Asian Journal of Medical Sciences 5(5): 101-104, 2013
ISSN: 2040-8765; e-ISSN: 2040-8773

Submitted: February 23, 2013 Accepted: March 27, 2013 Published: October 25, 2013

Prevalence of Hepatitis B and C among Blood Donors in Jos South LGA, Plateau State, Nigeria

[1]A.M. Adekeye, [2]A.A. Chukwuedo, [3]P.N. Zhakom and [3]R.S. Yakubu
[1]Department of Haematology, Federal College of Veterinary and Medical Laboratory Technology, Vom, Plateau State
[2]Rabies Research Project, Viral Research Divison, National Veterinary Research Institute, Vom, Plateau State
[3]National Blood Transfusion Service, North Central Zone Centre, Plateau State Specialist Hospital, Jos, Plateau State

Abstract: Hepatitis B and C infections are infectious liver diseases that result from infection with hepatitis B and C viruses and are transmitted via contact with contaminated blood and body fluids. This study was to determine the prevalence of HBV and HCV infection among blood donors in Jos South Local Government Area. Two hundred and forty-five volunteers were screened for HBsAg and anti-HCV using Enzyme Linked Immunosorbent Assay (ELISA) tests. Fifty-one (51) volunteers (20.8%) were positive for HBsAg, 12 (4.9%) were positive for anti-HCV while 3 (1.2%) were found to be co-infected with both the viruses. Volunteers in the age group 20-29 years had the highest prevalence of HBV (9.8%) and HCV (2.45%) infections. Those between the ages of 10-19 had the least prevalence of HBV infection (1.2%) while ages 40-49 years had the least prevalence. Based on sample location, Dadin Kowa had the highest infection rate of HBV (5.7%) while Zawan had the least prevalence of HBV (2.0%). Zaramaganda had the highest infection rate of HCV infection (2.0%) while Dadin Kowa had the least (1.2%) and Turu Vom and Zawan having no infections. Gender analysis showed that males had the higher prevalence (15.9%) for HBV and 4.1% for HCV higher than the females with 4.9% for HBV and 0.8% for HCV. The distribution by marital status showed that the single and married subjects had equal prevalence, 10.2% for HBV while for HCV the married had a higher prevalence of 2.85% than the single who had a 2.05% prevalence. This study also revealed that all the cases of HBV and HCV co-infections came from Zaramaganda area in Jos and among married people aged between 20 to 29 years. Co-infection was 0.8 and 0.4% for males and females, respectively. These results revealed the presence and circulation of HBV and HCV in the studied areas. Other details have been discussed in the study.

Keywords: Hepatitis B, Hepatitis C, Hepatitis co-infection, Nigeria, Plateau state

INTRODUCTION

In the developing world, the health care system may not be thorough enough to detect individuals infected with Hepatitis B or C as patients presenting to different hospitals are not screened for these viruses. As a result, people in these areas are at a greater risk of infection and carriers and infected individuals are more likely to be unaware of their status (CDC, 2009; Alavian, 2008). Chronic hepatitis due to different hepatic viruses is a common cause of liver related morbidity (Chaudhary *et al*., 2005; Zuberi *et al*., 2008). Infection with multiple viruses that cause hepatitis have been associated with several serious complications (like cirrhosis, liver failure and hepatocellular carcinoma) and these complications lead to management problems with higher incidence of morbidity and mortality.

MATERIALS AND METHODS

Subjects: Two hundred and forty five volunteers who gave blood to the National Blood Transfusion Service, North Central Zone Centre, Plateau State specialist Hospital (PSH), Jos, Plateau State which is the third largest hospital in the state. These consisted of 189 male and 56 female blood donors. Blood samples were collected by vene-section following informed consent and pre-test counselling of the subjects.

Sample collection and processing: Five milliliters of blood was collected with sterile syringes and needles from each donor into EDTA specimen tubes and centrifuged for 5 min at 2500 rpm. The plasma was separated and stored at -20°C, ready for use. Their bio data was collected with a well-structured questionnaire after ethical approval and consent was obtained.

Corresponding Author: A.M. Adekeye, Department of Haematology, Federal College of Veterinary and Medical Laboratory Technology, Vom, Plateau State

Laboratory assay: The samples were tested for the presence of HBV infection using adsorption qualitative technique based on the principle of antigen-antibody reaction (Monolisa™ HBsAg ULTRA ELISA assay kit) at the National Blood Transfusion Service (NBTS) in Jos, Nigeria. The screening for HCV antibodies was carried out using HCV antibody third generation enzyme immunoassay kit (Dia.Pro™). The test and interpretation of the results were carried out according to the manufacturer's specifications (Egah *et al*., 2007; Khattak *et al*., 2008).

