Journal of Global Biosciences
ISSN 2320-1355
Volume 9, Number 6, 2020, pp. 7603-7613
Website: www.mutagens.co.in
URL: www.mutagens.co.in/jgb/vol.09/06/090614.pdf

Research Paper

STUDY OF HEPATITIS B VIRUS INFECTION AMONG BLOOD DONORS ATTENDING THREE GENERAL HOSPITALS IN KEBBI STATE, NIGERIA

Idris, N. A.[1], B. S. Manga[2], Y. K. Danladi[3], U. Abubakar[4], L. Tanko[5], H. G. Jiga[5], A. I. Bagudo[6] and H. Tahir[7]

[1]Department of Medical Laboratory Science, General Hospital Maiyama, Maiyama local Government Kebbi State, Nigeria
[2]Department of Microbiology, Usmanu Danfodiyo University, Sokoto, Nigeria
[3]Department of Microbiology Kebbi State University of Science and Technology Aliero, Nigeria
[4]Department of Histopathology, School of Medical Laboratory Science, Usmanu Danfodiyo University, Sokoto, Nigeria
[5]Department of Medical Laboratory Science, College of Health Science and Technology Jega Kebbi State, Nigeria
[6]Department of Haematology, School of Medical Laboratory Science, Usmanu Danfodiyo University, Sokoto, Nigeria7
7Department of Science, and Medical Laboratory Technology School of Science and Technology, Abubakar Turai Ali Polytechnic, Bauchi State Nigeria.

Abstract

Introduction: Hepatitis is an inflammation of the liver caused by hepatitis virus from the family hepadnaviridae. The condition can be self-limiting or can progress to fibrosis (scarring), cirrhosis or liver cancer. Hepatitis viruses are the most common cause of hepatitis in the world but other infections, toxic substances (e.g. alcohol, certain drugs), and autoimmune diseases can also cause hepatitis. Hepatitis B is highly infectious; it is 50 – 100 times more infectious than HIV and 10 time more infectious than hepatitis C. **Aim:** The research was aimed at determining the incidence of Hepatitis B virus infection from blood donors at General Hospitals of three Local Governments (Aliero, Jega and Maiyama) Local Governments of Kebbi State, Nigeria. **Method:** The research is a case control study and structured-interviewer administered questionnaire was used then a sterile 5ml syringe and needle was used to bleed approximately 2 ml of blood from each donor and was transferred into a vacutainer and centrifuged at 1500 rpm for 3 min to obtain serum. The HBsAg positive samples was tested for the presence of antibodies to Hepatitis B core antigen (HBsAg, HBsAb, HBeAg, HBeAb, HBcAb). The test board was reverted and the testing samples was kept at room temperature (20-30^{o}C). The right side of the test board was kept horizontal from the original package, from left to right, respectively

corresponding to HBsAg, HBsAb, HBeAg, HBeAb, HBcAb, with a small straw to take subjects' serum, and add into 5 sample wells of the test board by drops (one drop). one drop of serum was added into 5 sample well of the board as well. Observation was made and recorded within 15 minutes, weakly positive samples test line appear within 15-20 minutes. Determination after 30 minutes is invalid. **Results:** The percentage incidence of Hepatitis B infection was higher in Jega local government among age range of 30 – 39 (52%) and Aliero in the age rangr of 40 -49 (52%). Maiyama local government in Kebbi state there was no significant percentage increase. But only Jega local government recorded significant number of peoples on the sex, knowledge on Hepatitis B, and Vaccination status on Hepatitis B virus while other local governments were not aware of the above mentioned socio demographic characteristics. The Maiyama and Aliero recorded the highest percentage of Male participation which was 100% while Female has the 0% but in Jega Male recorded was 96 % while female recorded 4% . The Positive sample was found to have the lowest percentage in almost all the local Governments with slight decreases in Maiyam, while the Negative samples have highest percentage with similar pattern as in case of Positive. The percentage incidence of Chronic Hepatitis B was higher in almost all the three local governments in Kebbi state, so also to the Acute Hepatitis b infection was less compared to the chronic Hepatitis and has the same scenario. Hepatitis B core antigen (HBsAg, HBsAb, HBeAg, HBeAb, HBcAb). **Conclusion:** The findings from this research there was gradual increase of Hepatitis B infection in the three local governments ie, Jega, Maiyama and Aliero in Kebbi state despite the adequate measures put in place by the Non- Governmental organization to curtail the infection of Hepatitis B.

