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# Seroprevalence of Hepatitis B Virus (HBV) among Blood donors in Federal Medical Centre Nguru, Yobe State, Nigeria

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# HISTORY

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#### **KEYWORDS**

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# ABSTRACT

The hepatitis B virus is responsible for a highly contagious infectious disease that is transmitted through contact with infected blood or body fluids to non-immune persons, transfusion of blood containing infections, engaging in close, intimate sexual interactions, sharing of contaminated sharp objects, close personal contact in overcrowded environments, and via the placenta of an infected mother to an unborn child. This work aims to determine the seroprevalence of hepatitis B virus among blood donors in Federal Medical Centre Nguru, Yobe State, Nigeria. The screening of HBsAg was carried out using the BioApex one Step HBsAg test kit manufactured by Richmond Hill, Ontario, Canada. Nine (9) out of one hundred persons screened for HBsAg tested positive, giving a seroprevalence of 9.0%. Seroprevalence was significantly higher in donors of the age group 35-44 years old compared to donors of other age groups. The highest prevalence of 11.1% was recorded in donors with tertiary education. Fifty-three percent (53%) of the sample population did not have any knowledge about HBV prior to this study and had the highest prevalence of 6(11.3%) with P<0.05. The highest prevalence of 7(9.9%) was recorded in those with no family history of hepatitis compared with those with a family history. Donors with no history of blood transfusion and those who were not sure of being vaccinated had the highest prevalence of 9.6% and 25.0%, respectively. The seroprevalence of hepatitis B among blood donors in this study population was high. Awareness campaigns on its modes of transmission and prevention should be promoted and strengthened.

# INTRODUCTION

Hepatitis B Virus, also known as HBV, is a double-stranded circular DNA virus that belongs to the Hepadnaviridae family with a very high percentage of transmission [1]. Hepatitis B Virus (HBV) is easily transmitted to non-immune persons through

exposure to infected blood or bodily fluids (saliva). It can be contracted or transmitted by transmission of infected blood through transfusion, engaging in intimate sexual activities, especially without protection, sharing of contaminated but unsterilized piercing objects, and personal contact within crowded households. It could also be contracted by an unborn child from an infected mother through the placenta [2].

Despite the availability of an effective vaccine and potent antiviral treatment, chronic hepatitis B (HBV) infection remains a threat to public health, globally [3] and causes hepatocellular carcinoma (HCC) and liver cirrhosis that somewhat lead to morbidity and death [4]. Out of about 2 billion HBV-infected people, approximately 360 million are found to be chronic carriers [5]. Annually, about one million persons infected die primarily of complications from hepatitis B such as liver cirrhosis and liver cancer [6]. Nigeria is among the countries marked as highly endemic for HBV infection, and at one point or the other in their life about 75% of the population is likely to be vulnerable to HBV [7].

Blood transfusion service stands as an essential and healing procedure, serving as a legitimate means to save the lives of numerous patients experiencing blood loss. Worldwide, over eighty-one million blood units are donated by generous blood donors. However, the primary reason for transmitting infectious agents through blood transfusion lies in the existence of blood-borne infections within the blood cells of asymptomatic donors [8]. Annually, worldwide, the transfusion of tainted blood leads to approximately 16 million new cases of hepatitis B and 5 million new cases of hepatitis C [9]. The annual rate of HIV infection worldwide ranges from 80,000 to 160,000 [10]. Blood transfusion accounts for 5-10% of transmission of HIV in Sub-Saharan Africa. Also, about 12.5% of patients who receive blood through transfusion are at high risk of contracting hepatitis [11].

In Nigeria, there is a high level of medical cases of blooddemanding health conditions, which include road accidents, pregnancy-related hemorrhage, armed robbery attacks, violent events, and so on, which have increased the possibility of HBV transmission through contaminated blood, according to the United Nations System in Nigeria (UNSN, 2001). Thus, regular checking of the magnitude of transfusion of transmissible infections in blood donors is crucial for optimizing donor recruitment strategies to reduce the transmission of infectious diseases. Therefore, this study aimed to determine the seroprevalence of hepatitis B virus among blood donors in Federal Medical Centre Nguru, Yobe State, Nigeria.

