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RESEARCH ARTICLE

PREVALENCE OF HEPATITIS B SURFACE ANTIGEN AMONGST BLOOD DONORS IN JOS, NORTH CENTRAL NIGERIA

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ABSTRACT

Background: Hepatitis B virus (HBV) infection is a vital health problem in blood transfusion throughout the world. A good number of studies in northern Nigeria were amongst people infected with HIV/AIDS; hence information is very scarce on the prevalence of HBV infection among blood donors in Nigeria.
Objectives: The necessity for information about this silent killer among these apparent healthy blood donors was the center for this study.
Methodology: Hepatitis–B-surface antigen (HBsAg) latex kit was used to determine the prevalence of HBsAg among 370 voluntary blood donors (age 20-60years) in Jos university teaching Hospital, Nigeria.
Result: Three hundred and seventy (370) blood donors were screened for HBsAg and 100 (27.0%) were positive. Males recorded 97 (27.3%) while females had 3 (21.4%). Prevalence of HBsAg according to age showed that, age 20-30 years recorded 33.8%, age 31-40 years recorded 27.9%, while ages 41-50 and 51-60 years recorded 14.5% and 9.1% respectively. Routine screening for HBsAg in blood donors is very important because asymptomatic donors may be chronic carriers.
Conclusion: The prevalence of 27.0% HBsAg within the study population shows that it is of public health significance.

INTRODUCTION

The public health burden of hepatitis B virus (HBV), a double stranded DNA virus of Hepadnaviridae family is almost entirely due to its long-term effects on liver function (Pungpapong *et al*., 2007). It is estimated that more than two billion have been infected with HBV and between three hundred and fifty (350) to four hundred(400) million people are hepatitis B virus (HBV) carriers in the world. More or less than 1 million die from HBV allied liver diseases annually (Drostten *et al* 2004,Mcmahon 2008). Hepatocellular carcinoma is the most frequent form of primary liver cancer and is a major cause of death in sub-Sahara and eastern Africa (Parkin *et al*, 2005).

The main etiologic factor in this region is chronic infection with hepatitis B virus. Other factors that contribute to the etiology of primary liver cancer include hepatitis C virus (HCV) and dietary exposure to aflatoxins, a group of mycotoxins that are natural contaminants of the staple diet. The latter has a multiplicative effect in conjunction with HBV infection on the risk of developing hepatocellular carcinoma (Montesano, 1997; Kirk *et al*, 2006). However, WHO (2000) estimated that worldwide, more than two billion people have been infected by HBV and 350 million people have chronic liver diseases (infection). The modes of transmission for HBV include perinatal, during birth from infected mother, unprotected sexual contact, intravenous drug use and blood transfusion. The principal routes of transmission vary between regions. In high prevalence areas, perinatal is the major route in the tropics (Finlayson *et al*., 1999). However, intermediate prevalence areas, horizontal transmission especially in early childhood, causes most chronic HBV infection and unprotected sexual intercourse and intravenous drug use in adults are the principal transmission routes in low prevalence areas (Kim *et al*., 2002).

Vaccine-preventable viral hepatitis continues to be a cause of considerable morbidity and mortality: on worldwide basis. The true incidence, however, has been estimated to be 3-10 times higher. Regarding hepatitis B, more than a third of the world's population has been infected. The World Health Organization has estimated (2000) that there are 367 million chronic carriers of hepatitis B worldwide, and approximately 1 million deaths per year as a consequence of chronic complications and acute fulminant disease. Hepatitis B vaccines have been licensed since 1982 (Van Damme and Van Herck, 2007).The prevalence of post transfusion hepatitis is very well documented and since the introduction of routine screening for hepatitis B surface antigen and with improved screening techniques, the incidence of post transfusion hepatitis has

