



## **Prevalence of HBV and its Associated Risks Factors among Patients Accessing Care at a Secondary Health Facility in Ekiti State, Southwest, Nigeria**

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### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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### **ABSTRACT**

Viral hepatitis is a serious disease of the liver that can have grim prognosis in the absence of early and appropriate medical intervention. Globally, an estimated two billion people are reported to have been infected with hepatitis B virus (HBV) and out of this, more than 350 million are said to have chronic(long term) liver infection. The likelihood that Hepatitis B Virus infection will become chronic depends upon the age at which a person becomes infected. Young children who become infected with HBV are most likely to develop chronic infection. About 25% of adults who become chronically

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infected during childhood die from HBV related liver cancer or cirrhosis. According to WHO ranking of hepatitis prevalence,  $\leq 1.9\%$ , 2-7.9% and  $\geq 8\%$  are low, moderate and high prevalence respectively. Hepatitis is endemic in Ekiti State, there is therefore the need to know its prevalence in the major cities of Ekiti State. Since Ikere-Ekiti is the second major city of Ekiti State, therefore this study set out to know the prevalence of HBV-caused hepatitis in Ikere-Ekiti and its associated factors. One hundred participants were enrolled- at the State specialist Hospital, Ikere-Ekiti- into the study after obtaining their informed consent. Consecutive sampling was used. Thirty-three (33%) of the subjects were males while 67 (67%) were females. Thirty-seven (37%), 30 (30%) and 33 (33%) respectively fell were in the  $\leq 26$  years, 27-36 and  $\geq 37$  age-brackets. Fifty-two (52%) were singles while 48 (48%) were married. Ninety-three (93%) were Christians while 7 (%) were Muslims. Structured self-administered questionnaires were served on the subjects. Five millilitres of blood were collected from each subject using venepuncture method. The samples were screened for the presence or otherwise of antibodies to HBsAg using a rapid test kit that worked on the principle of immunochromatography. An overall prevalence of 8% was discovered. Five (5%) of the positive subjects were males while 3 (%) were females ( $p=0.064$ ). Half (50%) of the positive subjects were within the  $\leq 26$  years age-bracket, the 27-36 age-bracket had the least number of positive subjects ( $p=0.512$ ). Two out of the positive subjects had a history of blood transfusion ( $p=0.748$ ), one had history of surgery ( $p=0.580$ ). The imports and implications of these are here discussed. Since viral hepatitis is vaccine-preventable and herd immunity can only be achieved when the vast majority of a society acquires immunity against a particular infectious disease, the government is advised to strive to vaccinate at least 70% of the populace against viral hepatitis- a disease which is endemic, not only in Ekiti State, but in many parts of Nigeria.

*Keywords: HBV; hepatitis; Ekiti; liver cirrhosis; liver carcinoma; Ikere-Ekiti.*

## 1. INTRODUCTION

Hepatitis B is a potentially life-threatening liver infection caused by the hepatitis B virus. It can also be seen as the inflammation of the liver [1].

Hepatitis can be caused by toxins, alcohol, hepatitis B virus and other viruses that can cause injury to the liver cells including the hepatitis A,C,D and E viruses. These viruses are not related to each other or to hepatitis B virus and differ in their structure, transmission mode among, individuals, severity or symptoms they can cause, the way they are treated and out come of the infection [2].

Hepatitis B is a global health challenge and the most serious type of viral hepatitis. It can cause chronic liver disease and put people at high risk of death from cirrhosis of liver and liver cancer [2].

World wide, an estimated two billion people have been infected with hepatitis B virus (HBV) and more than 350 million have chronic(long term) liver infection [3]. The likelihood that Hepatitis B Virus infection will become chronic depends upon the age at which a person becomes infected [4] Young children who become infected with HBV are most likely to develop chronic infection [5]. About 25% of adults who become

chronically infected during childhood die from HBV related liver cancer or cirrhosis [4]. Liver cancer caused by HBv is among the first three causes of death from cancer in men and major cause of cancer in women.High rates of chronic infection are also found in the Amazon and Southern part of middle east and India sub continent [6]. An estimated 2% - 5% of the general population in Western Europe and Northern American are chronically infected.

