by the study population. Majority of the study population were unaware of their HBV status and had not been vaccinated. The need for aggressive nation-wide HBV education and prevention/control campaign cannot be overemphasized, as this, along with mass immunization and adequate treatment of existing cases would be of use in reducing the spread and incidence of the virus among individuals and in the society at large. There is therefore an urgent need for concerted efforts to prevent further spread by proper monitoring to show success of implemented intervention measures in Kaduna state and Nigeria at large.

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References

Abiodun P. O., Omoike I. U. (1990): Hepatitis B Surface antigenemia in children in Benin City, Nigeria. *Nigerian Journal of Paed*iatrics 17 : 27-31.

Ali, S.A., Rafe, M.J., Donahue Qureshi, H and Sten, H. V. (2006): Hepatitis B and C in Pakistan, prevalence and risk factors. *International Journal Infectious Disease*, 13 (1):9-19.

Alikor, E.A., and Erhabor, O.N. (2007): Seroprevalence of hepatitis B surface antigenaemia in a Tertiary Health Institution in the Niger Delta of Nigeria. *Nigerian Journal of Medicine*, 16(3):250-251.

Budhu, A. and Wang, X.W. (2006): The role of cytokines in hepatocellular carcinoma. *J. Leukoc Biol*. 80: 1197-1181.

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

Blattacharya, P., Chandra, P.K., Datta, S., Banerjee, A., Chakrabotry, K., and Rajenfrank, L. (2007): Significant increase in HBV, HCV and syphilis among blood donors in West Beryal, Eastern India. *World Journal of Gastroenterology*, 13(27):3720-3733.

Chukwuka, J.O., Ezechukwu, C.C., Egburonu, I., Okoli, C.I. (2004): Prevalence of hepatitis B. 5th ed. Pathophysiology, Missouri: Sanders, p.886-887.

Eke, A.C., Eke, U.A., Okafor, c.I., Ezebiale, I., and Ogbuagu, C. (2011): Prevalence, correlates and patterns of hepatitis B surface antigen in low resource settings. *Virology Journal*, 8 (12):1-9.

Emechebe G O, Emodi I J, Ikefuna A N, Ilechukwu G C, Igwe W C, Ejiofor O S, Ilechukwu C A. (2009): Hepatitis B virus infection in Nigeria - A review. *Nigerian Medical Journal*, 50:18-22.

Ezegbudo, C.N., Agbonbhor, D.E., Nwosu, G.O., Igwe, C.u., Agba, M.I., and Okpala, H.O. (2004): The seroprevalence of hepatitis B surface antigen and human immunodeficiency virus (HIV) among pregnant women in Anambra State. *Sharaz E- Medical Journal*, 5(2): 1-8.

Idioha, J.C., Iroha, I.R., Agbafor, N., Nwuzo, A.C., and Ezijeka, G.O. (2010): Comparative study of the effects of single and dual infections of human immunodeficiency virus (HIV) and hepatitis B virus (HBV) in peripheral blood lymphocytes of infected individuals in Ebonyi State, Nigeria. *Journal of Clinical Medicine and Research*, 2(6):98-102.

Kaine W. N., and Okafor, G. O. (1983): Hepatitis B Surface Antigen in Nigerian Children with Sickle Cell Anaemia. *Journal of Tropical Paediatrics*, 29: 55 - 7.

Luka, S.A., Ibrahim, M.B., and Iliya, 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.

Multimer D. J., Olomi A., Skidmore S., Olomu N., Ratcliffe D., Rodger S. (1994): Viral hepatitis in Nigeria-sickle cell disease and commercial blood donors. *QJM*, 87: 407-11.

Musa B.B., Bussel S., Borodo M.M., Samaila A.A. and Femi O.L. (2015): Prevalence of hepatitis B virus infection in Nigeria 2000-2013; A systematic review and meta-analysis. *Nigerian Journal of Clinical Practice*, 18(2): 163-172.

Obioha, E.E. (2009): Becoming a Street Child in Poverty Ridden Society: A Descriptive Case of Kaduna Metropolis, Nigeria. *Journal of Social Science*, 19(1): 41-49

Prescott, L.M., Harley. J.P, and Klein, D.A. (2008): Microbiology, 7th ed. McGraw Hill, New York, p.936.

Sarwar, J., Ahmad, W., Saleem, M., Jamshed, f., Gul, N., and Idrees, M. (2010): Frequency of hepatitis B in asymptomatic patients of District Head Quarters Hospital, Koth, Azad Kashmir. *J. Ayub Med. Coll Abbottad,* 22(4):139-142.

Ugwuja, E.I. (2010): Seroprevalence of hepatitis B surface antigen and liver function test among adolescents in Abakiliki, South Eastern Nigeria. *Internet journals of Tropical Medicine,* 6(2):1-6.

WHO (1998): No Scientific Justification to suspend Hepatitis B Immunization. Press Release WHO/67 2" d Oct. 1998 http:// v, r.who.int/inf-fr-1998/en/pr98-67.htm

WHO (2016): Hepatitis B. WHO Fact Sheet. www.who.int/mediacentre/factsheets . Updated July, 2016. Asssessed 18th November, 2016.

Yang, J., Ray Kim, W., Coelho, R., Mettler, T.A., Benson, J.T., Sanderson, S.O., Therneau, T.M., Kim, B., and Robert, L.R. (2011): Cirrhosis is present in most patients with HepB and hepatocellular carcinoma. *Clinical Gastroenterology Hepatology*, 9 (1): 64-70.