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reduced significantly. It has been suggested that the observed decline is due to the inclusion of neonates in the national HBV vaccination since 1993 and the vaccination of high risk groups against HBV (Merat *et al*., 2000; Alavian *et al*., 2007). In sub Sahara Africa, the virus is hyperendemic with a carrier rate of 5 to 20% (Mphahlele *et al*, 2002)). Typically, about 50% of both blood donors and recipients have had natural exposure to HBV and infected individuals can remain asymptomatic for decades. Nevertheless, more than 80% of the carriers become chronic carriers which result in an increased risk of liver cirrhosis, liver cancer and liver failure in 30years there after (Volf *et al*, 2008). The world health organization (WHO) estimated that no more than 50% of the blood supply in sub Sahara Africa is screened for HBV. This low rate of screening is due to lack of perceived utility and lack of funds. No systematic study of donors has been undertaken that could provide the basic data to estimate the transfusion related risk of HBV infection in high prevalence areas of Africa referred to as a "silent killer"(Samuel *et al*., 2004). The Center for Disease Control and prevention reports an estimated 43,000 new infections each year in the United State. It is estimated that more than 1 million US residents have chronic infection, which contributes to an estimated 2,000-4,000 deaths each year. Internationally, each year, an estimated 500,000 people died of cirrhosis and hepatocellular carcinoma caused by chronic HBV infection, and an estimated 500,000-1,000,000 person died annually from HBV related liver disease. Screening of donors with a highly sensitive test is an effective method of preventing post transfusion hepatitis. (Maynard *et al*, 1990; McMahon, 2008).

METHODOLOGY

Individuals who came to the blood bank, Jos University Teaching Hospital for voluntary blood donation during this period of research were screened for the prevalence of HBsAg. The bio data of each individual was obtained using a structured questionnaire. Individuals with any history of viral hepatitis were excluded from the study. Individuals less than 20years and above 60years were also excluded from this study. Five millilires of blood was collected from each donor. Sera from separated samples were screened for HBsAg using Latex (Biotec hepatitis type's B latex test kit) particles which are coated with rabbit gamma globulins containing antibodies to hepatitis B surface antigen. When the sample of blood from an individual infected with HBsAg is mixed with the sensitized particles, a distinct agglutination will occur as a result of antigen–antibody interaction. Manufacturer's instructions were strictly followed to determine the HBsAg seropositivity or seronegativity of each sample.

RESULTS

Of the three hundred and seventy (370) voluntary blood donors who attended the screening exercise, the overall prevalence for HBsAg was 27.0%. Males had the highest prevalence of 27.3% while females had 21.4% as shown in Table 1. HBsAg positivity rate was found to be higher among age group 20-30 years who recorded 33.8%, followed by age group 31-40 years with prevalence rate of 27.9%. Age group 41-50 years had 14.5%, and age group 51-60 years recorded the least prevalence rate of 9.1% (Table 2).

Table 1. Sex distribution of Hepatitis B surface antigen amongst blood donors

Sex	No. Screened	No. positive	% positive
Male	356	97	27.3
Female	14	3	21.4
Total	370	100	27.0

Table 2. Age distribution of Hepatitis B surface antigen amongst blood donors

Age	No. Screened	No. positive	% positive
20-30	136	46	33.8
31-40	154	43	27.9
41-50	69	10	14.5
51-60	11	1	9.1
Total	370	100	27.0

DISCUSSION

Hepatitis B infection is a serious global health problem responsible for between 500.000 and 1.2 million deaths annually from cirrhosis and Hepatocellular carcinoma (EASL, 2003). Prevalence of hepatitis B virus varies greatly in different parts of the world, but is higher in tropical regions causing both acute and chronic liver disease (Szmuness *et al*, 1977). This study showed that HBsAg prevalence rate is high (27.0%) among blood donors in the study area. This agree with Hodges *et al*.(1998) who classified any adult population with a prevalence of greater than 7% HBsAg as high endemicity for HBV .The prevalence rate of 27.0% obtained in this study among blood donors revealed that Jos, Nigeria is endemic for HBV infection. Studies done in other parts of Nigeria, recorded prevalence rates of 23.9% in Jos among blood donors (Uneke *et al*, 2005); 21.3% in Ibadan among blood donors (Otegbayo *et al*., 2003); 11.1% in Kano among blood donors (Nwankwo *et al*, 2012); 13.3% in Keffi among healthy individual (Pennap *et al*.,2010) and 25.7% in Lagos among surgeons(Belo, 2000). Although HBV prevalence varies widely across the African continent, hepatitis B positivity is estimated to be between 8-20% (Apura *et al*, 2007).