Hepatitis B virus is more common in the health settings [5] mainly because the health setting has a higher risk of infection as most patients comes from marginal section of the population where there are intravenous drug users who are highly exposed to the virus [7]. They spread the virus to other patients and health workers through contact with body fluids spilt contaminated blood and other patients who are infected as a result of traditional practices of circumcision, tribal marks and tattooing which were done using unsterilized sharp objects such as needles, razor blades etc [6] Stratified random survey of patients and health workers in the health settings in the New South Wales health setting shows that 64% (85/132 ) of female and 4% (264/657) of male reported a history of injection drug use within one year of imprisonment [6]. Another study estimated that 60% of patients in New South Wales health setting had a recent history of

injection drug use [3]. Similarly, a cross sectional survey of 1205 health setting populations in Ireland indicates that 9% of the population were carriers of the hepatitis B surface antigen, while 43% had a history of injection drug use and multiple sex-partner, which are the risk factors for hepatitis B virus [7].

## 2. STUDY AREA

Link to study area google map:  
<https://goo.gl/maps/y9w7r77F3miPbk3E9>

This study was carried out in Ikere-Ekiti, the second most populous and principal city of Ekiti State. Ekiti State was created on 1<sup>st</sup> October, 1996 along few other states across the country. According to a 2015 estimate, Ikere has a population of 203, 913 people (City Facts, 2015). It is situated between 7<sup>o</sup> 30' N and 5<sup>o</sup>14' E. The city has an area of 262 km<sup>2</sup>, 52.2% of the population are females, while 47.8% are males. Compared to the entire Ekiti as a state and Nigeria as a country, Ikere is densely populated, with a population density of 778.3/ km<sup>2</sup>. Ekiti State and Nigeria, respectively have a population density of 541.3 km<sup>2</sup> and 200.2 km<sup>2</sup>. Ikere-Ekiti is essentially an agrarian and mining community (Wikipedia, 2020). The landscape- like other places in Ekitiland- is dotted with mountains and this makes quarrying a thriving business in the town. The city has one major secondary health facility (where this study was carried out) and a number of primary health centres. There are three major types of religion in Ikere; Christianity, Islam and traditional religion. Like nearly all Ekiti cities and towns, about 90% of the populace are of the Christian faith [8].

### 2.1 Study Design

This study made use of convenience sampling design and as such 100 consenting respondents were consecutively sampled at the State Specialist Hospital, Ikere-Ekiti.

### 2.2 Study Population

The study population comprised 100 consenting volunteers who were consecutively enrolled into the study at the point of accessing health care at a secondary health facility- State Specialist Hospital- in the city of Ikere-Ekiti, southwest Nigeria.

### 2.3 Sampling Collection

About 5ml of blood samples were collected into EDTA bottles (Ethylene diamine tetraacetic acid)

using venepuncture method from consecutively sampled 100 patients who accessed care at the State Specialist Hospital, Ikere-Ekiti, between October and November, 2020.

### 2.4 Sample Analysis

The samples were separated into sediments of plasma and corpuscles. The samples were then screened for the presence or otherwise of antibodies to HBsAg using an immunochromatographic rapid test-kit.

### 2.5 Inclusion Criteria

Adults and young adults accessing healthcare at the State Specialist Hospital, Ikere-Ekiti and who indicated their interest in participating in the study by signing the consent form, were enrolled into the study.

### 2.6 Administration of Questionnaire

Structured questionnaires were served on subjects so as to determine the risk-factors that predisposed positive subjects to hepatitis. Self-administered questionnaires were served on the literate subjects, while interviewer-administered ones were served on the non-literate.

### 2.7 Statistical Analysis

Data generated were analysed using SPSS, through descriptive and inferential tools.

## 3. RESULTS

The study comprised 33(33%) male and 67 (67%) female subjects.

Eight out of the 100 subjects tested positive for antibodies to HBsAg, thus giving an overall prevalence of 8% (see Table 1). Thirty-five (35%) of the subjects were 26years years old or less, 30 (30%) and 33 (33%) respectively fell within the 27-36 age bracket and  $\geq 37$  (see Table 2).

