

## TRANSFUSION TRANSMISSIBLE VIRAL INFECTIONS AMONG POTENTIAL BLOOD DONORS IN IBADAN, NIGERIA.

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### ABSTRACT

It is evident that proper screening procedures prior blood transfusion is a cost-effective approach for prevention and control of transfusion-transmissible infections (TTIs). Also, it has been documented that sub-standard test kits are mostly used in resource limited settings for transfusion related diagnosis. However, the role of such practice in epidemiology of transfusion transmissible viral infections in a tertiary health care facility would give an insight to the rates of blood transfusion associated viral transmission in the community at large. Therefore, the study was designed to determine the prevalence of Human Immunodeficiency Virus (HIV), Hepatitis B and Hepatitis C viruses among blood donors in a tertiary hospital where quality diagnostic procedures are considered prior recruitment of donors. Post ethical approval, counselled and consenting 507 (M= 426; F=81) aged 19 to 68 years (Median age:39) potential blood donors were recruited and tested for HIV, HBsAg and anti-HCV using commercial ELISA testkit in strict compliance with the manufacturer's procedures. Overall results show rates of 2.0%, 5.9% and 1.4% for HIV, HBsAg and HCV respectively. Also, highest prevalence rates were recorded among age group 26 to 35 years as 2.6%, 7.2% and 2.1% for HIV, HBV and HCV respectively. Furthermore, higher prevalences rates were noted among unmarried individuals as 2.6%, 6.8% and 2.1% for HIV, HBV and HCV respectively.

**Key words:** Transfusion Transmissible Infections, HIV, Hepatitis B, Hepatitis C, Blood Donors, University College Hospital (UCH), ELISA.

### INTRODUCTION

The most common diseases transmitted in blood transfusions are viral infections. Transfusion-transmissible infectious agents such as human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV) are among the greatest threats to blood safety for the recipient. The discovery of transfusion-transmissible infections (TTIs) has heralded a new era in blood transfusion practice worldwide with emphasis on two fundamental objectives, safety and protection of human life [1]. Human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV) are of great concern as transfusion-transmissible infections because of their prolonged viraemia and carrier or latent state. They also cause fatal, acute, chronic and life-threatening disorders. Blood transfusion accounts for 5-10% of HIV infections in sub-Saharan Africa [2]. Similarly, 12.5% of patients who received blood transfusion are at risk of post-transfusion hepatitis [3]. Therefore, this study was carried out to determine the seroprevalence, among selected group and trends of HIV, HBV and HCV among donors at University College Teaching Hospital in Ibadan Nigeria.

### MATERIALS AND METHODS

#### Study Centre

The Study centre was located in Ibadan, Oyo State, situated in the tropical belt of Southern Western

part of Nigeria. The study is at the Blood Bank of University College Hospital, Ibadan, Nigeria.

#### Study Population

The study participants were potential blood donors presenting at the blood bank of the University College Hospital, Ibadan between February and July 2010. Total of Five hundred and seven samples was collected from the prospective donors.

#### Sample Collection (Blood)

Samples were collected in a tube without anticoagulant. A tourniquet was firmly tied to the upper arm of the donor while sitting and skin sterilizer with 70% alcohol. The sterile needle was inserted into conspicuous antecubital vein and the plunger of the sterile syringe was withdrawn and pressure applied to the puncture site with a cotton wool to stop bleeding. Blood sample was spun on a bench centrifuge at 3,000rpm for 10 minutes to obtain serum. Serum or plasma was separated immediately.

#### Data Collection and Laboratory Methods

A survey of the blood sample of the prospective donors at the Blood Bank, University College Hospital (UCH) Ibadan was conducted between February - July 2010 using structured questionnaire. Descriptive statistics and correlation analysis was performed to check the relationship between the data and laboratory test results observed and inference was drawn using an inferential statistics (SPSS version 15).

A cross-sectional study was conducted from February to July, 2010 at blood bank of the University College Hospital, (UCH) Ibadan. The total samples included all the donors, presented and consented to participate during the study period. Prior to blood collection, the blood donors were required to answer questionnaire. After consent was obtained and pre-test counselling was done, and the questionnaire was completed. 5mls of blood sample was collected in sterile tubes without anticoagulant from each study participant using a vacutainer needle. Serological examination was conducted on each sample.

Serum samples were tested as follows: for HIV 1 and HIV 2 using BIO-RAD GenscreenELISA made in France; for HBsAg using BIO- RAD *monalisa ultram* made in France; for HCV-AbDIA.PRO ELISA made in Italy was used.

## RESULTS

Table 1 shows prevalence of HbsAg, HIV and HCV antibody in the study population. Out of 507 participants whose sera were tested using ELISA, 30 (5.9%) were positive for HbsAg, 7(1.4%) for HCV and 10 (2.0%) for HIV. The highest prevalence of HBsAg (7.2%) was found in persons whose ages were between 26-35 years as shown in Table 4. The prevalence of HbsAg in the other age groups was as follows; 16-25 years (6.6%), 36-45 years (4.2%), 46-55 years (4.7%).

