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Research Article

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Incidence Of Hepatitis B Core Antibody Among Hepatitis B Negative Donors Attending the Blood Bank of University College Hospital, Ibadan

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Abstract

This research focuses on detecting the presence of Hepatitis B Core Antibody (HBcAb) in Hepatitis B surface antigen-negative donors attending the blood bank of University College Hospital, Ibadan. The study aims to explore the association between HBcAb incidence and the demographic characteristics of the participants, as well as identify potential risk factors for Hepatitis B Virus (HBV) infection. A total of 300 donors, who tested negative for Hepatitis B surface antigen through rapid screening, were included in the study. Venous blood samples were collected from these donors and subjected to both Hepatitis B Surface Antigen Enzyme-Linked Immunosorbent Assay (HBsAg ELISA) and Hepatitis B Core Antibody Enzyme-Linked Immunosorbent Assay (HBcAb ELISA) screening. Demographic information was obtained from the donors through verbal and written methods using a structured questionnaire. The results revealed that out of the 300 donors, 85 (28.3%) tested positive for HBcAb, and 4 (1.3%) tested positive for HBsAg. The study also found that donors without previous vaccination against HBV were about three times more likely to be positive for HBcAb compared to donors with previous vaccination (OR=2.971). Similarly, donors who had shared sharp objects with others were about two times more likely to be positive for HBcAb compared to those who did not share sharp objects before (OR=2.0). Additionally, donors who had not been screened for Hepatitis B virus before were about two times more likely to be positive for HBcAb compared to those who had been screened previously (OR=2.0). Interestingly, no significant association was found between the donors' HBcAb status and their demographic data, contrary to findings from other studies. In conclusion, the incidence of HBcAb among Hepatitis B surface antigen-negative donors in this study was high. The researchers advocate for adopting HBcAb testing, in addition to HBsAg testing, as mandatory screening tests for donated units of blood in the study area and potentially in other blood bank laboratories.

Keywords: Hepatitis B core Antibody (HBcAb), Hepatitis B surface Antigen (HBsAg), Transfusion-Transmissible Infections (TTIs), Hepatitis B negative donors, Risk Factors

1. Introduction

According to Khan et al. transfusion of blood and blood components as a specialized modality of patient management saves millions of lives worldwide each year and reduces morbidity [1]. However, blood transfusion is associated with many complications; some are trivial, and others are potentially life-threatening, demanding meticulous pre-transfusion testing and screening. The use of unscreened or improperly screened blood in transfusion keeps the patient at risk of acquiring many transfusion-transmissible-infection (TTIs) like hepatitis Viruses (HBV, HCV), human immunodeficiency viruses (HIV), syphilis, malaria, and many others. These infectious agents are among the greatest threats to blood safety for transfusion recipients and pose a serious public health problem [2]. More so, transfusion departments have always been a major portal to screen, monitor and control infections transmitted by blood transfusion. They do not only screen for TTIs but also give clues about the prevalence of these infections in healthy populations [1].

There is no suitable artificial substitute for blood, so a constant supply of donors is needed to maintain supplies. The Australian red cross blood services estimate that more than one million blood donations are required annually to maintain the blood supply. Thus, becoming a donor is becoming part of essential health service providers [3].

Hepatitis B virus (HBV) genetic variability constitutes a major challenge in diagnosing HBV infection. The minimum

recommended testing for Hepatitis as a Transfusion Transmissible Infection is only one marker – Hepatitis B surface antigen (HBsAg). The fear of transfusion of blood sourced from such HBsAg-negative blood donors who may test positive for HBcAb has given rise to whether patients transfused with such blood are at risk of acquiring HBV infection.

Meanwhile, Nigeria, a developing country with a high poverty level, cannot afford DNA testing of all collected units of blood, despite DNA testing serving as the only possibility of achieving a near-zero risk of TAHBV.

