GSC Biological and Pharmaceutical Sciences
eISSN: 2581-3250 CODEN (USA): GBPSC2
Cross Ref DOI: 10.30574/gscbps
Journal homepage: https://gsconlinepress.com/journals/gscbps/

(RESEARCH ARTICLE)

Check for updates

Prevalence of hepatitis B infection among voluntary donor in Wuse District Hospital, Abuja

Ojevwe DD [1,*], Fajimi VO [2], Ifemeje OC [3], Ali HA [2], Gana DF [3], Abdulsalam JO [4], Adegoke AS [2], Agaga F [5] and Maduka MK [6]

[1] *Laboratory Dept, South Health Campus, Calgary, Alberta, Canada*
[2] *Laboratory Unit, Maitama District Hospital, Abuja, Nigeria.*
[3] *Medical Laboratory Services, Hospital Management Board, Abuja, Nigeria.*
[4] *Laboratory Unit, Asokoro District Hospital, Abuja, Nigeria.*
[5] *Laboratory Unit, Wuse District Hospital, Abuja, Nigeria.*
[6] *FHI360/AHNi Jos, Plateau State, Nigeria.*

GSC Biological and Pharmaceutical Sciences, 2021, 14(01), 109–115

Publication history: Received on 07 January 2021; revised on 14 January 2021; accepted on 16 January 2021

Article DOI: https://doi.org/10.30574/gscbps.2021.14.1.0017

Abstract

Blood transfusion is an important and lifesaving intervention of the healthcare system there by reducing mortality worldwide, resulting from high level of blood demanding health conditions. Screening and testing of the donated blood are necessary in order to prevent the risks and complications associated with blood transfusion. This study was carried out in retrospective, considering the six (6) month testing and screening of seven hundred and fifty (n= 750) samples from the relative donor of Wuse District Hospital, Abuja, this was done using the screening method with the use of a rapid test kit. The gender showed 689(91.9%) for male and female 61(8.1), result showed that 32(4.3%) were positive with 28(87.5%) male and 4(12.5%) female respectively, the percentage age group showed the highest to be (56.4%)of 29 -38 years. The study showed an overall seroprevalence of (4.3%) falling within (2 – 7%) intermediate risk group for hepatitis B virus infection as described by the WHO. Government should make available the vaccine against HBV, create more awareness for vaccination and make it free for all (without payment) as soon as possible

Keywords: Prevalence; Hepatitis B; Blood Donor; Transfusion; Screening.

1. Introduction

Hepatitis B virus (HBV) is a leading cause of hepatitis B infection. It is the commonest cause of liver disease worldwide, including Nigeria. The virus is more prevalent in developing countries and constitutes a major challenge to public health [1, 2]. The word "Hepatitis" means inflammation of the liver. The liver is a vital organ of the body that processes nutrients, filters the blood and fights infections. Inflammation of the liver by the hepatitis B virus is known as Hepatitis B infection or disease [3]. Other viral hepatitis includes; Hepatitis A, Hepatitis B and Hepatitis C, but the principal cause of both acute and chronic liver disease is Hepatitis B virus [1, 2]. The virus Hepatitis B is a double stranded DNA virus belonging to the Hepadnaviridae family of virus [35]. The virus cannot grow in artificial medium but able to replicate in primates like chimpanzee [15, 35]. It can exist outside the host for up to one month, it is susceptible to 0.5% (1:10) sodium hypochlorite [Ref 15] and remains viable for up to 20 years at the temperature -20^{0}C [36]Acute hepatitis B refers to newly acquired infection [4] with an average incubation period of about 90 days. At this stage over 95% of infected persons are asymptomatic ,the disease may resolve after weeks to months mostly in adults without treatment, the remaining 5% develop severe life threatening form of acute (fulminant) or chronic hepatitis disease [4,3]. People

* Corresponding author: Ojevwe DD
Medical Laboratory Services, Hospital Management Board, Abuja, Nigeria.

who recover from the virus becomes immune and cannot get infected again [3]. The first serologic markers that can be detected at this stage are hepatitis B surface antigen (HBsAg) and antibodies to hepatitis B core antigen (anti-HBcAg) and are helpful for the diagnosis of the infection. The carrier rate varies from 0.1 to 20% for this marker in different communities [4]. Chronic hepatitis B infection is infection that has lasted more than 6 months and may never go away.The likelihood of the infection progressing to chronic stage depends on the age of the infected person, About 90% of children are at risk of developing chronic hepatitis B while just 5% to 10% adult get to chronic stage[4,2]. Chronic Hepatitis B may lead to serious health issues, like cirrhosis or liver cancer. Approximately 15% to 25% of chronic infections result to death [3,4].