About 15-40% of HBV infected persons would develop cirrhosis, liver failure, or hepatocellular carcinoma (Aboulhab, 2006). Similar results have been obtained in other countries such as 30.8% prevalence rates in Taiwan and Singapore (Wong *et al*., 1992) and 24.7% in South Africa. Worldwide, it has been reported that about 350-400 million persons are likely to be chronically infected with hepatitis B virus and 15%-40% of those persons are at risk of developing cirrhosis and/or hepatocedlular carcinoma (HCC) without interference (McMahon *et al*, 2005). More so, Africa, Asia, and the Caribean have been categorised as areas of high endemicity - 8% to 20% (Alter *et al*, 1990). Analysis of sex–related prevalence rate of HBsAg showed that males were more infected (27.3%) than females (21.4%). Opaleye *et al* (2010) and Uneke *et al* (2005) who reported that hepatitis B virus infection was observed more often in men (14.6%) than in women (12.9%). Also, UNSN (2001) reported that multiple sexual partnership and promiscuity are habits occurring with higher frequency among males than females in Nigeria. Although the reason for this sex difference is not clear, the higher frequency of exacerbations in men may account in part for the higher incidence of HBV related cirrhosis and

hepatocellular carcinoma among men. The high prevalence rate (33.8%) of HBsAg among the blood donors in age group 20-30 and 27.9% from the age group 31-40 as seen in this study may suggest a sexual mode of acquisition of the virus. Since individuals within this age group are more sexually active. HBV is transmitted by exposure to infectious body fluids, by sexual contact with an infected person, and by perinatal transmission from an infected mother to her infant which is the major routes of transmission in high prevalence areas (WHO, 2010) The natural history of hepatitis B virus can vary dramatically between individuals. Studies have shown that the likelihood of chronicity after acute HBV infection varies as a function of age (Dienstag *et al*., 1998). In this study higher HBsAg prevalence of 33.8% was observed among age group 20-30 years of the blood donors. This group could be involved with sexual activity and intravenous drug use which was reported to be highest among Nigerians in their third decade of life (UNSN, 2001).

Conclusion

The high (27.0%) seroprevalence of HBsAg in this study is alarming, and therefore, calls for proper screening of blood for HBsAg and other blood transmissible infections such as HIV, HCV, and syphilis with sensitive and specific reagents kits; if possible, nucleic acid technology should be used. There is need for proper and compulsory screening of blood donors for HBV and other blood transmissible infectious agents and their prevention strategies should be strengthened. Chronic hepatitis B infection is a serious viral disease, which in the absence of proper screening of the blood and blood product can lead to post- transfusion infection. The blood safety measures that were implemented by the Iranian Blood Transfusion Organisation (IBTO) across the country, such as improved donor selection and exclusion of replacement donations should be encouraged.

REFERENCES

Aboulhab, J. (2006). HBV viral load in an independent predictor of progression to hepatocellular carcinoma in chronic HBV patients. Euro Surveill. 11(1): E06012.6.Available online:http//www.eurosurveillance.org.

Alavian, S.M.; Fallahiar,F. and Lankarani, K.B.(2007). The changing epidemiology of viral Hepatitis B in Iran. J. Gastrointestin Liver Dis.16(4):403-6.

Alter, M. J.; Handler, S. C; Margolis, H. S.; Alexander, W.J.; Hu, P.Y. and Judson, F.N. (1990).The changing epidemiology of hepatitis B in the United states. Need for alternative vaccination strategies. JAMA 263(9): 1218-22.

Apura, A.M, and Jordan, J.F. (2007).Viral hepatitis and HIV in Africa.AIDS Reviews 9: 25-39.

Belo, A.C. (2000). Prevalence of hepatitis B virus markers in surgeons in Lagos, Nigeria. East African Medical Journal 77(5): 283-285.

Dienstag, J.H. and Isselbacher K.J. (1998). Chronic hepatitis. In Fauci, A.S.; Braunwald, E.; Isselbacher, K. J. (eds). Harrison"s Principles of Internal Medicine. Vol 1. 14th ed.Mc-Graw-Hill, New York. P. 1696-1704

Drosten, C.; Nipprasch. K.T.; Manegold, C.; Meisel, H.; Brixner, V.; Roth, W. K.; Apedjinou, A. and Gunther S. (2004). Negative sera correlates with HCV but not HBV serostatus. J Clin Virol 29: 59-68.

EASL. (2003). International consensus conference on Hepatitis B. J Heptol 39:S3-S25.

Finlayson, M.D.C.; Hayes, P.C. and Simpson, K.J. (1999). Diseases of the liver and biliary system hepatitis. In Haslett, C.; Chilvers, F.R Hunter, J.A.A. (eds). Davidson Principles and practice of medicine. Churchil Living Stone. London. P.706-715.

Hodges, M.; Sanders, E. and Aitken, C. (1998). Seroprevalence of hepatitis markers: HAV, HBV, HCV, and HBV amongst primary school children in Freetown Sierra Leone. W. Afr J Med 17: 3-7.