This study therefore aimed at evaluating the incidence of Hepatitis B core antibody among blood donors who tested negative for HBsAg in the blood bank of the University College Hospital, Ibadan, to use its outcome as a basis for advocating for compulsory implementation of screening for anti-HBc as part of routine screening tests on donated units of blood.

2. MATERIALS AND METHODS

2.1 Study Area

This study was conducted in the blood bank, University College Hospital, Ibadan, Ibadan North Local Government area longitude 7.3569°N and latitude 3.8743°E. It is bordered to the East by Ibadan North East Local Government and to the West by Ibadan North West Local Government.

2.2 Study Subjects

A total number of 300 healthy prospective donors were recruited for this study. A structured questionnaire was used to obtain the demographic information from consenting subjects for the study; both verbal and written consent in the form of a signature was obtained from all participating donors.

2.3 Sampling Method

ABON rapid test kit was used to screen healthy prospective donors from which 300 subjects who tested negative for HBsAg were recruited. Those selected through the quick test kit were further screened for hepatitis B viral surface markers using Enzyme-Linked immunosorbent assay (ELISA). The presence of total anti-HBc positivity was also evaluated using the ELISA method.

2.4 Inclusion and Exclusion Criteria

The subjects between the ages of 18 and 60 years of both sexes who passed the selection criteria for blood donation and gave their consent in the study area were included in the study, while those below 18 and above 60 years, those who did not pass the selection criteria for blood donation, and those who did not give their consent were excluded. They were asked to sign an informed written consent before taking their sample.

2.5 Ethical clearance

The study proposal was examined, approved, and permission for the commencement of work was granted by the ethical committee of the Ministry of Health Oyo state, Nigeria. All study participants were educated on the purpose of conducting the research.

2.6 Sample collection

Each donor underwent a comprehensive process beginning with the administration of a detailed questionnaire, followed by a thorough explanation. Subsequently, the donors were allowed to read, comprehend, and seek clarification regarding the questionnaire before providing their consent by filling out and signing the consent form. After the consent process, 3.5 ml of blood was collected from the antecubital vein of each subject, and the site was sterilized with povidone-iodine. The collected blood was dispensed into plain bottles, and a small portion was introduced into copper sulphate using a simple capillary tube. This step aimed to assess the blood's movement and determine each donor's suitability for blood donation. The remaining blood sample was utilized for rapid Hepatitis B surface antigen (HBsAg) screening. The blood sample placed in a plain bottle was allowed to clot and retract, and the serum was subsequently separated into clean and dry micro vials. These vials were stored at a temperature of -80°C until the commencement of the analysis.

2.7 Sample assay

HBsAg rapid screening was done following the instructions in the user manual of the ABON quick test kit; further Hepatitis B surface antigen detection using ELISA followed (MONOLISA TM HBsAg ULTRA) user guide, while HBcAb detection was done following ELISA (DIA. PRO) instructions for the user.

2.8 Data Analysis

Data collected were subjected to descriptive and inferential statistical analysis using SPSS version 20 (SPSS Inc., Illinois, USA). The Mean, Standard Deviation of continuous variables were evaluated, while categorical variables were summarized as proportions and further analyzed using Chi-square and Fisher's exact test to assess the association between the variables. An examination of association using logistic regression was conducted to describe the relationship between the predictor variables (risk factors for HBV infection found to be statistically significant) and the outcome variable (HBcAb). P values ≤ 0.05 was considered important.

3. Results

In Table 1, the mean age was 38.9years ±SD=10.07years with age ranges from 18 to 59 years. The age group 30-39 years old has the highest frequency, 106(35.3%), while the age group greater than 50 years old has the lowest frequency, 21(7.0%) among the respondents. The male-to-female ratio was approximately 6:1, where there were 258(86.0%) males and 42(14.0%) females.

Table 2 showed that the majority of the participants were free from the risk factors of HBV infection, with previous screening for the virus being the highest with only 72 (24%) of the participants, followed by previous vaccination 52 (17.3%), while previous exposure to contaminated blood was the least with 2 (0.7%) participants.

