

# Hepatitis B virus among potential blood donors in Ibadan, Nigeria

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## ABSTRACT

Hepatitis B virus (HBV) is one of the agents of transmissible transfusion infection (TTI) and causes threat to blood safety for recipients. Blood transfusion is one of the pathway in which HBV is being transmitted. This study aimed to determine the prevalence rate of HBV among potential blood donors at Blood Bank of University College Hospital (UCH) Ibadan, Nigeria. Over a period of 6 months (February to July, 2010), 507 consenting potential blood donors, were tested for Hepatitis B virus surface antigen (HBsAg) using a convenient sampling technique. Pre-test counselling sessions was done, before validated questionnaire was administered, for data collection and laboratory serological test was done. The mean age of the study participants was  $32.7 \pm 9.2$  years. A total of 30(5.9%) were positive for HBsAg. HBsAg rate was highest among age group of 26 to 35 which is 14 (7.2%), males 26 (6.1%), others among occupational group 2 (9.5%), level of education {illiterate} 01 (11.1%) and unmarried, 13 (6.8%). The rate of HbsAg in this study were lower than previous studies in Nigeria perhaps this is due to effective prevention control programme, through provision of vaccines and immunization in accordance with Nigeria Federal ministry of health guidelines on Hepatitis B, and other vaccine preventable diseases, and the public enlightenment on transmissible transfusion infections.

**Keywords:** Hepatitis B, blood donors, Ibadan, TTI, surface antigen.

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## INTRODUCTION

Transfusion of blood and blood products, as a specialized modality of patient management saves millions of lives worldwide each year and reduces morbidity (Lavanya et al., 2012). The use of unscreened blood transfusion keeps the patient at risk of acquiring many transfusion transmitted infections (TTIs) like hepatitis viruses (HBV, HCV), human immuno-deficiency viruses (HIV), syphilis, malaria, etc. (Lavanya et al., 2012). Blood transfusion departments do not only screen transfusion transmitted infections, but also give clue about the prevalence of these infections in healthy populations (Khan et al., 2007). Hepatitis B virus (HBV) infection is a serious global health problem affecting two billion people worldwide and 350 million people suffer from chronic HBV infection (Dhawan et al., 2008). Viral Hepatitis is a systemic disease involving the liver and is one of the

world's major unconquered diseases. Hepatitis B virus (HBV) infections are common serious complications of blood transfusion which are recognised as important viral diseases in the tropical countries and have become major global public health problem. Therefore, this study was carried out in order to know the seroprevalence of HBV among potential blood donors at University Teaching Hospital, Ibadan.

## 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 was done 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 507 samples were collected from the prospective blood donors. The study was ethically approved by Oyo State ministry of health.

### 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 sterilized 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 samples were spun on a bench centrifuge at 3,000 rpm for 10 min to obtain serum. Serum was separated immediately.

### Data collection and laboratory method

A cross-sectional study was conducted from February to July, 2010 at blood bank of the University College Hospital, (UCH) Ibadan. The total samples include all the donors, presenting and consented to participate during the study period. Prior to blood collection, the blood donors were required to answer structured questionnaire. After consent was obtained and pre-test counselling was done, and the questionnaire was completed, 5 ml blood sample was collected in sterile tubes without anticoagulant from each study participant using a vacutainer needle. Serological examination was conducted on each sample after serum has been obtained. Serum samples were tested for Hepatitis B Virus surface antigen (HBsAg) using ELISA Kit manufactured by *BIO-RAD, 3, Bd, Raymond Poincare, Marnes La Coquette France*.

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).

## RESULTS

Out of 507 participants whose sera were tested using ELISA, 30 (5.9%) was positive for HBsAg. The highest rate of HBsAg (7.2%) was found in persons whose ages were between 26 and 35 years as shown in Table 1. The rate of HBsAg in the other age groups was as follows; 16 to 25 years (6.6%), 36 to 45 years (4.2%), 46 to 55 years (4.7%). The rate of HBsAg in age group 26 to 35 years was significantly higher than the other age groups. The difference observed in the rate of HBsAg among different age group, was not statistically significant  $P > 0.05$ .

The gender distribution of the study participants tested for HBsAg is shown in Table 2. Out of 426 males, 26 (6.1%) were positive for HBsAg and among the 81 females, 4 (4.9%) were positive for HBsAg. The rate of HBsAg in males was higher than in females, ( $P \geq 0.05$ ) but the difference is not statistically significant.

A total of 493 study participants belonging to different

occupational groups were tested for HBsAg. The rate of HBsAg in these groups is shown in Table 3, the highest rate of HBsAg (8.2%), was found among artisans and the lowest (3.7%) was found among traders. The rate of HBsAg in artisans was significantly higher than in traders  $P < 0.05$ .

A total of 470 study participants with different educational levels were tested for HBsAg. The rate of HBsAg among the study participants by level of their education is shown in Table 4. The prevalence of HBsAg was (11.1%) among the illiterate, (6.5%) each among study participants with secondary and tertiary level of education (4.0%) those with primary education. The highest rate of HBsAg was among the illiterate followed by those with primary education. The rate of HBsAg among the uneducated study participants was higher than that of the educated ones ( $P < 0.05$ ).

