



INTERNATIONAL JOURNAL OF SCIENCE FOR GLOBAL SUSTAINABILITY
Hepatitis B Surface Antigenaemia and Some Associated Risk Factors
Among Patients Attending Hospital in Danja Local Government Area of
Katsina State, Nigeria

Agba A. A. and Aguh I. B.

Department of Biological Sciences, Federal University Gusau, Nigeria.

Correspondence: fredagba14@gmail.com Phone Number: +234706650508

Received on: March, 2020

Revised and Accepted on: June, 2020

Published on: July, 2020

ABSTRACT

Hepatitis B virus (HBV) is a DNA virus which belongs to the family *Hepadnaviridae*. Infection with hepatitis B virus may be acute or chronic and can result in complications including cirrhosis and hepatocellular carcinoma. In Nigeria, community misconceptions, inadequate attention or funding by the government have led to a high prevalence of the disease. The study was carried out to assess the prevalence and some risk factors associated with hepatitis B virus in Danja Local Government Area of Katsina State. Blood samples were collected from 688 patients attending Comprehensive Health Centre in Danja Local Government Area of Katsina State. Screening of samples was done using HBsAg test strip which is a rapid chromatographic immune assay (EGENS Reagent Technology, USA). A structured questionnaire was administered to determine some of the factors that influenced the prevalence of infection. The overall prevalence of infection was 15% (103/688). Males were more infected (19.6%) than females (7.8%) ($P < 0.05$). Patients between the 0-12 years age group had the highest prevalence compared to other age groups. Factors such as marital status, blood transfusion, sharing of barbing and nail cutting items, previous infection with sexually transmitted diseases and number of persons living in a room were found to be significantly associated with hepatitis B virus ($P < 0.05$). Results from this study shows that hepatitis B virus infection is prevalent in the study area. Health education as well as vaccination of people should be carried out to prevent the spread of the infection.

Keywords: cirrhosis, *hepadnaviridae*, hepatitis b virus, hepatocellular carcinoma

1.0 INTRODUCTION

Hepatitis B virus (HBV) is a DNA virus which belongs to the family *Hepadnaviridae* (Brooks *et al.*, 2013). Infection with the virus causes a spectrum of acute and chronic liver disease, ranging from inactive chronic carrier status to progressive chronic hepatitis leading to cirrhosis and liver cancer (EASL, 2012; WHO, 2017). An estimated two billion persons worldwide have been infected with Hepatitis B virus (CDC, 2017). In 2015, infection with hepatitis B virus resulted in 887,000 deaths mostly from complications including cirrhosis and hepatocellular carcinoma worldwide (WHO, 2017). This figure may however underestimate the true Hepatitis B virus mortality rate due to inadequate disease and cancer surveillance in many resource-poor countries where the virus is endemic (Howell *et al.*, 2014). The virus is transmitted by percutaneous

and permucosal exposure to infected blood and other body fluids such as urine, semen, sweat, saliva, and tears semen and vaginal fluid (Brooks *et al.*, 2013). The hepatitis B virus can survive outside the body for at least seven days during which it can still cause infection if it enters the body of an unprotected person (CDC, 2017). The incubation period of hepatitis B is 50–180 days, with a mean between 60 and 90 days. It appears to vary with the dose of hepatitis B virus administered and the route of administration (Brooks *et al.*, 2013).

The World Health Organization (WHO) has defined different geographic areas according to hepatitis B surface antigen (HBsAg) prevalence rates in the adult general population. In highly endemic areas, the HBsAg prevalence rate is equal to or greater than 6%; in intermediate endemic areas, it is 2% to 4%;

and in low endemic areas, it is less than 1% (WHO, 2017).

In developing countries like Nigeria, hepatitis B virus infection has earlier been reported to be hyperendemic with a pooled prevalence of 13.6% among different sub-populations (Musa *et al.*, 2015). Despite the fact that vaccines against hepatitis B virus are available, these vaccination programmes in Nigeria have not received adequate attention or funding by the government. Furthermore, community misconceptions and logistics have hindered increasing coverage rates (Rainey *et al.*, 2011; Cutts *et al.*, 2013; Musa *et al.*, 2015).

