http://www.inosr.net/inosr-scientific-research/
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INOSR Scientific Research 6(1): 57-60, 2020.

International Network Organization for Scientific Research ISSN: 2705-1706

Study on the Prevalence of Hepatitis B Virus among Blood Donors

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ABSTRACT

Hepatitis B virus (HBV) is an endemic infection that constitutes a public health menace in Nigeria. Its prevalence is high in Nigeria and information regarding its transmission from blood donors is scarce.Globally, the prevalence of hepatitis B virus infection has been linked to nearly a million deaths annually with an estimated 257 million people living with the infection.Acquisition of non-screened blood from volunteer blood donors has remained the easiest means of HBV transmission. This study investigated the spread of HBV, through blood donation,by apparently healthy volunteer blood donors in National Blood Transfusion Centre, Enugu State. Two hundred and eighty (n = 280) volunteer blood donors (mean age = 38) were tested for hepatitis B surface antigen (HBsAg) by a double antibody sandwich ELISA method.Prevalence of HBVwas lowest at 4.1%. Result showed that this occurred as a consequence of natural immunity when compared with a 77.76% due to acquired immunity from vaccination. Higher number of the volunteers that were elderly had previous exposure to HBV and were not immunized. They were hence considered asymptomatic. Less than half of the volunteers, 64 (4.1%), were previously exposed to HBV via vaccination, while 15 (0.74%) showed no serologic evidence of vaccination but gave a serologic exposure to HBV.Result further indicated that only 77.76% of the volunteer blood donors showed serologic evidence of acquired immunity to HBV through vaccination.Occurrence of any vaccine preventable disease is highly unacceptable. Hence routine vaccination against thishigh-risk HBV should be given a priority attention to prevent spread through blood transfusion.

Keywords: Hepatitis B virus, immunization, blood donation, nosocomial infection.

INTRODUCTION

Hepatitis B virus is a DNA virus of the family *Hepadnaviridae* and the causative agent of hepatitis B infection. It is a viral disease that accounts for more than 2 billion hepatitis B virus (HBV) infections [1] and an estimated 1 million deaths globally [2]. It is highly prevalent in the tropics with an estimated 5-15% adults infected [3]. Nigeria, a west African country, has been placed as a highly endemic country, among the sub-Saharan African Nations, in the transmission of HBV [4]. And poor data collection has hindered accurate information on the prevalence of HBV infections, in this country, leading to under-reporting of the disease [5]. HBV infection could lead to acute and chronic hepatitis, cirrhosis, and hepatocellular carcinoma, posing a tremendous public health burden [6].

The HBV infection resulting from blood transfusion is a major concern in transfusion practice [7]. Mostly, this occurs among adults via contact with infected blood and body fluids like semen, vaginal fluids, and saliva [8]. However, this infection occurs rapidly as occupational health hazards among health care practitioners [9]. Therefore, transfusion of unscreened blood and use of unsafe injections are common avenues of its transmission. Thus, blood transfusion-related HBV infection remains a major concern in transfusion practice.

While highly industrialized and civilized countries have reduced the prevalence of HBV among blood donors [10], the incidence is rapidly increasing among third world and developing nations like Nigeria. Therefore, there is urgent need

to study the growth pattern, enact policies and providesolutions to rapidly reduce this incidence.

Aims and Objectives of Study

The aims, general and specific objectives of thisstudy included thefollowing:

a) To determine the prevalence of hepatitis-B virus among blood donors in Enugu.

b) To determine the effect of innate and acquired immunity on the prevalence of HBV in voluntary blood donors in Enugu metropolis.

MATERIALS AND METHODS

Sample Population

This study focused on voluntary blood donors in Enugu metropolis. Enugu is the capital city of Enugu State situated in the south-eastern region of Nigeria. The city is believed to have a population of 3,267,837 as at the year 2010, according to the National Bureau of Statistics [11].

