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Research Article

Pre-Donation Screening of Blood Donors for Hepatitis B in Federal Medical Centre, Abeokuta, Nigeria

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Abstract

Background: Hepatitis B remains a significant public health challenge in Nigeria, particularly among blood donors. This study aimed to assess the prevalence of occult hepatitis B infection (OBI) in blood donors at the Federal Medical Centre, Abeokuta, Nigeria.

Materials and Methods: A cross-sectional and longitudinal study was conducted from October to November 2020, involving 113 prospective blood donors aged 18-65. The study utilized questionnaires to obtain informed consent and socio-demographic information. Blood samples were collected and tested for Hepatitis B surface antigen (HBsAg) using both rapid diagnostic tests and ELISA. Anti-HBc screening was conducted on HBsAg-negative samples to detect occult hepatitis B infection.

Results: Out of 88 respondents, 2.3% tested positive for HBsAg using both rapid test and ELISA, while 3.6% of HBsAg-negative samples tested positive for Anti-HBc, indicating occult hepatitis B infection. A total of 93.2% of participants were male, and the majority (92.0%) were Yoruba. Socio-demographic and health-related practices such as sharing sharp objects (28.4%) and multiple sexual partners (10.2%) were analyzed but showed no significant associations with HBV infection ($p > 0.05$).

Conclusion: The study identified a low prevalence of HBsAg among blood donors but highlighted the presence of occult hepatitis B infection. Regular screening for Anti-HBc in HBsAg-negative blood donors is essential to prevent transfusion-transmissible infections. Enhancing public awareness and preventive measures is crucial in mitigating HBV transmission in Nigeria.

Keywords: Hepatitis B; Blood Donors; Occult Hepatitis B; Pre-donation Screening

Introduction

Hepatitis B virus (HBV) remains a significant global public health challenge, particularly in developing countries where the prevalence of chronic HBV infection is higher. The World Health Organization (WHO) estimates that about 296 million people globally were living with chronic HBV infection in 2019, with sub-Saharan Africa being one of the most affected regions [1]. Hepatitis B is a bloodborne virus that can be transmitted through exposure to infected blood and other bodily fluids. As such, blood transfusions carry a significant risk of HBV transmission if not properly screened.

In developed countries, stringent blood donor screening protocols have dramatically reduced the risk of HBV transmission through transfusion. However, in many developing nations, including Nigeria, challenges such as limited resources, inadequate screening facilities, and lack of awareness contribute to the continued transmission of HBV through blood transfusions [2].

Nigeria is classified as a high-prevalence country for HBV, with an estimated prevalence rate of 8.1% among the general population [3]. The prevalence among blood donors in different regions of Nigeria has also been reported to be significant, ranging from 5% to 15% in various studies [4]. This high prevalence poses a considerable challenge to safe blood transfusion practices in the country. The Federal Medical Centre in Abeokuta, Ogun State, like many other healthcare facilities in Nigeria, faces the dual challenge of ensuring an adequate blood supply while maintaining the safety of transfusion practices.

Blood donation is a critical component of healthcare systems, especially in emergency medicine, surgery, and treatment of vari-

ous medical conditions such as anaemia and cancer. The safety of blood transfusions hinges on the rigorous screening of donated blood for transfusion-transmissible infections (TTIs), including HBV. The WHO recommends that all donated blood be screened for TTIs to minimize the risk of transfusion-related infections [1]. In Nigeria, blood transfusion services are governed by the National Blood Transfusion Service (NBTS), which provides guidelines for donor screening. However, the implementation of these guidelines varies across different regions and healthcare facilities, leading to inconsistencies in the screening process [5].

The screening for HBV among blood donors typically involves serological tests to detect hepatitis B surface antigen (HBsAg), which indicates an active HBV infection. However, the accuracy of these tests can be affected by factors such as the window period of infection and the sensitivity of the testing methods used [6]. Consequently, there is a need for more advanced screening techniques, such as nucleic acid testing (NAT), which can detect HBV DNA even in the window period, thereby reducing the risk of HBV transmission through transfusion [7].

One of the primary challenges in blood donor screening for HBV in Nigeria is the inadequate infrastructure in many healthcare facilities. Many hospitals and blood banks lack the necessary equipment and trained personnel to conduct comprehensive screening of donated blood [8]. Additionally, the cost of advanced screening methods such as NAT is prohibitively high for many healthcare facilities, leading to reliance on less sensitive methods that may miss early-stage infections.

