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## *Full Length Research Article*

# SERO-PREVALENCE OF HEPATITIS-B VIRUS AND ITS ASSOCIATED RISK FACTORS AMONG STUDENTS OF A HIGHER INSTITUTION OF LEARNING IN ZARIA-NIGERIA

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**ABSTRACT**

This study was undertaken to assess the prevalence of Hepatitis B Surface Antigen and determine the risk factors associated with the transmission of the infection among subjects in the study area. One hundred and fifty samples were screened using a one-step, rapid chromatographic immunoassay hepatitis B surface antigen test strip. Blood samples were centrifuged and the test strips were equilibrated at room temperature (15 –30°C) before analysis. The prevalence of hepatitis B virus was 11.33%. There was no significant difference between the infection and the demographic information. However, unprotected sex is the major risk factor recorded in this study. Public awareness is pivotal in the control of transmission of the infection.



## INTRODUCTION

Hepatitis B remains a global health challenge that causes significant morbidity and mortality (WHO, 2002). Hepatitis simply means inflammation of the liver and can be caused by a variety of factors usually viral infection but sometimes due to toxic agents like alcohol, drugs (e.g. acetaminophen poisoning) etc. (Diestang, 2007). The disease is also referred to as serum hepatitis or homologous serum jaundice. HBV is the prototype member of the Hepadnaviridae (hepatotropic DNA virus) family with virions which are double-stranded particles, measuring 40 to 42 nm in diameter with an outer lipoprotein envelope that contains three related envelope glycoproteins (or surface antigens) (Uyar *et al*., 2009; Hinnachi *et al.,* 2009). The virus interferes with the liver function while replication occurs in the cytoplasm of the hepatocytes (Seeger and Manson, 2004). The highest rates of HBsAg carrier rate are found in developing countries with primitive or limited facilities.

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The highest rates of HBsAg carrier rate are found in developing countries with primitive or limited facilities. In areas like Africa, Asia, widespread infections may occur in infancy and childhood (D'Souza and Foster, 2004). In Nigeria, surveys conducted among blood donors in various locations revealed the prevalence ratio of 3% in Lagos and Bauchi (Nasidi *et al*., 1983), 13.7% in Ibadan (Ayoola *et al*., 2008), and 22% in Maiduguri (Harry *et al*., 1999). Without intervention, a carrier student confers 20% risk of passing the infection to HBV negative students through personal contact such as unprotected sex, direct blood to blood contact, through vaginal secretions, tattooing etc. (Cheesbrough, 2006). Only few studies have been conducted on students of higher institutions of learning in Nigeria therefore the need for this present study.

## MATERIALS AND METHODS

### Study Area

The study was conducted in a higher institution of learning in Zaria. Zaria is in northern Guinea Savannah zone, which lies between longitude 11003"N and latitude 07042"E. Zaria is about 300 kilometres from Abuja the capital city of Nigeria.

**Study Population**

The study population comprised of one hundred and fifty (150) students from all levels across several departments of the institution. Bio-demographic data were obtained from students who volunteered prior to the sample collection using structured questionnaire. The data obtained include: Age, Sex, Marital status, State of origin, State of residency and information on possible risk factors associated with hepatitis infection. Those who gave their consent but were not available for sample collection were excluded from the study.

**Sample Collection, Processing and Testing**

Blood samples (2-3ml) were collected from donors into sterile blood specimen bottles and subjected to centrifugation at 1500 rpm for 5 minutes to separate the serum from the blood cells (Cheesbrough, 2006). Each serum was screened for the detection of hepatitis B surface antigen (HBsAg) using aone-step hepatitis B surface antigen test strips "Diaspot". The one step (HBsAg) test strip is a rapid chromatographic immunoassay for the quantitative detection of hepatitis B surface antigen in serum or plasma manufactured by Wondfo Biotech Co., Ltd., USA. The test strip was allowed to equilibrate at room temperature (15 – 30$^{o}$C) before use. The test was done by immersing the test strips vertically in the serum for at least 10 – 15 seconds and the results read within fifteen minutes. The procedure was repeated for all samples.

