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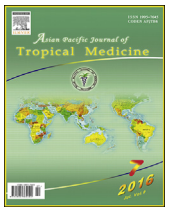

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High seroprevalence of asymptomatic viral haemoparasites among prospective blood donors in Nigeria

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ABSTRACT

Objective: To determine the prevalence of viral haemoparasites in prospective Nigerian blood donors.

Methods: Ethical clearance was obtained and informed consent questionnaires were distributed to blood donors to obtain their demographical data. A total of 186 blood donors from LAUTECH Teaching Hospital, Osogbo were tested for hepatitis A virus (HAV), hepatitis B virus (HBV) and hepatitis C virus (HCV) using rapid test kit and enzyme linked immunosorbent assay.

Results: The highest prevalence of blood transmitted infections was 182 (97.85%) while the prevalence of HIV, HAV, HBV and HCV were 6.45%, 97.85%, 14.52% and 3.23%, respectively. Highest seroprevalence for hepatitis A, B and C occurred among low risk occupation. There was no significant association between all the hepatitis viruses and demographic factors except occupation with P value of 0.002 7. Hepatitis A, B and C seropositive blood donors on average tend to have PCV within the normal reference range. Out of the 27 hepatitis B positive blood donors, 22 were donating blood for the first time while 5 were repeat donors. None of the hepatitis C seropositive donors have been exposed to blood or any form of its products and were all donating blood for the first time. However, the distribution of donor type for HAV is random.

Conclusions: The prevalence of HAV, HBV, HCV and HIV among prospective donors in Nigeria is alarming particularly HAV. These infections can be transmitted to recipients if proper screening is not carried out, hence they should be included as a routine test for blood donors.

1. Introduction

Transfusion of blood and its product is a life saving measure for anemic patient but transfusion-transmitted infections are the most setback of transfusion practice. Infectious agents such as hepatitis A virus (HAV), hepatitis B virus (HBV), hepatitis C virus (HCV), HIV and syphilis are among the utmost threats to blood safety for transfusion recipients and proffer serious public health challenges [1]. HAV is a member of the *Hepatovirus* genus of the family Picornaviridae and is a non-enveloped single-stranded RNA virus [2]. HAV replicates in hepatocytes and interferes with liver function, sparking an immune response that causes liver inflammation. Four of the seven genotypes of HAV affect humans (genotypes I and III are the most common), but only one serotype exists [3].

Infection with any of the genotypes usually results in lifelong immunity against all strains of HAV. HAV is transmitted via the fecal-oral route either by direct contact with an infectious person or by ingestion of contaminated food or water. The risk of disease increases with age [4]. The vast majority of hepatitis A patients make a full recovery, and the case fatality rate is low. The estimated mortality rate is 0.1% for children less than 15 years old, 0.3% for adults ages 15–39, and 2.1% for adults ages 40 and above [5]. Several complications may occur; about 15% of patients experience prolonged jaundice and/or relapses over several months. Some develop cholestatic hepatitis, in which the bile duct leading from the liver to the intestine becomes blocked.

A few suffer from fulminant (acute) liver failure that may require a transplant or cause death. Although liver failure is more likely to occur in patients suffering from chronic liver disease prior to the onset of hepatitis A, it can occur in anyone with HAV infection [5].

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Serological markers for hepatitis of HBV and HCV are screened in blood banks routinely but HAV is not routinely done. Due to their mode of transmission, it has made the provision of safe blood difficult and the screening of blood absolutely necessary [6]. Individuals with viral hepatitides chronic infection have high risk of liver cirrhosis and hepatocellular carcinoma. HBV and HCV have similar routes of transmission namely through blood and its products, intravenous drug abuse, unsafe injections and sexual activity [7].

Detection of hepatitis B surface antigen and antibodies to HCV in blood bank is routinely carried out for detection of hepatitis infection [8]. Globally, 320–350 million peoples are chronic carriers of HBV and mortality of 1.5 million are being recorded annually from HBV infection. In Nigeria, 12% of the total populations are chronic carriers of HBV; Anti-HCV antibody prevalence rate of 5.7% in Plateau, 8.4% in Lagos and 9.2% in Osun among blood donors, pregnant women and HIV patients, respectively has been reported [9]. Chronic hepatitis C is a progressive disease that leads to death through hepatocellular carcinoma and also predisposes to renal cell carcinoma [10]. In Nigeria, HCV infection is still endemic and the prevalence of hepatitis C and its mode of transmission among Nigerians are unidentified, but latest studies across the country among blood donors showed a prevalence ranging between 0.4% and 12.3% [7]. This study aimed to determine the prevalence of viral haemoparasites (HAV, HBV and HCV) among Nigerian blood donors.

2. Materials and methods

The study was carried out at the Blood Transfusion Unit of Department of Hematology, LAUTECH Teaching Hospital, Osogbo, Nigeria. A total of 186 blood donors (141 males and 45 females) with age range 18–56 years were enrolled in this study. Prospective donors were initially sorted using a structured questionnaire on risk behaviors and were physically examined. The study was approved by the ethical review committee of the hospitals.