On sharp objects-related risk factors, Table 3 revealed that 31(10.3%) have Tatoo marks or tribal marks. 54(18.0%) had no incision or scarification before, and 89(29.7%) of the donors had previously shared sharp objects with another person.

Table 4: sexual activities-related risk factors showed that the majority of the donors, 240(80.0%), were sexually active with a long-term relationship. 22(7.3%) of the donors declared that their sex partners were positive for HBV. Also, 10(3.3%) of the donors have been diagnosed with STDs before, while 7(2.3%) have had sex with same gender partner before. 255(85.0%) for one partner while 15(5.0%) is for the donors with more than one partner. 262(87.3%) of the donors have had sexual intercourse before though 75(25.0%) claimed to have used condom regularly and correctly. Number of life sex partners (69.3%) of donors claimed to have one partner, while (24.7%) had more than one.

In Table 5, the pattern of blood donation among the donors revealed that 156(52.0%) were first-time donors, while 144(48.0%) were regular donors. 239(79.7%) of the donors were for family replacement and 61(20.3%) were voluntary donors.

Table 6 showed that none of the demographic data was significantly associated with the anti-HBc status of the participants at a 5% significant level. This implied that the demographic variables enlisted in this study were not risk factors for the incidence of hepatitis B virus in the study area.

Table 7 showed that there was a significant association between previous vaccination against HBV (p=.009 <0.05), sharing of sharp objects with another person (p=.022 <0.05), previous exposure to contaminated blood (p=.026 <0.05), previous screening for HBV (p=.026 <0.05) and HBcAb status of the participants. This implied that they were risk factors for the incidence of HBV in the study area. Meanwhile, other factors have no significant association with the HBcAb status of the participant. Hence, they were likely not to be risk factors for HBV.

Table 8, regression analysis showed that donors without previous vaccination against HBV were about three times more likely to be positive for HBcAb than donors with previous vaccination (OR=2.971). Donors who had shared sharp objects with another person before were about two times more likely to be positive for HBcAb compared to donors who did not share sharp objects before (OR=2.0). Donors who have not been screened for HBV before were about two times more likely to be positive for HBcAb compared to donors who had been screened before (OR=2.0).

Figure 4.1 showed that 4(1.3%) of respondents tested positive using the HBsAg ELISA technique.
Figure 4.2 showed that using HBcAb ELISA technique, 85(28.3%) of respondents out of the 296 tested positive.

Variables	Frequency	Percentage (%)
Age (years)		
18-29	97	32.3
30-39	106	35.3
40-49	76	25.3
50+	21	7.0
Mean (SD) =38.9(10.07) range =18-59		
Sex		
Male	258	86.0
Female	42	14.0

Table 1: Demographic characteristics of the blood donors (n=300)

Variables	Frequency	Percentage (%)
Ever screened for HBV before now		
Yes	72	24.0
No	228	76.0
Have any previous vaccination against HBV		
Yes	52	17.3
No	248	82.7
Previously lived with someone who has been diagnosed with hepatitis B		
Yes	2	.7
No	298	99.3

Ever receive blood transfusion or organ transplant before		
Yes	11	3.7
No	289	96.3
Ever had any previous surgery		
Yes	21	7.0
No	279	93.0
Ever had jaundice (or yellow eyes) before		
Yes	6	2.0
No	294	98
Ever been exposed to contaminated blood before		
Yes	2	.7
No	298	99.3

Table 2: Risk factors of HBV infections among donors (n=300)

Variables	Frequency	Percentage (%)
Have Tatoo marks or tribal marks		
Yes	31	10.3
No	269	89.6
Ever had any incision or scarification before		
Yes	54	18.0
No	246	82.0
Ever share sharp objects with another person before		
Yes	89	29.7
No	211	70.3

