

## Knowledge and Prevalence of Hepatitis B Virus Infection among Pregnant Women attending Antenatal Care Services at Federal Teaching Hospital Ido-Ekiti, Ekiti State, Southwest Nigeria

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### Abstract

*Viral hepatitis encompasses liver inflammation caused by hepatotropic viruses, including hepatitis A, B, C, D, and E. The global prevalence of hepatitis B infection surpasses 300 million people. Pregnant women are particularly vulnerable to this infection, which significantly impacts maternal and child health. Limited knowledge and inadequate surveillance programs in Nigeria contribute to underestimating the prevalence rate. This study aims to assess the prevalence and knowledge of hepatitis B virus infection among pregnant women attending antenatal care at Federal Teaching Hospital Ido-Ekiti in Ekiti State, Nigeria. A descriptive cross-sectional study design was employed, utilizing a multi-stage sampling technique. Data collection involved self-administered semi-structured questionnaires, and analysis was conducted using IBM SPSS version 27.0. Findings revealed that approximately 69.9% of the study respondents possessed good knowledge regarding hepatitis B infection. The prevalence of hepatitis B infection among respondents was 9.6%. Notable associations were observed between occupation, religion, parity, history of multiple sexual partners, knowledge, and the prevalence of hepatitis B infection. While most respondents exhibited commendable knowledge and surprisingly low prevalence rates within the facility, the government must enhance knowledge dissemination and increase accessibility to vaccinations. The occurrence of chronic liver disease and hepatocellular carcinoma are most time linked to Hepatitis B infection, however, most individuals are not aware of this. This study will help increase awareness of the causes and benefits of early diagnosis and treatment of the infection in order to prevent the life-threatening complications associated with it. It will help reduce the infection through policy and implementation of preventive strategies.*

**Keywords:** Ekiti State, Hepatitis B Infection, Knowledge, Prevalence, Pregnant Women

### Introduction

It is a lamentable tragedy that an organ accorded the title of “seat of life” or at least once so, continues to be plagued by dire pathology- hepatitis [1]. It is particularly difficult for this not to be seen as sad when one of the major causes- viral hepatitis, is vaccine

preventable [2]. Indeed, the numbers accounting for hepatitis infection, particularly hepatitis B continues to soar despite the existence of well tested and widely distributed vaccines worldwide [3]. Viral hepatitis is inflammation of the liver caused by a group of viruses which affect the liver as the primary organ [4]. They are thus, referred to as

hepatotropic and are designated hepatitis A, B, C, D and E [4]. These five are of great concern because of the burden of morbidity and mortality associated with them and the potential for outbreaks and epidemic spreads [4]. Although hepatitis A and E are significant health problems, they are typically characterized by a self-limiting course and are not complicated by significant clinical sequelae in the majority of cases [5]. Therefore, researchers have focused mainly on hepatitis B and hepatitis C virus pathogenesis, including the development of liver fibrosis, the immune responses, the mechanism of viral persistence and the development of hepatocellular carcinoma [6].

Hepatitis B Virus (HBV) is a DNA virus which has an outer circular lipid envelope and a core icosahedral nucleocapsid protein. The nucleocapsid encloses the viral DNA and DNA polymerase which has reverse transcriptase activity [4]. HBV infects only humans. Its transmission is by parenteral or mucosal exposure to HBsAg-positive blood or body fluids [4,7].

In 2016, the 194 member states of the World Health Organization committed to eliminating viral hepatitis as a public health threat by 2030 and with the deadline fast approaching, knowledge of those at risk is imperative to put up a good fight [8]. Those at-risk populations include infants of infected mothers, health care workers, men who have sex with other men, intravenous drug users, people with multiple sexual partners, people with chronic liver disease, people travelling to countries with high incidence of hepatitis B virus infection, amongst others [9].

It must be said that the prevalence of infections caused by these viruses is particularly high in developing countries, notably those in Africa [10]. Active immunization is the cornerstone for preventing hepatitis B virus mother-to-child transmission [11]. By 2012, 181 countries had implemented universal hepatitis B virus vaccination with

global coverage estimated to be greater than 79 percent [11], leading to a remarkable reduction of chronic viral hepatitis B in high-burden countries in East-Asia [12]. However, sub-Saharan Africa has low infant hepatitis B vaccine coverage: 72 percent in 2012 [13]. Although the World Health Organization recommends commencing hepatitis B virus vaccination at birth [14], in much of Africa, the first dose is given at about 6 weeks of age leading to its climbing incidence in these parts [15].