The prevalence of HbsAg in age group 26-35 years was significantly higher than the other age groups. The difference observed in the prevalence of HbsAg among different age group, was not statistically significant  $P > 0.05$ .

**TABLE 1: PREVALENCE OF HEPATITIS B SURFACE ANTIGEN (HBSAG), HEPATITIS C (HCV) AND HUMAN IMMUNODEFICIENCY VIRUS (HIV) AMONG THE STUDY PARTICIPANTS.**

Virus	Total No Tested	Seropositive	
		%	No
HbsAg	507	5.9	30
HCV	507	1.4	7
HIV	507	2.0	10

**TABLE 2: PREVALENCE OF HEPATITIS B SURFACE ANTIGEN (HBSAG), HEPATITIS C (HCV) AND HUMAN IMMUNODEFICIENCY VIRUS (HIV) ANTIBODIES AMONG DIFFERENT AGE GROUP OF STUDY PARTICIPANT**

	AGE IN YEARS				TOTAL No (%)
	16-25 No (%)	26-35 No (%)	36-45 No (%)	46-55 No (%)	
HBsAg	9(6.6)	14(7.2)	5(4.2)	2(4.7)	30(6.0)
HCV Positive	2(1.5)	4(2.1)	1(0.8)	0(.0)	7(1.4)
HIV Positive	2(1.5)	5(2.6)	2(1.7)	1(2.3)	10(2.0)

**TABLE 3: PREVALENCE OF HEPATITIS B SURFACE ANTIGEN (HBSAG), HEPATITIS C (HCV) AND HUMAN IMMUNODEFICIENCY VIRUS (HIV) ANTIBODIES AMONG THE MARRIED AND UNMARRIED PARTICIPANTS**

Marital Status	No Tested	HbsAg No (%) Positive	HCV No (%) Positive	HIV No (%) Positive
Married	297	17(5.7)	3(1.0)	4(1.3)
Unmarried	192	13(6.8)	4(2.1)	5(2.6)
Total	489	30(6.1)	7(1.4)	9(1.8)

The results of tests for HCV antibody in the study population is shown in Table 1. Out of the 507 sera tested for antibody to HCV 7(1.4%) were positive. The age distribution of HCV antibody test result in the study is shown in Table 4. The highest prevalence of HCV antibody (2.1%) was found in 26-35 years age group. Prevalence of HCV antibody in the other age groups are as follows; 16-25 years (1.5%) and 36-45 years (0.8%).

Out of 507 study participants (individual blood donors) whose sera were tested for HIV antibody 10 (2%) were positive. The age distribution of HIV antibody in this study is shown in Table 2. The

highest prevalence of HIV antibody (2.6%) was found in 26-35 years age group. Prevalence of HIV antibodies in the other age groups was as follows; 16-25 years (1.5%), 36-45 (1.7%) and 46-55 years (2.3%). There was no significant difference between prevalence of HIV antibody among the different age groups,  $P > 0.05$ .

A total of 489 study participants with different marital status were tested for HbsAg and antibodies to HCV and HIV. The prevalence of HbsAg, HCV and HIV antibody in married and unmarried participants is shown in Table 3. Out of 297 married study participants 17(5.7%) had HbsAg in their

sera, 3(1.0%) and 4(1.3%) were positive of HCV and HIV antibodies respectively. Out of 192 unmarried, 13(6.8%) were positive for HbsAg, 4(2.1%) and 5(2.6%) were positive for HCV and HIV antibodies respectively. The prevalence of HbsAg, and HCV antibody was higher among the unmarried participants than in married individuals, the difference is statistically significant  $P > 0.05$ . Prevalence of HIV antibody among the unmarried was higher than married. There was a statistical significance ( $P < 0.05$ ) difference between HIV prevalence among the unmarried and the married participants.

## DISCUSSION

Blood transfusion is the process of transferring blood or blood-based products from one person into circulatory system of another, to save lives in some medical conditions. Although blood transfusion saves million of lives worldwide each year, recipients of the blood or blood product transfusions stand the risk of becoming infected with blood-borne diseases such as human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV), through transfusion of infected blood and blood products [4]. The discovery that HIV, HBV and HCV could be transmitted by blood transfusion has provoked a greatly heightened emphasis on two fundamental objectives, safety and protection of human life [5]. Transfusion transmissible infections (TTIs) are a very serious complication of blood transfusion [6]. These infections continue to pose a great challenge to transfusion medicine, most especially in Africa, due to a high transfusion demand [7]. Hepatitis B and C viruses and HIV are distinct, but share a similar mode of transmission, primarily; through unscreened and contaminated blood and blood products by contact or transfusion. Other routes include sexual intercourse and vertical transmission from mother to foetus in the immediate pre-natal period [8,9].