Table 3: Sharp object related risk factors of HBV infections (n=300)

Variables	Frequency	Percentage (%)
Sexually active person with a long-term relationship		
Yes	240	80.0
No	60	20.0
Is your sex partner positive to HBV		
Yes	22	7.3
No	278	91.3
Have ever been diagnosed with a STD		
Yes	10	3.3
No	290	96.7
Had sex with same sex as partner before		
Yes	7	2.3
No	293	97.7
Number of current sex partner		
None	30	10.0
One	255	85.0
More than one	15	5.0
Ever had sexual contact with known HBV positive		

Yes	2	.7
No	298	99.3
Ever had sexual intercourse before		
Yes	262	87.3
No	38	16.7
Number of life sex partner you have		
None	18	6.0
One	208	69.3
More than one	74	24.7
Do you use condom regularly and correctly		
Yes	75	25.0
No	225	75.0

Table 4: Sexual activities related risk factors of HBV infections (n=300)

Variables	Frequency	Percentage (%)
How often do you donate blood		
first time donor	156	52.0
Regular	144	48.0
Who did you come to donate blood for		
Family	239	79.7
Voluntary	61	20.3

Table 5: Pattern of blood donation among donors (n=300)

Items	HBcAb results		χ^2	p-value
	Negative (n=211) N(%)	Positive(n=85) N(%)		
Sex			1.190	.110
Male	178(84.4)	77(90.6)		
Female	33(15.6)	8(9.4)		
Age group (years)			.860	.836
18-29	71(33.6)	25(29.4)		
30-39	76(36.0)	30(35.3)		
40-49	50(23.7)	24(28.2)		
50+	14(6.6)	6(7.7)		

Table 6: Association of demographic data with status of HBcAb

Items	HBcAb results		χ^2	p-value
	Negative (n=211) N(%)	Positive(n=85) N(%)		
Have any previous vaccination against HBV			6.924	.009
Yes	44(21.1)	7(8.2)		
No	165(78.9)	78(91.8)		
Ever shared sharp objects with another person before			5.280	.022
Yes	70(33.5)	17(20.0)		
No	139(66.5)	68(80.0)		

Ever been exposed to contaminated blood before			4.975	0.026
Yes	0	2(2.4)		
No	210(100.0)	83(97.6)		
Ever screened for HBV before now			4.941	0.026
Yes	58(27.5)	13(15.3)		
No	153(72.5)	72(84.7)		
Number of life sex partner you have			.353	.838
None	11(5.2)	4(4.7)		
One	144(68.2)	61(71.8)		
More than one	56(26.5)	20(23.5)		
Number of current sex partner			**0.612**	**.736**
None	21(10.0)	6(7.1)		
One	178(84.4)	74(87.1)		
More than one	12(5.7)	5(5.9)		
Do you use condom regularly and correctly			.731	.881
Yes	52(24.6)	17(20.0)		
No	159(75.4)	68(80.0)		
Ever had any incision or scarification before			.868	.352
Yes	35(16.6)	18(21.2)		
No	176(83.4)	67(78.8)		
Ever receive blood transfusion or organ transplant before			0.013	0.908
Yes	8(3.8)	3(3.5)		
No	202(96.2)	82(96.5)		

Table 7: Association of risk factors with status of HBcAb

Factors	**Reference**	**Odds ratio (OR)**	**95% Confidence interval (C.I)**	***P value***
Have any previous vaccination against HBV				
No		2.971	1.280=6.895	0.011
Yes	1			
Ever shared sharp objects with another person before				
Yes		2.00	1.093-3.659	0.024
No	1			
Ever been exposed to contaminated blood before				
Yes		0.00	0.000	.999
No	1			
Ever screen of HBV before now				
Yes		2.100	1.081-4.076	0.028
No	1			

Table 4.9: Binary logistic regression showing the risk factors associated with status of hepatitis

