



Prevalence of Hepatitis B Viral Markers among Suspected Liver Disease Patients Attending Lagos University Teaching Hospital, Nigeria

A. B. Ajide^{1*}, L. Y. Adogo² and S. A. Omilabu¹

¹Department of Medical Microbiology and Parasitology, College of Medicine, University of Lagos, Idi- Araba, Lagos State, Nigeria.

²Department of Biological Sciences, Faculty of Science and Technology, Bingham University, Karu, Nigeria.

Authors' contributions

This work was carried out in collaboration between all authors. Author ABA designed the study, performed the statistical analysis, wrote the protocol, wrote the first draft of the manuscript and managed literature searches. Authors ABA, LYA and SAO managed the analyses of the study and literature searches. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/BMRJ/2016/23072

Editor(s):

(1) Gyanendra Singh, Gene Therapy & Louisiana Vaccine Center, School of Medicine, LSU Health Sciences Center, Louisiana, USA.

Reviewers:

- (1) Aisha Elsharkawy, Cairo University, Egypt.
(2) Mona Mohamed Rafik, Ain Shams University, Egypt.
(3) Fasakin Kolawole Asimiyu, Afe Babalola University, Ado Ekiti, Nigeria.
(4) Shalini, Ram Manohar Lohia Hospital, New Delhi, India.
(5) Simeon Achunam Nwabueze, Nnamdi Azikiwe University, Awka, Nigeria.
Complete Peer review History: <http://sciencedomain.org/review-history/13066>

Original Research Article

Received 12th November 2015
Accepted 11th January 2016
Published 25th January 2016

ABSTRACT

Aim: To determine the different outcomes of HBV infections among patients attending Lagos State University Teaching Hospital.

Place and Duration of Study: This study was conducted in Lagos University Teaching Hospital Idi Araba and College of Medicine University of Lagos, between June 2010- July 2011.

Methodology: A total of 87 samples were collected from suspected liver disease patients aged between 11 and 74 at the gastroenterology clinic, Lagos University Teaching Hospital (LUTH), Idi-Araba. These were screened for hepatitis B virus markers (HBsAg, HBeAg, and HBcIgM) using DIA. PRO DIAGNOSTIC BIOPROBES Srl.

*Corresponding author: E-mail: bukze2000@yahoo.com;

Results: Out of the number screened, 39 (44.8%) were positive for at least one marker and 17 (19.5%), 3 (3.5%) and 19 (17.5%) were positive for HBsAg, HBeAg and HBcIgM respectively. Among the positive research participants, 18 (20.7%) and 5 (5.8%) were positive for males and females respectively and the difference between them was statistically significant ($P < .001$). The highest prevalence rate of (18.4%) was recorded within the age group 31-40. On the basis of sex, the prevalence rate was higher in males 14 (16.1%) than females 2 (2.3%). Moreover, the prevalence of the markers was stratified by sex and HBcIgM had the highest prevalence among the respondents with the males having higher prevalence 15 (17.2%) than female 4 (4.6%).

Conclusion: This study suggests that screening for all the three markers is a useful tool for the diagnosis and monitoring of HBV infection. More importantly, efforts should be directed at early detection of HBV infection, other agents and effect of such other agents on the progression of HBV infection.

Keywords: Hepatitis B virus; surface markers; liver disease; blood.

1. INTRODUCTION

Viral hepatitis is a problematic health challenge worldwide. Some complications of hepatitis B virus, are super infection with HDV and HCV due to the fact that transmission is via parental routes but about 20% of patients become chronic carriers and quite a number of these chronic carriers are healthy hence no visible deficiency. Few, however shows chronic active hepatitis which can progress to liver cirrhosis and probably lead to hepatocellular carcinoma, which is of concerns to the world at large [1-3].

Hepatitis B is transmitted through blood transfusion, sexual contact, neonate exposure and probably via insect bite [4]. Over 350 million HBV carriers are reported worldwide but the highest HBV chronic carrier rates are among the population of the Asia pacific Region and sub-Saharan Africa [5]. In Nigeria, 10-17% carrier rate of hepatitis B surface antigen in healthy adults was recorded [6]. In Jos, Plateau State in north central Nigeria, the prevalence of HBsAg among apparently healthy blood donors was found to be 14.3% [7]. Although horizontal transmission is widely recognized as the major means of HBV transmission in areas of high endemicity such as Nigeria, the vertical transmission rate for HBV in a Nigerian population of HBsAg-positive pregnant women was found to be 51.6% [8].