The Epidemiology is estimated that more than 2 billion people have evidence of past or present infection of HBV worldwide with about 350 million people having chronic infection [1], many of which appear healthy but can spray the virus to others [4]. Over 750,000 annual mortality rates have been reported. According to WHO Global Hepatitis report for 2017, up to 68% are positive for HBsAg globally [6] Countries are categories based on the endemicity of the HBV infection. Endemicity is considered high when is greater or equal 8%, intermediate if the endemic rate is between 2 – 7%, and infection rate of less or equal to 2% is regarded as low [7].

Nigeria is classified among the group of countries highly endemic for HBV infection. About 75% of the Nigerian population is reportedly to have been exposed to HBV at one time or the other in life [8].About 257 million people are said to be living with hepatitis B virus infection (defined as hepatitis B surface antigen positive) (8). The infection has reached hyper endemic level in Nigeria [9]with estimated seroprevalence of hepatitis B surface antigen (HbsAg) of 10 – 40% it has been observed that the possibility of contacting the virus in Nigeria is high due to low vaccination rate and the fact that about 75% of population will be exposed [10,11]. Report in Nigeria shows prevalence rate of 23.4% among voluntary donors [12], surgeons 25.7% [13] and infants 16.3% (14).

Transmission of HBV is high and can be transmitted covertly by percutaneous routes (needles and other sharp objects) and overtly through blood transfusion or contact with other body fluids (semen, saliva), from an infected person to another [15,16]. Hepatitis B virus is not contacted through food, water, or casual contact[4], most transmission of the HBV in Nigeria has been attributed to mother to child transmission (vertical transmission), sexual promiscuity, low socioeconomic status has also been implicated [35]. About 2.8% of infections in Nigeria has been reported to be from mother to infants [38], while others have been linked to use of contaminated sharp objects from practices like tattoos, body cuttings/piercings, circumcision [17,18]. Blood transfusion however, an important source of spread of HBV in Nigeria [19,20,21] Unsafe blood is still a major concern in developing countries, due to transmission of blood –borne pathogens including HBV, this however, portends a great danger to public health globally [4].

1.1. Blood Transfusion and Hepatitis B Virus

Blood donation is an important, lifesaving intervention. It is the recommendation of World Health Organization (WHO) that all blood donations be screened for evidence of infection such as immunodeficiency virus (HIV), hepatitis B, hepatitis C, and syphilis before transfusion [24]. Donations from non-remunerated volunteers have been proven to the safest. Transfusion related HBV is still a major problem despite mandatory screening for hepatitis surface antigen (HBsAg) due to inability to detect the antigen during the window period of the infection [7]. WHO data base on blood safety suggests that more than 92 million blood samples are donated annually and out of which about 1.6 million units have been found to be unfit for transfusion due to presence of infectious makers, including hepatitis B [26]. There are a lot of risks and complications associated with blood transfusion, some of which are trivial and others are life threatening requiring a thorough and careful pre- transfusion testing and screening. Blood not properly screened poise a risk of acquiring many Transfusion Transmitted Infections (TTIs) such as HBV, HCV, HIV, syphilis, malaria etc., to the recipient. In addition to detecting TTIs, pre transfusion screening of blood also provide clue about the prevalence of HBV infections in donors that appears healthy [27]. The risk involved in Transfusing Hepatitis B Virus from blood of donors who tested negative to Hepatitis B surface antigen is that most test devices are not able to detect the" window period" and chronic occult infection [27, 26]. The chances that the Window period donations can transmit HBV is very high, but transmission rate of occult infection is low [29].

Research have revealed that antibody screening for hepatitis B core antigen can eliminate occult stage transmission, while Nucleic Acid Test (NAT) detects both the window period and occult infections, hence, additional safety for blood transfusion [30]. Studies have also suggested that hazards of Transfusion Transmitted HBV infection are lower in highly endemic areas than non- endemic areas, as some recipients of blood from endemic areas would have been previously exposed to the infection [31]. High incidence of HBV has been reported in patients who received blood from donors who were negative for HBsAg, but covertly positive to hepatitis B core antigen (anti- HBc), which is capable of replicating HBV [32]. Antibody to hepatitis B core antigen IgM is an evidence for recent infection and also specific maker for

"window period" of hepatitis B infection [7]. Hence, absence of HBsAg in the blood of an apparently healthy individuals donating blood, may not preclude HBV DNA sequences in the blood or liver. Presence of anti-HBc in the blood with or without detectable HBsAg during screening still may render the blood infectious, this accounts for why some countries have adopted routine blood donor screening for anti- HBcAg, and this has greatly decreased the risk of transfusion HBV infection.[32]. Seroprevalence of 3-22% level of viral hepatitis B have been reported among blood donors in West African sub region [33]. There are also documented evidence of incidence of hepatitis B virus DNA in seronegative donors in China and other countries [29]. Hence, brings about the study, to determine the prevalence of hepatitis B among voluntary blood donor in Wuse District Hospital.