**Data Analysis**

The data obtained from the study were statistically analysed using SPSS 20 (statistical package for social sciences version 20). The prevalence of HBV infection was determined using Pearson chi-square test to determine the relationships between the demographic data, risk factors and clinical information with HBV infection. P value of $\leq 0.05$ was considered significant at 95% confidence interval.

## RESULTS

A prevalence of 11.33% of HBsAg was recorded in this study (Table 1). The results of the distribution of HBsAg infection by demographic parameters are presented on Table 2.

**Table 1. Distribution of HBV among student in a higher institution of learning in Zaria-Nigeria**

| Viral antigen (HBV) | Samples tested (%) |
|---|---|
| No. positive (%) | 17 (11.33) |
| No. negative (%) | 133(88.77) |
| Total No. of samples | 150 (100) |

The age-specific prevalence indicated that, age group >30 had the highest prevalence of 30.00% whereas age group 26-30 had the least with7.69% (Table 2). Sex-specific distribution of HBsAg indicated a higher prevalence in females (14.49%) than in males (9.86%). It was observed that married students had higher prevalence of HBsAg (11.11%) where a sun married had 5.71%. North-East geopolitical zone had the highest prevalence of HBsAg (18.18%). However, there was no statistically significant differences between HBV infection and the demographic factors in the study area (P>0.05). The results of the distribution of HBsAg according to related risk factors and lifestyle are presented on table 3.It indicated that those with prior knowledge of the infection had a higher incidence (12.50%) than those without prior knowledge of it (10.26%). Students who share clothing with others had 12.12%prevalence higher than those that do not (11.11%).In like manner, those who share bed space had higher prevalence of (9.43%) while those who do not shared bed space had prevalence of 15.91%. Higher prevalence was observed among those that had no history of multiple previous sexual partners compared to those with history. Students who had no history of blood transfusion had 11.43% prevalence while those who had previously been transfused with blood had the prevalence of 10.00% (Table 3).However, those who received injection from non-professionals had 20.00% prevalence higher than those who had not received injection from non-professionals (10.00%).Also students who were involved in unprotected sex had a prevalence of 14.43% higher than those who engaged in protected sexual activities (5.66%). There was observed statistical relationship between the HBV infection and the risk factors studied (P>0.05).

## DISCUSSION

The prevalence of 11.33% of HBsAg obtained in this study which is a reflection of high prevalence rate of >8% in Africa, Western Pacific and Asian countries (D'Souza and Foster, 2004)suggests that hepatitis B is common among students in the study area and may be due to its mode of transmission. Hepatitis B virus can be transmitted via contact with all bodily fluids (including saliva, semen, sweat, breast milk, tears, urine, vaginal secretions, and faeces) and by frequent and prolonged close personal contact with an infected person (Emechebe *et al.,* 2009). The distribution of the infection by age group in this study area showed a higher prevalence in age groups 16-20 (12.50%) and 31 and above (30.00%). Whereas Ezegbudo *et al.,* 2004 in their studies reported and inverse relationship between chronic infection and age which was attributed to maturation of the immune system.

This study agreed with most studies in Nigeria on HBsAg that there are no significant differences (P>0.05) between male and female subjects (Emechebe *et al.*, 2009; Ola *et al.,* 1994). This study also showed similar distribution of prevalence by marital status with the work carried out by Aminu*et al*., (2013), which revealed that married students had the highest prevalence of HBsAg compared to unmarried students. This may be due to the risk of exposure from their spouses. There were no observed differences (P > 0.05) in geopolitical zones distribution of the infection as Sub-Saharan Africa is considered to be a region of high endemicity with an average carrier rate of 10 - 20% in the general population (WHO, 2002).The risk factors studied were; multiple sex partners, blood transfusion, knowledge of the infection, family history, Non-professionals, use of condoms, sharing of clothes and bed space. Ola *et al.,* (1994) found that, having multiple sex partners increased the carriage rate of HBsAg in Gombe and Jos. Obiaya *et al.* (1982) in their study noted that blood transfusion was hazardous in view of the high prevalence of HBsAg in donor blood.