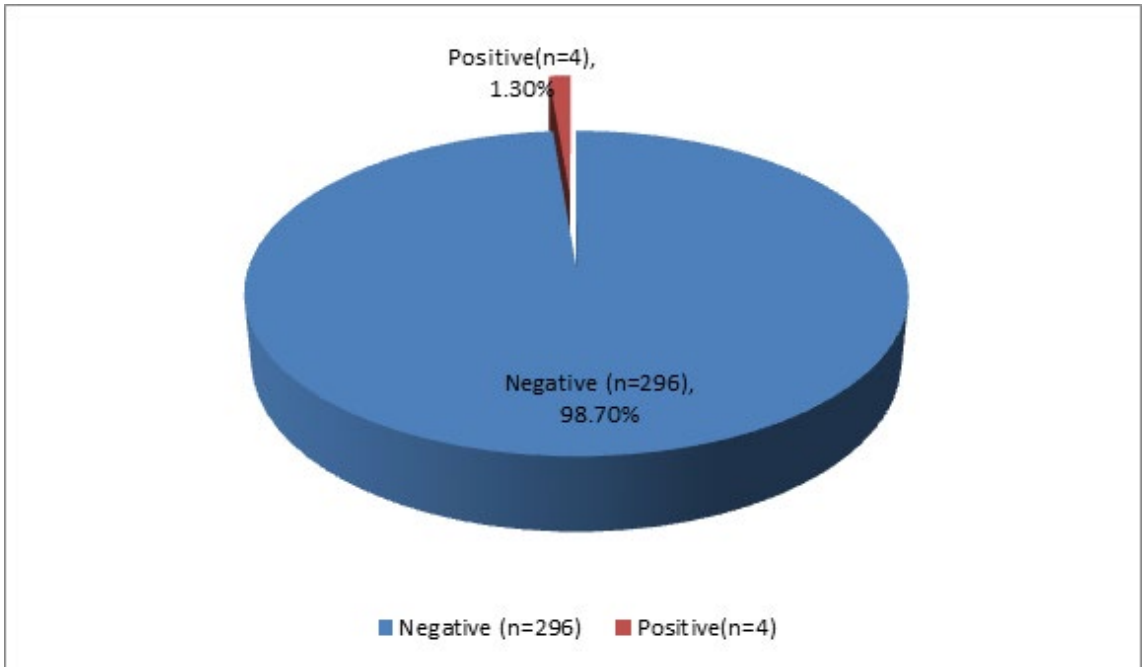

Figure 1: Distribution of result outcome of Hepatitis B surface antigen status using ELISA technique.