The objective of this study was to assess the prevalence and some risk factors associated with hepatitis B virus in Danja Local Government Area of Katsina State so as to provide baseline information which could be used as an aid in medical intervention in form of sanitation and chemotherapy.

2.0 MATERIALS AND METHODS

Blood samples were collected from 688 children patients attending Comprehensive Health Centre in Danja Local Government Area (11° 23' N; 7° 34' E / 11.383° N; 7.567° E) of Katsina State from April 2014 to April 2015. A structured questionnaire was administered from which information on some of the risk factors that can influence the prevalence of infection was obtained.

HBsAg test strip which is a rapid chromatographic immune assay for the qualitative detection of hepatitis B surface antigen in serum or plasma was

used for the screening of the samples (EGENS Reagent Technology, USA).

The test and result interpretations were done according to the manufacturers' instructions. Result from both the test strips were correlated for each subject and reported as positive or negative.

Data obtained were analysed using the Chi-square (χ^2) test to determine the association between the prevalence of hepatitis B virus infection with age and gender, Odd's Ratio (OR) was used to determine any association or otherwise, between the prevalence of infection and other risk factors in the questionnaire.

3.0 RESULTS

The findings of the study showed that 103 (15%) of the patients were infected with hepatitis B virus.

The prevalence of hepatitis B virus infection according to the gender showed that males were more infected (19.6%) than females (7.8%) and the difference was statistically significant ($P < 0.05$) (Table 1). The prevalence of infection in relation to age of the patients showed that the highest prevalence was obtained in the 0-12 years age group (44.4%) ($P < 0.05$) followed by the 13-25 years age group (15.2%) ($P > 0.05$), while those who were 65 years and above had 13.6% ($P > 0.05$). Patients within the ages of 26-38 had a prevalence of 9.7% ($P < 0.05$), those within the 52-64 years age group had 8.7% ($P > 0.05$) while the least prevalence of infection (6.5%) was obtained among the 39-51 years group ($P < 0.05$) (Table 2).

Table 1: Prevalence of Hepatitis B Virus Infection among Patient in Relation to Gender

Gender	Number examined	Number infected	Prevalence (%)	Chi Square (χ^2)	P- Value
Male	418	82	19.6	18.06	0.00
Female	270	21	7.8		
Total	688	103	15.0		

Table 2: Prevalence of Hepatitis B virus Infection among Patients in Relation to Age

Age	Number Examined	Number Infected	Prevalence (%)	Chi Square (χ^2)	P- Value
-----	-----------------	-----------------	----------------	-------------------------	----------

0-12	93	40	44.4	66.41	0.00
13-25	178	27	15.2	0.07	0.93
26-38	165	16	9.7	4.74	0.03
39-51	139	9	6.5	9.88	0.00
52-64	91	8	8.7	3.15	0.08
65 & above	22	3	13.6	0.32	0.86
Total	688	103	15.0		

Table 3: Relationship between Prevalence of Infection and some Associated Risk Factors

Risk Factor	Number Examined	Number Infected	Prevalence (%)	Odd's Ratio	95% C I
Marital Status					
Single	241	56	23.2	2.58	1.68-3.94
Married	447	47	10.5		
Blood Transfusion					
Yes	203	54	26.6	3.23	2.10-4.95
No	485	49	10.1		
Sharing of Nail Cutters					
Yes	495	80	16.2	0.43	0.87-2.34
No	193	23	12.0		
Sharing of Barbing/Sharp items					
Yes	376	68	18.1	1.75	1.12-2.71
No	312	35	11.2		
History of STD/Infection					
Yes	108	68	63.0	26.47	15.75-44.48
No	580	35	6.0		
No. of Persons per Room					
5 & above	475	89	18.7	17.09	1.82-5.91
1-4	213	14	6.6		