Another significant challenge is the lack of awareness and education among the general population and potential blood donors about HBV and its transmission routes. Many individuals who are chronically infected with HBV are unaware of their status, which increases the risk of unknowingly donating infected blood [9]. Public health education campaigns and targeted interventions are essential to improve the awareness of HBV and encourage voluntary, non-remunerated blood donation from low-risk populations.

The Federal Medical Centre (FMC) in Abeokuta is one of the leading tertiary healthcare facilities in Ogun State, Nigeria. As a referral Centre, FMC Abeokuta handles a high volume of patients requiring blood transfusions, making it a critical site for blood safety interventions. The hospital's blood bank relies on both voluntary and replacement blood donors to meet the demand for blood and blood products. However, like many other healthcare facilities in Nigeria, FMC Abeokuta faces challenges in ensuring the safety of its blood supply due to the high prevalence of HBV among the donor population and the limitations of current screening practices.

Given the high prevalence of HBV in Nigeria and the critical importance of safe blood transfusion practices, this study aims to evaluate the effectiveness of pre-donation screening for HBV among blood donors at FMC Abeokuta. The findings of this study will provide valuable insights into the current screening practices, identify potential gaps, and suggest improvements that could enhance the safety of blood transfusions in the facility. Moreover, the study will contribute to the broader understanding of HBV transmission risks in blood donation settings in Nigeria and inform policy decisions aimed at improving blood safety across the country.

Materials and Methods

Research design

This was a cross-sectional and longitudinal study to assess occult hepatitis B in blood donors. This study was conducted at the Federal Medical Centre, Idi-Aba, Abeokuta Nigeria from October to November 2020.

Study area

This study was conducted at the Federal Medical Centre, Abeokuta, Ogun State, Nigeria located in the South-Western region of Nigeria at latitude 7.1440^0N and longitude 3.3805^0E.

Study subjects and population

The subjects included in this study were prospective blood donors between the age of 18 and 65 years at the Federal Medical Centre, Abeokuta after obtaining informed consent through pre-donation questionnaires.

Sample size determination

The sample size will be determined using the Cochran formula for estimating proportions in a population outlined by Airaodion., *et al*. [10]

$$n = \frac{Z^2(Pq)}{e^2}$$

where n = minimum sample size

Z = 1.96 at 95% confidence level,

P = known hyper-reactive malarial splenomegaly

e = error margin tolerated at 5% = 0.05

q = 1 - p

According to Nna *et al.,* [11], the existing prevalence of occult hepatitis B infection (OBI) is 8.0%.

P = 8.0% = 0.08

q = 1 – p

= 1 – 0.08

= 0.92

$$n = \frac{(1.96)^2(0.08 \times 0.92)}{(0.05)^2}$$

$$n = \frac{3.8416 \times (0.0736)}{0.0025}$$

$$n = \frac{0.2827}{0.0025} = 113.10$$

A total number of 113 participants were selected for the study.

Eligibility of subjects

Inclusion criteria

- Blood donors between the age of 18-65 years.
- HBsAg negative donors.
- Blood donors weighing above 50kg.
- Male donors with haemoglobin greater than or equal to 12.5 g/dl and female donors with haemoglobin greater than or equal to 11.5g /dl.

Exclusion criteria

- HBs Ag positive donors.
- Underaged or overaged subjects.
- Subjects that have skin marks, bizarre piercings and tattoos
- Blood donors positive for any transfusion transmissible infection
- Any prospective donor who refuses to participate in the study will be excluded.

Procedure for recruiting subjects

All prospective blood donors who visit the Federal Medical Centre, Abeokuta blood bank to donate blood were enrolled on this study.

Ethical consideration

Ethical clearance for this study was obtained from Babcock University Health Research Ethics Committee (BUHREC) with reference number BUHREC068/20. Informed consent was obtained from the subjects at the beginning of the study in the form of questionnaires.

Socio-demographic information

Using a structured questionnaire, relevant socio-demographic information was obtained from subjects to elicit risk factors for HBV infection. These included age, sex, history of alcohol use, smoking, sharing of sharps, sexual partners, vaccination status and other information. The questionnaires were administered to subjects by the researcher.

