



# **Analysis On Prevalence Of Hepatitis B Among Pregnant Women In Katsina Local Government Area, Katsina State, Nigeria**

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## **ABSTRACT**

Infection with Hepatitis B virus (HBV) is a serious public health problem worldwide, with over 360 million carriers. Sixty Million of these are resident in Sub-Saharan Africa. Hepatitis B infection is the cause of Hepatocellular carcinoma (HCC), Vertical transmission is the commonest route of spread of Hepatitis B Virus in many endemic areas. The main aim of the study was to determine the prevalence of Hepatitis B surface antigen (HBsAg) among pregnant women attending antenatal clinic at the different clinic and hospitals in Katsina metropolis of katsina state. Federal teaching hospital Katsina and General hospital Katsina where considered for the research area 320 pregnant women where tested using commercial rapid diagnostic Elisa kits at the point of care within the period of research from June to December in which 72(22.5%) are positive of (HBsAg). In this study, history of jaundice, and Sharp injury are highly associated with prevalence of HBV infection among the pregnant women in katsina local government of Katsina state, under the p-value <0.05.

**Keywords:** Prevalence, hepatitis B, pregnant women

## **INTRODUCTION**

Hepatitis B virus (HBV), a DNA virus of the family *Hepadnaviridae* is the causative agent of hepatitis B infection. Hepatitis B is one of the most common infectious diseases in the world and a major health problem. It is 50 to 100 times more infectious than HIV and 10 times more infectious than hepatitis C virus (HCV) with many carriers not realizing they are infected with the virus. It is an important cause of liver diseases such that chronic infection with HBV is a common cause of death associated with liver failure, cirrhosis and liver cancer.

Infection with the hepatitis B virus (HBV) happen to be a global public health issue. About 360 million of the 2 billion people infected with HBV (about a third of the world's population) are known to be chronic carriers (Hwang and Cheung 2011). Furthermore, approximately a million of these infected people die each year, mostly from hepatitis B consequences such as liver cirrhosis and cancer (Perz et al. 2006). After Asia, Sub-Saharan Africa has the second highest global burden of chronic hepatitis B infection carriers (Hwang, and Cheung, 2011). Though the true incidence of HBV infection in Sub-Saharan Africa remains unknown due to incorrect medical records and underreporting of cases, particularly in rural areas where the bulk of the population lives. Hepatitis B antiginaemia seroprevalence estimates of 6–20 percent have been observed, making Sub-Saharan Africa a hyper-endemic zone. Nigeria is likewise a country

where HBV is hyper-endemic, with rates ranging from 0.5 to 44.7 percent (Okonko and Okeretugba 2007). The age at which an infection is acquired is inversely associated to the chance of acquiring chronic HBV infection, which is defined as being positive for hepatitis B surface antigenaemia (HBsAg) for more than 6 months. In general, newborns infected at birth have a 90 percent chance of developing chronic HBV infection, whereas children infected between the ages of 1 and 5 have a 30 percent chance, and older children and adults have a 1–5% chance, in addition to hepatocellular carcinoma, chronic HBV infection has been linked to the development of chronic liver disease (Emechebe et al., 2009). Viral hepatitis has become a public health problem and the need governments and populations to take action to prevent, diagnose and treat it. WHO are called upon to provide the necessary technical support to enable Member States to develop robust national viral hepatitis prevention, diagnosis and treatment strategies with time-bound goals and to survey the feasibility of eliminating hepatitis B and hepatitis C. In recognition of its public health importance, target 3.3 of the 2030 Agenda for Sustainable Development 5 calls for specific action to combat viral hepatitis. The Global Health Sector Strategy (GHSS) 2016 – 2021 addresses all five hepatitis viruses (hepatitis A, B, C, D and E), with particular focus on hepatitis B and C, owing to the relative public health burden they represent. The strategy defines a set of priority actions for countries to undertake, which are organized under five strategic directions, namely information for focused action, interventions for impact, delivering for equity, financing for sustainability and innovation for acceleration of the response. This framework is aligned with the GHSS on viral hepatitis and it takes into consideration the specific priorities of the African Region. It provides a platform for Member States to implement effective interventions for the viral hepatitis response. The disease affects people of all age groups, but in most studies conducted recently HBV infection is predominant in young adults and are acquired sexually or through injecting drug use. (Aba et al., 2012). Most people who become infected with HBV are able to clear the virus from their blood stream within 6 months of post infection and develop immunity. Those who have not cleared the virus after 6 months are considered to have chronic hepatitis B infection. The risk of death from HBV related liver cancer or cirrhosis is approximately 25% for persons who acquire chronic infection at childhood. Moreover, 8% to 10% of people in the general population in developing countries become chronically infected and most acquire infection with HBV at childhood. (Ahizechukwu et al., 2011) they also discovered that Nigeria is classified among the group of countries highly endemic for HBV infection. About 75% of the Nigerian population is reportedly likely to have been exposed to HBV at one time or the other in their life. Although hepatitis B vaccination is highly effective in preventing infection with HBV and consequent acute and chronic liver disease, this infection is still a major problem in Nigeria as reported by various workers.

