



Prevalence of Hepatitis B Virus among Prospective Blood Donors at University of Ilorin Teaching Hospital, Kwara State, Nigeria

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Abstract This study was aimed at determining the rate of infection with hepatitis B virus among prospective blood donors at University of Ilorin Teaching hospital, Nigeria. One hundred and sixty blood samples (160) were screened for possible detection of hepatitis B virus using Diaspot test strip. Eighteen (18) blood samples (11.25%) were found positive. Male donors had the prevalence of 11.25% and female donors recorded no prevalence. Similarly, prospective blood donors within the age group 21 – 30 and 31 – 40 years recorded prevalence of 4.38% each, followed by 41 – 50years (1.88%) and 11 -20 years recorded the lowest rate (0.63%) of infection. Blood donors in tertiary institutions recorded the highest rate (6.25%) of infection compared to other groups. Chi- square test revealed that the infection rates according to sex, age and educational status of the blood donors was not significant at $p < 0.05$. Although the infection rate was statistically insignificant, adequate proactive measures should be in place to further reduce the disease burden in the Kwara State.

Keywords: Blood donors, Prevalence, Hepatitis B virus, Disease burden.

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1. Introduction

Hepatitis is a condition defined by the irritation or swelling of the liver and it is characterized by the presence of inflammatory cells in the tissue of the organ. The condition can be healing on its own (self-limiting) or can progress to scarring and cirrhosis. Hepatitis can be acute (inflammation of the liver that lasts less than six months) or chronic (Hollinger and Liang, 2001). It can be induced by both infectious and non infectious agents. The former include hepatotropic viruses (hepatitis A, B, C, D and E) of which hepatitis B is the most infectious and most virulent while, the later includes an over

active immune system, use of drugs, alcoholism, chemicals and environmental toxins (Deinstag *et al.*, 1995).

Adults that acquire acute infection usually recover (Awole and Gebre-Selassie, 2005; Buster *et al.*, 2008) or can be managed by supportive therapy, the chronic type is ultimately fatal. Clinical consequences of Hepatitis such as chronic hepatitis B, liver cirrhosis and hepatocellular carcinoma makes a strong case for prevention and treatment. Consequently it has been referred to as a public health problem worldwide, affecting an estimated population of more than 2 billion people (Buster *et al.*, 2008). Although hepatitis B vaccination is highly effective in preventing infection with HBV and con-

sequent acute and chronic liver disease, it is still a major health problem in Nigeria (Adoga *et al.*, 2010). To date, Nigeria remains one of the endemic nations of the world whose citizen health is being challenged with hepatitis B virus infection. This has been attributed to unavailability of vaccine for prophylactic measures.

This study was aimed at determining the prevalence of hepatitis B virus infection among blood donors in Kwara State, Nigeria for prompt prophylactic and curative measures.

2. Material and methods

2.1 Sample size determination

The sample size for this study was determined by the formula

$$\frac{n=t^2 \times p(1-p)}{m^2} \quad (\text{Kuta } et \text{ al, } 2012)$$

Where: n = Sample size
t = Standard normal deviate at 1.96
p = prevalence of the disease
M = marginal tolerable error at 0.05%

2.2 Blood Sample Collection and Preparation

The veinopuncture method of Julius and Schiff (2007) was employed to aseptically collect 5ml of blood sample each from 160 blood donors. An ethical clearance was sought for before the collection. Each of the 5ml of blood collected from the prospective blood donors was transferred into a labeled plastic microtitre tube coated with ethylene diamine tetraacetic acid (EDTA) and was moved to the hematology laboratory of the University of Ilorin teaching hospital for further analysis.

2.3 Preparation of blood samples

Each of the blood sample collected was treated separately as outlined:

The blood samples were transferred into centrifuging tubes and spin at 10,000 revolutions per minute (rpm) for 5 minutes. The plasma cell were collected in each case separately and stored at 4° C for further analysis.

2.4 Screening of the plasma cells

Diaspot test strip with 98.5% accuracy was used for screening of plasma cells from the prospective blood donors. The screening was conducted in accordance with manufacturers' specifications as outlined below:

The strips were dipped into plasma cells in each case separately for 10 seconds. The test strip were removed separately and placed on sterile non- absorbent table top for 15 minutes. Observation for red bands was done and results recorded.