The data were summarized as frequency tables and compared by Chi-Square tests.

RESULTS

Table 1 shows the distribution of Hepatitis B and C in various locations. From the results, Dadin Kowa and Zaramaganda had the highest prevalence of HBV (5.7%) and HCV (2.0%), respectively while Zawan and Dadin Kowa had the least prevalence of HBV (2.0%) and HCV (1.2%) respectively. The co-infection with both HBV and HCV were observed only in volunteers from Zaramaganda. HBV prevalence was obtained in all the locations while Turu-Vom and Zawan had no HCV prevalence. HBsAg and anti-HCV were reactive in 20.8 and 4.9% of the study population respectively while co-infection was recorded in 1.2% of donors.

The age distribution of hepatitis infections among subjects is shown in Table 2. Among the age groups, the subjects within ages 20-29 years had the highest prevalence of 9.8% for HBV infection and 2.45% for HCV infections. Also, Table 2 shows that this group had the highest prevalence for co-infection (1.2%). The difference in the distribution of infections by age groups was not significant ($p>0.05$).

Table 3 shows the prevalence of hepatitis infections in relation to the gender distribution of the subjects. HBV infection was higher among the males (15.9%) than the females (4.9%). The prevalence of

Table 1: Distribution of Hepatitis B and C in relation to sample location

Location	No. tested	No. reactive for HBV (%)	No. reactive for HCV (%)	No. reactive for both infections (%)
Dadin Kowa	75	14 (5.7)	3 (1.2)	0 (0.0)
Fwol Vorok	41	7 (2.9)	4 (1.6)	0 (0.0)
Turu Vom	43	13 (5.3)	0 (0.0)	0 (0.0)
Zaramaganda	48	12 (4.9)	5 (2.0)	3 (1.2)
Zawan	38	5 (2.0)	0 (0.0)	0 (0.0)
Total	245	51 (20.8)	12 (4.9)	3 (1.2)

Table 2: Distribution of Hepatitis infection in relation to the age groups of the subjects

Age group	Overall No. tested	No. reactive for HBV (%)	No. reactive for HCV (%)	No. reactive for both infections (%)
10-19	25	3 (1.2)	0 (0.00)	0 (0.0)
20-29	119	24 (9.8)	6 (2.45)	3 (1.2)
30-39	57	15 (6.1)	4 (1.63)	0 (0.0)
40-49	44	9 (3.7)	2 (0.82)	0 (0.0)
Total	245	51 (20.8)	12 (4.9)	3 (1.2)

Table 3: Distribution of Hepatitis infection in relation to the gender of the subjects

Gender	Overall No. tested	No. positive for HBV (%)	No. positive for HCV (%)	No. positive for HBV and HCV (%)	No. negative for both infections (%)
Male	189	39 (15.9)	10 (4.1)	2 (0.8)	138 (56.33)
Female	56	12 (4.9)	2 (0.8)	1 (0.4)	41 (16.73)
Total	245	51 (20.8)	12 (4.9)	3 (1.2)	179 (73.06)

Table 4: Distribution of Hepatitis infection in relation to the occupation of the subjects

Occupation	Overall No. tested	No. reactive for HBV (% of total)	No. reactive for HCV (% of total)	No. reactive for both infections (% of total)	No. negative for both infections (% of total)
Banker	11	3 (0.0)	1 (0.0)	0 (0.0)	7 (1.25)
Broadcaster	11	0 (0.0)	0 (0.0)	0 (0.0)	11 (0.62)
Carpenter	14	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.00)
Civil servant	20	6 (3.8)	0 (0.0)	0 (0.0)	14 (8.75)
Farmer	20	4 (2.5)	2 (1.2)	1 (0.6)	13 (8.13)
Designer	12	0 (0.0)	0 (0.0)	0 (0.0)	2 (1.25)
Gardner	11	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.62)
Hair dresser	3	1 (0.3)	0 (0.0)	0 (0.0)	2 (1.25)
House wife	10	0 (0.0)	0 (0.0)	0 (0.0)	2 (1.25)
Lecturer	8	2 (1.5)	0 (0.0)	0 (0.0)	3 (1.88)
Mechanic	3	2 (1.2)	0 (0.0)	0 (0.0)	1 (0.62)
Manufacturing	13	0 (0.0)	0 (0.0)	0 (0.0)	6 (3.75)
Security guard	9	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.62)
Student	78	18 (11.2)	4 (5.0)	1 (0.6)	55 (34.38)
Telecom	5	0 (0.0)	1 (0.6)	0 (0.0)	1 (0.62)
Trader	7	3 (1.9)	1 (0.6)	0 (0.0)	3 (1.88)
Unemployed	6	1 (0.6)	0 (0.0)	0 (0.0)	3 (1.88)
Welder	4	1 (0.6)	1 (0.6)	1 (0.6)	1 (0.60)
Total	245	51 (20.8)	12 (4.9)	3 (1.2)	179 (75.50)