Sample collection

About 5ml of venous blood was collected from each participant through vein puncture into plain bottles and the sera were separated and stored in cryovial tubes at 4-6^{0}C until analysis was ready to be carried out

Laboratory analysis

HBsAg rapid screen test

Subjects were first confirmed to be HbsAg negative using a rapid test kit (one-step dipstick test). The rapid test is an immunochromatographic strip immobilized with antibodies that are specific to the hepatitis surface antigen. This one-step test is very sensitive and only takes about 15-20 minutes. Internal control is also included in the strip. Positive samples would show two red lines.

Test Procedure

The strip was removed from the sealed pouch and laid on a clean, dry, non-absorbent surface. Two drops of serum were dropped onto the sample pad. The strip was left undisturbed for 15 minutes after which the result was read.

Interpretation of results

- **Negative**: Only one colour band appears on the control region. This indicates that there is no detectable HBsAg in the serum.
- **Positive**: Distinct colour bands on the control and test regions. This indicates that there is a detectable amount of HBsAg in the serum.
- **Invalid**: No visible colour band or only one colour band appearing in the test region. This indicates that there is a possible error in performing the test. The test should be repeated using a new strip.

HBsAg ELISA

Another hepatitis B screening was done on the negative samples using a one-step sandwich method Anti-HBs PLUS ELISA method for hepatitis B antigen. All procedures were performed according to the manufacturer's instructions.

Determination of Anti-HBc

This test was carried out according to the manufacturer's instructions. About 200 µl of the sample diluent was added to each well, 20 µl of control (positive and negative) samples were added to their appropriate wells, 20 µl of test samples were added to their appropriate wells. The reaction mixtures were then homogenized by gently shaking the microplate. The plate was then covered with a lid and incubated at 37°C for 30 minutes. All the wells were emptied by aspiration and washed 4 times. 200 µl of the well-homogenized enzyme conjugate solution was immediately added to all the wells. The plate was then covered with a lid and incubated at 37°C for 60 minutes. All the wells were emptied by aspiration and washed 4 times. 100µl of substrate solution was immediately dispensed into each well. The reaction was allowed to develop in the dark for 30 minutes at room temperature, and 100 µl of stop solution was added. The reaction mixture was homogenized. The plate

bottom was wiped and the absorbance was read at 450nm using a plate reader.

Statistical analysis

The data collected were entered into Microsoft Excel and the statistical analysis was carried out using Statistical Package for Social Sciences (SPSS) version 27.0 and a p-value ≤ 0.05 was considered significant.

Results

Table 1 indicates a male-dominated sample, with 93.2% male respondents and only 6.8% female. The majority of the respondents are Christians (69.3%) and singles (51.1%). Most participants are employed (77.3%) and have university-level education (53.5%). Yoruba is the predominant tribe, accounting for 92.0% of the sample.

Table 2 show that an overwhelming 98.9% of respondents believe blood donation is important, with 93.2% donating primarily to help relatives. A small minority (2.3%) were on antibiotics or other medications at the time of donation. More than half (55.7%) had donated blood before, and none had been advised against donating or had suffered from anaemia or blood disorders.

Table 3 indicates that 95.5% of the respondents had not taken aspirin, painkillers, or anti-inflammatory drugs. The majority (70.5%) were non-alcoholic, 98.9% had no tattoos or body piercings, and 100% had not used illegal drugs with needles. However, 28.4% reported sharing sharp objects, and 10.2% had multiple sexual partners.

Table 4 and Figures 1 and 2 show that out of the 88 respondents, 2.3% tested positive for Hepatitis B Surface Antigen (HBsAg) using both Rapid Diagnostic Tests (RDT) and ELISA, while 3.6% were positive for Total Anti-HBc, indicating previous exposure to the Hepatitis B virus.

Table 5 reveals that gender, religion, occupation, tribe, education, and marital status did not show statistically significant associations with HBV test results ($p > 0.05$). Both positive cases were male, employed, and of the Yoruba tribe, with one being a university graduate.

Table 6 also did not show significant associations ($p > 0.05$). However, there is a noteworthy trend where all positive cases had a history of alcohol use, and one had taken aspirin or painkillers, but these associations were not statistically significant.