Although there are around eight distinct genotypes of HBV, the E genotype has been found to be the most common in Sub-Saharan Africa. HBV is highly contagious and is usually transmitted vertically from mother to infant at birth, through blood products, intravenous drug use, sexual interactions, scarifications/tattooing, sharing of insufficiently sanitized syringes and needles, and institutional and intimate care with carriers (Bukbuk et al., 2005). Hepatitis B prevention relies heavily on the hepatitis B vaccine. Hepatitis B immunization is approximately 95% effective in preventing infection. All babies should have the HBV vaccine during the first 24 hours of their life, according to the World Health Organization (WHO). WHO is also striving to raise awareness, build partnerships, mobilize resources, and provide evidence-based policies and statistics to help people get access to screening, care, and treatment.

### **Acute Viral Hepatitis B**

The Viral Hepatitis B disease is classified into two states which may be acute state or chronic state. Acute Hepatitis infections have a 1 month (4-6 weeks) to as long as 6 months incubation period after transmission as the virus spreads within the liver. In approximately 65% of acute infections the infection and resolution is clinically silent. Symptoms that are clinically recognized in the remaining cases include decreased appetite, nausea and vomiting, fatigue and abdominal pain as well as jaundice in the more severe cases. These symptoms most often result from increased production of pro-inflammatory cytokines such as INF- $\gamma$  or TNF- $\alpha$ . The first serological marker to become detectable during infection is the HBsAg, which usually becomes detectable at 8-12 weeks post-infection, assuming a one (1) month incubation.

This marker typically precedes an elevation of serum ALT levels and symptoms of hepatitis by 2 to 6 weeks and remains detectable throughout the symptomatic phase. After the onset of jaundice, HBsAg titres gradually decrease and usually become undetectable after 2 to 6 months. Shortly thereafter antibodies against S-antigen (Anti-HBs) become detectable in the serum and may remain detectable indefinitely.