Key words: Hepatitis B , Infection and Blood Donors.

INTRODUCTION

Hepatitis is an inflammation of the liver caused by hepatitis virus from the family hepadnaviridae. The condition can be self-limiting or can progress to fibrosis (scarring), cirrhosis or liver cancer. Hepatitis viruses are the most common cause of hepatitis in the world but other infections, toxic substances (e.g. alcohol, certain drugs), and autoimmune diseases can also cause hepatitis [20; 21]. Hepatitis B is highly infectious; it is 50 – 100 times more infectious than HIV and 10 time more infectious than hepatitis C. Viral hepatitis has emerged as a major public health problem throughout the world affecting millions of people. Viral hepatitis is a cause of considerable morbidity and mortality in the human population, both from acute infection and chronic sequelae which include, in the case of hepatitis B, C and D, chronic active hepatitis and cirrhosis. Hepatocellular carcinoma which is one of the ten most common cancers world wide, is

closely associated with hepatitis B, and at least in some regions of the world with hepatitis C virus [24; 27].

Hepatitis B virus (HBV), is a member of the hepadnavirus group, double-stranded DNA viruses which replicate, unusually, by reverse transcription. Hepatitis B virus is endemic in the human population and hyper endemic in many parts of the world. A number of variants of this virus have been described. Natural hepadna virus infections also occur in other mammals including woodchucks, beechy ground squirrels and ducks. Hepatitis B virus was originally recognized as the agent responsible for "serum hepatitis", the most common form of parental transmitted viral hepatitis, and an important cause of acute and chronic infection of the liver[17; 18]. . The incubation period of hepatitis B is variable with a range of 1 to 6 months. The clinical features of acute infection resemble those of the other viral hepatitis. Acute hepatitis B is frequently asymptomatic, although a severe illness with jaundice can occur and occasionally acute liver failure may develop ([5; 27].

Hepatitis B virus (HBV) is transmitted through exposure to infective blood, semen, and other body fluids. HBV can be transmitted from infected mothers to infants at the time of birth or from family member to infant in early childhood. Transmission may also occur through transfusions of HBV-contaminated blood and blood products, contaminated injections during medical procedures, and through injection drug use. HBV also poses a risk to healthcare workers who sustain accidental needle stick injuries while caring for infected-HBV patients [7; 8; 11]. The virus persists in 5 to 10% of immuno-competent adults, and in 90% of infants infected parentally. Persistent carriages of hepatitis B, defined by the presence of hepatitis B surface antigen (HBsAg) in the serum for more than six months, have been estimated to affect about 350 million people worldwide. The pathology is mediated by the responses of the cellular immune response of the host to the infected hepatocytes. Long term continuing virus replication may lead to progression to cirrhosis and hepatocellular carcinoma ([9; 12; 14].

In the first phase of chronicity, virus replication continues in the liver, and replicative intermediates of the viral genome may be detected in DNA extracted from liver biopsies. Markers of virus replication in serum include HBV DNA, the S1 proteins (HBsAg) and a soluble antigen, hepatitis B *e* antigen (HBeAg) which is secreted by infected hepatocytes. In those infected at a very young age, this phase may persist for life but, more usually, virus levels decline over time. Eventually, in most individuals, there is immune

clearance of infected hepatocytes associated with seroconversion from HBeAg to anti-HBe. During the period of replication, the viral genome may integrate into the chromosomal DNA of some hepatocytes and these cells may persist and expand clonally. Rarely does seroconversion to anti-HBs follow clearance of virus replication but, more frequently, HBsAg persists during a second phase of chronicity as a result of the expression of integrated viral DNA [5; 8; 10; 13].