Discussion

Hepatitis B virus (HBV) remains a significant public health challenge, particularly in developing countries like Nigeria, where the prevalence of the virus among blood donors is a concern. The

Variables	Frequency	Percentage (%)
Gender		
Female	6	6.8
Male	82	93.2
Religion		
Christianity	61	69.3
Islam	27	30.7
Marital status		
Divorced	1	1.1
Married	42	47.7
Single	45	51.1
Occupation		
Students/unemployed	20	22.7
Employed	68	77.3
Education		
Primary	1	1.2
Secondary	39	45.3
University	46	53.5
N = 86		
Tribe		
Hausa	1	1.1
Igbo	5	5.7
Yoruba	81	92.0
Others	1	1.1

Table 1: Socio-Demographic Characteristics of Respondents.

Variables	Frequency	Percentage (%)
Do you think blood donation is important?		
No	1	1.1
Yes	87	98.9
What is the reason for the donation?		
Friend	1	1.1
Relative	82	93.2
Voluntary	5	5.7
Are you currently taking an antibiotic?		
No	86	97.7
Yes	2	2.3
Are you currently taking any other medication?		
Yes	2	2.3
No	86	97.7
Have you ever donated blood before?		

No	39	44.3
Yes	49	55.7
Have you ever been advised not to give blood?		
Yes	0	0.0
No	88	100.0
Have you suffered anaemia or any blood disorder?		
Yes	0	0.0
No	88	100.0
Have you ever had a serious ill-ness, operation or been admitted to hospital?		
Yes	2	2.3
No	86	97.7
Have you ever taken vaccine for hepatitis b virus?		
No	82	93.2
Yes	6	6.8

Table 2: Clinical Characteristics of Respondents.

Variables	Frequency	Percentage (%)
Taken any aspirin, pain killers or anti-inflamatory preparations?		
No	84	95.5
Yes	4	4.5
Are you alcoholic?		
No	62	70.5
Yes	26	29.5
Do you have any tattoos or body piercings?		
No	87	98.9
Yes	1	1.1
Do you take illegal drugs with needle?		
No	88	100.0
Yes	0	0.0
Do you have multiple sex partners?		
No	79	89.8
Yes	9	10.2
Do you share sharp objects?		
No	63	71.6
Yes	25	28.4
Been injured with a used needle (needlestick)?		
No	85	96.6
Yes	3	3.4
Had blood/ body fluid splash body or broken skin		
No	87	98.9
Yes	1	1.1
Do you smoke?		
No	82	93.2
Yes	6	6.8

Table 3: Health-Related Practices of Respondents.

VARIABLES	Frequency	%
HIV Negative Positive HCV	88	100.0
Negative	88	100.0
Positive	0	0.0
Syphilis		
Negative	88	100.0
Positive	0	0.0
HbsAg Rapid Test Screening		
Negative	86	97.7
Positive	2	2.3
ELISA Screening		
Negative	84	97.7
Positive	2	2.3
Total Anti-HBc		
Negative	81	96.4
Positive	3	3.6

Table 4: Results of Clinical Tests of Respondents.

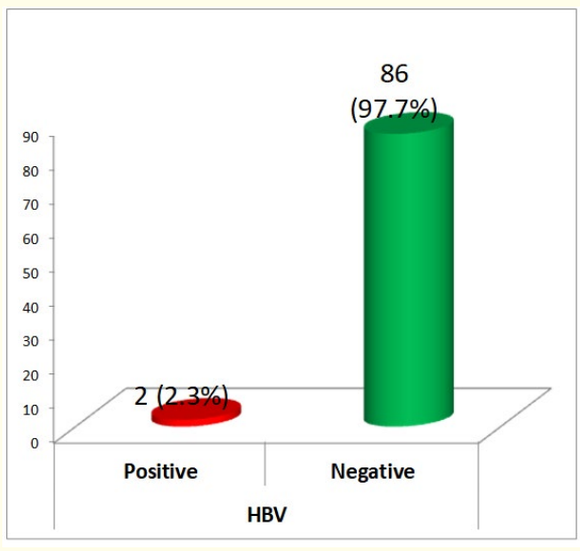

Figure 1: Prevalence of HBsAg.

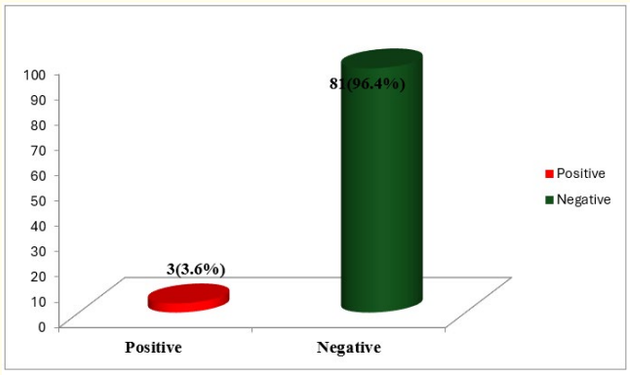

Figure 2: Prevalence of Anti-HBc.