#### MATERIALS AND METHODS

#### **Study Area and Population**

This work was done at Federal Medical Centre Nguru (FMC), situated along Machina Local Government road in Nguru town, Nguru Local Government area of Yobe State, Nigeria. The ethical clearance was obtained from the Federal Medical Center, Nguru, office of the Head of Clinics, before the commencement of the work. One hundred (100) blood donors at the medical center who consented were used for this study.

#### Administration of Questionnaire

Socio-demographic data and important information on HBV awareness were gathered from the respondents using structured questionnaires. The recruitment and enlightenment about the significance of the study were done before the questionnaires were administered. All participants signed consent forms, after which samples were collected.

## Sample Collection and Processing

Two (2) mls of venous blood were collected aseptically from each participant into plain bottles, which were allowed to be clotted at room temperature, and serum separated for further analysis. Hepatitis B surface Antigen (HBsAg) was detected using the BioApex one Step HBsAg test kit manufactured by Richmond Hill, Ontario, Canada. It is a rapid immunechromatographic in vitro assay for qualitatively detecting HBsAg in serum. All samples were kept at room temperature (20-25°C). The test kits were removed from the foil cover and labeled appropriately with an identification number. Fifty microliters of serum were placed on the sample pad on one end of the strip and flat on a clean, dry, and non-absorbent surface. It was observed for 10 to 15 minutes before the results were taken. The presence of visible bands (lines) on both the control and the test regions indicates a positive result, while a band (line) only at the control region shows a negative result.

### RESULTS

The Overall prevalence of HBV among blood donors in Federal Medical Center, Nguru, Yobe State. Nigeria shows that out of the one hundred (100) people screened for HBsAg, nine (9) of them tested positive, showing a seroprevalence of 9.0%. Result analysis based on bio-data showed that donors aged 35-44 had the highest prevalence of 18.2% while those in the age bracket of 18-24 had the lowest prevalence of 2.9%. Blood donors in the age group of 45 and above years had a zero-percent prevalence rate. Both singles and married individuals had the same prevalence of 9.7%, while the divorce had a zero percent prevalence of 11.1%, and the lower prevalence of 10.4% was recorded in those with secondary education, while donors with primary education had a zero-percent prevalence (**Table 1**).

 
 Table 1. Prevalence of HBV in relation to bio-data among blood donors in Federal Medical Center, Nguru, Yobe State, Nigeria.

Variable	No Examined No Positive (%)	
Age group		
18-24	35	1 (2.9)
25-34	52	6 (11.5)
35-44	11	2 (18.2)
45 and above	02	0 (0)
Total	100	9 (9.0)
Marital Status	;	
Single	31	3 (9.7)
Married	62	6 (9.7)
Divorce	07	0 (0)
Total	100	9 (9.0)
Education		
Primary	16	0 (0)
Secondary	48	5 (10.4)
Tertiary	36	4 (11.1)
Total	100	9 (9.0)

Fifty-three percent (53%) of the sample population did not have any knowledge about HBV prior to this study, while the remaining forty-seven percent (47%) admitted to having knowledge about HBV. There was a 6 (11.3%) prevalence reported in donors who had no knowledge about HBV and a 3 (6.4%) prevalence in those that had knowledge of HBV. A prevalence of 7 (9.9%) was observed in those with no family history of hepatitis and a lower prevalence of 2 (6.9%) in those with a family history of hepatitis. Donors with no history of blood transfusion had the highest prevalence of 9.6% while those with a history of blood transfusion had zero-prevalence. Donors who have been vaccinated against HBV had zero prevalence, those who have not been vaccinated had the lowest prevalence of 13.6% and those who were not sure had the highest prevalence of 25.0% (**Table 2**). Table 2. Prevalence of HBV in relation to possible risk factors among blood donors in Federal Medical Center, Nguru, Yobe State, Nigeria.