Thirty-three (33%) of the subjects were males, while 67 (67%) were females (see Table 3).

Fifty-two (52%) were single, while the remaining 48 (48%) were married (see Table 4).

Religion-wise, 93 (93%) were Christians while 7(7%) were Muslims (see Table 5).

Educationally, one (1%) of the subjects had only primary education, 22 (22%) had secondary

education, 41 (41%) had OND/NCE, 24(24%) had B.Sc/HND, while 12 (12%) were educated up to postgraduate level (see Table 6).

Out of the eight positive subjects, 4, 1 and 3 respectively fell within the  $\leq 26$ , 27-36 and  $\geq 37$  age brackets (p-value 0.512), thus indicating that age wasn't a statistically significant factor in the rate at which the subjects got infected (see Table 7).

Five males (5%) were positive, while 3 were positive. Twenty-eight and 64 males and females respectively were negative, p-value =0.064, thus indicating that is no significant association between gender and the subjects' hepatitis B status (see Table 8).

Two (2%) out of the positive subjects had a history of blood transfusion, while the remaining 6 (6%) had never received blood transfusion. Twenty-eight of the negative subjects had history of blood transfusion, while the remaining did not (see Table 9).

Only 1 (1%) out of the positive subjects had a history of surgical operation, the remaining 7 (7%) positive subjects did not report a history of surgical operation, though 19 out of the negative subjects also reported history of surgery (see Table 10)

**Table 1. Overall Prevalence**

Positive	8
Negative	92
Total	100

**Table 2. Age-Distribution**

Bracket (years)	
$\leq 26$	37
27-36	30
$\geq 37$	33
Total	100

**Table 3. Gender Distribution**

Male	33
Female	67
Total	100

**Table 4. Marital Status**

Single	52
Married	48
Total	100

**Table 5. Religion**

Christians	93
Muslims	7
Total	100

**Table 6. Level of Education**

Primary	1
Secondary	22
OND/NCE	41
B. Sc/HND	24
Postgraduate	12
Total	100

#### 4. DISCUSSION

HBV (Hepatitis B Virus) -caused hepatitis is a serious liver infection which- in the absence of early and appropriate intervention- have unpleasant outcomes. These outcomes could be liver cirrhosis or liver carcinoma, both of which are life-threatening infections (Omatola et al, 2020).

In this present study, an overall prevalence of 8% was found among the subjects who were patients accessing care at the State Specialist Hospital, Ikere-Ekiti (Ekiti State, Nigeria). This is a high rate in the light of WHO [9] categorisation which classified  $\geq 1.9\%$  as low prevalence, 2-7.9% as moderate and  $\geq 8\%$  as high prevalence. The findings of this present study corroborate the results of various workers that hepatitis is endemic in developing countries, particularly sub-Saharan countries. Endemicity of hepatitis in developing countries – especially Nigeria- is precipitated by a large number of hepatitis carriers who aren't even aware of the presence of the virus in their body and who for this reason wouldn't seek early medical intervention, with the consequence that they continue to pose the danger of transmitting the infection to their close contacts, like family members, friends, colleagues etc.

It's been estimated that about 10% of infected adults, 90% of infants infected at birth and 50% of children aged 1-5 years are the risk of progressing to chronic infection stage [9,10]. The 8% overall prevalence discovered in this present study compares favourably with the findings of Omatsola et al., at Ankpa, Kogi State (northcentral, Nigeria); Eke at al. [11] at Nnewi, southeast, Nigeria; Olokoba et al. [12] at Yola, northeast, Nigeria and Luka et al. [13] at Zaria, northcentral, Nigeria.