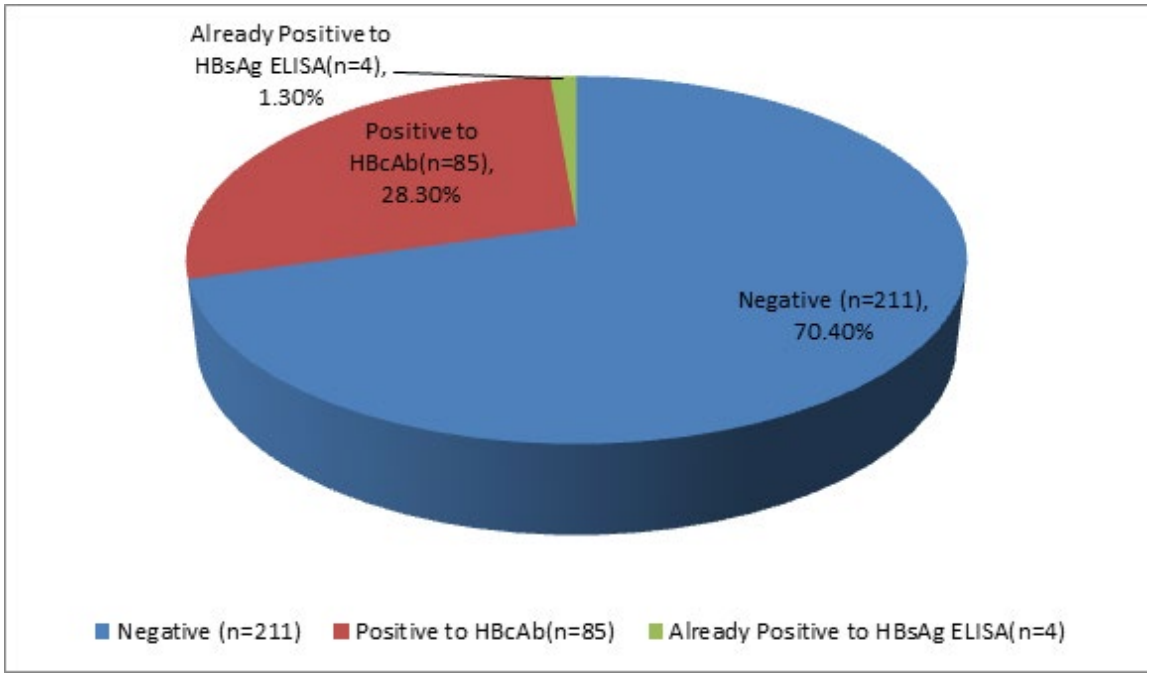

Figure 2: Distribution of result outcome using Hepatitis B core antibody ELISA technique.

4. Discussion

The primary objective of this research was to assess the prevalence of Hepatitis B core antibody (HBcAb) among blood donors who tested negative for Hepatitis B surface antigen (HBsAg) at the Blood Bank of University College Hospital, Ibadan. Three hundred (300) donors, comprising family replacement and voluntary donors, were selected after undergoing comprehensive clinical screenings to ensure the suitability of their donated blood for transfusion. Additionally, the study focused on determining the accepted donors' HBsAg status (positive or negative). Following the approach suggested by Khan et al., which emphasized screening transfusion-transmissible infections (TTIs) to ascertain their seroprevalence/incidence in healthy populations, the willing donors underwent rapid HBsAg strip screenings to identify 300 negative donors [1]. Subsequently, the collected samples were analyzed using the HBsAg enzyme-linked immunosorbent assay (ELISA) method. Out of the participants, four individuals (1.3%) tested positive for HBsAg, while the remaining 296 donors

(98.7%) were subjected to further HBcAb ELISA screening. The results revealed that 85 donors (28.3%) tested positive for HBcAb, while 211 donors (70.4%) tested negative. These findings align with the outcomes of analogous studies conducted by Panigrahi et al., Salawu et al., and Mutiat et al. [4,5,6].

The study participants had a mean age of 38.9±10.07 years, ranging from 18 to 59 years. The age group with the highest frequency was 30-39 years old, accounting for 106 individuals (35.3%). These findings align with previous studies conducted in Abuja, Nigeria, and Libya by Shambesh et al., where a similar age range showed the highest frequency of blood donors [7,8]. This observation could be attributed to individuals within this age bracket being more actively engaged in blood donation. Regarding gender distribution, the male-to-female ratio was approximately 6:1, indicating a higher number of male donors compared to females. This finding is consistent with studies conducted in Ilorin, Nigeria, by Mutiat et al., and Tamale, Ghana, by Dongdem et al. [6,9]. According to the National Standards for Blood Transfusion Service (2013), the reason for this gender disparity may be that many women within these age groups might not fulfill the criteria for blood donation due to factors such as the monthly menstrual cycle, pregnancy, and potentially breastfeeding, which do not apply to male donors. Additionally, men are more likely to independently decide to save lives by voluntarily donating blood compared to their female counterparts.