Studies in Nigeria also showed that the prevalence of HBV measured by HbsAg and Anti-HCC ranges between 3.2% and 70.4% [9]. However, chronic liver disease associated with "e" negative HBV infection is being increasingly recognized in Asia and parts of sub-Saharan Africa [10]. This form of chronic hepatitis B liver

disease is also referred to as HBeAg-negative chronic hepatitis B liver disease and has been found to be associated with high HBV replication, chronic liver necro-inflammation and progressive fibrosis [11].

However, a variety of serological assays may be employed to differentiate the types of viral infection as well as discriminate between chronic and acute hepatitis B virus infection. Specific methods used commercially in the diagnosis of hepatitis B are radio immunoassay (RIA) and enzymes linked immunosorbent assays (ELIZA). Both assays make use of specific antibodies against Hepatitis B virus protein and can detect the HBsAg, HBeAg and HBcIgM markers at lowest volumes [12,13].

This study therefore was designed to make use of commercially prepared ELIZA kits to assess the prevalence of Hepatitis B virus markers among suspected liver disease patients attending Lagos University Teaching Hospital (LUTH).

2. MATERIALS AND METHODS

2.1 Study Centre

Lagos University Teaching Hospital of the University of Lagos, Idi Araba, was used as study centre. Patients attending this hospital were from low, medium, and upper socio-economic class of the populace.

2.1.1 Study population

Patients with suspected liver disease attending gastroenterology medical outpatient clinics and wards in the department of medicine, College of

Medicine University Teaching Hospital were recruited for this study.

2.1.2 Study criteria

Patients with suspected liver disease that have undergone liver function test were recruited for this study while patients who were not suspected for liver diseases were excluded in the study.

2.1.3 Ethical approval

The blood samples were obtained with the informed consent of the research participants. Ethical approval was obtained from the ethics review committee of the institution.

2.1.4 Blood sample collection, processing and storage

Blood samples were collected (5ml) by vein puncture using sterile syringe and needle into sterile plain bottles. The blood samples were allowed to clot before spinning at 1,500 rpm for 5 – 10 mins. Sera were then separated and collected into sterile cryovials and stored away at -200C until tested for hepatitis B virus markers. Sera were coded and screened using DIA.PRO Diagnostic Bio probesSrL via Columella n031 20128 Milano-Italy for HBsAg, HBeAg and HBcIgM differently.

2.1.5 Data analysis

The data collected were subjected to statistical analysis using chi-square to determine the significant difference at ($P < 0.001$). The software used was Microsoft Excel.

3. RESULTS

A total of 87 blood samples from patients suspected of liver disease were screened for Hepatitis B virus with special reference to HBsAg, HBeAg, and HBcIgM markers. Of this, 39 (44.8%) were positive for at least one marker and 17(19.5%), 3(3.5%) and 19(21.8%) were positive for HBsAg, HBeAg, and HBcIgM respectively.

Among the positive research participants 18(20.7%) were males and 5(5.8%) were females and the difference between them was statistically significant ($P < 0.001$).

However, the prevalence of the viral markers among the patients was classified by age and

sex and the results were summarized as shown in Table 2. Here 31 – 40 age group had the highest prevalence 16(18.4%) of all the markers and this prevalence was higher in males 14 (16.1%) than females 2(2.3%). Whereas, 61 and above age group all tested negative for all the markers.

Furthermore, the prevalence of the markers was classified by sex and the result is shown in Table 2. This table showed that HBcIgM had the highest prevalence among the research participants with the males having higher prevalence than females.

Similarly, the difference between the prevalence of HBeAg and HBsAg markers were significant ($P < 0.003$). Also the difference between the prevalence of those without HBeAg and those with HBsAg was statistically significant ($P < 0.001$). In the same vein, the difference between the prevalence of those without HBcIgM was also significant ($P < 0.001$). The prevalence of the three markers occurring simultaneously was low; however, there was no significant difference amongst the males (Table 2).