Variable	Hepatitis B virus test results		χ^2-value	p-value
	Negative (%)	Positive (%)		
Gender				
Female	6 (7.0)	0 (0.0)	0.150	1.000
Male	80 (93.0)	2 (100.0)		
Religion				
Christianity	59 (68.6)	2 (100.0)	0.906	1.000
Islam	27 (31.4)	0 (0.0)		
Occupation				
Students/ unemployed	19 (22.1)	1 (50.0)	0.867	0.405
Employed	67 (77.9)	1 (50.0)		
Tribe				
Yoruba	79 (91.9)	2 (100.0)	0.177	1.000
Others	7 (8.1)	0 (0.0)		
Education				
University	38 (44.2)	1 (50.0)	0.027	1.000
Others	48 (55.8)	1 (50.0)		
Marital status				
Married	41 (47.7)	1 (50.0)	0.004	1.000
Others	45 (52.3)	1 (50.0)		

Table 5: Association of Socio-Demographics and HBV Test Results.
*Statistically significant at $p \leq 0.05$.

Variable	Hepatitis B virus test results		X^2-value	p-value
	Negative (%)	Positive (%)		
Taken any aspirin, painkillers or anti-inflammatory preparations?				
No	83 (96.5)	1 (50.0)	9.745	0.089
Yes	3 (3.5)	1 (50.0)		
Are you an alcoholic?				
No	62 (72.1)	0 (0.0)	4.880	0.085
Yes	24 (27.9)	2 (100.0)		
Do you have multiple sexual partners?				
No	77 (89.5)	2 (100.0)	0.233	1.000
Yes	9 (10.5)	0 (0.0)		
Do you share sharp objects?				
No	62 (72.1)	1 (50.0)	0.469	0.490
Yes	24 (27.9)	1 (50.0)		
Been injured with a used needle (needle stick)?				
No	83 (96.5)	2 (100.0)	0.072	1.000
Yes	3 (3.5)	0 (0)		
Had a blood/ body fluid splash on the body or broken skin				
No	85 (98.8)	2 (100.0)	0.024	1.000
Yes	1 (1.2)	0 (0.0)		
Do you smoke?				
No	80 (93.0)	2 (100.0)	0.150	1.000
Yes	6 (7.0)	0 (0.0)		

Table 6: Association of Health-Related Practice and HBV.
*Statistically significant at $p \leq 0.05$.

pre-donation screening of blood donors for HBV is vital in preventing the transmission of the virus through blood transfusion. This study aimed to evaluate the effectiveness of pre-donation screening for HBV among blood donors at FMC Abeokuta.

The findings of this study on the pre-donation screening of blood donors for Hepatitis B in Federal Medical Centre, Abeokuta, Nigeria, reveal significant insights into the clinical characteristics and health-related practices of the respondents. These insights are essential in understanding the risk factors associated with Hepatitis B among blood donors, ultimately contributing to the safety of blood transfusion practices.

The overwhelming majority of respondents (98.9%) acknowledged the importance of blood donation, indicating a high level of awareness regarding the significance of this altruistic act. This finding aligns with previous studies that emphasize the role of education and awareness in motivating individuals to donate blood [12,13]. The primary reason for blood donation was to assist a relative (93.2%), with only a small fraction (5.7%) participating in voluntary blood donation. This trend of familial donation over voluntary donation has been observed in various studies across Nigeria, suggesting a strong cultural inclination towards helping family members in need [14,15].

Notably, the study revealed that a significant proportion of the respondents (55.7%) had donated blood before. This suggests a relatively high level of repeat donors, which is crucial for maintaining a stable blood supply. However, none of the respondents had been advised against donating blood, and none reported having suffered from anemia or any blood disorders. These findings indicate a generally healthy donor population, which is consistent with the eligibility criteria for blood donation [1].

A small percentage (2.3%) of respondents reported a history of serious illness or hospitalization, which could potentially disqualify them from donating blood depending on the nature of the illness. Additionally, only 6.8% of the respondents had received a Hepatitis B vaccine, a critical preventive measure against the virus. The low vaccination rate raises concerns about the potential risk of Hepatitis B transmission through blood donation, particularly given the endemicity of the virus in Nigeria [15].