A total of 489 study participants with different marital status were tested for HBsAg. The rate of HBsAg in married and unmarried participants is shown in Table 5. Out of 297 married study participants 17 (5.7%) had HBsAg in their sera, in which out of 192 unmarried, 13 (6.8%) were positive for HBsAg. The rate of HBsAg was higher among the unmarried participants than in married individuals, the difference is statistically significant  $P > 0.05$ .

## DISCUSSION

The discovery that HBV could be transmitted by blood transfusion has provoked a greatly heightened emphasis on two fundamental objectives, safety and protection of human life (Tapko et al., 2007). Transfusion transmissible infections (TTIs) are a very serious complication of blood transfusion (Fleming, 1998). These infections continue to pose a great challenge to transfusion medicine, most especially in Africa, due to a high transfusion demand (Fleming, 1997). Prevention of transfusion transmitted infections in developed countries has been achieved by reducing unnecessary blood transfusion, using only regular voluntary donors, excluding donors with specific risk for those viral infections, and systematic screening of all donated blood for infections (Emekdas, 2006). The findings of this study showed that hepatitis B viruses are circulating in Ibadan and infecting the residents of the city, including the blood donors. The prevalence of Hepatitis B surface antigen (HbsAg), found was 5.9%. The result of this study on the prevalence of HBsAg in blood donors in UCH, Ibadan is different from that Olaleye et al. (1996), which showed a very high prevalence (30.8%) of HBsAg in Ibadan. The prevalence of HBsAg in blood donors in Ibadan from this study is also lower than that found by Okerengwo and Mudasiru (1992) when they tested sera of blood donors for HbsAg in the same location. Overall, the prevalence of HbsAg found in this study is one of the lowest ever reported from Nigeria.

**Table 1.** Rate of Hepatitis B virus among different age group of study participant.

Age range	Total no. tested	Total no. positive	Prevalence % (95% CI)
16 – 25	137	09	6.6
26 – 35	195	14	7.2
36 – 45	120	05	4.2
46 – 55	043	02	4.7
Total	495	30	6.0

**Table 2.** Gender distribution of Hepatitis B virus among the study participants.

Sex	Total no. tested	Total no. positive	Prevalence % (95% CI)
Male	426	26	6.1
Female	81	4	4.9
Total	507	30	5.9

**Table 3.** Rate of Hepatitis B Virus in different occupational groups.

Occupational group	Total no. tested	Total no. positive	Prevalence % (95% CI)
Unemployed	0	0	0
Civil servant	061	0	0
Professional	076	6	7.9
Artisan	110	9	8.2
Trading	107	4	3.7
Student	112	8	7.1
Others	021	2	9.5
Total	487	29	5.9

**Table 4.** Rate of Hepatitis B Virus among study participant with different level of education.

Level of education	Total no. tested	Total no. positive	Prevalence% (95% CI)
Illiterate	9	1	11.1
Primary	75	3	4.0
Secondary	186	12	6.5
Tertiary	199	13	6.5
Quranic	1	0	0
Total	470	29	6.2

**Table 5.** Prevalence Hepatitis B Virus antibodies by marital status of the study participants.

Marital status	Total no. tested	Total no. positive	Prevalence % (95% CI)
Married	297	17	5.7
Unmarried	192	13	6.8
Total	489	30	6.1

Age distribution of HBsAg revealed that there was no significant difference in the prevalence of HbsAg among the different age groups of blood donors. In previous studies by Jeremiaah and Enwin (2009), there was a

significant difference in the prevalence of HBsAg among different age groups of study participants in Port Harcourt. Youths aged 21 to 30 constituted the highest number of hepatitis B infection (No = 21, 1.4%). Also

findings of this also reveals that the prevalence of HbsAg by educational status among the blood donors was highest among illiterates group than among those with secondary and tertiary education. This is due to better awareness of the mode of transmission of these viruses and how to avoid being infected in this group than the illiterates.

The result of this study also showed that there was no significant difference in the prevalence of HBsAg in males and females ( $P \geq 0.05$ ). Jeremiaah and Enwin (2009) in their studies of Transfusion Transmissible viral infections, among students in Port Harcourt showed that highest prevalence of HbsAg occurred among males 23 (1.5%). However, several other studies on the prevalence of HBsAg are in agreement with the findings of this study, Chaudhary et al. (2007) and Shrestha et al. (2009). Prevalence of HBsAg (6.8%) (Table 5) in this study was significantly higher among the unmarried participants than in married individuals. Higher prevalence values for HBsAg 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 seroprevalence of HBsAg infection among the potential blood donors in University College Hospital provided information on the amount of the infection in our society. It has emphasized the need of continuous epidemiological surveillance that would help in decision policy making concerning blood safety.

Results of the study which showed that the prevalence of HBsAg is 5.9% suggesting that this major transfusion transmissible viral infection is still causing considerable morbidity in our communities and continue to pose a major challenge for blood safety. It seems that the prevalence of this infection 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 infection. Infection is more common among youth. This suggests that that infection control is not addressing the needs of the youth. Also infection are more common among the males than the females.

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