4. DISCUSSION

The prevalence of hepatitis B markers in this study was 39 (44.8%) in patients with suspected liver disease in Lagos University Teaching Hospital. When each marker was considered individually, 17 (19.5%) were positive HBsAg suggesting that the infection was either at carrier stage or to some extent active. Also 3 (3.5%) were positive for HBeAg suggesting subjects had active viral replication. Similarly, 19 (21.8%) were positive for HBcIgM suggesting that subjects were recently infected. In addition, the occurrence of a combination of two markers- HBsAg and HBcIgM showed that the infection was at its early stages, and 11 (12.6%) of such cases were observed during the study.

A combination of HBeAg and HBcIgM suggest recent active infection and the prevalence of this marker was very low 1 (1.3%). On the other hand, the occurrence of all three markers suggest active viral replication that indicate ongoing liver damages and a likelihood of progression to severe chronic liver disease [14] and only 2 (2.3%) of the research participants were found in this category. Hence, the findings of this study suggest that Hepatitis screening for all three markers is necessary for conclusive diagnosis of viral infection and liver disease.

Table 1. Age and sex specific prevalence of hepatitis B markers among suspected liver disease patients

Age group	Number of subjects	HBsAg positive (%)	HBeAg positive (%)	HBcIgM positive (%)
≤ 20	14 (16.1)	1 (1.2)	-	3 (3.5)
21 – 30	32 (36.8)	5 (5.8)	1 (1.2)	5 (5.8)
31 – 40	25 (28.7)	7 (8.1)	2 (2.3)	7 (8.1)
41 – 50	7 (8.1)	3 (3.5)	-	3 (3.5)
51 – 60	8 (9.1)	1 (1.2)	-	1 (1.2)
≥ 61	1 (1.2)	-	-	-
Total	87(100%)	17 (19.8)	3 (3.5)	19 (22.1)
Sex				
Male	55 (63.2)	14 (16.1)	3 (3.5)	15 (17.2)
Female	32 (36.8)	3 (3.5)	-	4 (4.6)

Table 2. Sex specific prevalence of different hepatitis B virus marker among suspected liver disease patients

HBV markers	Number of positive (%)	Number of males (%)	Number of females (%)
HBsAg	17 (19.5)	14 (16.1)	3. (3.5)
HBeAg	3 (3.5)	3 (3.5)	-
HBcIgM	19 (21.8)	15 (17.2)	4 (4.6)
HBsAg&HBeAg	-	-	-
HBsAg&HBcIgM	11 (12.6)	9 (10.4)	2 (2.3)
HBeAg&HBcIgM	1 (1.2)	1 (1.2)	-
HBsAg&HBeAg&HBcIgM	2 (2.3)	2 (2.3)	-

Among those that were tested positive, the difference between male and female patients was highly significant ($P < 0.001$). This suggests that males are more likely to be infected than females. Such discrepancy in the degree of exposure and infection was probably due to the fact that males were more likely to be exposed to the predisposing factors such as cigarette smoking, alcohol consumption, multiple sexual partners, blood transfusion and homosexuality. This is consistent with the findings of similar works done on the subject [15,16].

When sex and age were considered at the same time, research participants within 31-40 age groups had the highest prevalence for all the markers and this prevalence was high in males than females. This was probably due to the fact that the patients within this age bracket were probably the most active socially and were more likely to be exposed to the predisposing factors [17], on the contrary, patients who were aged 61 and above all tested negative for all the marked of HBV. This was probably due to the fact that the number of observation within this age group was very low 1 (1.2%) compared with other age groups and was therefore not adequate for drawing meaningful conclusion.

Nevertheless, since this was a baseline study, questionnaires were not administered and therefore, it was not possible to identify predisposing factors on individual bases. Moreover, further investigations to determine definitive diagnosis such as liver Cirrhosis (LC) and hepatocellular carcinoma (HCC) for suspected liver disease patients was beyond the scope of this study. This did not allow for the measurement of risk (odd ratio) or likelihood of infection of HBV due to exposure to one or more predisposing factors. Hence, further studies along these lines are suggested to take into consideration these shortcomings.

