



## ORIGINAL RESEARCH

### Viral Hepatitis B Infection among Undergraduate Students Accessing Health Services at Public Tertiary Institution in Kwara South, Nigeria

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**To cite this article:** Bello SI, Williams FE, Aliyu FO, Ojieabu WA and Adewumi MA. Viral Hepatitis B Infection among Undergraduate Students Accessing Health Services at Public Tertiary Institution in Kwara South, Nigeria. *Journal of Basic and Social Pharmacy Research*, 2019;1(2):8-16  
**ISSN: 2705-3245**

#### ABSTRACT

**Background:** Hepatitis B virus (HBV) has been a major public health concern causing above a million deaths worldwide. The disease can be averted by employing relevant screening programs and effectual vaccines.

**Objectives:** This research aimed to assess the occurrence and risk factors for infection of HBV among undergraduate students accessing health services at University of Ilorin, Ilorin, Nigeria.

**Method:** A cross-sectional study was conducted between 15th February and 4th June, 2019. One hundred and eighty-one students were recruited and tested for Hepatitis B surface antigen (HbsAg) with the use of Micropoint Diagnostics Kit, Nantong, China. A validated questionnaire was used to capture information on socio-demographics and risk factors for infection of HBV of the consenting volunteers. Ethical approval with number UIL/UHS/TW was obtained. Statistical Package for Social Sciences was used to analyze the data collected for descriptive and inferential statistics.

**Results:** The mean age of the students was  $19.21 \pm 5.37$  years with the majority being females 110 (60.8%). Ten students tested positive for HBV giving an incidence rate of 5.5%. The age of the students showed a significant association with HBV positivity. Use of injectable illicit drugs and sharing of utensils were the behavioural risk factors that correlated with HBV infection.

**Conclusion:** The incidence rate of HBV disease was intermediate and the risk factors identified were age, use of injectable illicit drugs and sharing of utensils. Proper adherence to prevention and control measures coupled with efficient follow-up could decrease the occurrence of the disease.

**Keywords:** Students, Hepatitis B Virus, University of Ilorin, risk factors, occurrence

#### INTRODUCTION

Hepatitis B virus (HBV) infection has been foremost public health concerned causing above a million deaths worldwide<sup>1</sup>. Around two billion persons were infected by the disease and about 360 million were prolonged carriers having the threat of liver

disease advancement<sup>1,2</sup>. Greater than 780,000 deaths occurred per annum. The hepatocellular carcinoma (HCC) disease was the fifth most common cancer and second major prevalent caused of cancer deaths<sup>3</sup>. The occurrence of HBV-linked HCC cases is forecasted to rise for a minimum of two decades as a result of the

high incidence of prolonged infection of HBV globally<sup>4</sup>. Countries that recorded high pandemic had 8% HBV seroprevalence, those with intermediate was 2-7% while those with low pandemic were less than 2%<sup>5</sup>.

The occurrence of high prolonged infection of HBV was observed in Africa, intermediate was found in southern Europe and Australia had a low rate<sup>6</sup>. In spite of initiation of anti-viral Hepatitis B treatment that repressed the virus and decline in the development of liver disease, many carriers were affected by the disease in the developing countries<sup>7</sup>. This is because the drugs were neither accessible nor affordable<sup>7</sup>. As of 1990, a decrease of 75% HBV seroprevalence was recorded in the United States. However, the HBV seroprevalence has declined between 10% and 0.6% in the Gambia probably due to the advent of routine vaccination<sup>3</sup>. A significant decline of HBV was reported in South Africa in comparison with the pre-vaccination era<sup>8</sup>. A reduction between 13.4% and 3.7% were also observed in Malaysia<sup>9</sup>. Currently, in many countries worldwide, there is a downward trend in the prevalence of prolonged infection of HBV probably owing to improved HBV immunization and enhanced health-care services<sup>10</sup>. As reported by the Federal Ministry of Health, Nigeria, among the countries in Africa, Nigeria is one of the main incidences of HBV infection with about 20 million people affected by the disease<sup>11,12,13</sup>. However, variation of seroprevalence rates had been reported in Nigeria. In Maiduguri<sup>14</sup>, Port Harcourt<sup>15</sup>, Ilorin<sup>16</sup>, Zaria<sup>17</sup>, Nassarawa<sup>18</sup> and Yola<sup>19,20</sup>, prevalence of 11.4 %, 4.3%, 5.7%, 8.3 %, 17.1% and 14.9 % were observed, respectively. Poor socio-cultural practices, unprotected sex, and poor hygiene are most factors that predisposed Nigerians in contracting the disease<sup>21</sup>. Awareness of viral hepatitis B infection as a deadly disease is very poor in Nigeria and the call for it as health emergency<sup>21</sup>. Therefore, concerted efforts to avert the infection of

HBV are immediately required to reduce the menace in Nigeria. Based on the aforesaid, this research was conducted to assess the occurrence and risk factors for infection of HBV among undergraduate students accessing health services in the University of Ilorin, Ilorin, Nigeria. This is with the view of screening apparently healthy individuals, identifying those that required vaccination and those for drug therapy.