### **Chronic Viral Hepatitis B**

Chronic Hepatitis B, or the persistence of HBsAg and HBV disease for more than 6 months, is host and virus dependant and presents in several distinct phases based on differing levels of viral replication and intensity of the immune response. Carriers experience an initial immune tolerant phase characterised by near normal levels of ALT, high levels of HBV DNA and both HBsAg and HBeAg positivity. This phase ends when the immune system matures (in younger carriers) or recovers and begins to control and clear the virus. The end of the immune clearance (or immune active) phase is often marked by HBeAg seroconversion when HBeAg levels become undetectable and Anti-HBe antibodies appear. This is considered a good clinical sign and marks the beginning of an inactive carrier state because high HBeAg levels are indicative of high viral replication and infectivity, whereas high Anti-HBe levels indicate a low level of viral replication with low to moderate infectivity. In some cases, patients may fail to undergo seroconversion and remain in the immune active phase which is associated with an increase in ALT and high but variable HBV DNA titers. During this phase the virus causes more severe liver damage while the host immune system is unable to control the infection. This eventually contributes to liver cirrhosis and hepatocellular carcinoma (Kramvis 2008). It should be noted, that the phases of chronic infection are not static and an active phase can move to an inactive phase and vice versa. One such “reactivation”, the 18 immune escape phase, occurs when infected individuals acquire HBV strains with mutations that prevent the expression of e-antigen. The term HBeAg-negative chronic hepatitis carrier now has a wider geographic distribution and refers to all chronic carriers with hepatitis B with mutations which diminish or abolish HBeAg production (Hadziyannis and Vassilopoulos 2001). This phenomenon has been well studied and reported in South African Negroid populations who are infected with subgenotype (Kramvis 2008) but these reports have largely been ignored in global discussions on HBeAg-negative chronic hepatitis B from regions where subgenotype A2 is prevalent.

### **Current Situation**

At the 2022 world health assembly, countries recommitted to eliminate viral hepatitis by 2030. Since the initial history committed in 2016, the sustainable development goal 2020 target of reducing the prevalence of hepatitis B in children under 5 years to under 1% has been met globally and most WHO regions. In addition, the number of people receiving treatment for hepatitis C has increase 10-fold to more than 10 million. The world health organization (WHO) estimated that during 2019, 296 million people worldwide are living with hepatitis B. 58 million worldwide are living with hepatitis C and 1.5 million people where newly infected with the chronic hepatitis B and in the year 2019, hepatitis B resulted in an estimated 820,000 deaths mostly from cirrhosis and hepatocellular carcinoma (primary liver cancer). In 2013, viral hepatitis was the seventh highest cause of mortality in the world. It is responsible for an estimated 1.4 million deaths per year, mostly hepatitis-related liver cancer and cirrhosis of those deaths, approximately 47% are attributable to hepatitis B virus, 48% to hepatitis C virus and the remainder to hepatitis A virus and hepatitis E virus.6 In the African Region, hepatitis B is highly endemic and probably affects an estimated 5–8% of the population, mainly in West and Central Africa. It is estimated that 19 million adults in the Region are chronically infected with hepatitis C. Viral hepatitis is also a growing cause of mortality among people living with HIV. About 2.3 million people living with HIV are coinfectd with hepatitis C virus and 2.6 million with hepatitis B virus. Recent outbreaks of hepatitis E virus have been reported in Chad, Senegal, South Sudan and Uganda and high levels of endemicity have been reported in other countries in the African Region. The hepatitis B virus vaccine is administered in all 47 Member States and coverage of the three-dose childhood vaccination is 77%. However, hepatitis B birth-dose was introduced in few countries with a low regional coverage reported at 11%.10 In 2015, it

was estimated that less than 5% of people with chronic hepatitis infection were aware of their status and less than 1% of those in need accessed effective antiviral therapy.

Hepatitis B is a virus that targets the liver and causes both acute and chronic illness. The virus is most commonly passed from mother to child during birth and delivery, as well as through contact with blood or other bodily fluids, such as sex with an infected partner, injection-drug use that involves sharing needles, syringes, or drug-preparation equipment, and needle sticks or exposures to sharp instrument. Nigeria is included in the list of countries where HBV infection is endemic. Approximately 18 million Nigerians are currently afflicted (Jombo, 2005). Many of these people may be unaware that they have an infection and hence fail to seek medical help, leading to chronic liver disease, cirrhosis, and hepatocellular cancer. Pregnant women, on the other hand, pose a major health risk not just to their unborn child but also to society as a whole. Although research on HBV have been conducted in other regions of the country, as a result, there are no guidelines or any adequate information on prevention and control techniques.