5. CONCLUSION

This study has revealed the high prevalence of Hepatitis B Virus infection among suspected liver disease patients. However, further studies should include the five viral markers of HBV in addition to HBV-DNA for a conclusive diagnosis.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Puoti M, Torti C, Bruno R, Filice G, Carosi G. Natural history of chronic hepatitis B in co-infected patients. *J Hepatol.* 2006;44: 65-70.
2. Ganem D, Prince AM. Hepatitis B infection: Natural history and clinical consequences. *New England Journal of Medicine.* 2004;350:1125-1126.
3. Merle P, Trepo C. Therapeutic management of hepatitis B related cirrhosis. *Journal of Viral Hepatitis.* 2001;8: 391-399.
4. Surendra K, Prakash G, Bishnu RT, Manita R. HBsAg Sero surveillance among Nepalese blood donors. *Ann. Trop. Med. Public Health.* 2008;1(1):15-18.
5. World Health Organization (2012) Hepatitis B. Fact Sheet No.204. Available:<http://www.who.int/mediacentre/factsheets/fs204/en/> (Accessed 20 February, 2013)
6. Uneke CJ, Ogbu O, Inyama PU, Anyanwu GI, Njoku MO, Idoko J. Prevalence of hepatitis B surface antigen among blood donors and human immunodeficiency virus infected Patients in Jos, Nigeria. *Mem Inst Oswaldo Cruz.* 2005;100:13-16.
7. Ayoola, EA, Adelaja AB. Subdeterminants and incidence of hepatitis B antigen in carriers of hepatitis B surface antigen. *Nigeria Medical Practice.* 1986;11:133-136.
8. Eke AC, Eke UA, Okafor CI, Ezebialu IU, Ogbuagu C. Prevalence, correlates and pattern of hepatitis B surface antigen in a low resource setting. *Virology.* 2011;8:12.
9. Olubuyide IO, Aliyu B, Olateye OA, Ola SO, Olawuyi F, Malabu UH, et al. Hepatitis B and C virus and hepatocellular carcinoma. *Transaction of Royal Society of Tropical Medicine and Hygiene.* 1997;91: 38-41.
10. Lesi OA, Kehinde MO, Omilabu SA. Prevalence of the hepatitis B "e" antigen in Nigerian patients with chronic liver diseases. *Nigerian quarterly Journals of Hospital Medicine.* 2004;14:1-3.
11. Manesis E, Papatheodoridis GV, Sevastianos V, Chrlongitas E, Papaioannou C, Haziyanmis SJ. Significance of hepatitis B viremia levels determined by a quantitative polymerase chain reaction assay in patients with hepatitis e- antigen negative in chronic hepatitis B virus infection. *American Journal of Gastroenterology.* 2003;98:2261-2267.
12. Hollinger FB, Dienstag JL. Hepatitis B and D viruses. In: Murray PR, Baron EJ, Pfaller MA, Tenover FC, Tenover RH, (eds). *Manual of Clinical Microbiology*, 6th edition Washington, D.C: ASM press. 1995;1033-1049.
13. Elefsiniotis IS, Pappazios V, Bots C, Pantazis KD, Katsambas A. Serological profile and virological evaluation of hepatitis B and hepatitis C virus infection among HIV infected patients in Greece. *Centr Eur J Public Health.* 2006;14:2224.
14. Yuen MF, Lai CL. Natural history of chronic hepatitis B virus infection. *Journal Gastroenterology Hepatology.* 2000;15: S125-S145.
15. Olubuyide IO, Bamgboye EA. A case controlled study of the current role of cigarette smoking and alcohol consumption in primary liver cell carcinoma in Africans. *Africa Journal of Medical Science.* 1990;19:191-194.
16. Okeke EN, Malu AO, Obafunwa JO, Nwana EJ. Aetiological significance of alcohol in liver cirrhosis on the Jos Plateau, West Africa. *Journal of Medicine.* 2002;21:12-14.
17. Parrish KM, Higuchi S, Muramatsu T. A method for estimating alcohol related liver cirrhosis mortality in Japan. *International Journal of Epidemiology.* 1991;20:921-926.

© 2016 Ajide et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<http://sciedomain.org/review-history/13066>