The health-related practices of the respondents are crucial in assessing their risk of Hepatitis B infection. Most respondents (95.5%) reported not taking aspirin, painkillers, or anti-inflammatory preparations, which is important as these medications can affect platelet function and increase bleeding risks [1]. The prevalence of alcohol consumption was relatively high, with 29.5% of respondents identifying as alcoholics. This finding is concerning given that alcohol use can compromise liver function, potentially exacerbating the effects of Hepatitis B infection [16].

Only 1.1% of respondents had tattoos or body piercings, practices associated with an increased risk of bloodborne infections, including Hepatitis B [17]. None of the respondents reported using illegal drugs with needles, a significant risk factor for Hepatitis B transmission. However, 10.2% of respondents admitted to having multiple sex partners, and 28.4% reported sharing sharp objects, both of which are known risk behaviors for Hepatitis B transmission [18].

Interestingly, a small percentage of respondents (3.4%) had been injured with a used needle, and 1.1% had experienced blood or body fluid splash on broken skin, both of which are high-risk exposures for Hepatitis B [1]. The majority of respondents (93.2%) did not smoke, aligning with studies that suggest a lower prevalence of smoking among blood donors compared to the general population [13].

The findings of this study are consistent with previous research on blood donors in Nigeria, particularly regarding the high level of awareness about the importance of blood donation and the predominance of familial donation. For instance, Nwogoh., *et al*. [13] reported similar trends in a study conducted in Benin City, Nigeria, where 87.5% of blood donations were from family members. The low rate of voluntary donation observed in this study underscores the need for more robust public health campaigns to encourage voluntary blood donation, which is crucial for ensuring a reliable and safe blood supply [14].

The low Hepatitis B vaccination rate among the respondents is also in line with findings from other parts of Nigeria, where Hepatitis B vaccination coverage remains suboptimal [15]. This highlights the need for increased efforts to promote Hepatitis B vaccination, particularly among populations at higher risk, such as blood donors.

The health-related practices observed in this study, particularly the high prevalence of alcohol consumption and the sharing of sharp objects, are concerning given their association with an increased risk of Hepatitis B infection. These findings are similar to those reported by Laroche., *et al.* [17], who found that alcohol use and risky behaviours such as sharing needles and sharp objects were prevalent among blood donors in other regions.

The results of this study reveal a 2.3% prevalence of Hepatitis B Surface Antigen (HBsAg) among blood donors at the Federal Medical Centre, Abeokuta, Nigeria. This finding aligns with previous studies conducted in similar regions, which have reported varying prevalence rates depending on geographic location and the population under study. For instance, a study conducted in the North-Central region of Nigeria reported an HBsAg prevalence rate of 5.1% among blood donors, indicating a higher rate compared to the findings of this study [19]. Similarly, a study in the Southeast region

reported a prevalence of 3.6% [20], slightly higher than the 2.3% found in the current study. These variations can be attributed to differences in public health interventions, awareness campaigns, and vaccination rates across different regions of the country.

The relatively low prevalence rate observed in this study could suggest effective public health measures in the Southwest region, particularly in Abeokuta, where this research was conducted. However, it also underscores the persistent presence of HBV among blood donors, necessitating continuous and rigorous screening processes to ensure the safety of the blood supply. The presence of HBsAg indicates an ongoing HBV infection, which could lead to chronic liver disease, cirrhosis, or hepatocellular carcinoma in infected individuals [21]. Therefore, identifying and excluding HBsAg-positive individuals from blood donation is crucial in preventing HBV transmission through transfusion.

This study utilized both Rapid Diagnostic Tests (RDT) and Enzyme-Linked Immunosorbent Assay (ELISA) to screen for HBsAg among blood donors. The findings showed consistent results between the two methods, with both indicating a 2.3% prevalence rate. This consistency suggests the reliability of RDTs as a preliminary screening tool for HBsAg in resource-limited settings. However, ELISA, known for its higher sensitivity and specificity, remains the gold standard for confirmatory testing [1]. The concurrence of results between RDT and ELISA in this study supports the use of RDT for initial screening, followed by ELISA for confirmation, as recommended by several guidelines [1].