Prevention of transfusion transmitted infections (TTIs) in developed countries has been achieved by reducing unnecessary blood transfusion and exclusion of donors with specific risk of viral infections. By contrast, in many developing countries, none of these interventions is applied uniformly and the risk of (TTIs) remains high. The high incidence and prevalence of (TTIs) in the blood donors in developing countries means that, some agents escape laboratory detection, [10].

In this study 507 donors were recruited into the study with ages ranging from age 16 years to 68 years. In general blood donors must fulfil certain requirements, one of which is the age requirement of between 18 - 60 years. This explains why no study subject was below age 19 and only a few were above 60 years old. There was a predominance of males among the study participants because

females are not encouraged to donate blood in Nigeria society. Also, most of the replacement donors are men. Prevalence of HbsAg (6.8%) and antibody to HCV (2.1%) in this study was significantly higher among the unmarried participants than in married individuals. The prevalence of HIV antibody in unmarried was higher than the married. Higher prevalence values for HbsAg, HCV and HIV antibody in unmarried may be due to the fact that the unmarried individuals are more likely to engage in behaviours that put them at risk of all these infections than the married participants.

The findings of this study showed that hepatitis B and C viruses and HIV are circulating in Ibadan and infecting the residents of the city, including the blood donors. Hepatitis B surface antigen, HCV and HIV antibodies found were 5.9%, 1.4%, and 2.0%, respectively. The result of this study on the prevalence of HbsAg in blood donors in UCH, Ibadan is different from that of Olaleye, *et al.*, [11], which showed a very high prevalence (30.8%) of HbsAg in Ibadan. The prevalence HbsAg in blood donors in Ibadan is also lower than that found by Okerengwo and Mudasiru [12], when they tested sera of blood donors for HbsAg in the same location, this may be due to the awareness and effect of HIV control programmes in the society, for the fact that they share the same route of transmission. The seroprevalence of HCV antibody found among blood donors in this study is lower than that reported by previous workers. Fashola, *et al.*, [13] showed the prevalence of HCV antibody among blood donors in UCH, Ibadan was 4.96%. Studies carried out in other location in Nigeria also showed a higher prevalence of HCV antibody in blood donors than that found in the present study. Isa, *et al.*, [14] found HCV antibody prevalence of 1.8% among blood donors in Kaduna, Kaduna state, Nigeria. Studies carried out by Egah, *et al.*, [15] in Jos, Plateau state, Nigeria showed that the prevalence of HCV antibody among blood donors was 6%. Chukwurah, *et al.*, [16] and Ayolabi, *et al.*, [17] also found higher prevalence of HCV antibody among blood donors. A study carried out in South-Eastern state of Nigeria, Chukwurah, *et al.*, [16] found that 7.6% of blood donors had HCV antibody in their sera. In similar study carried out in Lagos, Nigeria Ayolabi, *et al.*, [17] reported that 8.4% of blood donors were positive for HCV antibody.

Marked variation in the prevalence of HIV antibody of HIV antibody has been reported in different part of Nigeria. Some workers have reported prevalence of HIV to be lower than the 2% found in this study, while others reported higher prevalence of HIV antibody from some locations [18, 19,13]. Ejele, *et al.*, [18] found that 4% of blood donors in Port Harcourt, South-Southern Nigeria had HIV antibody.

Overall, the prevalence of HbsAg, HCV and HIV antibodies found in this study is one of the lowest

ever reported from Nigeria. This observation may probably be due to the positive impact of HIV education and public enlightenment campaign which have been in place in Ibadan and everywhere for many years and which helped in reducing the spread of HIV in Nigeria. Since HIV, HCV and HBV have similar modes of transmission, the reduction in prevalence of HIV infection in the community will also lead to a reduction in HBV and HCV transmission. Another factor that may account for the low prevalence of HbsAg, HCV and HIV antibody is donor recruitment. Infections by these three viruses are more common in commercial and replacement donors than voluntary donors. It is possible that most of the donors whose sera were tested in this study were voluntary donors. Age distribution of HbsAg, HCV and HIV revealed that there was no significant difference in the prevalences of HbsAg, HCV and HIV

antibody among the different age groups of blood donors. Youths aged 21-30 constituted the highest number of HIV and hepatitis B infection, HBV had 21, {1.4%} seropositivity; HIV had 15 {1.0%} seropositivity and age 31-40 had 1 (0.1%) for HCV.

Results of the study which showed that the prevalence of HbsAg, HCV and HIV antibody is 5.9%, 1.4% and 2.0% suggest that these three major transfusion transmissible viral infections are still causing considerable morbidity in the communities and continue to pose a major challenge for blood safety. It seems that the prevalence of these viral infections is lower than that was reported by previous workers. This suggests that the disease control measures of the Federal government of Nigeria and Non-governmental organizations (NGO) are making a positive impact in the spread of these viral infections.

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