2. Material and methods

Study Area: The study was carried out in Abuja city, the state capital of the nation Nigeria, founded in 1976. The territory is located just north of the confluence of the Niger River and Benue River. It is bordered by the states of Niger to the West and North, Kaduna to the northeast, Nasarawa to the east and south and Kogi to the southwest. Lying between latitude 8.25 and 9.20 north of the equator and longitude 6.45 and 7.39 east of Greenwich Meridian, Abuja is geographically located in the center of the country. The population stands at 1,406,239 with municipal council as 776,298 (pop census, 2006). Wuse District Hospital is in the Wuse District in the municipal.

Study population/Subject: A retrospective study of 750 samples collected and worked upon within the period of six (6) month from November 2017 to April 2018 and analyzed between the male and female subject with respect to age and number of positive cases.

2.1. Screening of Hepatitis B surface antigen

The screening was carried out using rapid test kits (Acon Laboratories, USA) to detect hepatitis B surface antigen (HBsAg) in the blood sample of the donor. 3 - 4ml of blood was collected in a plain bottle, allow to get clotted, spun then separated, the serum was then tested.

2.2. Statistical Analysis

Statistical Analysis of the result was done using Descriptive statistics using the Statistical Package for social sciences (SPSS). The frequency, percentage and the bar chart of the gender, no of positive donors and age difference were analyzed.

3. Results and discussion

The results obtained in this study are shown in the tables and figures below:

Table 1 Frequency of gender of study population

GENDER					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	Male	689	91.9	91.9	91.9
Valid	Female	61	8.1	8.1	100.0
Total		750	100.0	100.0	

Table 2 Frequency/ percentage of positive cases of the study population

	Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
MALE	28	87.5	87.5	87.5
FEMALE	4	12.5	12.5	100.0
Total	32	100	100.0	

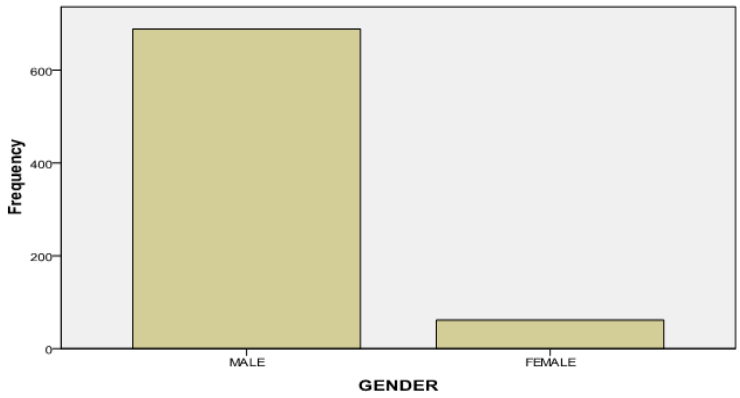

Figure 1 Bar chart of the gender population of the study.

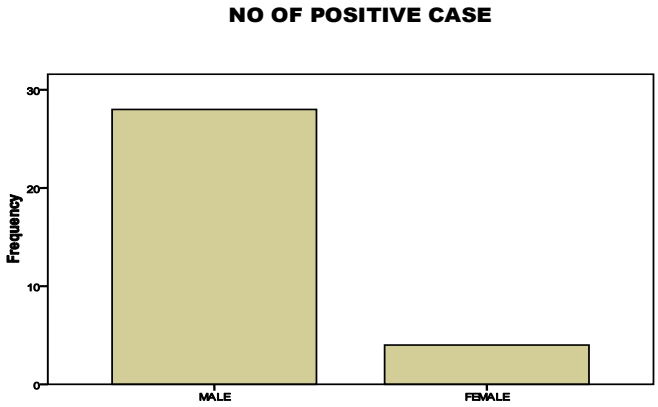

Figure 2 Bar chart of positive cases among gender

Table 3 Age frequency/ percentage of the study population.