This study aimed to assess the risk factors associated with HBV infections among donors. The findings revealed that 24.0% of donors claimed to have never undergone HBV screening, while 17.3% showed evidence of previous HBV vaccination. A small percentage of donors (0.7%) had previously cohabited with someone diagnosed with hepatitis B infection, 0.7% had no history of exposure to contaminated blood, and 3.7% had received blood transfusions in the past. Moreover, 7.0% of donors had undergone previous surgeries, and 2.0% had experienced jaundice (yellow eyes) at some point. These findings suggest that while these risk factors were present, they were not widespread among the donors in the study area. The observed results are consistent with the guidelines set forth by the World Health Organization (WHO) on Hepatitis B (2014) and GAVI Nigeria (2015), which emphasize the significance of screening, vaccination, and preventive measures for individuals living with hepatitis B-positive individuals and exposure to contaminated blood. Similar outcomes were reported by Allain and Siblinga in their study [10]. However, the findings differed from those Polizzotto et al. reported, who recorded higher values for these risk factors in their own research [11].

The results concerning risk factors related to sharp objects indicated that 10.3% of the participants reported having tattoo marks or tribal marks, while 18.0% had undergone incisions or scarification. These findings are consistent with a study conducted in Libya's teaching hospitals, where 10.5% of individuals claimed to have tattoo marks [11]. Still, a higher proportion of 29.7% had shared sharp objects with others. The descriptive information provided by the respondents aligns with the findings of Global Alert and Response (GAR, 2015), which emphasized that HBV is highly infectious and commonly transmitted through vertical transmission via scarification/tattooing, the use of shared inadequately sterilized syringes and needles, institutional care, and intimate contact with carriers. These results were not unexpected, as previous studies have consistently reported higher percentages of hepatitis B-infected donors who had shared sharp objects with others [12,13,14]. Moreover, a similar study demonstrated that shaving at barbershops posed a significant risk factor for HBV infection among various populations, including blood donors.

Regarding sexual activities-related risk factors, the majority of participants (80.0%) reported being sexually active in long-term relationships. In contrast, a smaller proportion (7.3%) acknowledged having sex partners who tested positive for HBV. Furthermore, 3.3% of the donors had never been diagnosed with a sexually transmitted disease (STD), while 2.3% had engaged in sexual activity with partners of the same gender. Among the participants who had sexual intercourse before (87.3%), 25.0% claimed to consistently and correctly use condoms. In comparison, 69.3% reported having only one sexual partner throughout their lives, and 24.7% had more than one sexual partner. These findings agree with Sadohand Ofili (2014), who asserted that HBV is highly infectious and can be transmitted through sexual contact. Various studies have also indicated that factors such as a family history of jaundice, previous history of STD, high sexual activity (with the same or opposite sex), and unprotected sex can contribute to the presence of HBV markers [15,16,14].

The results on the pattern of blood donation revealed that 52.0% of donors were first-time contributors, while 48.0% were regular donors. Among these, 79.7% donated blood for family members, while 20.3% did so voluntarily. These findings suggest that the efforts of the World Health Organization (WHO) in actively promoting the recruitment of voluntary non-remunerated donors (VNRDs) had a significant impact on the study area [17]. Asenso-Mensah et al. highlighted that blood safety is further improved by encouraging VNRDs to become regular donors, as they exhibit a considerably lower prevalence of viral markers [18].

Results obtained from HBcAb ELISA screening indicated that 85 donors (28.3%) tested positive, whereas only four donors (1.3%) were positive in the HBsAg ELISA screening. This finding demonstrated a sensitivity of 27.0% using core antibodies in comparison to surface antigen screening.

These results are consistent with the findings of Kauret et al., who suggested that replacement donors tend to exhibit higher sero-activity rates compared to voluntary donors due to various factors, including high-risk behaviors and paid donors falsely posing as relatives [19]. The study by Japhet et al. also supported our findings, stating that anti-HBc is an excellent indicator of occult HBV infection and is the only detectable marker during the window period after HBsAg disappearance [20].

