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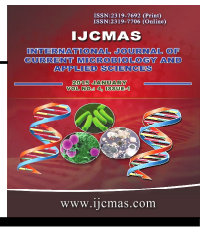

Original Research Article

Prevalence of Hepatitis B and human immunodeficiency virus co-infection among blood donors in Abia State University teaching hospital, Aba, South East, Nigeria

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Keywords

Hepatitis B and human immune-deficiency virus co-infection among blood donors

A B S T R A C T

Hepatitis B (HBV) and human immunodeficiency virus (HIV) infections are vital health issues in blood transfusion. Co - infections of these two viruses are major public health problems worldwide. The study was conducted to determine the prevalence rates of these two viruses and their co – infection among blood donors in Aba. Hepatitis B surface antigen (HBs Ag) latex kits and ELISA were used to determine the prevalence of HBV and HIV among one hundred and twenty blood donors aged 18 – 46 years between the months of July – September, 2013 in Abia State University Teaching Hospital, Aba. The prevalence rates of HBV and HIV were found to be 5.8% and 4.2% respectively. The prevalence rate of HBV was found to be higher than that of HIV notwithstanding that both viruses have similar modes of transmission. Co – infection with HBV and HIV was found in 0.8% of this population. The co – infection rate was quite low in this study population where mono infection with HBV or HIV was high. Age group 36 – 45 years had the highest prevalence of HBV while age group 16 – 25 years had the highest prevalence of HIV. Statistical analysis revealed that there was no significant difference in the prevalence of HBV and HIV among the different age groups. There is need to intensify health promotion efforts like immunization, health education, campaign and provision of adequate blood screening equipments to ensure blood safety and to avoid the spread of infectious agents.

Introduction

Transfusion of blood is a life saving measure for numerous patients worldwide but it can transmit infectious disease when clerical errors occur. These types of errors include the release of unsuitable units of blood, accidental transfusion of autologous blood to another recipient (autologous blood may include infectious diseases) and errors in testing (Tulika *et al*.,2009)

The priority objective of blood transfusion service is to ensure safety, adequacy, accessibility and efficiency of blood supply at all levels (Islam, 2009). Although blood

safety has greatly improved over the years, transfusion transmissible infections (TTIs) still pose a major health risk in Nigeria given the high prevalence of HIV, hepatitis, malaria and several sexually transmitted diseases (STDs) infections and increased demands for blood donations.

The magnitude of the TTI varies from country to country depending on the TTI load in that population from where the blood units are sourced (Oladele *et al.*, 2013)

HIV and HBV are among the major viruses transmitted by transfusion. 5 – 10 % of Human Immunodeficiency Virus (HIV) transmission in Africa is as a result of contaminated blood transfusions (WHO, 2010) while 12.5% of patients who received blood transfusion are at risk past transfusion hepatitis (Fashola and Otegbayo, 2002; Afolabi *et al.*, 2013).

HBV is one of the most important infectious agents causing acute and chronic morbidity worldwide. It is estimated that between 350 million people are chronic HBs Ag carriers (Hossein *et al.*, 2007). HIV AIDS has became pandemic. The current estimate of the number of cases of HIV infection among adults worldwide is approximately 33 million; two thirds of whom are in sub-Saharan Africa (French, 2007). Coinfection with HBV and HIV is common because of shared modes of infection.

Since few studies have been carried out in recent years on the coinfection with HIV and HBV among blood donors in Nigeria. Knowing the prevalence of these viruses among blood donors will underpin the extent to which these infections are present in our locality.

Therefore, the objective of this study was to determine the prevalence of HIV and HBV and their coinfections among blood donors at Abia State University Teaching Hospital, Aba, Abia State, South East, Nigeria.

Materials and Methods

Study Centre

The study centre was done at the hematology department of ABSUTH, Aba, Nigeria

Study Population

The study population were potential apparently healthy blood donors presenting at the hematology unit of ABSUTH, Aba from July to September, 2013. A total of 120 samples were collected from the prospective donors.