Peoples in Aliero, Jega and Maiyama are usually having high risk of hepatitis B virus infection due to improper blood screening before donation which is as a result of inadequate awareness about the hepatitis B virus infection, and also patronizing sub-standard health facilities laboratories [1; 23].

3.0 MATERIALS AND METHODS

3.1 THE STUDY AREA, SCOPE AND LIMITATION OF THE STUDY

Aliero is a town located in the southeast of Kebbi State 12°16′42″N 4°27′6″E, while Jega is situated at 12.22° North latitude, 4.38° East longitude and 242 meters elevation above the sea level. Maiyama has an area of 1,028 km^2 and is on latitude 12^0 04′ 56.10″N and longitude 4^0 22′ 8.65″ E located south of Jega.

The study concentrate and cover issues relating to blood donation and transfusion as it appears to be one of the major ways of transmitting the HBV. The study was limited to the donors donating blood in three general hospitals i.e Aliero,jega and maiyama local governments in kebbi state.

3.2 STUDY POPULATION AND SAMPLE SIZE

The study samples include all individuals who were donating blood in the three general hospitals located in Aliero, Jega and maiyama local Government area respectively. The study recruited 300 individuals who were to be donating blood within the research time frame. Donor consent was obtained and confidentiality was guaranteed.

3.3 ETHICAL APPROVAL

The ethical approval and research clearance was obtained from the Kebbi state Ministry of Health and other appropriate authorities at the Hospitals where the research was carried out for the purpose of research only.

3.4. RESEARCH DESIGN

The research is a case control study and structured-interviewer administered questionnaire was used then a sterile 5ml syringe and needle was used to bleed approximately 2 ml of blood from each donor and was transferred into a vacutainer and centrifuged at 1500 rpm for 3 min to obtain serum. The HBsAg positive samples was tested for the presence of antibodies to Hepatitis B core antigen (HBsAg, HBsAb, HBeAg, HBeAb, HBcAb). The test board was reverted and the testing samples was kept at room temperature (20-30^{o}C). The right side of the test board was kept horizontal from the original package, from left to right, respectively corresponding to HBsAg, HBsAb, HBeAg, HBeAb, HBcAb, with a small straw to take subjects' serum, and add into 5 sample wells of the test board by drops (one drop). one drop of serum was added into 5 sample well of the board as well. Observation was made and recorded within 15 minutes, weakly positive samples test line appear within 15-20 minutes. Determination after 30 minutes is invalid.

3.5. SAMPLE COLLECTION

A sterile 5ml syringe was used to collect venous blood sample in a sterile conditions, into a container with anticoagulant (EDTA or heparin).

When testing, fresh sample was used, if the sample cannot be analyzed in time, it can be refrigerated for 3 days at 2-8^{o}C, Long term preservation needs to be frozen at -20^{o}C and it can be repeatedly freezing and thawing. The conventional anti-coagulant does not affect the test results. The hemolytic, viscous and high-fat blood samples do not apply to this reagent.

3.6. DATA ANALYSIS AND SAMPLE SIZE CALCULATION

The sample size was determine using the statistical software SPSS version 23.0 at 95% confidence level and a reported 13.6% IgG sero prevalence of HBsAg among patients donating blood in the three local governments of Kebbi State [27].

$N = \underline{Z^2(P)Q}L^2$

Where N = Sample size

Z statistics for a level of 95% confidence interval = 1.96

P = Prevalence HBsAg from previous studies = 13.6%

L = Level of significance (allowable error) = 5% or 0.05

Q = l-p

Thus $N = \underline{(1.96^2 \text{ x } 0.136 \text{ x } (1\text{-}0.136)}$

$= \underline{3.8416 \text{ x } 0.136 \text{ x } 0.864}0.0025$

$= 180.561$

The calculated sample size was 180.561 however in order to minimize error and occurrence of result by chance, a total of 300 sample was collected and used for the study, However, the number of positive test determine the sample size for combo test (profile).