## METHODS

### Study Site

The study was conducted at the University of Ilorin Health Services located in the Ilorin South Local Government Area of Kwara State, Nigeria.

### Study Population

The total population of registered students in the health services of the University as at 2019 was 35,783.

### Study Design

This is a single-centre, cross-sectional study that involved undergraduate students who attended the University of Ilorin Health Services.

### Inclusion Criteria

- Male and female students  $\geq 18$  years of age
- Students unaware of their HBV status
- Students who gave their consent

### Exclusion Criteria

- Students who declined consent
- Students on hospital admission
- Pregnant students

### Sampling Size Estimate and Sampling Technique

The minimum sample size was determined<sup>22</sup>.

$$n = \frac{Z^2 pq}{d^2}$$

Z= standard normal deviation set at 1.96,

$p$  = the proportion in the target population estimated to have a particular characteristic which is 13.6%<sup>23</sup>.

$$p = 0.136$$

$$q = 1 - 0.136 = 0.864$$

$d$  = degree of accuracy desired which is 5% (0.05)

$$n = \frac{1.96^2(0.136)(0.864)}{0.05^2}$$

$n = 180.56$  approximately 181

The number of students enrolled into the study was 181.

Sampling of the students for enrolment into the study was based on convenience as dictated by the inclusion and exclusion criteria and availability of students.

### Study Questionnaire

The study questionnaire was written after thorough literature search on previous works done on hepatitis B virus infection. The questionnaire was validated by running a pilot study and internal consistency was also checked before the application. The name and matriculation number of the students were not captured in the questionnaire to maintain confidentiality. The validated questionnaire was used in capturing students' personal and social histories (smoking and alcohol intake) and behavioural risk factors of hepatitis B (body tattoo, ear or body piercings, injectable illicit drug use, history of blood transfusion, sharing of toothbrushes, multiple sexual partners, sharing of sharp objects, exposure to blood, history of past surgical operations, history of any work in the medical field and any knowledge on hepatitis B and its vaccination.

### Laboratory Procedure

Blood samples were obtained and tested for Hepatitis B surface antigen. The blood sample (5 ml) was collected by venipuncture from each subject, allowed to clot and the sera recovered using standard technique as described by<sup>24</sup>. The sera were tested for presence of anti-hepatitis B virus

using a rapid visual immunoassay kit (Micropoint Diagnostics, Nantong, China). The strip was immersed into the serum for 10-15 seconds. The result was read after 15 minutes to observe the appearance of the red line. The intensity of the red colour on the test line varies depending on the degree of concentration of HBV in each specimen. Any shade of red line in the test (T) region as well as in the control (C) region was taken as positive. Red line on the control (C) region and no shade of red colour on the test (T) region was taken as negative. The results were then interpreted as follows; positive (two lines), negative (one line), and invalid (no line or no control line).

### Data analysis

Data collected were analyzed using the Statistical Package for Social Sciences version 25. Descriptive statistics such as mean and proportions were calculated for continuous and discrete variables, respectively. Inferential statistics used was chi-square test.

### Ethical Considerations

Ethical approval with number UIL/UHS/TW was obtained from the University of Ilorin Health Services. Written and oral consent of the students were sought before enrolment.

## RESULTS

### Socio-Demographic Data of Participants

The socio-demographic characteristics of this study are shown in Table 1. Most of the students were between the ages of 18-20 (128, 70.7%) years and females (110, 60.8%). The majority of the students were single (173, 95.6%), from the Yoruba tribe (146, 80.7%) and Christians (91, 50.3%).

Table 2 below shows that HBV serology was negative in 171 (94.5%) and positive in 10 (5.5%) students, with an occurrence rate of 5.5%.