Variable	No Examined No Positive (%)			
Knowledge of HBV				
Yes	47	3 (6.4)		
No	53	6 (11.3)		
Total	100	9 (9.0)		
Family History				
Yes	29	2 (6.9)		
No	71	7 (9.9)		
Total	100	9 (9.0)		
History of blood transfusion				
Yes	6	0 (0)		
No	94	9 (9.6)		
Total	100	9 (9.0)		
Vaccinated				
Yes	44	0 (0)		
No	44	6 (13.6)		
Not sure	12	3 (25.0)		
Total	100	9 (9.0)		

## DISCUSSION

In our study, HBV seropositivity of 9% among blood donors indicates that the prevalence of HBV infections among blood donors in the North-eastern region, similar to other areas of Nigeria, signifies an endemic presence, which agrees with the study of Uneke et al. [12], which states that a prevalence higher than 7% for HBsAg in a population that constitutes adults is a definition of high endemicity. The frequency of HBsAg observed in this study agrees with the findings of Ezeonu et al. [13], carried out in Abuja, which reported a prevalence of 8.9%, but contradicts a previous study by Ugwuja [14], in Abakiliki, Nigeria, with a lower prevalence of 3.9%. Damulak et al. [15], reported a higher prevalence of 13.8% among blood donors. Although explaining the disparity in the rate reported in this and other studies would be difficult, the variation might have resulted from differences in knowledge on the risk of exposure, ways in which HBV can be transmitted, and the available information.

The age brackets 35-44 years demonstrated the highest occurrence rate; this demographic consists of sexually active, largely self-sufficient adults, coincidentally forming the backbone of the workforce within the population. This agrees with a previous study with the highest prevalence in the age group of 31-40 years [16,17]. The prevalence in this study contradicts that carried out in Makurdi, with the highest prevalence within the age group of 23-27 years [18] and studies of Uneke et al. [12] that recorded the highest prevalence of 44% in donors aged 51-60 years. In relation to marital status, both singles and married individuals had the same prevalence of 9.7%, which could result from their sexual activity and the possibility of having more than one sexual partner. The result of this study contradicts a previous study that recorded the highest prevalence in divorced/separated donors [13].

Analysis based on educational status showed that donors with tertiary education had the highest prevalence compared to those with secondary education. This contradicts the report of Ezeonu et al. [13], which recorded the highest prevalence in primary education with a 100% rate. One would expect that those with a higher level of education would have more knowledge and awareness, thereby avoiding possible risk factors, but that was not the case in this study. The result from this study shows those without knowledge of HBV have the highest prevalence in comparison with those who know about it. Their lack of knowledge about HBV could have made them more vulnerable

to the virus. This result corroborates previous studies carried out in Zaria, Kaduna State by Edia-Asuke et al. [19]. Those with no family history of HBV and donors who have not been transfused with blood have the highest prevalence; these populations might have come down with the infection by other means of transmission.

Those who were not sure of their vaccination status had the highest prevalence, followed by those who have not been vaccinated. Immunization stands out as the primary and highly efficient method in controlling HBV. The vaccine is widely recognized for its safety and effectiveness in preventing the development of a chronic carrier state [20]. Despite the availability of HBV vaccines since the 1990s, the vaccination rate against HBV remains disappointingly low [21] and has been incorporated in the National Program in Immunization (NPI) in Nigeria since 2004 [22]. The findings in this research support the earlier claim, showing that none of the surveyed participants who had received immunization before the study were found to have HBV infection. This also agrees with a previous study by Edia-Asuke et al. [19].

Donating and receiving blood significantly increase the chances of contracting HBV infection. Although there was no HBV infection reported among donors that have been transfused with blood in this survey, this concurs with the findings of Edia-Asuke et al. [19]. Considering the prevalence documented among blood donors in the survey, it is evident that receiving infected blood through transfusion poses a significant risk. This is consistent with earlier research, which states that the transfer of blood and blood-related products remains identified as the primary mode of HBV transmission [23-25].

## CONCLUSION

Until recently, the issue of HBV infection was not typically regarded as a Nigerian concern. Recent research, including this study, is shedding more light on the endemic nature of HBV infection in Nigeria. This survey, carried out among blood donors, indicates the presence of HBV infection at the Federal Medical Centre in Nguru, Yobe State, recording a 9% prevalence. The importance of an extensive nationwide campaign for HBV awareness, education, and prevention/control cannot be overstated. Additionally, widespread immunization and proper treatment of existing cases could help diminish the virus's transmission and proliferation within both individuals and society. Further studies are required among blood donors in Yobe State and Nigeria at large.

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