4.0 RESULTS

The percentage incidence of Hepatitis B infection was higher in Jega local government among age range of 30 – 39 (52%) and Aliero in the age range of 40 -49 (52%). Maiyama local government in Kebbi state there was no significant percentage increase. But only Jega local government recorded significant number of peoples on the sex, knowledge on Hepatitis B, and Vaccination status on Hepatitis B virus while other local governments were not aware of the above mentioned socio demographic characteristics

The Maiyama and Aliero recorded the highest percentage of Male participation which was 100% while Female has the 0% but in Jega Male recorded was 96 % while female recorded 4%

The Positive sample was found to have the lowest percentage in almost all the local Governments with slight decreases in Maiyam, while the Negative samples have the highest percentage with similar pattern as in case of Positive samples

The percentage incidence of Chronic Hepatitis B was higher in almost all the three local governments in Kebbi state, so also to the Acute Hepatitis b infection was less compared to the chronic hepatitis and has the same scenario

Table 4:1 Socio-demographic Characteristics Percentage Incidence of Hepatitis B Infection Among Different Age Groups Screened in Three Local Governments of Kebbi State

Characteristics	Jega Local Govt.	Maiyama Local Govt.	Aliero Local Govt.
Age			
18 -29	31 (31%)	20 (44.4%)	18 (18.9%)
30 -39	52 (52%)	0 (0%)	20 (21.1%)
40 -49	17 (17%)	20 (44.4%)	51 (53.7%)
50 and above	0 (0%)	5 (11.1%)	6 (6.3%)
Total	100	45	95
Sex			
Male	296 (99.3 %)	19 (78 %)	11(73.3 %)
Female	4 (1.4 %)	0(0 %)	0(0 %)
Total	298	19	11
Knowledge on HVB	61 (74.4 %)	5(25 %)	2 (16.7 %)
Yes	21 (25.6 %)	15 (60 %)	10 (83.3 %)
No	82	20	12
Total			
Vaccination Status on HVB	36 (12.2 %)	3 (60 %)	3 (37.5 %)
Yes	260 (87.8%)	2 (40 %)	6 (75 %
No	296	5	8
Total			

Table 4:2 Percentage Incidence of Hepatitis B Infection Among the Gender Groups Screened in Three Local Governments of Kebbi state

Gender	Jega Local Govt.	Maiyama Local Govt.	Aliero Local Govt.
Male	96 (96%)	100 (100%)	100 (100%)
Female	4 (4%)	0 (0%)	0 (0%)
Total	100	100	100

Table 4:3 Percentage Incidence of Hepatitis B in Positive and Negative Samples Screened in Three Local Governments of Kebbi state

Samples	Jega Local Govt.	Maiyama Local Govt.	Aliero Local Govt.
Positive	18 (18%)	17 (17%)	18 (18%)
Negative	82 (82%)	83 (83%)	82 (82%)
Total	100	100	100

Table 4:4 Percentage Incidence of Hepatitis B in Acute and Chronic Samples Screened in Three Local Governments of Kebbi state

Profile result (Combo Test kit)	Jega Local Govt.	Maiyama Local Govt.	Aliero Local Govt.
Acute	7 (38.9%)	5 (29.4%)	7 (38.9%)
Chronic	11 (61.1%)	12 (70.6%)	11 (61.1%)
Total	18	17	18