**Table 1: Socio-demographic Data of the Participants**

Variables		Frequency	Percentage (%)
<b>Age</b>	18-20 years	128	70.7
	21-23 years	36	19.9
	24 years and above	17	9.4
<b>Gender</b>	Male	71	39.2
	Female	110	60.8
<b>Marital Status</b>	Single	173	95.6
	Married	8	4.4
	Divorced	0	0.0
<b>Tribe</b>	Yoruba	146	80.7
	Igbo	15	8.3
	Hausa	0	0.0
	Others	20	11.0
<b>Religion</b>	Islam	87	48.1
	Christianity	91	50.2
	Traditionalists	3	1.7

**Table 2: Incidence of Hepatitis B virus among the students**

Testing of Hepatitis B Virus	Number of patients	Percentage (%)
Those infected by HBV	10	5.5
Those not infected by HBV	171	94.5
<b>Incidence of HBV</b>		<b>5.5</b>

Few students (22, 12.2%) smoked while thirty-seven (20.4%) consumed alcohol. None (0, 0%) of the students had a tattoo on their body, while (68, 37.6%) have their ear or body pierced (Table 3). Eighteen (9.9%) students use injectable illicit drugs. The majority of the students (173, 95.6%) had not undergone a blood transfusion. Eighty-three (45.9%) had multiple sexual partners while some shared toothbrushes (24,

13.3%) and utensils 129 (71.3%). Fifty (27.6%), 23 (12.7%) and 20 (11.0%) of the students respectively had shared sharp objects, been operated on and had worked in the medical field with exposure to blood. None of the students (0, 0%) had ever done hepatitis B screening tests nor received the hepatitis B vaccine, though, 119 (65.7%) of the students were however aware of Hepatitis B virus infection (Table 3).

**Table 3: Exposure of students to Behavioural Risk Factors**

Variables		Frequencies	Percentage (%)
Social History: Smoke/ Smoked	Yes	22	12.2
	No	159	87.8
Drink Alcohol	Yes	37	20.4
	No	144	79.6
Body Tattoo	Yes	0	0.0
	No	181	100.0
Ear or body piercing	Yes	68	37.6
	No	113	62.4
Injecting Drug Use	Yes	18	9.9
	No	163	90.1
History of Blood Transfusion	Yes	8	4.4
	No	173	95.6

Multiple Sexual Partners	Yes	83	45.9
	No	98	54.1
Sharing of Toothbrushes	Yes	24	13.3
	No	157	86.7
Sharing of Utensils (spoon, fork, and knives)	Yes	129	71.3
	No	52	28.7
Sharing of sharp objects	Yes	50	27.6
	No	131	72.4
Have you ever been operated on	Yes	23	12.7
	No	158	87.3
Ever worked in the Medical Field	Yes	20	11.0
	No	161	89.0
Have you heard about Hepatitis B Virus before	Yes	119	65.7
	No	62	34.3
Ever done Hepatitis B Screening Test	Yes	0	0.0
	No	181	100.0
Have you ever been vaccinated for hepatitis B virus	Yes	0	0.0
	No	181	100.0

#### Association between Hepatitis B Virus infection and socio-demographic information

Only age was shown to be significant with the occurrence of the infection of HBV among the socio-demographic characteristics at  $p < 0.034$  (Table 4).

For behavioural risk factors, only injectable illicit drug use and sharing of utensils by the students were significant with the incidence of infection of HBV at  $p < 0.001$  and  $0.025$  respectively (Table 5)

**Table 4: Association between Hepatitis B Virus infection and socio-demographic data**

Variables		Positive	X <sup>2</sup>	P-Value
Age	18-25 years	10	4.501	0.034
	26-33 years	0		
Gender	Male	4	0.008	0.929
	Female	6		
Marital Status	Singled	10	0.178	0.673
	Married	0		
	Divorced	0		
Tribe	Yoruba	10	2.537	0.281
	Igbo	0		
	Hausa	0		
	Others	0		
Religion	Islam	7	2.100	0.350
	Christianity	3		
	Others	0		
Smoke/Smoked	Yes	0	1.465	0.226
	No	10		

**Table 5: Association between Hepatitis B Virus infection and behavioural risk factors**

Variables		Positive	X <sup>2</sup>	P-Value
Drink Alcohol	Yes	0	2.720	0.099
	No	10		
Ear or Body Piercing	Yes	4	0.027	0.870
	No	6		
Injectable Illicit Drug Use	Yes	4	10.676	0.001
	No	6		
History of Blood Transfusion	Yes	0	0.489	0.484
	No	10		
Sexually active	Yes	4	0.146	0.702
	No	6		
Sharing of Toothbrushes	Yes	1	0.098	0.755
	No	9		
Sharing of sharp objects	Yes	1	1.644	0.200
	No	9		
Sharing of Utensils (spoons, forks, and knives)	Yes	4	5.055	0.025
	No	6		