Antenatal care makes pregnancy and child-bearing a safe and satisfying experience, but it also ensures that infancy is as disease-free as possible [15]. In Nigeria, nearly sixty per cent of women have at least one antenatal care visit [15]. Antenatal care is a specialized program of observation, information, education and medical management of the pregnant woman, aimed at making pregnancy and childbirth a safe and satisfying experience [16]. Its overall purpose is to optimize the outcome of pregnancy for the mother, her child, and other members of the family. The need to eradicate it has never been greater and education on the disease, its risk factors, and the general level of knowledge about it will be important to achieve this target [4].

Vaccination against hepatitis B is the most effective strategy to control HBV infection, however, many are not aware of the infection, its complications and benefits of vaccination [17,18]. Concurrent use of hepatitis B immunoglobulin and hepatitis B vaccine has substantially reduced the mother-to-child transmission of HBV [18]. Despite the growing trend of the disease and the risk of mother-to-child transmission, there is a paucity of studies on Hepatitis B among pregnant women in Ekiti State, Southwest Nigeria. This study which aims at determining the knowledge and prevalence of Hepatitis B Virus Infection among Pregnant Women attending Antenatal Care Services at Federal Teaching Hospital Ido-Ekiti, Ekiti State,

Southwest Nigeria will not only increase awareness of the infection in order to prevent the life-threatening complications associated with it, it will also help in putting in place policies to reduce its growing trend.

## Methods

This is a cross-sectional study carried out among pregnant women who attend regular antenatal clinics at Federal Teaching Hospital, Ido-Ekiti, Ekiti State. Federal Teaching Hospital, Ido-Ekiti is a federal tertiary healthcare institution in Ekiti State and it provides quality healthcare services to the people of Ekiti State and its environs. It has a functioning department of Obstetrics and Gynecology and well-trained specialists in its arsenal. The department runs an outpatient antenatal clinic twice weekly where lab investigations are ordered.

A sample size of 408 was calculated using Fisher's formula  $n = Z^2 pq / d^2$  for the determination of sample size where  $Z$  is the Standard normal deviate = 1.96,  $p$  is the prevalence rate of hepatitis B [19] = 45.0% = 0.45,  $q$  is  $1 - p = 1 - 0.45 = 0.55$  and  $d$  is margin of error = 0.05. All pregnant women aged >18 years, either pregnant for the first time and/or had been pregnant before and were registered attendees at the antenatal clinics in Federal Teaching Hospital, Ido-Ekiti who gave written consent were recruited in this study. Critically ill pregnant women who needed emergency obstetrics care were excluded from the study.

A two-stage sampling technique method was employed in the selection of the study participants. The first stage involved the use of a stratified sampling technique to stratify study participants to clinic days. The study was carried out over 8 weeks with each week having two clinic days making a total of 16 clinics. With these 26 participants were recruited per clinic day throughout 16 clinics to make up the sample size of 408. The second stage involved the use of a simple random sampling technique by balloting to select 26

respondents out of the total number of pregnant women who present for a clinic each day using the clinic register.

Data was collected between October and December 2021 using a self-administered semi-structured questionnaire designed from previous studies [9,16,17] to capture the participant's HBsAg test results, demographic data and knowledge of HBV and its infection. Verbal consent and written Consent were obtained before the administration of the questionnaire. Participants were given clear instructions on how to fill in the questionnaire appropriately. The data obtained from the questionnaires were entered and analyzed with IBM, Statistical Package for Social Sciences (SPSS) version 27.0. Continuous variables (such as age) were summarized as means (and standard deviation) while categorical variables were summarized as tables. To determine the knowledge of participants, 12 questions that have the options of yes and no were scored with all correct answers having one (1) score and incorrect answers having zero scores and those who scored 60% or more of the cumulative score were classified as having good knowledge score. Bivariate analysis was done using Chi-square to determine the relationship between variables while multivariate analysis was done using logistic regression analysis to determine the predictors of Hepatitis B infection. The level of statistical significance was taken at  $p$ -value < 0.05 and confidence at 95%.