5.0 DISCUSSION

The Scio demographic characteristics Percentage incidence of Hepatitis among different age groups , sex, Knowledge of participants on Hepatitis and Vaccination against Hepatitis status in three Local Governments of Kebbi state. The percentage incidence of Hepatitis B infection positive patients was higher in Jega local government among age range of 30 – 39 (52%) and Aliero in the age range of 40 -49 (52%).. Maiyama local government in Kebbi state there was no significant percentage increase these findings were not in agreement with the research work reported by Ishak, (2000). The reason could be due the fact that method used in the this research in testing to determine the position or negative patients was not the same used by the research work carried out by Ishak, (2000). Similarly to the sex, knowledge on hepatitis, and vaccination status were all high and none of them have been recorded in the other local government, the finding disagree with finding reported by Kim *et al.* [19; 23], the possible reason for this variation could be due the differences in the geographical area. This shows that people in the other local governments were having little knowledge about Hepatitis B Virus Infection and its vaccination status this can lead to the high prevalence of these infections in those areas. This finding are in line with research conducted and with work reported by Aba. and Aminu [1]. The reason could be due to the method of sample analysis was used in all the researches are the same.

The Percentage incidence of Hepatitis B infection of positive patients among the Gender Groups screened in three Local Governments of Kebbi State was found to be higher in male than female, especially in Maiyama and Aliero where the percentage positive patients were 100% while in Jega was 96% this could be due to the fact that female participate more in vaccination exercise against Hepatitis B than the Male. This finding was in contrast with the work reported by Ado *et al*. [2; 19]. the reason for this variation could be attributed to the fact that geographical location varies from all the researches area where all the researches were carried out.

Also the Percentage incidence of Hepatitis B infection the Positive samples have the highest percentage which was 18% than the Negative Samples which was 82% Screened in all the three Local Governments of Kebbi state, this means that the public awareness campaign on hepatitis B infection and vaccination exercise against the disease is really yielding good result.

Percentage incidence of Hepatitis in Acute and Chronic positive patients with Hepatitis B screened in three Local Governments of Kebbi state. The percentage incidence of Chronic Hepatitis B was higher in almost all the three local governments in Kebbi state, while the Acute Hepatitis B infection was less compared to the chronic hepatitis and has the same scenario across all the three local governments, the reason for this result may be due to not knowing there status against hepatitis B infection. This finding was in contrast with the work reported by Yakubu *et al.* [27]; [15; 26].; .The reason could be linked to the variation in the methodology used in all the researches.

CONCLUSION

The findings from this research there was gradual increase of hepatitis B infection in the three local governments i. e, Jega, Maiyama and Aliero in Kebbi state despite the adequate measures put in place by the Non- Governmental organization to curtail the infection of hepatitis B.

REFERENCES

1. Aba, H.O. and Aminu. M.. Seroprevalence of hepatitis B virus serological markers *Applied Sciences,* 2016; 3 (1):20-22
2. Ado, A.A., Alhassan, S. Chonoko, U.G. and Samaila, A.U. Sero-prevalence of Hepatitis B infection among pregnant Nigerian Women. *Annals of African Medicine,* 201015 (1):20-27..
3. Cao, G.W. Clinical relevance and public health significance of hepatitis B virus infection 2009
4. Cavinta, L, Sun, J. and May, A . A new isolate of hepatitis B virus from the Philippines possibly representing a new subgenotype C6. *Journal of Medical Virology,* 2009