Responses from the questionnaire also showed that there was a significant association between infection and marital status ($P < 0.05$, OR= 2.58, 95% CI= 1.68-3.94). There was statistically significant association between having a sexual relationship and the prevalence of infection ($P > 0.05$, OR= 0.94 95% CI= 0.60-1.46). Blood transfusion was found to be statistically associated with the prevalence of hepatitis B virus infection ($P < 0.05$, OR= 0.94, 95% CI= 2.10-4.95). People who shared nail cutting items had more infection than those who did not share these items, however, the difference obtained was

not statistically significant ($P > 0.05$, OR = 1.43, 95% CI = 0.87-2.34). Sharing of barbing items was observed to be statistically associated with hepatitis B virus infection ($P < 0.05$, OR = 1.75, 95% CI = 1.12-2.71). People who had a history of sexually transmitted infections had the highest prevalence compared to those who did not have any infection ($P < 0.05$, OR = 26.47, 95% CI = 15.75-44.48). People who lived in a single room above five in number had a higher prevalence compared to those who were four or fewer in a room ($P < 0.05$, OR = 3.28, 95% CI = 1.82-5.91).

4.0 DISCUSSION

The result of the study shows that hepatitis B virus infection is prevalent among patients attending hospital in Danja Local Government Area of Katsina. This corroborates the World Health Organisation report for Nigeria as highly endemic area with a prevalence greater than 6% (WHO, 2017). The findings of this study also corroborates the findings of Alo *et al.* (2013) who reported a prevalence of 15.5% among medical students of Usman Danfodiyo University, Sokoto, Nigeria. The prevalence obtained in this study is higher than those obtained by other studies carried out among different populations in different parts of Nigeria (Donbraye *et al.*, 2014; Anaedobe *et al.*, 2015; Omatala *et al.*, 2017). The low prevalence obtained in these studies might be attributable to small sample size, increased awareness and less exposure to risk factors. Higher prevalence have earlier been reported among different study groups in Nigeria by (Mustapha and Jibrin, 2004; Okoye and Samba, 2006; Adekeye *et al.*, 2013; Ndako *et al.*, 2016; Tula *et al.*, 2016). The difference in demographic characteristics of the study population such as cultural and economic factors, sexual practice, and the population dynamic in these studies might partly explain these discrepancies.

In this study, males were more infected than females and the difference obtained between gender and prevalence of infection with hepatitis B virus was statistically significant. This corroborates the findings of (Pennap *et al.*, 2010; Adekeye *et al.*, 2013; Obekpa *et al.*, 2014; Isah *et al.*, 2015). The difference in gender might be attributed to increased frequency of males to high-risk behaviour such as multiple sexual partners, sharing of barbing and nail cutting items as well as clothes. It has been reported

that males are less likely to clear HBsAg and have a higher risk of progression to cirrhosis (Martinson *et al.*, 1998; Mustapha and Jibrin, 2004).

The significant difference obtained between the prevalence of infection and the 0-12 years age group, might be attributed to contact of the children with contaminated environmental surfaces, overcrowding as well as sharing of personal items, while the observed difference among the 26-38 years age group and 39-51 years age group might be as a result to their exposure risk factors of infection such unprotected sex. This agrees with the findings of Ndams *et al.* (2013) and Isah *et al.* (2015) who reported that age is a factor that can influence the prevalence of hepatitis B virus infection. The insignificant difference observed among the 13-25 years age group is surprising but may be due to their reduced exposure to contaminated surfaces and unprotected sex. The present study revealed that single patients were more likely to be infected with hepatitis B virus compared to those who were unmarried. This corroborates the findings of Isah *et al.* (2015) and Omatala *et al.* (2017) who reported higher prevalence among single patients than in married patients. This however contradicts the findings of Aminu *et al.* (2013) and Pondei and Ibrahim (2013). This difference might be attributed to exposure of these single individuals to some routes of infection other than sex or as a result of promiscuity which is common among the unmarried. The statistically significant association between hepatitis B virus infection and history of blood transfusion might be attributable to the transfusion of improperly screened blood. The insignificant association between infection and sharing of nail cutting items indicates that this risk factor can poorly influence infection. The findings of this study also revealed that sharing of barbing items such as clippers, knives and razor blades as well as other sharp objects are significant factors which can influence the prevalence of hepatitis B virus infection among humans. The statistically significant association obtained in relation to history of sexually transmitted infections may be as results of unprotected sexual activity among the study group.