## Ethical Consideration

An ethical clearance was obtained from the Health Research and Ethical Committees of Federal Teaching Hospital, Ido-Ekiti with approval number ERC/2021/09/06/626B. Informed consent was obtained from the participant via signing the informed consent form in carrying out the study. Confidentiality was ensured through anonymous distribution (names of respondents not included and required in the filling of the questionnaire) of

the questionnaire and data saved in a confidential file.

## Results

### Socio-demographic Characteristics

The mean age of the respondents was 30.3± 5.6 years with most of them being within the age range of 25-34 (58.1%). Majorities had

secondary education (60.3%), resided in a rural area (56.1%), were traders (33.8%), were married (76.7%), were Christians (70.8%), multiparous (48.6%), in their second trimester (47.1%), had a single sexual partner (90.2%) and earned ≥ 30,000 Naira (84.3%) (**Table 1**).

**Table 1.** Socio-demographic Characteristics of Respondents

Variable	Frequency N = 408	Percentage (%)
<b>Age group (in years)</b>		
15 – 24	69	16.9
25 – 34	237	58.1
35 – 44	102	25.0
<i>Mean age ± SD</i>	<i>30.3± 5.6</i>	
<b>Educational Status</b>		
Primary	123	30.1
Secondary	246	60.3
Tertiary	39	9.6
<b>Residence</b>		
Rural	229	56.1
Urban	179	43.9
<b>Occupation</b>		
Unemployed	101	24.8
Civil servant	94	23.0
Artisan	10	2.5
Trading	138	33.8
Student	51	12.5
Others	14	3.4
<b>Marital Status</b>		
Single (Never Married)	45	11.0
Separated/divorced	16	3.9
Married	347	85.1
<b>Religion</b>		
Christian	289	70.8
Muslim	115	28.2
<b>Parity</b>		
Nulliparous	41	10.0
Primiparous	154	37.7
Multiparous	198	48.6
Grand multiparous	15	3.7
<b>Sexual Partner</b>		
Single	368	90.2

Multiple	40	9.8
<b>Average monthly income</b>		
≥ 30,000 Naira	344	84.3
< 30,000 Naira	64	15.7

### Respondents' Knowledge on HBV Infection

About (69.9%) of the respondents had good knowledge ( $\geq 60\%$  knowledge score) of Hepatitis B infection in this facility (**Table 2**).

**Table 2.** Knowledge of Hepatitis B among Respondents in this Study

Variable	Frequency N = 408	Percentage (%)
<b>Knowledge of Hepatitis B</b>		
Good ( $\geq 60\%$ )	285	69.9
Poor ( $< 60\%$ )	123	30.1
Mean knowledge score $\pm$ SD (%)	71.7 $\pm$ 19.0	

### Prevalence of HBV Infection among Respondents in this Study

The prevalence of Hepatitis B infection amongst respondents was 9.6%. It is however

noted that only 76.7% (313 out of 408) of the respondents have done their Hepatitis B Virus test before. (**Table 3**)

**Table 3.** Prevalence of Hepatitis B among Respondents in this Study

Variable	Frequency N = 408	Percentage (%)
<b>Hepatitis B test done/status known</b>		
Yes	313	76.7
No	95	23.3
<b>Prevalence of Hepatitis B (n = 313)</b>		
Positive	30	9.6
Negative	283	90.4

### Relationship between Socio-demographic Factors and Prevalence of Hepatitis B

Educational status, occupation, religion, parity and having multiple sexual partners were significantly associated with Hepatitis B Virus infection (**Table 4**)

**Table 4.** Relationship between Socio-demographic Factors and Prevalence of Hepatitis B

Variable	Hepatitis B positivity	
	Yes n (%)	No n (%)
<b>Age group (years)</b>		
15 – 24	6 (12.5)	42 (87.5)
25 – 34	19 (10.6)	161 (89.4)
35 – 44	5 (5.9)	80 (94.1)
Statistical test	$\chi^2 = 2.011, p = 0.366$	
<b>Educational Status</b>		
Primary	4 (14.3)	24 (85.7)