A total of 280 voluntary blood donorsof260 males and 20 females were enrolled in this study. Donorswere of different ages and visited the Blood Bank and Transfusion Department at the Enugu State University Teaching Hospital.

Study Location

The study location was National Blood Transfusion Service (NBTS) Centre,Enugu. This Centrebanks blood and supplies same to hospitals in Enugu metropolis and neighbouring states of the southeast. Due to strategic roles the NBTS plays, it is pertinent it operates at maximum standards comparable to internationally best practises to avoid nosocomial infections.

Sampling Procedure

A total of280 blood donorswere used forthis study.Blood samples were obtained from these donors, via venous puncture,bytrained medical officers using sterile equipment.Collected blood samples were transferred into sterile non-EDTA bottles and allowed to stand for six (6) minutes. The blood sample was then centrifuged at a speed of 5000rpm for 5 minutesto obtain the serum.Obtained serum samples were usedto assay for HBVseromarkers, including the HBV surface (HBsAb) and core (HBcAb) antibodies and HBV surface antigen (HBsAg), respectively using an enzyme-linkedimmunosorbent assay (ELISA) kit.

Data and Statistical Analysis

Data obtained were analysed using Statistical Package for SocialScience (SPSS)version 20.

RESULTS

Results were interpreted as positive or negative.A positive HBsAg test wasconsidered evidence ofHBV infection (chronic carrier state or infection); a positive HBcAb test was consideredevidence of previous exposure to the HBV; and a positiveHBsAb test was considered evidence of being immune toHBV, which when in combination with a positive HBcAb wasconsidered due to natural infection and when alone due tovaccination. Being negative for all markers meant participantwas susceptible to HBV infection.

Table 1: Serology of blood donors

Characteristics	Serology Profile		
	HBsAb + / HBcAb +	HBsAb + / HBcAb -	HBsAb - / HBcAb +
	64 (4.1%)	563 (77.76%)	15 (0.74%)
Mean Age ± SD	32.6 ± 9.95	35.3 ± 10.4	39.6 ± 11.8

DISCUSSION

Transfusion-transmissible hepatitis B virus (HBV) infection is a major health challenge globally [10] and screening of blood donor for HBsAg can reduce the risk of transfusion-transmitted HBV infection (El-Zayadi *et al.*, 2008).

The World Health Assembly, in the year 2010, adopted resolution63.18 which recognized viral hepatitis as a global healthproblem [12] and also responded by developing a four- prongstrategy aimed at raising awareness/mobilizing resources,policy, preventing

transmission and screening with treatment [7]. While 180 countries included Hepatitis Bvaccination as part of their routine vaccination schedule andthe worldwide coverage approached 80% in 2011, disparitiesremained between developed and developing countries [12].

Results of this study, as summarised in Table 1, showed that a lower percentage (4.1%) of the donors has innate immunity to HBV infection compared to the 77.76% who had an acquired immunity due to vaccination. This is an indication that the need of HBV vaccination, as enthroned by the WHO, is highly efficient in the fight against HBV infection. The result showed that innate immunity alone is not the only reliable means of fighting HBV infection. Furthermore, it was observed that 0.74% of the total voluntary blood donors were earlier exposed to the HBV and the age range of these donors were higher compared to donors with acquired immunity and innate immunity to HBV. It can be interpreted that younger and healthy voluntary blood donors should be encouraged to freely donate blood. Again, vaccination should be encouraged among all age groups for the total eradication of various life-threatening diseases/infections.

CONCLUSION

Prevalence of HBV infection from voluntary blooddonors in Enugu State is low. Further studies should be funded to investigate HBV transmission and prevalence from other means like HIV, sharing of sharp objects etc.Vaccination of citizens against HBV should be encouraged as this will further reduce any opportunistic infections and transmissions of the virus.

Competing Interest

There is no competing interest.

Acknowledgement

Authors acknowledge the Tertiary Education Trust Fund (TETFund) of the Enugu State University of Science and Technology (ESUT) for providing fund for this study.

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