The significant association obtained in this study in relation to number of persons living in a room suggests that frequent and prolonged personal

contact with an infected person can influence the infection (Shepard *et al.*, 2006; Willey *et al.*, 2011; Aminu *et al.*, 2013).

5.0 CONCLUSION

The finding of the present study shows that hepatitis B virus infection is hyperendemic among people in Danja Local Government Area of Katsina State Nigeria. Therefore, control measures including screening, treatment as well as vaccination of people should be carried out. More so, enlightenment of people on the dangers of hepatitis B virus and factors that could predispose them to the infection should be organized periodically.

ACKNOWLEDGEMENTS

The authors are grateful to the staff of Comprehensive Health Centre Danja Local Government Area of Katsina State for their permission and assistance in collection of the stool samples. We also thank the patients who were enrolled in this study. We are highly indebted to Malam Jamilu Iliya for his technical assistance.

REFERENCES

- Adekeye, A.M., Chukwuedo, A.A., Zhakom, P.N. and Yakubu, R.S. (2013). Prevalence of Hepatitis B and C among Blood Donors in Jos South LGA, Plateau State, Nigeria. *Asian Journal of Medical Sciences*, 5(5): 101-104.
- Alo, M. N., Alhassan, H. M., Saidu, A. Y., Ugah, U. I. and Abdulahi, H. (2013). Seroprevalence of hepatitis B surface antigen (HBsAg) among the medical students of Usmanu Danfodiyo University, Sokoto, Sokoto State, Nigeria. *European Journal of Experimental Biology*, 3(3):666-671.
- Aminu, M., Okachi, E.E., Sani, M. A. and Abdullateef, Y. (2013). Prevalence of hepatitis B virus surface antigen among healthy asymptomatic students in a Nigerian University. *Annals of African Medicine*, 12(1): 55-56.
- Anaedobe, C.G., Fowotade, A., Omoruyi, C.E. and Bakare, R.A. (2015). Prevalence, socio-demographic features and risk factors of hepatitis B virus infection among pregnant women in Southwestern Nigeria. *Pan African Medical Journal*. 20:406
doi:10.11604/pamj.2015.20.406.6206.
- Brooks, G.F., Carroll, K.C., Butel, J.S. and Morse SA. (2013). *Medical Microbiology*. 26th ed. New York: McGraw Hill Publishers. Pp. 507- 526.
- Centers for Disease Control and Prevention (CDC). (2017). *Epidemiology and prevention of vaccine preventable diseases*.
- Cutts, F.T., Izurieta, H.S. and Rhoda, D.A. (2013). Measuring coverage in MNCH: Design, implementation, and interpretation challenges associated with tracking vaccination coverage using household surveys. *PLoS Med*: 10:e1001404.
- Donbraye, E., Japhet, M.O., Adesina, A.O. and Abayomi, O.A. (2014). Prevalence of asymptomatic hepatitis B virus surface antigen in children in Ilesha, Osun State, Southwestern Nigeria. *African Journal of Microbiology Research*, 8(23): 2329-2331.
- European Association for the study of the Liver (EASL). (2012). Clinical practice guidelines: Management of chronic hepatitis B infection. *Journal of Hepatology*, 57: 167-185.
- Howell, J., Ladep, N.G., Lemoine, M., Thurz, M.R. and Taylor-Robinson, S.D. (2014). Hepatitis B in Sub-Saharan Africa. *South Sudan medical Journal*, 7(3): 59-61.
- Isah, I., Aminu, M., Abdullahi, S.A., Sani, M.A. and Esona, M.D. (2015). Seroprevalence of hepatitis B virus in a tertiary institution in North Western Nigeria. *African Journal of Microbiology Research*, 9(3): 171-179.
- Martinson, F.E.A., Weigle, K.A., Royce, R.A., Weber, D.J., Suchindran, C.M. and Lemon, S.M. (1998). Risk factors for horizontal transmission of hepatitis B virus in a rural district in Ghana. *American Journal of Epidemiology*, 147(5): 478-487.
- Musa, B., Bussell, 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*, 18:163-172.
- Mustapha, S.K. and Jibrin, Y.B. (2004). The prevalence of hepatitis B surface antigenaemia in patients with Human Immunodeficiency Virus (HIV) infection in Gombe, Nigeria. *Annals of African Medicine*, 3(1): 10 – 12.
- Ndako, J.A., Onwuliri, F.C., J. M. Banda, J.M., Alejolowo, O.O., Fajobi, V. and Olapade, D.O. (2016). Risk Factors and Prevalence of Hepatitis B Surface Antigen (HBsAg) among Apparently