Numerous studies conducted both within the country and elsewhere, focusing on the prevalence and incidence of anti-HBc among prospective donors negative for hepatitis B surface antigen, have reported high rates and percentages of positivity [7,22,23]. These studies underscore the notion that relying solely on HBsAg screening (both rapid and ELISA) as a marker for HBV might be insufficient to declare donated blood units free of HBV and suitable for transfusion.

A study by Sodhi et al. found that 6% of cancer patients developed post-transfusion hepatitis, and upon retesting their corresponding blood donors' stored samples, they were positive for anti-HBc and HBV DNA [21]. The incidence of transfusion-associated HBV is notably high in patients receiving multiple blood transfusions, and some HBsAg-negative donors who are anti-HBc positive have been shown to continue replicating HBV [22].

Recently, there has been a growing body of evidence regarding HBV transmission from donors who repeatedly test negative for HBsAg but positive for anti-HBc with the most sensitive available assay, as reported by Taira et al. [24]. While in most Western countries, donors positive for anti-HBc are excluded from blood donation, in Nigeria, due to resource constraints and the risk of excluding a large number of potential blood donors, anti-HBc screening is optional for donated blood units. The absence of HBsAg in apparently healthy individuals may not guarantee the absence of circulating HBV. The relatively high incidence (28.3%) reported in this study could be attributed to the possibility of positive donors being in the window period.

The chi-square analysis results indicated that no demographic data, including sex ($p= 0.110>0.05$) and age ($p= 0.836>0.05$), were significantly associated with the HBcAb status of the donors. This suggests that age and sex do not determine the incidence and prevalence of hepatitis B core antibodies and the spread of HBV in the study area. These findings agree with the WHO report (2014), which highlights that a major transmission route is through blood. HBV infection may manifest as either symptomatic or asymptomatic disease. also emphasized the importance of effective strategies, improved routine screening tests on donated blood units, and stringent donor selection implementation to ensure blood safety in resource-limited countries like Nigeria [25].

The study results indicated a significant association between several variables and the participants' hepatitis B core antibody (anti-HBc) status. Specifically, previous vaccination against HBV ($p=0.009$), sharing sharp objects with another person ($p=0.022$), exposure to contaminated blood ($p=0.026$), and previous screening for HBV ($p=0.026$) were identified as risk factors for the incidence of anti-HBc in the participants. According to WHO (2014), individuals' immune systems can clear the HBV, leading to the development of anti-HBc; however, those who develop antibodies remain at risk of virus reactivation, and their blood can be infectious.

On the other hand, the number of sex partners ($p=0.838$), regular and correct condom use ($p=0.881$), and previous receipt of blood transfusion or organ transplant ($p=0.908$) showed no significant association with the participants' anti-HBc status. The Nigerian government and non-governmental agencies have made efforts to raise public awareness regarding the dangers of indiscriminate sexual activities, which can serve as a potential vehicle for HBV transmission. These awareness initiatives may have contributed to behavioral changes among the population, including the study participants.

Considering all the risk factors collectively, this study demonstrated that all the variables under consideration were independent risk factors for HBV infection. This finding aligns with Ataei et al., who reported that hospitalization, history of jaundice, intravenous drug use, needle sharing, immune deficiency, imprisonment, and family history of HBV infection were independent risk factors for HBV infection [27]. Furthermore, the relationship between exposure to contaminated blood and a positive hepatitis B core antibody status was not statistically significant ($p=0.999$). This finding is also consistent with Ataei et al., who reported no significant relationship between the history of transfusion, acupuncture, and HBV infection [27-31].

5. Conclusion

The study's findings clearly indicate that relying solely on HBsAg screening as a serological marker is insufficient for declaring the absence of Hepatitis B Virus (HBV) in potential blood donors. Therefore, implementing anti-HBc testing as a mandatory screening test alongside HBsAg is essential to ensure the safety of prospective blood recipients. Furthermore, the age and sex of the donors do not necessarily determine their likelihood of transmitting HBV through blood transfusion.

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