This research is aimed to identify the prevalence of Hepatitis B and the influencing factors in pregnant women in Katsina Local Government and to provide information on its prevention and control strategies.

### **Transmission of Hepatitis B Virus**

Hepatitis B virus is a blood borne and sexually transmitted pathogen that is spread through contaminated blood or other body fluids (saliva, sweat, semen, vaginal secretions, breast milk, urine, and feces). Transmission can occur when using the same syringe as an infected person, from blood transfusions prior to 1975 (now screened in most countries), having tattoos or body piercing, from mother to child during childbirth, during medical procedures, occupational exposure, during sexual intercourse. Hepatitis B virus also shares similar routes of transmission with HIV. (Chang 2007). Currently, there are four recognized modes of transmission which are; from mother to child at birth (prenatal), by contact with infected person (horizontal), by sexual contact and by exposure to blood or other infected fluids. Because HBV can remain stable and infectious on environmental surfaces for at least 7 days, transmission may occur indirectly via contaminated surfaces and other objects such as tooth brush, baby bottles, razors, eating utensil, hospitals equipment's, by contact with mucous membranes or open skin breaks. (Willey et al 2011).

### **Hepatitis B Vaccine**

The HBV vaccine consists of a yeast-derived recombinant HBsAg protein (Engerix-B) and is effective at producing protection in up to 95% of immunocompetent recipients. The first vaccine experiments, observing immuno-protection elicited by immunization with short HBsAg irrespective of subtype showed effective protection (Brocke et al., 2005). However, the majority of anti-HBsAg antibodies of the primary immune response were type specific.

### **Research Questions**

- i. What are the prevalence of hepatitis B virus carrier?
- ii. What are the infectivity statuses of carrier pregnant women in Katsina Local Government?
- iii. What are the recent information on its prevention, control strategies and possible cures of the virus?

### **Objectives of the Study**

This research is aimed to identify the prevalence of Hepatitis B and the influencing factors in pregnant women, and the specific objectives of this study are:

- To determine the prevalence of Hepatitis B surface antigen among pregnant women in Katsina local government.
- To identify factors associated with Hepatitis B surface antigen among pregnant women attending antenatal clinic.
- To provide information on its prevention, control strategies and possible cures of the virus.

## **RESEARCH METHODS**

### **Study Area**

The study was conducted in Katsina metropolis. Katsina State which is located at latitude 12.15°N and longitude 7.30°E and the Population of the state is about 5,801,584. The city of Katsina is an urban area which is estimated to have 505,000 populations in 2022.

### **Research Design**

To find the Analysis on prevalence of Hepatitis B Among Pregnant Women in Katsina Local Government Area, Katsina State. The researchers adopt a descriptive design with a survey method. The researchers also conduct a survey that is primarily quantitative in nature with some qualitative elements. The study entails to analyses the number of patients recorded in federal teaching hospital Katsina and General Hospital Katsina from Katsina local Government area for the period of June to December 2022. As well as their social status, the research will analyse the hepatitis B patients' awareness, causes, control measure and some possible treatment of hepatitis B in Katsina Local Government Area, Katsina State, Nigeria.

### **Method of Data collection**

The researcher analyses the secondary data that was obtained from the record departments of laboratory and Antenatal care unit of Federal Teaching hospital Katsina and General Hospital Katsina. Data from laboratory and Data on deliveries is considered since it contained all the required information about the pregnant women that attend antenatal. The ethical approval was obtained from the ethical committee of Katsina state ministry of Health and federal teaching hospital Katsina.

### **Method Data processing and analysis**

After the data collection, each questionnaire was checked for its completeness. Data entry, cleaning and coding done by Microsoft Excel software package and was exported to SPSS window (version 23.0) for analysis. Logistic regression was carried out to identify the predictors associated with HBV infection. All variables with p-value of <0.05 in bivariate logistic regression were taken into Crude Odd Ratios (COR) and Adjusted Odds Ratios (AOR) with their 95% Confidence Intervals (CI) were calculated. Tables, cross tabulations was used to present the data.