5. CDC (Center for Disease Control). Geographical Distribution HBV Infection; available at: http://wwnone w.cdc.gov//ncidod/disease/hepatitis/slideset/hepb/slide9.htm. 2015
6. Custer, B., Sullivan, S.D., Hazlet, T.K., IIoeje, U., Veenstra, D.L. and Kowdley, K.V. Global Epidemiology of Hepatitis B Virus. *Journal of Clinical Gastroenterology,* 2004. **38**(3):158-168.
7. Daw M.A and El-Bouzedi A. Prevalence of hepatitis B and hepatitis C infection in Libya: Results from a national population based survey. BMC Infection Disease. 2014. 14-17.
8. Eke, A.C., Eke, U.A., Okafor, C.I., Ezebielu, I.U. and Ogbuagu, C. Prevalence correlates andpattern of hepatitis B surface antigen in a low resource setting. *Virology Journal*, 2011 **8:** 12
9. Elgouhari, H.M., Tamimi, T.I.A.R. and Corey, W.D. Hepatitis B virus infection: Understanding its epidemiology, cause and diagnosis. *Cleveland Journal of Medicine*, 2008. **75:** 881-889.
10. Ezegbudo C. N., Agba M. I., Agbonlahor D. E., Nwobu G *O.,* Igwe C. U and Agba M. I. The seroprevalence of hepatitis B Surface antigen and human immunodeficiency virus among pregnant women in Anambra state Nigeria. 2004
11. Hwang, E.W. and Cheung, R. Global Epidemiology of Hepatitis B Virus (BHV) infection. *North American Journal of Medicine and Science,* 2011. **4**(1):7-13.
12. Japhet M.O, Adesina O.A, Donbraye E and Adewumi M.O. Hepatitis B Core IgM antibody anti-CVIgM) among hepatitis B surface antigen (HBsAg) negative blood donors in Nigeria.*Virology Journal*. 2011. 8:513-518.
13. Komas, N.P., Vickos, U., Hubschen, J.M., Bere, A., Manirakiza, A., Muller, C.P., and Le Faou, A.. Cross-sectional study of hepatitis B virus infection in rural communities. Central African Republic. *Biomedical Central Infectious Diseases,* 2013. *13:286.*
14. Lok, A.S. and McMahhon, B.J. Chronic hepatitis B. infection Hepatology, 2007. **45**(2):507-539.
15. Lusida, M.I., Nugrahaputra, V.E., Soetjipto, H. R., Nagano-Fujii, M., Sasayama, M., Utsumi, T. and Hotta, H. Novel subgenotypes of hepatitis B virus genotypes C and D in Papua, Indonesia. *Journal of Clinical Microbiology,* 2008. **46**(7):2160-2166.
16. Ogbu O and Uneke C.J. Hepatitis B virus and blood transfusion safety in sub-Saharan Africa. *Internet Jornal of Infectious Diseases*. 2009

17. Otegbayo JA, Fasola FA and Abja A. Prevalence of hepatitis B surface and e antigens, risk factors for viral acquisition and serum transaminase among blood donors in Ibadan, Nigeria. Tropical Gastroenterology, 2003. 24:196-197.
18. Redd, J.T., Baumbach, J., Kohn, W., Nainan, O., Khristova, M., and Williams, I. Patient-to-patient transmission of hepatitis B virus associated with oral surgery. *Journal of infectious Disease*, 2007. **195**(9):1311-1314.
19. Shepard, C.W., Simard, E.P., Finelli, L., Fiore, A.E. and Bell, B.P. Hepatitis B Virus Infection: Epidemiology and Vaccination. *Epidemiologic Reviews* 2006. **28:**112-125.DOI:10.1093/epirev/mxj009.
20. Sunbul, M. Hepatitis B virus genotype: Global distribution and clinical importance. *World Journal of Gastroenterology,* 2014. **20**(18):5427-5434.
21. Ganem D, and Prince AM. Hepatitis B virus infection—natural history and clinical consequences. *National England Journal of Medicine*; 2004. 350:11.
22. Ishak KG. Pathologic features of chronic hepatitis: a review and update. *American Journal of Clinical Pathology* ; 2000. **113:**40-55.
23. Kim WR, Brown RS, Terrault NA, and El-Serag HH: (2002) Burden of liver disease in the United States: summary of a workshop. *Hepatology* ; 36:227-242.
24. World Health Organization. Blood safety. Aide-Memoire for national blood viral hepatitis. 2013. **35**:58.
25. World Health Organization. Recommendations on Viral hepatitis. Available from: *Digestive Liver Disease*; 2014. **35**:58.
26. World Health Organization . Global policy report on the prevention and control of www. Acrobiotech.com. 2015.
27. Yakubu A , Sahabi D.M., Umar A., Saidu Y and Magaji U.F . Prevalence of HBsAg Among Prospective Blood Donors and Pregnant Women in Kebbi State, Nigeria. *Nigerian Journal of Haematology and Transfusion Science* 2016.