Secondary	12 (14.1)	73 (85.9)
Tertiary	14 (7.0)	186 (93.0)
<i>Statistical test</i>	$\chi^2 = 5.039, p = 0.080$	
<b>Residence</b>		
Rural	16 (9.6)	150 (90.4)
Urban	14 (9.5)	133 (90.5)
<i>Statistical test</i>	$\chi^2 = 0.001, p = 0.973$	
<b>Occupation</b>		
Unemployed	18 (16.8)	89 (83.2)
Employed	12 (5.8)	194 (94.2)
<i>Statistical test</i>	$\chi^2 = 9.828, p = 0.002$	
<b>Marital Status</b>		
Single ( <i>Never married and divorced</i> )	13 (16.0)	68 (84.0)
Married	17 (7.3)	215 (92.7)
<i>Statistical test</i>	$\chi^2 = 2.031, p = 0.382$	
<b>Religion</b>		
Christian	13 (5.6)	
Muslim	17 (21.0)	
<i>Statistical test</i>	$\chi^2 = 16.397, p < 0.001$	
<b>Parity</b>		
Nulliparous	1 (5.0)	
Primiparous	18 (15.4)	
Multiparous	8 (4.8)	
Grand multiparous	3 (27.3)	
<i>Statistical test</i>	$\chi^2 = 13.269, p = 0.004$	
<b>Sexual partner</b>		
Single	24 (8.5)	
Multiple	6 (20.0)	
<i>Statistical test</i>	$\chi^2 = 4.153, p = 0.042$	
<b>Monthly income</b>		
≥ 30,000 Naira	17 (9.3)	
< 30,000 Naira	13 (10.0)	
<i>Statistical test</i>	$\chi^2 = 0.044, p = 0.833$	

\* $\chi^2$  = Chi-square,  $p$  =  $p$ -value

### Relationship between Respondents' Knowledge and Prevalence of Hepatitis B

Poor knowledge of Hepatitis B Virus infection was statistically significantly associated with the prevalence of the infection ( $p = 0.017$ ). - (Table 5)

**Table 5.** Relationship between Respondents' Knowledge and Prevalence of Hepatitis B

Variable	Hepatitis B positivity	
	Yes n (%)	No n (%)
<b>Knowledge of Hepatitis B &amp; C</b>		
Good ( $\geq 60\%$ )	16 (7.1)	209 (92.9)
Poor ( $< 60\%$ )	14 (15.9)	74 (84.1)
Statistical test	$\chi^2 = 5.650,$ $p = 0.017$	

\* $\chi^2$  = Chi-square,  $p = p$ -value

Binary logistic regression for the predictors of Hepatitis B positivity among respondents in this study (Table 6)

**Table 6.** Binary Logistic Regression for the Predictors of Hepatitis B Positivity among Respondents in this Study

Variable	Hepatitis B positivity	
	AOR (95% CI)	P
<b>Occupation</b>		
Employed	1.000	
Unemployed	3.785 (1.500 – 9.549)	0.005
<b>Religion</b>		
Christian	1.000	
Muslim	4.216 (1.684 – 10.553)	0.002
<b>Parity</b>		
Nulliparous	1.000	
Primiparous	8.700 (0.927 – 81.635)	0.058
Multiparous	4.034 (0.366 – 44.503)	0.255
Grand multiparous	21.142 (1.403 – 318.629)	0.027
<b>Sexual partner</b>		
Single	1.000	
Multiple	2.882 (1.004 – 9.095)	0.048
<b>Knowledge of Hepatitis</b>		
Good ( $\geq 60\%$ )	1.000	
Poor ( $< 60\%$ )	2.528 (1.090 – 4.959)	0.045

\*AOR = Adjusted Odds Ratio,  $p = p$ -value.

Being unemployed is about four times more likely to have Hepatitis B Virus infection than those employed (AOR: 3.785,  $p = 0.005$ ), Muslims are four times more likely to have Hepatitis B Virus infection than Christians (AOR: 4.216,  $p = 0.002$ ), Grand multiparous are twenty-one times more likely to have Hepatitis B Virus infection than nulliparous (AOR: 21.142,  $p = 0.027$ ), those who have

multiple sexual partners are about thrice more likely to have Hepatitis B Virus infection than those who have single sexual partner (AOR: 2.882,  $p = 0.048$ ) and those with poor knowledge of the infection twice times more likely to have Hepatitis B Virus infection than those with good knowledge (AOR: 2.528,  $p = 0.045$ )

## Discussion

A greater percentage of respondents have heard of Hepatitis B infection (84.3%) and are aware that Hepatitis B is caused by a virus. This may be because the study participants attend a tertiary health institution which has a specialized unit for Hepatitis management. This finding by this study is similar to the finding in a study done in three southern states of Nigeria where an awareness rate of 70% was reported and another study in Northern Nigeria though among students where 63.6% of the respondents were aware of the disease [20,21]. However, it is much higher than the finding in a study done among households in Malaysia which reported that only 38.8% of the respondents were aware of Hepatitis B [22]. The much lower finding among the Malaysian respondents may be because of the community-based approach as against the Hospital-based used in our study.