### **Exclusion criteria**

The research should involves every pregnant woman that attend antenatal clinic in the Federal teaching hospital Katsina and General hospital Katsina for the period of June to December 2022, The study should exclude those that only go for checkup after home delivery in which there record is not captured in the antenatal record book and women who are found not to be pregnant after the pregnancy test.

**RESULTS AND DISCUSSION**

This research used the data collected from the laboratory and antenatal care units of the hospitals in Katsina metropolis of Katsina state. To obtained the following result

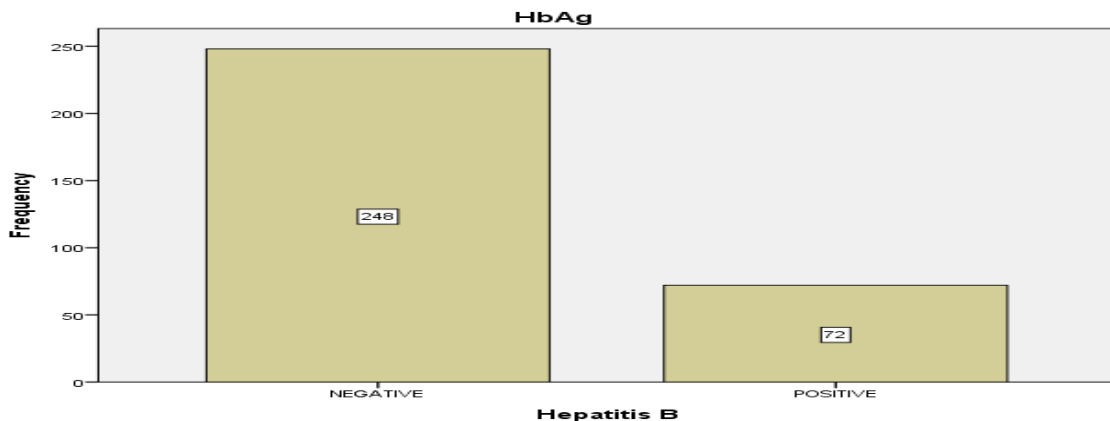
**Demographic profile of the respondents**

This section analyzed personal data of the respondents, under the research the data includes their Age, Educational level, place of residence and gestation of the pregnant women.

**Table 1: Socio-demographic Characteristics of pregnant women**

AGE	Frequency	Percent (%)
10-20	12	3.8%
21-30	109	34.1%
AD	198	61.9%
Total	320	100.0%
<b>Educational Level</b>		
Primary.	259	80.9%
Secondary.	51	15.9%
Tertiary	10	3.1%
Total	320	100.0%
<b>Place of Residence</b>		
Urban	229	71.6%
Rural	91	28.4v
Total	320	100.0%
<b>Gestation</b>		
First	5	25.9%
Second	179	55.9%
Third	56	17.2%
Total	320	100.0%

The table 1 analysed the Socio-demographic Characteristics of pregnant women in Katsina, In this study a total of 320 pregnant women attending Antenatal care units were participated with a response rate of 97.09%. The majority 198(61.9%) of the participants were found in adult, followed by 109(34.1%) with the age range between 21-30 years. Majority of the respondent attend only primary school, 259(80.9%), followed by those that stop their education at Secondary school, 51(15.9%). Regarding place of residence of respondents, 229(71.6%) of them lived in urban area at the time of data collection, followed by rural settlers 91(28.4%). Pertaining to the gestation period of the participants, 179(55.9%) were in their second trimester, followed by 56(17.2%) were in third trimester while the least trimester were the first trimester 5(25.9%). Considering that majority of the pregnant woman registered for their antenatal during their second trimester ranging from four to six months of their pregnancy.