Table 5: Distribution of Hepatitis infection in relation to marital status of the subjects

	Overall No. tested	No. reactive for HBV (%)	No. reactive for HCV (%)	No. reactive for both infections (%)
Single	133	25 (10.20)	5 (2.05)	0 (0.0)
Married	110	25 (10.20)	7 (2.85)	3 (1.2)
Divorced	1	0 (0.00)	0 (0.00)	0 (0.0)
Widowed	1	1 (0.41)	0 (0.00)	0 (0.0)
Total	245	51 (20.81)	12 (4.90)	3 (1.2)

HCV infection similarly was higher among the males 10 (4.1%) than the females 2 (0.8%). Co-infections with HBV and HCV were more prevalent in the males 2 (0.8%) than in the females 1 (0.4%). The difference in the distribution of infections by gender was not significant ($p>0.05$).

The distribution of Hepatitis infections in relation to the occupations of the subjects is shown in Table 4. Table 4 showed that students had the highest prevalence rates of 18 (11.25%) for HBV and 4 (2.5%) for HCV. On the other hand hair dressers, welders and the unemployed had the least prevalence with 1 (0.625%) each respectively. Co-infection with HBV and HCV were recorded only among farmers, students and welders with 1 (0.625%) each respectively. The difference in the distribution of infections by occupation was not significant ($p>0.05$).

Table 5 showed that the prevalence rates of HBV and HCV were highest among the married with 25 (10.2%) and 7 (2.85%) respectively followed by the single subjects. The widows had the least HBV prevalence 1 (0.41%) but no case of HCV. However, 3 cases of hepatitis co-infection were recorded among the married with 1.2% prevalence. The difference was not significant ($p<0.05$).

DISCUSSION

Screening blood donors is essential to prevent the transmission of diseases like HBV and HCV infections via blood and blood products. This study therefore set out to determine the prevalence of HBsAg and anti-HCV antibodies in a population of apparently healthy blood donors.

Out of 245 people screened, total of 51 individuals (20.6% of the sample population) were reactive for HBsAg antibody. This could be due to poor health care coverage and the difficulty in detecting viral hepatitis infections during routine investigations (Lawal *et al*., 2009; Chaudhary *et al*., 2005). In comparison to studies from other parts of the country, the prevalence reported in this study was higher than the 13.3% reported in Keffi by Pennap *et al*. (2010) and Otegbayo *et al*. (2003), but less than the 23.9 and 21.3% recorded in studies in Jos and Ibadan respectively (Pennap *et al*., 2010; Tanfer *et al*., 1995; Otegbayo *et al*., 2003; Uneke *et al*., 2005). These differences may be due to sample size, increased awareness and less exposure to risk factors.

Individuals aged 20 to 29 years had the highest prevalence of HBV with an infection rate of 9.83% (24 individuals). This may be due to the fact that Hepatitis B Virus has a low infectious dose among sexually transmitted and blood borne infections, thus making high risk individuals more likely to get infected. This age group contains active youths in the society so it may be attributed to some negative social behavior associated with the youth today like sexual activity with multiple partners, intravenous drug use and tattooing.

The gender distribution showed that the infection was higher among the males (15.9%) than the females (4.9%) probably due to lifestyle variations between both gender groups. This is similar to the findings of Lawal *et al*. (2009) and Uneke *et al*. (2005) who reported a higher prevalence of HBV infection among males (17.5%) than the females (9.5%) in Ibadan. The distribution by occupation showed that students had the highest prevalence of HBV infection (11.25%). This prevalence could be attributed to a number of factors such as sexual activity with multiple partners and contact with contaminated blood or blood products. The distribution by marital status showed that the prevalence of HBV infection was highest among the married with 10.2% prevalence. The high prevalence among the married may be due to pre exposure before marriage and then transmission of the infection to his or her spouse.

Twelve individuals (4.9%) in this study were reactive to anti-HCV antibody. This is similar to other reports which reported a prevalence of 4.3% in Jos (Zuberi *et al*., 2008; Egah *et al*., 2007) and 4% among blood donors in Iran (Khattak *et al*., 2008). Individuals aged 20 to 29 years had the highest prevalence of HCV infection (2.45%) and co-infection with (1.2%) prevalence. The prevalence of HCV infection was higher among the males (0.8%) than the females (0.4%). This finding is different from the findings of Pennap *et al*. (2010) and Otegbayo *et al*. (2003) who reported prevalence of 16.6% among females and 3.4% among males in Keffi. The reason for this may be due to larger number of samples from males than females used in the study. Also males are actively more exposed to risk factors than the females. HCV infection was also highest among the married with prevalence 2.85%. The possible reasons for this are the same as those discussed above for Hepatitis B infection.