Collection of blood samples

Samples were collected in a tube without anti-coagulant. 5 mililiters of various blood was collected from the antecubital vein of each donor. The blood was allowed to retract and their centrifuged at 1500 rpm. The sera were stored at -20^0 C until tested (Oladele *et al.*, 2013)

Detection Assay for HIV and HBV

Serum samples from 120 blood donors were assayed for the presence of HBV antigen. Detection of HBV antigen was carried out using a one step strip style HBs Ag test kit (Global Diagnostic ® USA). This test is a rapid, direct binding test for the HBV surface antigen (HBs Ag) and is based on the principle of sandwich immunoassay in serum in serum. Monoclonal and polyclonal antibodies are employed to identify HBs Ag specifically; this one step test is very sensitive. Detection of HIV was done with a Determine HIV -1/2 Ab/Ag Combo (Alere

Medical Co Ltd, USA), which requires a simple two step procedure for serum; it is quick and easy to use delivering clear, dependable results. The HIV-1/2 Ab/Ag combo detects HIV-1/24 antigen and HIV-1 and HIV-2 antibodies. The manufacturer's instructions were strictly followed to identify the serum samples that were sero positive for HBV and HIV antibody.

Test Procedure

Screening test procedure for HBV: The strip was dipped into the serum sample from participants with the arrow end pointing toward the serum. It was removed after 5s and the results were read after 25min. the sample was considered positive for HBV if colored band appeared in the control(C) region and test (T) regions. It was considered negative for HBV if only one region and no apparent band appeared in the test (T) region.

Screening test procedure for HIV: A sample of whole blood (50uL) from participants was added to the sample pad of the strip. When all the blood was transferred from the capillary tube to the sample pad, one drop of chase buffer was immediately added to the sample pad. The results were obtained in 20-30min. If antibody is reactive, two pink or red lines appear, one in the control area and the other in the lower test area of the test unit. If a line appears on the upper test area of the test unit, then it is HIV- 1 p-24 reactive.

Ethical consideration

Ethical clearance for this study was obtained from the ethics committee of the Abia State University Teaching Hospital, Aba. Informed/verbal consents was also obtained from the blood donors before enrollment into the study.

Data Analysis

The following indicators were assessed:

(i) Number and ratio of persons infected with HBV and HIV

(ii) Number and ratio of participants infected with HBV and HIV by age and sex. The chi-square test was used to compare means and the difference was considered statistically significant for $P < 0.05$.

Results and Discussion

A total of 120 blood donors were screened for this study. The age range was 18-46 years and the mean age was 27.6. Out of these, 112 (93.3%) donors were male and remaining 8(6.7%) were female donors, with male to female ratio of 14:1. The prevalence of HBV was 5.8% and the prevalence of HIV was 4.2%. The HIV/HBV coinfection rate was only 0.83% in this population (table 1). The prevalence of HBV and HIV among males was 4.5% and 3.6% respectively. The prevalence of HBV and HIV among females was 25% and 12.5% respectively (table 2).

The prevalence of HBV was highest in the 36-46 age group, followed by 16-25 and 24-35 age groups. However, the prevalence of HIV was highest in the 16-25 age group, followed by 26-35 age groups. Notably, no cases of HBV or HIV were found in participants 46-55 years age group (table 3).

The prevalence of HBV in our study was 5.8% which is comparable to a study done by Afolabi *et al.,* (2013) who reported a prevalence of 5.9% amongst blood donors in Ibadan and Umolu *et al.,* (2005) which reported a prevalence of 5.4% among blood donors in Benin, city. The result is different from Opaleye *et al.,* (2010) which reported a much higher prevalence rate of 19.9%

amongst blood donors in Oshogbo; 20% reported by Alao *et al.* (2009) among prospective blood donors in Otukpo, Benin State, 14.5% reported by Agbaji (2005) in Juth, Jos and 14.47% among blood donors at federal Medical Centre Bida (Amiwero *et al.,* 2013). The differences in prevalence in these studies could be attributed to difference in population selection.