**Fig 1: Chart represents Total frequency of pregnant women on HBV with their status**

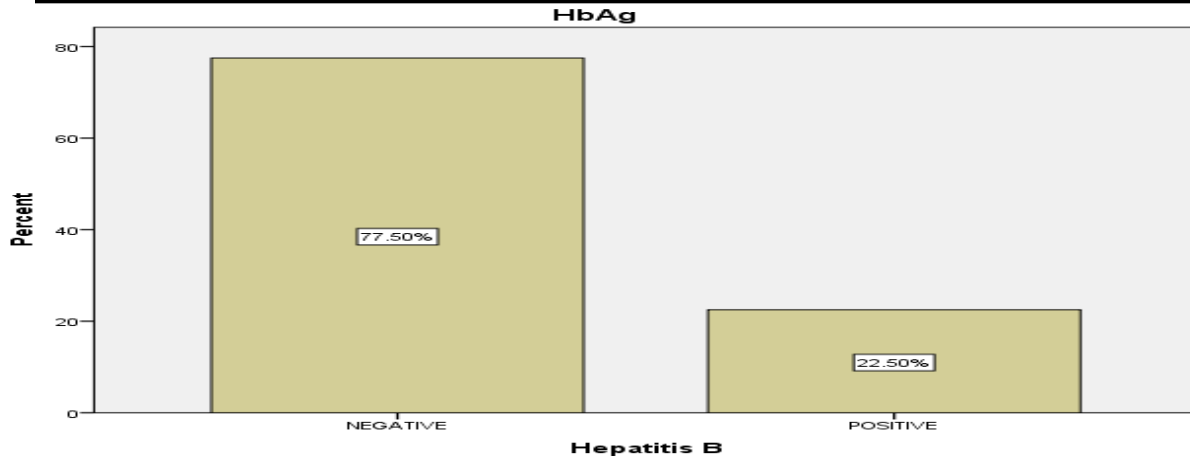


Fig 2: Chart represents percentage of pregnant women on HBV with their status

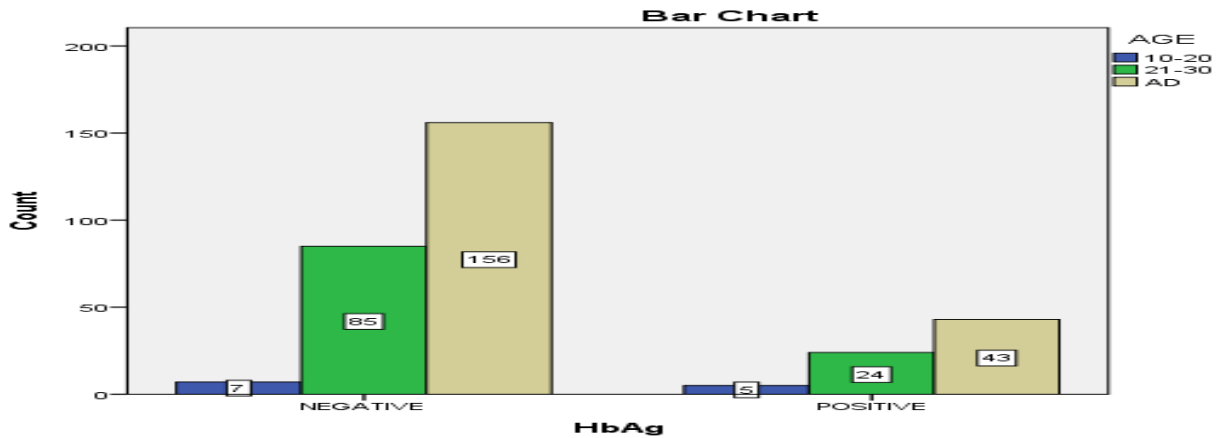


Fig 3: Chart represents Age of pregnant women with their status

The above visualization shows the overall prevalence of HBV infection was, 72 (22.50%). Out of these, 5 were belong to age group 10 – 20, 24 belongs to age group 21 – 30 while the highest were 43 and were adult between the age of 31 and above.