The study also assessed the prevalence of total antibodies against Hepatitis B core antigen (Anti-HBc) among the blood donors. The findings indicated a 3.6% prevalence of anti-HBc positivity. Anti-HBc is an important marker as it indicates a past or ongoing HBV infection, which may not always be detected by HBsAg testing alone, especially in cases of occult hepatitis B infection (OHB) [23]. The presence of Anti-HBc in blood donors who test negative for HBsAg could imply a resolved infection, chronic carrier state, or OHB, which poses a risk for HBV transmission, particularly in immunocompromised recipients [24].

The 3.6% prevalence of Anti-HBc observed in this study is comparable to findings from other studies. For example, a study in the South-South region of Nigeria reported a 4.0% prevalence of anti-HBc among blood donors [25]. This slight variation might be due to differences in sample size, population characteristics, and the sensitivity of the screening assays used. The detection of anti-HBc is essential in ensuring the safety of the blood supply, as anti-HBc-positive donors with low or undetectable levels of HBV DNA can still transmit the virus [23].

The presence of HBsAg and Anti-HBc among blood donors has significant implications for blood transfusion safety. The 2.3% prevalence of HBsAg and 3.6% prevalence of Anti-HBc indicate that a small proportion of blood donors carry markers of HBV infection, which could potentially lead to HBV transmission if not properly screened and excluded. This highlights the importance of implementing comprehensive HBV screening protocols that include both HBsAg and Anti-HBc testing, particularly in regions with intermediate to high HBV endemicity like Nigeria [1].

Moreover, the results underscore the need for public health interventions aimed at reducing the burden of HBV in the population, such as increasing HBV vaccination coverage, raising awareness about HBV transmission, and promoting safe blood donation practices. The implementation of nucleic acid testing (NAT) for HBV DNA in blood donation Centres, although costly, could further reduce the risk of transfusion-transmitted HBV by detecting occult infections that may not be identified by serological assays alone [24].

The study revealed that out of 86 blood donors, 6 (7.0%) females tested negative for HBV, while none tested positive. Among male donors, 80 (93.0%) tested negative, and 2 (100.0%) tested positive. The chi-square ($\chi 2$) value was 0.150, and the p-value was 1.000, indicating no statistically significant association between gender and HBV positivity. This result is consistent with several studies, including Olatunji., *et al*. [22], which found no significant gender difference in HBV prevalence among blood donors in Nigeria. However, some studies, such as those by Buseri., *et al*. [26], have reported a higher prevalence of HBV among male donors, which could be attributed to behavioural factors such as higher rates of unsafe sexual practices among men.

The distribution of HBV test results across religious affiliations showed that Christianity accounted for 59 (68.6%) negative and 2 (100.0%) positive cases, while Islam accounted for 27 (31.4%) negative cases, with no positive cases. The $\chi 2$ value was 0.906, and the p-value was 1.000, indicating no significant association between religion and HBV infection. This is in line with findings by Akinbami., *et al*. [27], who also reported no significant association between religious beliefs and HBV infection among blood donors in Lagos, Nigeria.

The results indicated that employed individuals had a higher proportion of negative HBV test results (67, 77.9%) compared to students/unemployed (19, 22.1%). However, among the positive cases, both categories recorded one case each, with a $\chi 2$ value of 0.867 and a p-value of 0.405. This suggests no significant association between occupation and HBV status. This finding is consistent with the study by Fasola., *et al*. [28], which also found no significant relationship between occupation and HBV infection among blood donors in Southwestern Nigeria.

Among the participants, the majority were Yoruba (79, 91.9%), with 2 (100.0%) testing positive for HBV. Other tribes accounted

for 7 (8.1%) negative cases, with no positive cases. The $\chi 2$ value was 0.177, and the p-value was 1.000, suggesting no significant association between tribal affiliation and HBV infection. Previous studies, such as that by Olokoba., *et al*. [29], also reported no significant correlation between ethnic groups and HBV prevalence in Northern Nigeria.

The analysis showed that individuals with university education accounted for 38 (44.2%) negative and 1 (50.0%) positive cases, while those with other levels of education accounted for 48 (55.8%) negative and 1 (50.0%) positive cases. The $\chi 2$ value was 0.027, and the p-value was 1.000, indicating no significant association between educational level and HBV infection. This finding aligns with studies by Ejele., *et al*. [30], which found that education level did not significantly influence HBV infection rates among blood donors in Port Harcourt, Nigeria.