An interesting finding in this study, all the cases of HBV and HCV co-infections were found at Zaramaganda, among the age group 20 to 29 years and married (Table 5). Co-infections were most prevalent in the males (Table 3).

The distribution of HBV or HCV among the subjects in this study indicates that most of these subjects may have acquired the infection via exposure to one or more of the various risk factors and were not aware since some social life styles are implicated in the

mode of infection and spread. However, the incidence of HBV and HCV transmission through sex and transfusion of unscreened infected blood could be reduced with the introduction of HBV vaccines, screening of blood donors and better sterilization procedures for all blood products (CDC, 2009).

In conclusion, this study has shown that both HBV and HCV infections could be transmitted through blood donors in Jos South LGA, some of whom may be in the window phase of these infections. To prevent further transmission of Hepatitis, it is important to take steps to improve our medical facilities and diagnosis in the hospitals which will enable us detect the diseases early enough to reduce their spread and manage infected individuals.

Highly sensitive and modern serological tests need to be introduced to hospitals and medical centres to help detect these pathogens. The incidence of HBV and HCV transmission through sex and transfusion of unscreened infected blood could be reduced with the introduction of HBV vaccines, screening of blood donors and better sterilization procedures for all blood products (CDC, 2009). In addition, all laboratory personnel and clinicians should be informed of the importance of proper screening of blood and other blood products against Hepatitis before transfusion. A focused enlightenment campaign against HBV and HCV infections should be carried out in the state and nationwide to educate the population on the mode of spread, risk factors and danger of contracting these diseases. Vaccines for Hepatitis B are effective in preventing infection in the vaccinated and should be made available to the general population to help reduce the rate of infection.

We wish to suggest that more work be done in other centres in other states to establish the national prevalence.

REFERENCES

CDC, 2009. Hepatitis C: FAQ-CDC Viral Hepatitis. Retrieved from: http:// www. cdc.gov/ ncidod/ diseases/ hepatitis/c/faq.htm#5d (Accessed on: June 18, 2010).

Chaudhary, I.A., S.A. Khan and Samiullah, 2005. Should we do hepatitis B and C screening on each patient before surgery: Analysis of 142 cases. Pak. J. Med. Sci., 21(3): 278-280.

Egah, D.Z., E.B. Banwat, E.S. Audu, D. Iya, B.M. Mandong, A.A. Awele and N.E. Gomwalk, 2007. Hepatitis B surface antigen, Hepatitis C and HIV antibodies in a low risk blood donor group, Nigeria. East Med. Health J., 13: 211-215.

Khattak, M.F., N. Salamat, F.A. Bhatti and T.Z. Qureshi, 2008. Seroprevalence of hepatitis B, C and HIV in blood donors in northern Pakistan. J. Pak. Med. Assoc., 52: 398-402.

Lawal, O.A., A.S. Bakarey, L.N. Uche, A.O. Udeze and I.O. Okonko, 2009. Hepatitis B virus infection among prospective human immunodeficiency virus positive blood donors at two designated blood banks in Ibadan, Nigeria. World Appl. Sci. J., 7(10): 1269-1274.

Otegbayo, J.A., F.O. Fasola and A. Abaja, 2003. Prevalence of hepatitis B surface antigen (HBsAg) and Hepatitis B envelope antigens (HBeAg), risk factors of viral acquisition and transminase among blood donors in Ibadan, Nigeria. Trop. Gasteroent., 24: 217-226.

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

Tanfer, K., L.A. Cubbins and J.O. Billy, 1995. Gender, race, class and self-reported sexually transmitted disease incidence. Fam. Plann. Perspect., 27(5): 196-202.

Uneke, C.J., O. Ogbu, P.U. Inyama, G.I. Anyanwu, M.O. Njoku and J.H. Idoko, 2005. Prevalence of Hepatitis-B surface antigen among blood donors and human immunodeficiency virus-infected patients in jos, Nigeria. Mem. Inst. Oswaldo. Cruz., 100(1): 13-16.

Zuberi, B.F., S. Afsar and M.S. Quraishy, 2008. Triple hepatitis: Frequency and treatment outcome of co/super-infection of Hepatitis C and D among patients of Hepatitis B. JCPSP-J. Coll. Physici., 18(7): 404-407.