Kim, W.R.; Ishitani, M.B.; Dickson, E.R. (2002). Rising burden of hepatitis B in the United States: Should the other virus be forgotten. Hepatology. 36(4): 222A.

Kirk,G.D. and Bah, E.(2006). Montesano R. Molecular epidemiology of human liver cancer: insights into etiology, pathogenesis and prevention from The Gambia, West Africa. Carcinogenesis .27:2070–82.

Maynard, S.E.(1990). Hepatitis B: global importance and need for control vaccine. 8 (suppl) S18-20; discussion S1-3.

McMahon, B.J. (2005). Epidemiology and natural history of hepatitis B.Semin LiverDis.25(1) 3-8, (PubMed:16103976).

McMahon, B.J. (2008). National history of chronic hepatitis B–Clinical implications. Medscape J med 10(4): 91

Merat,s.; Malekzadeh, R.; Rezvan, H. and Khatibian, M. (2000). Hepatitis B in Iran. Arch Iranian Med 3(4): 192-201.

Montesano, R.; Hainaut, P and Wild, C.P. (1997). Hepatocellular carcinoma: from gene to public health. J Natl Cancer Inst.89:1844–1851.

Mphahlele, M.J.; Francois,G.; Kew,M.; Van Damme,P.; Hoosen,A. and Meheus,A.(2002). Epidemiology and control of hepatitis B implicates for Eastern and Southern Africa. S Afr Epidemiol infect: 17, 12 -17.

Nwankwo, E.; Momodu, I.; Umar, I.; Musa, B. and Adeleke, S. (2012). Seroprevalence of major blood-borne infections among blood donors in Kano, Nigeria. Turk J Med Sci. 42 (2): 337-341.

Opaleye, O.O.; Zakariyahu, T.O.; Tijani, B.A. and Bakarey, A.S. (2010). HBV, HCV co-infection among blood donors in Nigeria. Indian J Pathol Microbiol 53: 182-3.

Otegbayo, J.A.; Fasola, F.O. and Abaja,A (2003). Prevalenceof Hepatitis B surface antigen (HBsAg) and Hepatitis B envelope antigens HBeAg), risk factor of viral acquisition and transminase among blood donors in Ibadan, Negeria.Trop.Gasteroent. 24:26.

Parkin, D.M.; Bra, F.; Ferlay, J. and Pisani ,P.(2005). Global cancer statistics, 2002. CA Cancer J Clin 55:74–108.

Pennap, G .R.; Yakubu, A.; Oyige,O. and Forbi , J (2010).Prevalence of hepatitis B and C virus infection among people of local community in Keffi, Negeria. Afr. J. Microbiol. Res 4(4): 274-278.

Pungpapong, S.; Kim, W.R. and Poterucha, J.J. (2007). Natural History of Hepatitis B virus infection: An Update for clinicians. Mayo clinical procedures. 82: 967-975.

Samuel, D.; Muller, R. and Alexander, G. (2004). Educational Research. National Hepatitis B virus programme. Infect. Dis.234: 221-332.

Szmuness, W.; Dienstag,J.L.; Purcell,R.H.; Steven,C.E.; Wong,D.C. and Ikram,H. (1997). The prevalence of antibody to hepatitis B antigen in various parts of the world:a plot study.Amer.J.Epidem.106:392-8.

Uneke, C.J.; Ogbu,O.; Iyami,P.U.; Anyayu,G.J.; Njoku, M.O. and Idoko, J.H.(2005).Prevalence of HBsAg among blood donors and HIV-infected patients in jos Negeria. Afr.Health sci,5:58-59.

UNSN (2001). Nigerian Common Country Assessment. World Health Organisation Geneva. 563pp.

Volf, V.; Marx, D.; Pliscova, l.; Sumega, L and Celko, A. (2008). A survey of Hepatitis B and C prevalence among the homeless community of paragues. Eur. J. Pub. Health 18: 44-47.

WHO - World Health Organization. Hepatitis B fact sheet number204/WHO.(2000).Available: (http://who.int/inf.fs/en/fact204.html.

WHO (2010). Hepatitis B (An update). Available from http://www.who.int/csr/diseas/hepatitisB_whodcsrlyo 2002_2. pdf.

Wong, J.; LI, ZI Yang (1992). Detection of Hepatitis B virus DNA in leucocytes of primary hepato carcinoma using polymerease chain reaction. Chung Hua Nei-2Ko-Isa-Chun 31(2) 90-21 126.

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