## DISCUSSION

Viral Hepatitis B is known as a prolonged infectious liver disease that required urgent attention worldwide<sup>25</sup>. From the results of this study, a relationship between infection of HBV and age of the students was observed which corresponds with a previous study among students in North-central, Nigeria<sup>26</sup>, but differs from the findings among students of the University of Maiduguri, Nigeria where age was not a significant risk factor<sup>27</sup>. It has been previously reported that disease of HBV could affect all the age groups and that age could be a risk factor in the progression of the infection<sup>25</sup>.

Other major risk exposures for infection of HBV found in this study were injectable illicit drug use and sharing of utensils. This agrees with factors reported by other authors from other parts of the country. The study<sup>28</sup> observed that risk factors for infection of HBV among their respondents was sharing of utensils with an infected person and indulgence in the use of injectable illicit drugs, while another study reported factors such as injection needles and use of utensils as principal risk factors<sup>29</sup>.

There were more female carriers of Hepatitis B surface antigen than males in the present study. This study is supported by the findings conducted among students of the University of Maiduguri<sup>27</sup>. A study in China also corroborates this finding<sup>30</sup>. In this study, the significant difference in the number of female carriers compared to the males could be attributed to the higher population of female students in the school<sup>30</sup>.

HBV is transmitted via different ways including contaminated blood products, body piercing instruments and utensils, multiple partners, unprotected sex, injection needles, ear piercing, tattooing, and through healthcare workers<sup>29,31</sup>.

There was no relationship between intake of alcohol, smoking, piercing of ear or body, blood transfusion history, sharing of toothbrushes and sharing of sharp objects with infection of HBV. However, this does not mean that other students who tested negative with exposure to all these factors are not at risk of contracting the infection of HBV<sup>26</sup>. It has been earlier reported that smoking and alcohol consumption were rampant among the youths which predispose them to the virus<sup>26</sup>. Also, the males shared toothbrushes and sharp



objects among themselves compared with females<sup>26</sup>.

Sexual contact that was a major factor in the infection of HBV in this study was probably due to the higher number of females than the males. This is in tandem with many previous researchers<sup>26,27</sup>. University students are known to indulge in risky sexual exposure patterns and are hence prone to the disease<sup>24</sup>. Although, in this study only four students out of the ten that tested positive were sexually active. However, seventy-nine students who tested negative were also sexually active and they could be susceptible to the disease, especially those with multiple sexual partners. This result differed from that obtained among students in North-Central, Nigeria where the sexually transmitted disease was the major risk factor encountered<sup>26</sup>.

The occurrence level (5.5%) of infection of HBV in this study can be regarded as intermediate according to the classification<sup>32</sup>. Our finding of a 5.5% occurrence level of HBV can be considered low when compared to that of (13.6%)<sup>23</sup> and (16.3%)<sup>33</sup>, both among Nigerian population and (11.4%) among University of Maiduguri students<sup>14</sup>. A lower result (4.3 %) was however observed in Port Harcourt<sup>15</sup> while 5.7% obtained from Ilorin can be said to be consistent with the finding of this study<sup>16</sup>. These variations could be attributed to the screening methods and the group of the study populations. Other countries with similar intermediate pandemic levels (2%-8%) with that of Nigeria were Senegal, Liberia, Kenya, Sierra Leone, Ivory Coast, and Zambia<sup>34</sup>. Those with a very low pandemic level (< 2%) included Tunisia, Egypt and Algeria. Saudi Arabia (2.6%), India (3.5%), Singapore (3.6%) and China (7.18%)<sup>34</sup>.

#### **Limitation of the study:**

The sample size was small and located in the health services of one tertiary institution; therefore, the study may not be generalizable to other student populations.

## **CONCLUSION**

The incidence of infection of HBV was intermediate and the risk factors identified were age, use of injectable illicit drugs and sharing of utensils. Health professionals in the University of Ilorin Health Services should be obliged to educate students on infection of HBV and incorporate testing of HBV into the clinic investigations for students during the clinic registrations.

## **ACKNOWLEDGEMENTS**

The authors were grateful to the staff of the University of Ilorin Health Services and the students that consented to participate in the study.

This work received no funding and the authors declare that there are no conflicts of interest.

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