2.5 Interpretation of the results

The test strips used have control bands region C and the test line region T. when two distinct red bands appear, the result is said to be positive. However, the intensity of the bands which appears in red colour in the test band depends on the concentration of the hepatitis B virus surface antigen present in the blood sample. Therefore, any band at the test band region T is considered positive, absence of apparent red band at the test (T) region suggest negative (Blumberg,1971).

2.6 Data analysis

Data generated from the study was analyzed using Chi square test and the level of significance was determined at $p < 0.05$.

3. Results

Out of the 160 blood samples screened for possible detection of hepatitis B virus surface antigen, 18 were found positive. This represent; prevalence of 11.25%. Male blood donors recorded the high prevalence of 11.25% with no positive case recorded against their female counterparts (Table 1).

Table 1: Infection rate of HBsAg according to Gender

Gender	Number of Samples	Number of Positive	Prevalence
	Screen	Samples	(%)
Male	153	18	11.25
Female	7	0	0.0
Total	163	18	11.25

$$\chi^2 = 0.928 \text{ at } P < 0.05$$

Out of the 160 blood samples screened for detection of HBsAg according to the age of the blood donors, higher prevalence of infection (4.38%) was recorded against donors within the age group 21 - 30 years and 31 – 40 years each (table 2).

Table 2: Infection rate of HBsAg according to Age

Age Group	Number of Blood Samples	Number of Positive	Prevalence
	Screened	blood Samples	(%)
11-20	3	1	0.63
21-30	81	7	4.38
31-40	59	7	4.38
41-50	14	3	1.88
51-60	3	-	0.00
Total	160	18	11.25

$$\chi^2 = 3.872 \text{ at } P < 0.05$$

Prospective blood donors without formal education had 1.25%, those at primary level of education had 0.63%, secondary school level recorded 3.13% and those at higher education level had the highest prevalence of 6.25% (table 3).

Table 3: Infection rate of HBsAg according to Educational status

Educational status	Number of Blood Samples	Number of Positive	Prevalence
	Screened	blood Samples	(%)
Illiterate	9	2	1.25
Primary	17	1	0.63
Secondary	38	5	3.13
Higher School	96	10	6.25
Total	160	18	11.25

$$\chi^2 = 1.78 \text{ at } P < 0.05$$

4. Discussion

In this study the prevalence of hepatitis B virus infection among prospective blood donors at University of Ilorin

teaching Hospital, Kwara State, Nigeria was determined. The prevalence was found to be 11.25% out of the 160 blood samples screened. Higher prevalence of 19.05% has been reported in recent study in Niger State by Kuta *et al.*, (2012). This may be attributed to ignorance about the possible route of transmission, beside unavailability of a candidate vaccine that could be used to bring down the disease burden. These may have contributed significantly to the high prevalence of

infection observed in this study. Although the study conducted and reported by Kuta *et al.*, (2012) was carried out in Niger State, the fact that the present study considered similar demographic information as was done in the previous study coupled with the fact that Niger State and Kwara State lie on the same geographical location makes the two reports comparable.

Male blood donors recorded the prevalence of 11.25% (Table 1) in this study with no positive case recorded against female donors. Higher prevalence of the disease have been reported in previous study by Muktar *et al.*, (2005); Nwake-diuko *et al.*, (2007) and Olokoba *et al.*, (2009). This could be attributed to life style associated with men folk. However, despite the higher prevalence recorded against male blood donors, chi-square test revealed not significant at $P > 0.05$.

The age group (21 – 30years, 31 – 40years) had higher prevalence compared with other age groups. Already Ado *et al.*, (2010) and Sayed *et al.*, (2013) reported high prevalence of hepatitis B virus among blood donors within the age group (20 -40year in Zaria). This therefore makes the result of this study comparable with the previous studies. Chi-square test revealed that age was not a factor at $p > 0.05$.

The results indicated high prevalence of 6.25% among prospective blood donors in tertiary institution in the study area out of the overall prevalence of 11.25%. This is on the high side and could be attributed to lapses associated with students in tertiary institutions in Nigeria (ranging from unprotected sexual intercourse)coupled with steady increase in the proliferation of quack medical practitioners in both rural and urban areas in Nigeria. Fake and counterfeit drugs appear to be another hydra headed monster that may have aggravated the steady increase in the infection rates among Nigeria citizen. However, chi-square analysis revealed that educational status of the subjects considered in the study was not a factor in the infection rate with hepatitis B virus in Kwara State. More epidemiological investigation should be conducted to determine the true picture of the situation in Kwara State of Nigeria.

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