**Table 7. Subjects' Result According to Age**

Age-Bracket	Positive		Negative		p-value
	Count	%	Count	%	
≤ 26	4	50	33	36	0.512
27-36	1	13	29	32	
≥ 37	3	38	30	33	
Total	8		92		

**Table 8. Subjects' Result According to Gender**

Gender	Positive		Negative		p-value	
	Count	%	Count	%		
Male	5	53	28	30	0.064	
Female	3	38	64	70		
Total	8		92			100

**Table 9. Subjects' Result According to Blood Transfusion**

Blood Transfusion	Positive		Negative		p-value
	Count	%	Count	%	
Yes	2	25	28	30	0.748
No	6	75	64	70	
Total	8		92		

**Table 10. Subjects' Result According to Surgery**

History of Surgery	Positive		Negative		p-value
	Count	%	Count	%	
Yes	1	13	19	21	0.580
No	7	88	73	79	
Total	8		92		

**Table 11. Subjects' Results According to Skin-Tattooing etc.**

Category	Hepatitis B Status				p-value	
	Positive (N=8)		Negative (N=92)			
	Count	%	Count	%		
Skin-Tattoo	Yes	1	13	20	22	0.538
	No	7	88	72	78	
Number of Sex-Partners	1	7	88	69	75	0.596
	2-3	1	13	13	14	
	None	0	0	10	11	
STD	Yes	1	13	30	33	0.238
	No	7	88	62	67	
Sexual Debut Age	≤15	0	0	5	5	0.845
	16-20	2	25	37	40	
	21-25	5	63	36	39	
	26-30	1	13	12	13	
	≥31	0	0	1	1	
	I don't know	0	0	1	1	

It is also similar to prevalences discovered in studies in Thailand [14] Brazil [15] Dar es Salaam [16] and India [8], but contrasts with prevalences reported in studies carried out in

Port Harcourt, southsouth Nigeria [17]. Abakaliki, southeast, Nigeria [15] and Uyo, southsouth, Nigeria [18].

HBV outbreaks occurring within the health settings are still in serious public health issue in high-income countries, involving patients already affected by pre-existing conditions such as chronic renal failure, diabetes and cancer or patients who have gone through solid organ transplant. In a developing country, however, it involves all health settings workers and patients accessing health care in the setting.

Though, according to a study the rate of Hepatitis B virus amongst randomly selected patients may not accurately reflect its true prevalence. It has been reported that the patients are at risk of getting infected with the virus due to overcrowding and the compromise of medical standards practice in the health settings [12].

In this present study, only 12.5% of the 8 positive subjects had a history of surgical operation, while only 2 had blood transfusion history.

From the overall results, it's inferable that the risk of men of any age-bracket getting infected is twice as that of their female counterparts. A disturbing angle to this is that, men who are infected with HBV put their sexual partner- since HBV- just like HIV infection- can be transmitted both vertically and horizontally.

Also from the overall result, 1 out of the positive subjects had surgical history while 19 out of the negative subjects also had surgical history and other risk factors such as blood transfusion, unprotected sexual intercourse and also may have had contact with family member's body fluid, which according to CDC are risk factors for infectious hepatitis B virus.

Based on the life history analysis, it is clear that patients accessing health care in health setting environment are at a high risk of infection with HBV. According to Goyer [7], hospital and health settings worldwide continue to demonstrate a significantly higher prevalence of hepatitis B virus infection. Other factors which entrench infection and endemicity include, high risk sexual behaviour among young adults aged 15-25 years who exchange sex for money with multiple sex partners, family history of hepatitis B infected patients and also tattooing among families and friends (Allwright et al., 1997).

## 5. CONCLUSION AND RECOMMENDATION

Going by the findings of this study, using WHO's hepatitis prevalence ranking, there's high prevalence ( $\geq 8\%$ ) of viral hepatitis in Ikere-Ekiti, the second largest city in Ekiti State. Since viral hepatitis is vaccine-preventable and herd immunity can only be achieved when the vast majority of a society acquires immunity against a particular infectious disease, the government should strive to vaccinate at least 70% of the populace against viral hepatitis- a disease which is endemic in many parts of Nigeria and educate the citizenry on simple safety precautions they can adopt to keep viral hepatitis away.

## CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

## ETHICAL APPROVAL

Ethical clearance for the study was obtained at the Ekiti State University Teaching Hospital, Ado-Ekiti, Ekiti State, Southwest Nigeria. Protocol number: EKSUTH/A67/2021/05/001

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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