- Healthy Volunteers in an Urban Setting, North-Central Nigeria. *International Journal of Sciences*, 5(3): 9-15.
- Ndams, I.S., Joshua, I.A., Luka, S.A. and Sadiq, H.O. (2008). Epidemiology of hepatitis B infection among pregnant women in Minna, Nigeria. *Science World Journal*, 3(3): 5-8.
- Obekpa, S., Khatib M., Mbwas, M., Francis, A. and Das, N. (2014). Prevalence of HBV and HIV among students and staff at the University of Jos, Nigeria: Results of a medical outreach screening program. *International Journal of Scientific and Research Publications*, 4(11): 1-5.
- Okoye, I.C. and Samba, S. A. (2006). Sero-epidemic survey of hepatitis B in a population of Northern Nigeria. *Animal Research International*, 3(2): 485 – 488.
- Omatola, C.A., Ukamaka, J.A., Agieni, G.A., Oseni Okolo, M.O., Adejo, P.O., Maina, M.M. and Mofolorunsho, C.K. (2017). Hepatitis B Surface antigenaemia and risk factors of transmission among students of Kogi State University in Anyigba, North Central Nigeria. *Nature and Science*, 15(6): 88-94.
- Pennap, G.R., Yakubu, A., Oyige, O. and 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.
- Pondei, K. and Ibrahim, I. (2013). The Sero-prevalence of Hepatitis B surface antigen and anti-hepatitis C antibody among women attending antenatal clinic at a tertiary health facility in the Niger Delta of Nigeria. *Global Advanced Research Journal of Medicine and Medical Sciences*, 2(1): 006-012.
- Rainey, J.J., Watkins, M., Ryman, T.K., Sandhu, P., Bo, A and Banerjee, K. (2011). Reasons related to non-vaccination and under-vaccination of children in low and middle income countries: Findings from a systematic review of the published literature, 1999-2009. *Vaccine*, 29:8215 -8221.
- Shepard, C.W., Simard, E.P., Finelli, L., Fiore, A.E. and Bell, B.P. (2006). Hepatitis B virus infection: Epidemiology and vaccination. *Epidemiologic Reviews*, 28:112-125.
- Tula, M.Y., Iyoha, O., Okpalauwaekwe, E.A., Mohammed, A., Iruolaje, F.O. and Okpara, A, N. (2016). Seroprevalence of Hepatitis B surface antigen (HBsAg) and Hepatitis C virus (HCV) co-infection among Apparently Healthy Students of a Tertiary Institution in North-eastern Nigeria. *Nigerian Journal of Microbiology*, 30(2): 3565-3571.
- Willey, J.M., Sherwood, L.M. and Woolverton, C.J. (2011). *Prescott's Microbiology*. The McGraw Hill Companies International Edition, New York. Pp. 919-921.
- World Health Organization (WHO) (2017). Hepatitis B fact sheet. Available from: <http://www.who.int/mediacentre/factsheets/fs204/en/> [Accessed on 14th April, 2017].