AGE					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	18-28yrs	136	18.1	18.1	18.1
	29-38yrs	423	56.4	56.4	74.5
	39-48yrs	171	22.8	22.8	97.3
	49-58yrs	20	2.7	2.7	100.0
	Total	750	100.0	100.0	

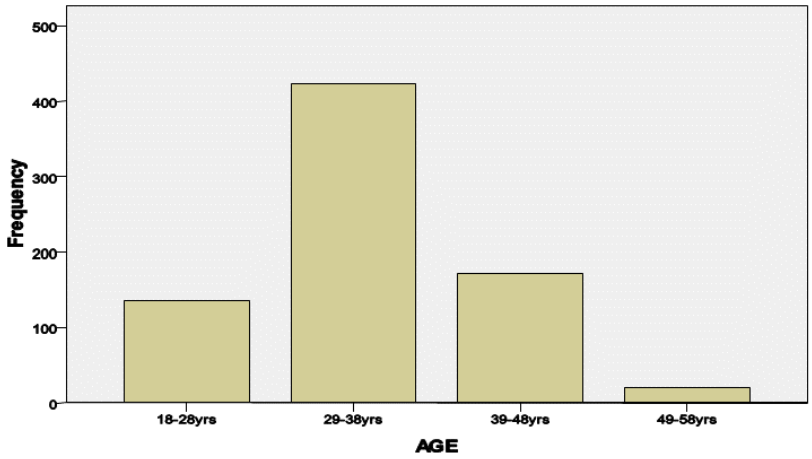

Figure 3 Age Bar chart of the study population

A total number of 750 blood donors in Wuse district hospital were tested with rapid method for this study; in Table 1 it showed that a total of 689 (91.9%) to be male donors while 61 (8.1%) were female donors, these shows that male are more seen in the blood bank donating blood than their female counterpart. The result of the study in Table 2 shows that positive cases are more in male than in female with 28 (87.5%) in male and 4 (12.5%) in female respectively. Table 3 showed the age range of 29-38years as the most active years that comes out for voluntary blood donation which is 56.4% accounting for a little more than half of the whole population of the study. The percentage prevalence of HBV among voluntary blood donor in Wuse district hospital is 4.3%

4. Conclusion

The results of this study showed the seroprevalence of hepatitis B virus at 4.3% among voluntary blood donor in Wuse district hospital which fell within the intermediate as in line with the WHO standard of high 8%; intermediate 2% to 7%; or low <2%; and the 2015 Prevalence of 0.02%, 0.64% and 3.59% for high, middle and low-income countries, respectively. Therefore, more awareness need to be created as per Hepatitis B virus immunization and a proper screening of donors before bleeding in order to prevent the spread of the infection.

Compliance with ethical standards

Acknowledgments

We like to thank the Medical Lab Scientist responsible for donor testing for availing the data to us.

Disclosure of conflict of interest

We wish to state that there is no conflict of interest among the authors in this research.

Statement of informed consent

No case studies, survey, interview was carried out during this research.

References

[1] Drosten C, Nippraschk T, Manegold C, Meisel H, Brixner V, Roth WK, Apedjinou A, Gunther S. Prevalence of hepatitis B virus DNA in anti-HBC-positive/HBsAg-negative sera correlates with HCV but not HIV serostatus.JClinVirol. 2004; 29: 59-68.

[2] Musa BM, Bussell S, Borodo MM, Samaila AA, Femi OL. Prevalence of hepatitis B infection in Nigeria, 2000-2013: A systematic review and meta-analysis. Nig.J.clinical practice.

[3] Hepatitis B, General information, US Dept of Health and Human Services. 2016.

[4] Mary N, Bhupinder A. Hepatitis B (HBV,Hep B). 2017.

[5] Colin WS, Edgan PS, Lyn F, Anthony EF, Beth PB. Hepatitis B virus infection; Epidiomology and vaccination. 2006; 8(112-125).

[6] World Health Organization Global Report. 2017.

[7] Lavanya V, ViswanathanT, SheebaMS, Malavizhi A, Moorthy K. Prevalence of Hepatitis B among donors with antibodies to HBcAg. 2012.

[8] Sirisena ND, Njoku MO, Idoko JA. Carriage rate of hepatitis B surface antigen in urban community in Jos. Nig Postgrad J. 2002; 9: 7-10.

[9] Ott J, Stevens GA, Groeger J, Wiersma ST. Global Epidiomology of Hepatitis B virus infection: New estimates of age-specific HBsAgsero –prevalence and endemicity. Vaccine. 2012; 30: 221-9.

[10] Forbi J, Pennap G, Silas-Ndukuba C, Agabi Y, Agwale S. Serological maker and risk factors for hepatitis B virius among students in a Nigerian university. East AfrJ Public Health. 2009; 6: 152-5.