Blood donors were bled by venipuncture into EDTA bottle and processed in Hematology and Microbiology Laboratory, LAUTECH, Osogbo, Nigeria.

Blood donors were screened for HIV, HAV, HBV and HCV antibodies. HIV 1/11 screening was done using Determine Kit (Abbott Diagnostic Division, Hoofddorp, The Netherlands) and later confirmed with Unigold (Trinity Biotech, Ireland). Hepatitis A virus assay was done using competitive enzyme immunoassay (ELISA); reagent sourced from PRO Diagnostic Bio probes Srl via Columella NO 31 20128 Milano, Italy while HBV and anti-HCV assay were done using clinotech diagnostic test kit (manufactured by Clinotech® Diagnostics, Canada). Both positive and negative control sera were included.

Data were analyzed using Statistical Package for Social Sciences software. Chi square was used to determine the effect of sex, age, and other social demographic factors, including the level of hemoglobin on HAV, HBV and HCV. The P value <0.05 was considered to be significant.

3. Results

The overall prevalence of blood transmitted infections in this study was 182 (97.58%). The prevalence of HIV, HAV, HBV and HCV were 6.45%, 97.85%, 14.52% and 3.23%, respectively. Table 1 showed age distribution in relation to viral hepatitis which showed significant association (P = 0.005). Prevalence of HAV, HBV and HCV infection in relation to social demographical factors were shown in Table 2. Fourteen (7.69%), 7 (25.9%) and 1 (16.7%) prospective blood donors had HIV–HAV, HIV–HBV and HIV–HCV coinfection, respectively. Coinfection of HBV and HCV was found in 2 (1.08%) patients while 4 (2.15%) were non-reactive to any of the hepatitis viruses. Highest seroprevalence for hepatitis A, B and C occurred among low risk occupation. There was no significant association between all the hepatitis viruses and demographic factors except occupation with (P = 0.027).

The hematocrit level showed that hepatitis A, B or C seropositive blood donors on average tends to have PCV within the normal reference range as shown in Table 3. Hematocrit level, when compared with sex was not significant. Out of the 27

Table 1
Age distribution in relation to viral hepatitis (P = 0.005).

Age group	Number	HAV (%)	HBV (%)	HCV (%)
18–24	49	45 (24.90)	7 (3.76)	1 (0.54)
25–31	62	62 (33.34)	12 (6.45)	3 (1.61)
32–38	37	37 (19.89)	5 (2.69)	1 (0.54)
39–45	26	26 (13.98)	1 (0.54)	0 (0.00)
49–52	7	7 (3.76)	2 (1.08)	0 (0.00)
53–60	5	5 (2.69)	0 (0.00)	1 (0.54)
Total	186	182 (97.85)	27 (14.52)	6 (3.23)

Table 2
Social demographic factors in relation to viral hepatitis.

Factors	Number	HAV (%)	HBV (%)	HCV (%)	P
Education level					0.081
Primary school	20	20 (100.00)	3 (15.00)	0 (0.00)	
Sec. school	74	73 (95.50)	11 (14.86)	5 (5.41)	
Diploma	41	41 (100.00)	7 (17.70)	1 (2.44)	
Undergraduate	16	13 (81.25)	1 (6.25)	0 (0.00)	
Graduate	35	35 (100.00)	5 (14.29)	1 (2.86)	
Sex					0.734
Male	141	139 (74.77)	23 (12.37)	5 (2.69)	
Female	45	43 (23.12)	4 (2.15)	1 (0.54)	
Occupation					0.027
High risk	37	37 (19.89)	6 (3.23)	2 (1.08)	
Low risk	146	142 (76.35)	21 (11.29)	4 (2.15)	
Unemployed	3	3 (1.61)	0 (0.00)	0 (0.00)	
Donor type					0.059
Family donor	153	152 (81.72)	21 (11.29)	5 (2.69)	
Voluntary donor	30	27 (14.56)	5 (2.69)	1 (0.54)	
Commercial donor	3	3 (1.61)	1 (0.54)	0 (0.00)	
Prevalence		182 (97.85)	27 (14.52)	6 (3.22)	

Table 3
Hematocrit levels in relation to viral hepatitis infection.

Sex	PCV (%)	HAV (%)	HBV (%)	HCV (%)	P
Male					0.094
Within	40–54	135 (72.58)	22 (11.83)	5 (2.69)	
Below	<40	1 (1.61)	1 (0.54)	0 (0.00)	
Above	>54	1 (0.54)	0 (0.00)	0 (0.00)	
Female					0.187
Within	36–46	42 (22.58)	3 (1.61)	1 (0.54)	
Below	<36	1 (0.54)	1 (0.54)	0 (0.00)	
Above	>46	2 (1.08)	0 (0.0)	0 (0.00)	