**Table 2. Distribution of HBV infection by demographic factors among students of a higher institution of learning in Zaria-Nigeria**

| Demographic Factor | | No. Examined | No. Positive HBV (%) | No. Negative HBV (%) | P value ≤ 0.05 | Odds Ratio |
|---|---|---|---|---|---|---|
| Age group (yrs.) | 16 – 20 | 32 | 4(12.50) | 28(87.50) | 0.275 | |
| | 21 – 25 | 69 | 7(10.14) | 62(89.86) | | |
| | 26 – 30 | 39 | 3(7.69) | 36(92.31) | | |
| | 31 and above | 10 | 3(30.00) | 7(70.00) | | |
| Gender | Male | 71 | 7(9.86) | 64(90.14) | 0.589 | 0.751 |
| | Female | 69 | 10(14.49) | 59(85.51) | | |
| Marital Status | Married | 135 | 15(11.11) | 120(88.89) | 0.797 | |
| | Unmarried | 35 | 2(5.71) | 33(94.29) | | |
| Geopolitical Zone of Residency | North West | 93 | 10(10.75) | 83(89.25) | 0.958 | |
| | North East | 11 | 2(18.18) | 9(81.82) | | |
| | North Central | 35 | 4(11.43) | 31(88.57) | | |
| | South East | 01 | 0(0.00) | 01(100) | | |
| | South- South | 03 | 0(0.00) | 03(100) | | |
| | South West | 07 | 1(14.29) | 6(85.71) | | |

**Table 3. Distribution of HBV among students in relation to some risk factors and life style that may be associated with the virus**

| Possible Risk Factors | | No. Examined | No. Positive HBV (%) | No. Negative HBV (%) | P Value ≤ 0.05 | Odd Ratio |
|---|---|---|---|---|---|---|
| Knowledge of Hepatitis | Yes | 72 | 9(12.50) | 63(87.50) | 0.665 | 1.250 |
| | No | 78 | 8(10.26) | 70(89.74) | | |
| Family History | Yes | 18 | 4(22.22) | 14(77.78) | 0.257 | |
| | No | 118 | 11(9.32) | 107(90.68) | | |
| | Do not Know | 14 | 2(14.29) | 12(85.71) | | |
| Injection by non-professionals | Yes | 20 | 4(20.00) | 16(80.00) | 0.189 | 2.250 |
| | No | 130 | 13(10.00) | 117(90.00) | | |
| Sharing of Clothes | Yes | 33 | 4(12.12) | 29(87.88) | 0.872 | 1.103 |
| | No | 117 | 13(11.11) | 104(88.89) | | |
| Sharing of Bed Space | Yes | 106 | 10(9.43) | 96(90.57) | 0.254 | 0.551 |
| | No | 44 | 7(15.91) | 37(84.09) | | |
| Multiple Sex Partners | Yes | 9 | 0(0.00) | 09(100.00) | 0.269 | 0.000 |
| | No | 141 | 17(12.06) | 124(87.94) | | |
| Use of Condom | Yes | 53 | 3(5.57) | 50(94.33) | 1.105 | 2.625 |
| | No | 97 | 14(14.43) | 83(85.57) | | |
| Blood Transfusion | Yes | 10 | 1(10.00) | 9(90.00) | 0.890 | |
| | No | 140 | 16(11.43) | 124(88.57) | | |

Amazigo *et al.*, (1990) found a significantly higher HBsAg prevalence among prisoners in eastern Nigeria which was attributed to overcrowding and clustering. Study from north-central Nigeria indicates that unprotected sex is implicated in the transmission of HBV (Sirisena *et al*., 2002 and Mustapha *et al*., 2004). However, in this study the use of condom did show that unprotected sex is associated with HBsAg while those using condoms showed a lower prevalence of 5.66%. This may be as the result of wide campaign on HIV/AIDS and fear of unwanted pregnancy among students.

Two common risk factors were identified as having a likely relationship with the infection in this study area. They are unprotected sexual activities and receiving injection from unqualified personnel. The findings in this study showed that demographic information was not significantly associated with the infection. It is concluded here that a HBV campaign should be integrated in health programmes of tertiary institutions especially health orientation for fresh students. Screening of HBV should be institutionalized in higher institutions of learning.

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