[11] Ola SO, Otegbayo JO, Odaibo GN, Olaley OD, Olubuyide ON. Serum hepatitis C and hepatitis B surface antienaemiia in Nigeria patients with acute icteric hepatitis. West Afr J Med. 2002; 21: 215-7.

[12] Bada AS, Olatuni PO, Adewuyi JO, IseniyiJO, Onile BA. Hepatitis B surface antienaemia in Ilorin, Kwara State, Nigeria. Cent Afr J Med. 1996; 42: 139-41.

[13] Belo AC. Prevalence of hepatitis B marers in surgeons in Lagos, Nigeria. East Afr Med J. 2000; 77: 283-5.

[14] Sadoh AE, Sadoh WE. Serological marker of hepatitis B infection in infants presenting for theirfirst immunization. 2016 Nig. J paeadiatr. 2013; 40: 248-53.

[15] Finlayson ND, Hayes PC, Simpson KJ. Diseases of Liver and biliary system. In, Christopher H., John A. A., Hunter N. A. et al (eds) Davidson's Principle and Practice of Medicine. Edinburg, Churchill Livingstone, 18'h edition. 1999; 683-736.

[16] Surendra K, Prakash G, Bishnu RT, ManitaR. (2008). HBsAgSerosurveillance among Nepalese blood donors. Ann. Trop. Med. Public Health. 2008; 1(1): 15-18.

[17] Chukwuka JO, Ezechukwu CC, Egbuonu I, Okoli CC. Prevalence of Hepatitis B Surface Antigen in Primary School Children in Nnewi Nigeria. Nig J Paed. 2003; 7: 8-10.

[18] Angyo IA, Yakubu AM. Lack of association between some risk factors and Hepatitis B Surface Antigenaemia in children with sickle cell anaemia. W Afr Med J 2001; 20: 214-8.

[19] Abiaya MO, Ebohom PA. Blood transfusion hazards in Benin City, Nigeria. Nig Med J. 1992; 12: 251-4.

[20] Multimer DJ, Olomi A, Skidmore S, Olomu N, Ratcliffe D, Rodger S. Viral hepatitis in Nigeria-sickle cell disease and commercial blood donors. QJM. 1994; 87: 407-11.

[21] Sear M. The Jaundiced Child. In: a Manual of Tropical Paediatrics. Cambridge University press. 2000; 185-200.

[22] United Nations System in Nigeria Report. 2001.

[23] Hepatitis B Fact Sheet M204, World Health int. July 2014. Archived from original on 9th November. 2014.

[24] Yuen, MF, et al. Transmissibility of hepatitis B virus (HBV) infection through blood transfusion from blood donors with occult HBV infection. Clin Infect Dis. 2011; 52: 624–632.

[25] Dhawan HK, Marwaha N, Sharma RR, Chawla Y, Thakral B, Saluja K, Sharma SK, Thakur MK, Jain A. (2008). Anti-HBc screening in Indian blood donors: Still an unresolved issue. World J. Gastroenterol. 2008; 14(34): 5327-5330.

[26] WHO Global Database on blood Safety: summary report. 2012.

[27] Khan ZT, Asim S, Tariz Z, Ehsan IA, Malik RA, Ashfaq. Prevalence of Transfusion transmitted infections in healthy blood donors in Rawalpindi District, Pakistan–a five-year study. Int. J. Pathol. 2007; 5: 21-25.

[28] Tsoi WC, Lelie N, Lin CK. Enhanced detection of hepatitis B virus in Hong Kong blood donors after introduction of a more sensitive transcription-mediated amplification assay. Transfusion. 2013; 53: 2477–2488.

[29] Chao Liu et al. prevalence of HBV DNA among seronegative blood donors in China. 2015.

[30] Stramer SL, et al. Nucleic acid testing to detect HBV infection in blood donors. N Engl J Med. 2011; 364: 236–247.

[31] Su, TH, et al. The clinical significance of occult hepatitis B transfusion in Taiwan–a look-back study. Transfus Med. 2011; 21: 33–41.

[32] Kumar CH, Lt Col Gupta PK, Jaiprakash M. The role of anti-HBc IgM in screening of blood donors.MJAFI. 2007; 63: 350-352.

[33] Tong S, Brook GF. Hepatitis Viruses. In, Butel J. S., Muse S. A. (eds) edical Microbiology.

[34] Emechebe GO, Emordi IJ, Ikefuna AN. Ilechukwu GC, Igwu WC, Ejiofor OS. Hepatitis B infection in Nigeria. A Review. 2009; 0(1): 18.

[35] Mel Krajden. The Laboratory diagnosis of hepatitis B virus. Cand J Infect dis Med Microbiol. 2015; 16(2): 65-72.