Table 2: Binary logistic regression table

		B	Std. Error	Wald	Df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
NEGATIVE	Intercept	1.124	.783	2.063	1	.151			
	Gestation	-.024	.047	.256	1	0.012	.977	.891	1.070
	JUANDICE	-.002	.271	.000	1	0.01	.998	.586	1.698
	BLOODTRANS FUSION	.293	.277	1.123	1	0.56	1.341	.779	2.306
	SHARP INJURY	-.218	.279	.607	1	0.3	.804	.465	1.391
	SURGERY	-.005	.275	.000	1	0.99	.995	.580	1.706

a. The reference category is: POSITIVE.

Odd is the ratio of probability –  $P(A)/P(B)$ , this table shows the relationship between the predictors and the outcome. B (Beta) is the predicted change in Log odds – for 1 unit change in predictor, there is Exp (B) change in the probability of the outcome. The Beta coefficient can be negative or positive, and have a t-value and significance of the t-value associated with each.

In this study, history of jaundice, and Sharp injury are highly associated with Sero-prevalence of HBV infection under the p-value <0.05, however; social demographic factors and rest of associated factors such as medical surgical, Blood transfusion, and gestation period are not significant to this study. The odds of having HBV among those who had sharp injuries were greater than those pregnant women who had no sharp injuries.

#### **Pre-analytical stage**

First the specimens were collected by trained lab technician from women and labelled by the patient unique identification number. Then samples were centrifuged; the serum was evaluated and separated; appropriately and stored until transported to the laboratory. The transported samples were stored at the optimum temperature until they were processed.

#### **Analytical stage**

The blood test for HBsAg was performed by trained laboratory technologist of the hospitals. All samples were tested, using Enzyme Linked Immunosorbent Assay (ELISA) for HBsAg. The standard laboratory procedures were also followed and the results were checked by the supervisors.

#### **Treatments of the disease**

As of yet, seven drugs have been implemented as treatment for chronic hepatitis B viral infection. These agents are injectable Interferon- $\alpha$  (INF- $\alpha$ ), pegylated interferon (PEG-INF- $\alpha$ ) and the oral agents' lamivudine, adefovir dipivoxil, entecavir, telbivudine and tenofovir (Ayoub and Keeffe 2011).

### **CONCLUSION**

In conclusion, this study has provided an update on the HBV status in Katsina local government. The level of awareness on Hepatitis B virus and its transmission is low among the study population particularly as it regards mother to child (perinatal) transmission. This might be responsible for the surge in the number of acute hepatitis cases among infants in Katsina state.

More also, Hepatitis B is identified to be a major health problem in this community. According to W.H.O classification, the prevalence of HBV infection in this study area can be categorized as moderate prevalence (2–7%). In this study, sharp injuries and jaundice are found to be the risk factors associated with HBV infection. The associated risk factors prevalence of Hepatitis B Virus was found to be highly among the adults i.e. 31 and above years old, and most of them were assumed to be full house wife. Therefore, there is a need for health promotion awareness campaign to educate the general public on the danger, mode of transmission and the risk factors associated with HBV infection especially among youth population.

### **RECOMMENDATION**

It is recommended from the research work that the following recommendation should be adopted by the government of all level in other to prevent the spread of the disease and find the possible treatment for those that are already infected.

Katsina state government should ensure that the hepatitis response is led, coordinated and owned by the Member States.

- ✓ Hepatitis B test should always be run between two couples before they should get married in other to know the status of each other.
- ✓ People should avoid sharing of unsterilized objects in other to avoid been infected with the diseases and other infectious disease.
- ✓ Pregnant women in the state should endeavor to register for their antenatal as early as possible in other to receive all the necessary care by medical doctors.

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