Studies from different parts of Nigerian have reported varying prevalence r ates of HIV among blood donors. Some studies have reported prevalence of 3.4% (Afilabi *et al.,* 2009), 3.8% (Imoru *et al.,* 2003), 3.1% (Fiekumo *et al.,* 2009) while others reported higher prevalence of HIV antibody (Zocharia *et al.,* 2002; Kagu *et al.,* 2005). The prevalence rate of HIV reported in this study is 4.2% which is similar to 4% reported by Ejele *et al.* (2005) in port-Harcourt and 4.5% by Tounkara *et al.* (2009) in Mali. These differences may be due to differences in sample population, size, period of time studies were carried out and different socio cultural practices.

The prevalence of co- infection of HBV and HIV varies from place to place. HIV and HBV co-infection prevalence rate of 0.8% recorded in this study is as low as 1.13% reported by Tounkara *et al.,* (2009) among blood donors in Mali, 0.4% reported by Egah *et al.(*2007) and 0.5% reported by Oladele *et al.* (2013) in Oshogbo. However, this differ with report from Benin City where no co- infection with these viruses was observed (Egah *et al.,* 2007).

Age distribution of HBV and HIV revealed that there was no significant difference in the prevalence of HBV and HIV among the different age groups of blood donors. High proportions of donors positive to HIV were in the sexuality active and reproductive age period 16 – 25 years. Higher prevalence of HBV was seen in 36 – 45 years of age which agrees with Luka *et al.* (2008) who reported higher HBV prevalence among older age group (30 – 34 years). However, age of acquiring infection is the major determinant of incidence and prevalence rates (Ezegbudo *et al.,* 2004).

The study showed that female blood donors had higher prevalence for HBV (25%) than their male counterparts (4.5%). The difference was however statistically significant. This observation agrees with Okonko *et al.,* (2012) but however contradicts report by Mehmet *et al.,* (2005) in which males had higher prevalence rate than females. A higher HIV prevalence rate of 12.5% was seen in females than in males (3.6%) in this study but there was no statistical difference between females and males. Although blood transfusion is not though as a significant mode of transmission of HIV and HBV, blood transfusion, places where HIV and HBV is prevalence and where many transfusions are conducted could be a problem to public health. Therefore, appropriate and compulsory screening of blood donors using sensitive methods must be ensured to prevent post transfusion hepatitis and HIV.

Table.1 Co- prevalence of hepatitis B and HIV among blood donors at Absuth, ABA

Sample Tested	Number positive For HIV (%)	Number positive for HBV (%)	Number positive for both HIV and HBV (%)
120	5(4.2%)	7(5.8%)	1(0.83%)

Table.2 Prevalence of HIV and HBV according to sex among blood donors in ABA

SEX	No. Screened	No. Positive for HBV(%)	No. Positive for HIV(%) HIV(%)	No. Positive for HBV and HIV(%)
Male	112	5 (4.5%)	4 (3.6%)	1 (0.9%)
Female	8	2 (25%)	1 (12.5%)	0 (0%)
	120	7(5.8%)	5(4.2%)	1(0.83%)

Table.3 Prevalence of HIV and HBV according to age among blood donors in ABA

Age Group	Number Screened	No. Positive for HBV (%)	No. Positive for HIV (%)	No. Positive for HBV and HIV (%)
16 - 25	51	4 (7.8%)	3 (5.0%)	_
26 – 35	55	2 (3.6%)	2 (3.6%)	1 (1.8%)
36 – 45	12	1 (8.3%)	_	_
46 – 55	2	_	_	_
Total	120	7 (5.8%)	5(4.2%)	1 (0.83%)

Authors' contributions

Kanu AM conceived and designed the study. Kanu AM, Ihekwumere I and Kalu JE coordinated the study. Data analysis and interpretation: Kalu JE. The manuscript was drafted by Kanu AM and all authors contributed to the revision and approved the final manuscript.

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