This study found that about 69.9% of the respondents had good knowledge of Hepatitis B infection. This finding may be due to good regular health education for pregnant women attending antenatal clinics in the facility. This study finding shows a higher knowledge when compared to studies done in southern Nigeria and Mbagathi District Hospital in Nairobi, Kenya, where the study participants' knowledge of Hepatitis B was 46.4% and 49.8% respectively [20,23]. The findings of this study are also much higher than findings among tertiary institution students in Northern Nigeria, among a community-based study done among households in Malaysia and among a population of respondents in Khartoum State, Sudan where only 36.9% and 43.7% of the study participants had good knowledge of Hepatitis B [21,22,24]. This wider difference may be due to the differences in the study settings.

The prevalence of hepatitis B infection among respondents was 9.6%. This finding fits into the prevalence range in the West African region of 6.2% to 16% and is similar to

findings in a systematic review study done on hepatitis B in Nigeria between 2010-2019 where an average prevalence rate of 9.5% was reported [25,26]. It is also similar to a study done in Sudan where a self-reported prevalence rate of 9.6% was documented [24]. However, this study finding showed a significantly higher prevalence compared to a similar study done in Ekiti State in 2012 on hepatitis B surface antigenaemia among pregnant women in a tertiary health institution in Ekiti State, Nigeria where a prevalence rate of 4% was reported [27]. It is also higher than the findings of a study done at University College Ibadan on the hazards of Hepatitis B on pregnant women with a prevalence rate of 1.7% [28].

Religion, unemployment status, having multiple sexual partners and knowledge were predictors of Hepatitis B Virus infection as found in this study. Muslims were four times more likely to have hepatitis B infection than Christians, unemployed respondents were about four times more likely to have hepatitis B infection than employed respondents, respondents with multiple sexual partners were three times more likely to have hepatitis B infection than those with single sexual partners and those with good knowledge of Hepatitis B were about two and half times more likely to have hepatitis B infection than those with poor knowledge. This is partly similar to some findings and dissimilar to others in systematic review and meta-analysis studies done on epidemiological studies published between 2005 and 2020 where Blood transfusion, scarification, promiscuity, HIV seropositivity, and being male were independent predictors documented to be significantly associated with HBV infection and a study done in Ethiopia where history of abortion and having multiple sexual partners were predictors of the disease [29,30]. The findings of this study are also different from as documented in a study on risk factors of hepatitis B virus infection in Northern Ethiopia where familial exposure to



hepatitis, prior traditional medical procedure and history of dental procedures were risk factors for Hepatitis B virus infection and another on prevalence and factors associated with hepatitis B virus infection among household members in Beijing where having household members infected or exposed to HBV was documented to increase the risk of HBV transmission [31, 32].

This study improved the consciousness of pregnant women on hepatitis B infection and the risk of transmission to the unborn child. It also emphasized the reason why hepatitis B surface antigen is a compulsory antenatal care investigation. However, this study is done in a tertiary health centre and findings may be slightly different from the study done at primary health care centres that are being mostly patronized by those in rural communities. Therefore, a future study to determine and compare knowledge, prevalence and factors associated with hepatitis B virus infection among pregnant women in primary and tertiary healthcare facilities will be beneficial.

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## Conclusion

Encouraging portions (84.3%) of this study's respondents were aware of Hepatitis B virus infection and 69.9% had good knowledge of the disease. The Prevalence of Hepatitis B virus infection found by this study was 9.6% while religion, age, unemployment status and knowledge were predictors found to be significantly associated with Hepatitis B Virus infection. It is however recommended that the Government and other relevant stakeholders need to institute continuous awareness campaign programmes on causes, risk factors and symptoms of Hepatitis B virus infection to increase knowledge and reduce the prevalence of the disease.

## Competing Interest

The authors declare no competing or conflict of interest.

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