The distribution of HBV test results based on marital status showed that married individuals accounted for 41 (47.7%) negative and 1 (50.0%) positive cases, while other marital statuses accounted for 45 (52.3%) negative and 1 (50.0%) positive cases. The $\chi 2$ value was 0.004, and the p-value was 1.000, indicating no significant association between marital status and HBV infection. This finding is consistent with studies such as that by Alao., *et al*. [31], which found no significant association between marital status and HBV infection in a similar population.

The study found that a significant proportion of donors who had not taken any such medications tested negative for HBV (83, 96.5%), while those who had taken them showed a higher proportion of positive cases (1, 50.0%). The $\chi 2$ value was 9.745, and the p-value was 0.089. Although not statistically significant, this result suggests a possible association between the use of these medications and HBV positivity, which could be due to the impact of these drugs on liver function. However, further studies are needed to confirm this relationship.

The analysis revealed that all individuals who tested positive for HBV (2, 100.0%) reported alcohol consumption, compared to those who tested negative (62, 72.1%). The $\chi 2$ value was 4.880, and the p-value was 0.085, indicating a non-significant association. This finding suggests a potential link between alcohol consumption and increased risk of HBV infection, which has been reported in studies like that by Adekanle., *et al*. [32], where alcohol was identified as a risk factor for HBV due to its immunosuppressive effects.

The study found no positive HBV cases among those who reported having multiple sexual partners, while 2 (100.0%) of those who did not have multiple partners tested positive. The $\chi 2$ value was 0.233, and the p-value was 1.000, indicating no significant association. This result is contrary to several studies, such as that by Mbakwem-Aniebo., *et al*. [33], which identified multiple sexual partners as a significant risk factor for HBV transmission. The discrepancy may be due to underreporting or the small sample size in this study.

The analysis showed that those who did not share sharp objects had a lower proportion of positive HBV cases (1, 50.0%) compared to those who did (1, 50.0%). The $\chi 2$ value was 0.469, and the p-value was 0.490, indicating no significant association. Previous studies, such as that by Bello., *et al*. [34], have shown that sharing sharp objects is a significant risk factor for HBV transmission, suggesting that the findings of this study may be influenced by sample size limitations.

The study found no significant association between needle stick injury, blood/body fluid splash, and HBV positivity, with all positive cases occurring among those who had not experienced these incidents. The $\chi 2$ values were 0.072 and 0.024, respectively, with p-values of 1.000. These findings are consistent with the study by Fasola., *et al*. [28], which also reported no significant association between these factors and HBV infection among blood donors.

The study found no significant association between smoking and HBV infection, with all positive cases occurring among non-smokers. The $\chi 2$ value was 0.150, and the p-value was 1.000. This finding contradicts studies like that by Ugbebor., *et al*. [35], which identified smoking as a risk factor for HBV due to its impact on the immune system. The lack of association in this study could be due to the small number of smokers in the sample.

Conclusion

This study investigated the prevalence of hepatitis B virus (HBV) among blood donors at the Federal Medical Centre, Abeokuta, Nigeria. Out of 88 screened participants, only a few tested positive for HBsAg using both rapid screening tests and ELISA, and Anti-HBc, indicating exposure to hepatitis B infection. The low prevalence of HBV among this population demonstrates the effectiveness of pre-donation screening in reducing the risk of transmitting HBV through blood transfusion. However, the presence of occult hepatitis B infections (OBI) remains a concern due to the potential risks associated with undetected infections in routine screenings.

Recommendations

- **Enhanced Screening Protocols**: The use of more sensitive testing methods such as nucleic acid testing (NAT) should be implemented to detect occult HBV infections that might be missed by traditional HBsAg screening.
- **HBV Vaccination Campaigns**: Increased vaccination efforts targeting the general population, especially prospective blood donors, should be intensified to reduce HBV transmission rates.
- **Donor Education**: Continuous education and sensitization programs should be organized for prospective blood donors

to improve awareness of hepatitis B and its implications for blood donation and public health.

- **Routine Anti-HBc Testing**: Routine testing for anti-HBc in blood donors could be adopted as an additional safety measure to identify individuals with previous HBV exposure and reduce the risk of transmitting OBI.
- **Strengthening Blood Donation Policies**: Blood banks should adopt stricter criteria for donor eligibility, ensuring that individuals with high-risk behaviours, such as sharing sharp objects or having multiple sexual partners, are thoroughly screened before donation.

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